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EFFECTS OF SUSTAINED ATTENTION ON THE SOCIAL SKILLS OF ASSERTION, COOPERATION, SELF CONTROL, AND PEER COMPETENCE

by

Amy J. Burns

A Dissertation Submitted to the

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University of the Pacific
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by

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EFFECTS OF SUSTAINED ATTENTION ON THE SOCIAL SKILLS OF ASSERTION, COOPERATION, SELF CONTROL, AND PEER COMPETENCE

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by

Amy J. Burns

DEDICATION

This dissertation is dedicated to my sister for teaching me the beauty of individuality. Molly, you carry genuine strengths that many people try their entire lives to cultivate. But remember, as is true for us all, it is both your strengths and your weaknesses that make you the beautiful person you are. The dissertation process has been more rigorous than I could have imagined, and in the times of great darkness, you were my light, my reason, my inspiration. You always will be.

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I am eternally grateful to my parents for their unwavering love and support of my goals; to Andrew for his unconditional love which has effortlessly healed my wounds and brightened my life; to my grandparents for instilling in me the value of persistence and hard work in education; to Diana for celebrating the successes with me, crying on the hard days with me, and truly keeping me afloat from day one; and to Dr. Low for his patience, guidance, and helping me set and accomplish goals I had never dreamed of.

Effects of Sustained Attention on the Social Skills of Assertion, Cooperation, Self-Control, and Peer Competence

Abstract

by Amy J. Burns

University of the Pacific
2018

The current study explored the relation between sustained attention and the social skills of assertion, cooperation, self-control, and peer competence and whether sex moderated this relation. Data from the National Institute of Child Health and Development – Study of Early Child Care and Youth Development were analyzed. Structural equation models were used to test the possibility of sex as a moderator for each relation. Results suggest sex moderates the relation between sustained attention and

assertion skills. Additionally, results suggest sex moderates the relation between sustained attention and cooperation skills. However, results suggest sex did not moderate the relation between sustained attention and self-control and also suggest sex did not moderate the relations between sustained attention and peer competence. Such relations emphasize the importance of understanding social outcomes for children who struggle with attention and should be utilized by educators, parents, and families to ensure social success for children with attention problems.

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Chapter 1: Introduction

In the words of William James, "Everyone knows what attention is. It is the taking possession of the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects of trains of thought" (James, 1890, p. 403). Noted as one of the "most popular constructs in modern cognitive psychology," attention is a universal concept that widely affects both children and adults (Näätänen, 1992, p. 2). Attention impacts many areas of a person's cognitive functioning, including but not limited to, their ability to have a broad or narrow focus on a surrounding stimulus. In many cases, a person can attend to stimuli can occur both voluntarily and passively. Voluntary attention is a choice. A child or adult makes the decision to attend to a specific stimulus presented to them. Passive attention is the opposite; a child or adult is presented with a novel, abrupt or significant stimuli and they are automatically drawn to attending. Although the concept of attention is well known and universal (James, 1890), it is complex and can occur at both the behavioral and cognitive levels.

Behavioral attention can be categorized into the unique states of inattentive, alert, sustained, focused and divided (Lane, 1979; Quittner, Smith, Osberger, Mitchell, & Katz, 1994; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000; Brown, Bortoli, Remine & Othman, 2008). Inattentive behavior occurs when a stimulus is present but not attended

to. Inattentive behavior can be observed when the person is consistently checking their surroundings and does not focus on any stimuli. Alert attention results in minimal focus to stimuli. Brown et al. (2008) clarifies that the state of alert attention does not entail more than three seconds of focus on any stimuli. On the other hand, sustained attention, also known as vigilance, can be defined as the act of maintaining focus on stimuli for a particular amount of time (Näätänen, 1992). Brown et al. (2008) also clarifies that sustained attention occurs when the person maintains focus on a task or stimuli for more than 3 seconds. Focused attention can be understood as maintaining intense focus on a specific task or object while excluding other stimuli in the surrounding area (Näätänen, 1992; Brown et al., 2008; Seli, Cheyne, Barton, & Smilek, 2011; Shisler et al., 2016). Further, divided attention is different from sustained or focused attention in that divided attention occurs when multiple stimuli are being attended to and attentional skills are being spread between stimuli or sources of input (Näätänen, 1992; Getzmann, Wascher, & Golob, 2016). Each state of behavioral attention (inattentive, alert, sustained, focused and divided) offers a plethora of behaviors and actions with which to examine and observe the process of attention.

While each state of behavioral attention can be observed and identified, cognitive attention is an internal process that underlies all internal and external activity (Warner-Rogers et. al, 2000; Naglieri, 2011). The cognitive process of attention allows a person to have the ability to function in the world by providing the skill to attend to stimuli (Naglieri, 2011). The internal, cognitive process of attention can only be observed through actions or tasks which require the use of cognitive attentional processes to create a measurable product (Warner-Rogers et al., 2000). Although they are unique, both

behavioral and cognitive attention provides the capability for a person to focus on one or more specific stimuli. Maintaining focus on a particular stimulus for longer periods of time requires more attention and focus control, which is a harder task, in most cases (Naglieri, 2011).

Due to its complexity, the process of attention affects a variety of areas in the development of children including but not limited to academic achievement, physiological homeostasis, and self-regulatory abilities (Wilson & Gottman, 1996; Rudasill, Gallagher & White, 2010; Rennie, Beebe- Frankenberger & Swanson, 2014; Molitor, Langberg, & Evans, 2016; Owens & Jackson, 2016). Academic areas such as reading, math, literacy and written expression have all been explored by researchers and found to be affected by a child's attention skills. For example, Spria and Fischel (2005) reported that children diagnosed with ADHD experienced learning difficulties later in life in areas such as reading and literacy. According to Owens and Jackson (2016) and Molitor et al. (2016), mathematics and written expression have also been academic areas that are affected by attention deficits in children. More than affecting academic achievement, attention also impacts the way a child regulates their body and is able to reach physiological homeostasis (Cicchetti , Ganiban & Barnett, 1991 as cited in Wilson & Gottman, 1996). An infant's attention skills impact their ability to soothe themselves when caregivers are unable to provide immediate support. These attention skills help infants to reach physiological homeostasis because they are able to attend to cues that will help them utilize their self-regulatory abilities (Wilson & Gottman, 1996). Overall, attention deficits have a widespread effect on a person's development and are vital to the development of children.

Social Competence

Similar to attention, social competence is a concept that has been discussed by psychologists for hundreds of years. James Baldwin noted that interacting with other children, helped children to develop a sense of who they are and helped them begin to form a sense of moral understanding (Odom, McConnell, & McEvoy, 1992). Other psychologists such as Jean Piaget and E. L. Thorndike agreed with Baldwin regarding the importance of social interaction. In fact, E. L. Thorndike thought social interaction was so important, he included social intelligence as a form of intellect in his 1920 model of intelligence (Odom, McConnell, & McEvoy, 1992).

Although social competence does not have one steadfast definition, the importance and value of this concept does not diminish. Because social interactions are so prominent in navigating through life, each aforementioned facet of social competence is vital to the success of a child or person. The successful development of social competence helps students to form a thorough understanding of appropriate behavior (Parker & Asher, 1987; Brown et al., 2008). People who have higher social competence are more likely to flourish in their life, which in turn has a tendency to enhance their overall resiliency (Uysal, 2015). Social competence is also one of the best predictors of how children will adapt to the world as adults (Hartup, 1992). Additionally, students who have more prosocial tendencies tend to have higher grade point averages and standardized test scores than students who have antisocial tendencies (Wentzel & Erdley, 1993). Generally, social competence is vital to overall life success. Social competence can be reflected through a person's use of social skills.

In general, attention is associated with social competence and social skills (Wilson & Gottman, 1996; Belsky, Friedman & Hsieh, 2001; Kats-Gold, Besser, & Priel, 2007; Murphy, Laurie-Rose, Brinkman & McNamara, 2007; Vaughan Van Hecke et al., 2007; Pérez-Edgar et al., 2010;) Wilson and Gottman (1996) discuss the importance of attention and alertness for children with their peers. It is vital for students to pay attention to social cues that will assist them socially, such as entry to social situations. The way in which a child develops and practices their attention skills has also been shown to impact the way a child socially responds to situations and their environment (Pérez-Edgar et al., 2010). Brown et al. (2008) suggests that attention and social competence work together to help children navigate social interactions.

Specifically, sustained attention has an effect on social outcomes for children (Eisenberg et al., 1993; Eisenberg et al., 1998). For instance, sustained attention is associated with sympathy for children who are not likely to respond to emotion-evoking stimuli. Children that focus their sustained attention on a person in distress are more likely to feel sympathetic toward the distressed person (Eisenberg et al., 1998). Denham (1986) suggested that children who are high in emotionality (such as the children discussed by Eisenberg et al., 1998) are more likely to produce prosocial behaviors. Further, according to teacher ratings, attentional control is associated with both social skills and peer status. Children with low attentional control, high emotional intensity and low coping skills often have low social skills and were rated poorly by their peers (Eisenberg et al., 1993). Further, Wilson (1994) found that children with faster response times and more correct responses on an attention task were quicker to respond to a presented social opportunity.

While there is prominent literature regarding the attention skills of students who carry a clinical diagnosis, there is a lack of research regarding the social competence of typically developing students and children who struggle with attention. The literature reviewed thus far note the relationship between attention and social outcomes. However, there is an overall lack of research regarding how the relationship specifically between a child's correct responses on a sustained attention task, response time on an attention task and social skills. The goal of the current research is to add to the literature regarding the social competence of the attention skills of typically developing children. To help address the gaps in the research, the present study aims to explore the relationship between a student's sustained attention skills and their social outcomes for both male and female students.

Chapter 2: Review of the Literature

Millions of children have been identified with a medical diagnosis that affects their attention (Visser, Danielson, Bitsko, Holbrook, Kogan, Ghandour, Perou, & Blumberg, 2014) and considering undiagnosed children, this is an underestimate of the widespread prevalence of attention problems for children. One of the many problems these children face is the diminished ability to attend to social stimuli in their environment and, thus, respond appropriately. These children may exhibit an inability to attend to a specific stimulus, or they may provide minimal focus to important stimuli. For example, a child whose attention wanders may miss an important social cue. Also, these children may exhibit an inability to maintain focus on a particular stimulus for a specific amount of time, such as briefly paying attention to one conversation but becoming distracted and focusing on something else. Further, these children may demonstrate an inability to maintain intense focus on a specific task or object while excluding other stimuli in the surrounding area or attempting to attend to multiple stimuli, such as trying to pay attention to a single conversation while multiple conversations occur simultaneously (Barton, & Smilek, 2011; Brown, Bortoli, Remine & Othman, 2008; Getzmann, Wascher, & Golob, 2016; Näätänen, 1992; Seli, Cheyne, Shisler et al., 2016). These attention impairments and accompanying social deficits are likely to affect children's relationships in various contexts.

Attention and Social Skills

In general, attention is associated with social competence (Belsky, Friedman & Hsieh, 2001; Kats-Gold, Besser, & Priel, 2007; Murphy, Laurie-Rose, Brinkman & McNamara, 2007; Wilson & Gottman, 1996; Pérez-Edgar et al., 2010; Vaughn Van Hecke et al., 2007) or, "the ability to achieve personal goals in social interaction while simultaneously maintaining positive relationships with others over time and across situations" (Rubin and Rose-Krasnor, 1992, p. 285). Behaviors related to social competence include but are not limited to awareness of emotions, communication, impulse management, relationship building, working with others, and problem solving (Huitt & Dawson, 2011). Brown et al. (2008) suggest that attention and social competence work together to help children navigate social interactions. In fact, sustained attention may affect a child's navigation and outcome of a social situation (Eisenberg et al., 1993; Eisenberg et al., 1998). For instance, children who focus their sustained attention on a person in distress are more likely to feel sympathetic toward the distressed person. Further, sustained attention is associated with imitation skills and sympathy for children who are not likely to respond to emotion-evoking stimuli (Barkley, 1997; Eisenberg et al., 1998; Iacoboni, 2009). Research attributes the relation between imitation skills and empathy to the mirror neuron system, which has been noted to have an impact on social competence (Pfeifer, Iacoboni, Mazziotta, & Dapretto, 2008). Impaired attention also impacts irritability, excitability, and general emotional over responsiveness (Barkely, 1997) which may affect peer competence because research states that for both typically developing students as well as students with disabilities, emotional regulation skills and social problems are significantly related (Berkovits & Baker, 2014).

Another social skill that is impacted by attention impairment is assertiveness which refers to the ability to instigate behaviors such as asking questions or responding to others' questions or statements (Gresham & Elliott, 1990). Compared to children with typical attention skills, children with impaired attention tend to have poorer assertion skills according to their parents, teachers, and themselves (Van der Oord, Van der Meulen, Prins, Oosterlaan, Buitelaar, Emmelkamp, 2005). The relation between attention and assertion may be due to the lack of response control and inhibition that individuals with impaired attention tend to experience (Barkley, 1997). With less developed response control and inhibition skills, children with impaired attention may be unable to control their initiating behaviors, such as when or how they respond to and initiate behaviors with others. Because they miss important social cues, they may respond to others at inappropriate times.

Cooperative behaviors, including helping others, sharing, and complying with rules or directions (Gresham & Elliott, 1990), may also be affected by impaired attention. Children with impaired attention may not sufficiently attend to directions and bids to work together resulting in fewer cooperative interactions. Indeed, research suggests that students with impaired attention have significantly worse cooperation skills, such as following directions or working with other students when compared to their peers with typical attention skills (DuPaul, McGoey, Eckert, & VanBrakle, 2001). Danforth, Barkley and Stokes (1991) (as cited by Barkely, 1997) also report that children with impaired attention have more difficulties following directions from their mothers and strangers compared to children with typical attention skills.

Deficiencies in attention may also weaken self-control behaviors or the ability to refrain from performing natural responses and replace actions with an intentional response (Rothbart & Rueda, 2005 as cited by Rothbart et al., 2011). Self-control behaviors include reacting to the actions of other people, taking turns, working with others to solve problems and find resolutions (Gresham & Elliott, 1990), and the capability to modify specific behaviors, emotions, or attention in response to a specific situation including having the ability to stop, start, or alter behaviors while a situation is occurring (Raikes et al., 2007; McKown, Gumbiner, Rothbart, Sheese, Rueda, Posner, 2011; Russo & Lipton, 2009). Because children with impaired attention may have difficulty attending to social cues they may not be able to identify when to take their turn in an activity that requires taking turns, or they may not be able to alter their behaviors as the context of a situation changes. Thus, while the ability to replace natural responses with intentional actions may be in tact, the ability to recognize when to initiate such processes may be diminished.

Attention and Sex

Evidence from the research suggests a significant relation between sex and social skills in those diagnosed with ADHD (Rosen, Vaughn, Epstein, Hoza, Arnold, Hechtman, Molina, & Swanson, 2014). Boys with impaired attention tend to be more hyperactive and impulsive and create more problems in school, when compared to girls also with impaired attention (Bauermeister, Shrout, Chávez, et al., 2007; Rucklidge, 2010). Specifically, boys with impaired attention have a tendency to exhibit more disruptive behaviors than girls which may suggest an impact on social skills (such as assertion, cooperation, self-control, or peer competence; Abikoff et. al, 2002; Harris,

Milich, Corbitt, Hoover, & Brady, 1992). However, girls with impaired attention tend to have more internalizing problems and exhibit more verbal aggressiveness when compared to boys with the same impaired attention (Abikoff et al., 2002; Rucklidge, 2010). Overall, both externalizing and internalizing behaviors are related to social skills suggesting that both males and females are likely to have diminished social skills but, perhaps, in different ways (Bornstein, Hahn, & Haynes, 2010; Rucklidge, 2010). There is also research that suggests limited to no differences between sex with impaired attention in regard to specific cognitive, social, and academic skills (Gaub & Carlson, 1997; Rucklidge, 2010); accordingly, more research is needed in this area.

The Present Study

While there is prominent literature regarding the attention of students who have a clinical diagnosis of impaired attention, there is a lack of research regarding social skills as they relate to attention in the general population. Additionally, previous research indicates differences between boys and girls in how they demonstrate attention problems and social skills deficits. Accordingly, the goal of the current research is to add to the literature by examining how attention influences social skills in boys and girls. To help address the gaps in the research, the following two research questions are presented.

1. What is the relation between sustained attention and each of the following components of social skills: assertion, cooperation, self-control, and peer competence?
2. If such a relation exists, does sex moderate the relation between sustained attention and each of the following components of social skills: assertion, cooperation, self-control, and peer competence?

Chapter 3: Methodology

Participants

This study utilizes data from the National Institute of Child Health and Development's (NICHD) Study of Early Child Care and Youth Development (SECCYD). The SECCYD is a longitudinal study that began in 1991 with 1,364 children and their families. The study consists of four phases: Phase I consists of information from 1 month to three years, Phase II consists of information from age four to first grade, Phase III consists of information from second grade to sixth grade, and Phase IV consists of information from seventh grade to high school. Phase III data will be used in the current study and for this phase, over 1,100 of the children and families provided data. Over 80 percent of the sample was reported as White, with the rest of the sample reported as Asian, Aleutian, Eskimo, American Indian, African American, Hispanic, or other.

Instruments

Social Skills Rating System. The Social Skills Rating System (SSRS) was used to measure assertion, cooperation, self-control, and peer competence at both third and fifth grade. The SSRS is a measure of social skills that acquires input from multiple raters including the mother, father, and teacher. Parent raters answered a total of 38 questions regarding their child's social skills, and teacher raters answered a total of 30 questions regarding the child's social skills. Raters answer each question using the following scale: 0=Never, 1=Sometimes, or 2=Very Often (NICHD-SECCYD-2005b).

The SSRS provides total scores for four subscales (Cooperation, Assertion, Responsibility, and Self-control), as well as Total Social Skills, Academic Competence, and Peer Competence. Cronbach's alpha's for the scales ranged from .84 – .95 for teachers and .81 – .86 for care providers such as mothers or fathers. According to Gresham and Elliot (1990), the SSRS correlates adequately with other measures of similar constructs such as the Child Behavior Checklist (CBCL) and the Social Behavior Assessment (SBA) and exhibits adequate convergent and discriminant validity between raters.

Continuous Performance Task. Sustained attention skills in the fourth grade was measured using the Continuous Performance Task (CPT). The CPT is a neuropsychological test which presented 45 blocks of 12 stimuli to a child via a computer screen. Each stimuli was presented for 200 milliseconds with a 1500 millisecond interval between stimuli. Each time the child was presented with the letter "X" after the letter "A" (the target stimuli), the child was told to press a button. This test continued for 15 minutes. The computer then calculated the number of times the child pressed the button for the target stimuli and the accuracy of responses. A response is marked correct when a target stimulus was present and the child pressed the button. The proportion of correct responses is used in the current study as a measure of the child's sustained attention (NICHD-SECCYD, 2005b). In a previous study utilizing the CPT (Halperin, Sharma, Greenblatt, & Schwartz, 1991), test-retest reliability and content validity were considered adequate.

Analysis

A series of structural equation models was analyzed wherein the independent variable will be sustained attention skills and the dependent variable in each model will be one of the social skills (assertion, cooperation, self-control, and peer competence) measured at fifth grade. Child sex served as a moderator, and background variables included the corresponding third grade social skill as well as the family's income-to-needs ratio. In each model a latent variable was formed for the social skill in third grade as well as a latent variable for the same social skill in fifth grade with the mothers', fathers', and teachers' ratings of the particular social skill at each grade level loading onto the respective social skill latent variable. Error variances for similar raters were allowed to correlate to account for any common variance shared by similar raters. Family income-to-needs ratio, the third grade social skill, and sustained attention were allowed to covary. Paths were estimated from the background and independent variables to the dependent variable. Next, child sex was entered into each model as a moderator. The change in chi-square was used to test for moderation. Maximum likelihood procedures were used to estimate any missing data. The comparative fit index (CFI) Tucker-Lewis index (TLI) with values above .95 and the root mean-square error of approximation (RMSEA) with values below .05 indicated good model fit. AMOS version 23.0.0 was be used to analyze the data.

Chapter 4: Results

Four structural equation models were produced and analyzed. Each model utilized one of the four social skills subscales (assertion, cooperation, self-control, and peer competence) and tested for the possibility of sex as a moderator for the relation between sustained attention and the social skill subscales (Figure 1). For the model analyzing assertion, fit indices indicated that the model fit the data well (CFI=.996; TLI=.991; RMSEA=.011). When the path between correct responses on the CPT and assertion skills in fifth grade was constrained, the change in chi-square significantly increased (X^2=6.992, p=.008) suggesting sex moderates the relation between correct responses on the CPT in fourth grade and assertion skills in fifth grade. Results indicated correct responses on the CPT in fourth grade were significantly associated with assertion skills in fifth grade for boys (β=.095, p=.033) but the same was not true for girls (β=-.091, p=.059). Path coefficients for the model analyzing assertion are presented in Table 1.

Table 1
Standardized Path Coefficients of Background Variables and Third Grade Assertion on Sustained Attention and Fifth Grade Assertion

Variable	Sustained Attention Skills		Fifth Grade Assertion	
	Boys	Girls	Boys	Girls
Family Income-to-Needs Ratio	.085	.116*	.038	.010
Sustained Attention Skills			.095*	-.091
Third Grade Assertion	.228**	.285**	.882**	.906**

*p<.05. **p<.001

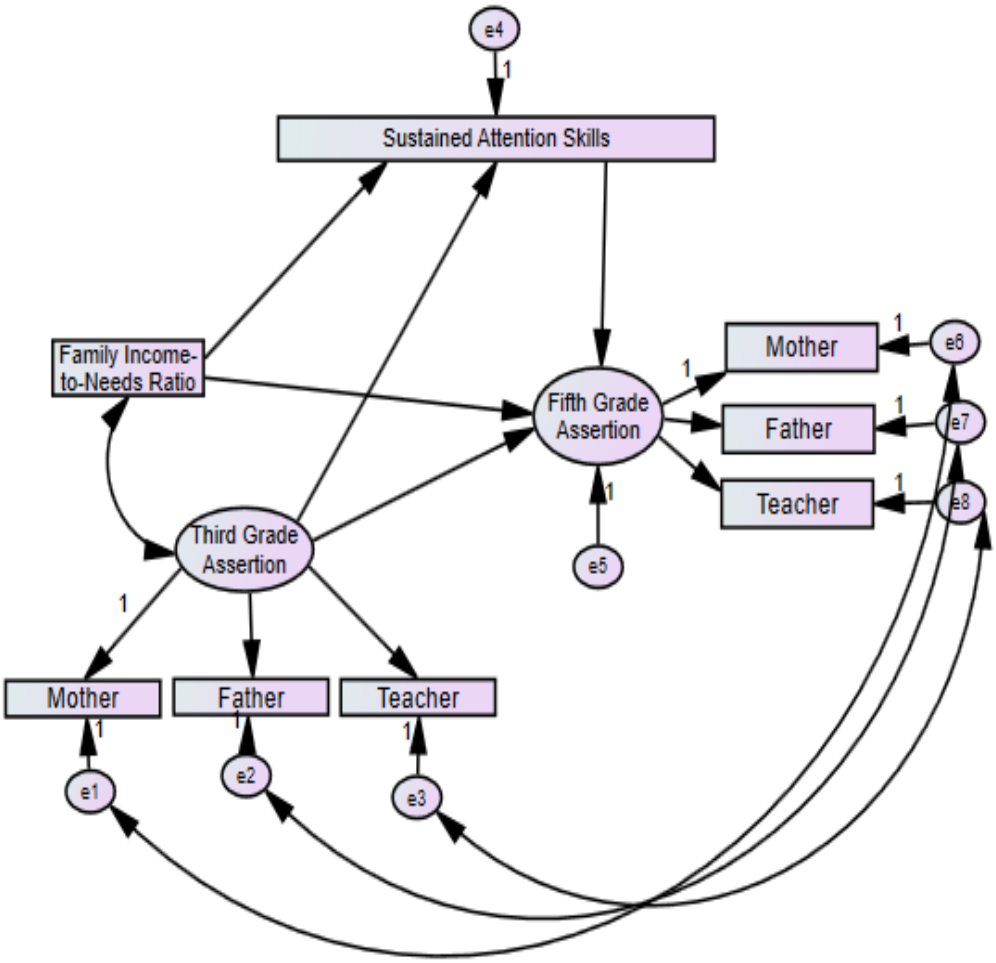

Fig. 1 Model of the relation between third grade social skills, sustained attention and fifth grade social skills (figure created in AMOS version 23.0.0)

For the model analyzing cooperation, fit indices were mixed with some indices indicating that the model fit the data well and the TLI indicating poor fit (CFI=.956; TLI=.895; RMSEA=.042). When the path between correct responses on the CPT in fourth grade and cooperation skills in fifth grade was constrained, the change in chi-square significantly increased (X^2=6.834, *p*=.009) suggesting sex moderates the relation between correct responses on the CPT in fourth grade and cooperation skills in fifth grade. Results indicated correct responses on the CPT in fourth grade were significantly associated with cooperation skills in fifth grade for boys (β=.185, *p*>.001) but not for girls (β=-.014, *p*=.754). Path coefficients for the model analyzing cooperation are presented in Table 2.

Table 2
Standardized Path Coefficients of Background Variables and Third Grade Cooperation on Sustained Attention and Fifth Grade Cooperation

Variable	Sustained Attention Skills		Fifth Grade Cooperation	
	Boys	Girls	Boys	Girls
Family Income-to-Needs Ratio	.150*	.144*	.000	.016
Sustained Attention Skills			.185**	-.014
Third Grade Cooperation	.003	.197*	.793**	.760**

*p<.05. **p<.001

For the model analyzing self-control, fit indices indicated that the model fit the data well (CFI=.986; TLI=.966; RMSEA=.025). When the path between correct

responses on the CPT in fourth grade and self-control skills in fifth grade was constrained, the change in chi-square increased but not significantly (X^2=1.981, *p*=.159) suggesting sex does not moderate the relation between correct responses on the CPT in fourth grade and self-control skills in fifth grade. Results indicated correct responses on the CPT in fourth grade were significantly associated with self-control skills in fifth grade (*B*=2.532, β=-.077, *p*=.014 for boys; *B*=2.532, β=.070, *p*=.014 for girls). Path coefficients for the model analyzing self-control are presented in Table 3.

Table 3
Standardized Path Coefficients of Background Variables and Third Grade Self Control on Sustained Attention and Fifth Grade Self Control

Variable	Sustained Attention Skills		Fifth Grade Self Control	
	Boys	Girls	Boys	Girls
Family Income-to-Needs Ratio	.089	.128*	.008	.010
Sustained Attention Skills			.119*	.023
Third Grade Self Control	.203*	.243**	.875**	.863**

*p<.05. **p<.001

For the model analyzing peer competence, fit indices indicated the data fit the model well (CFI=.994, TLI=.986, RMSEA=.016). When the path between correct responses on the CPT in fourth grade and peer competence skills in fifth grade was constrained, the change in chi-square insignificantly increased (X^2=0753, *p*=.386) suggesting sex does not moderate the relation between correct responses on the CPT in fourth grade and peer competence skills in fifth grade. Results indicated correct responses

on the CPT in fourth grade were not significantly associated with peer competence skills in fifth grade (B=1.155, β=.038, p=.255 for boys; B=1.155, β=.034, p=.255 for girls). Path coefficients for the model analyzing peer competence are presented in Table 4.

Table 4
Standardized Path Coefficients of Background Variables and Third Grade Peer Competence on Sustained Attention and Fifth Grade Peer Competence

Variable	Sustained Attention Skills		Fifth Grade Peer Competence	
	Boys	Girls	Boys	Girls
Family Income-to-Needs Ratio	.065	.118	.069	.045
Sustained Attention Skills			.065	.003
Third Grade Peer Competence	.262**	.286**	.830**	.838**

*p<.05. **p<.001

Chapter 5: Discussion

The goal of this study was to explore the relation between the unique aspects of social skills for children and their attention skills. Further, this study also aimed to establish if sex moderated the relation between attention skills and social skills. Exploring these relations is vital to develop a deeper understanding of the social successes and failures of students who struggle with attention. Overall, results indicated that sex moderated the relation between sustained attention in fourth grade and fifth grade assertion skills as well as fifth grade cooperation skills. In other words, sex and sustained attention interact in their effect on assertion and cooperation skills in fifth grade. There is no statistical evidence that sex serves as a moderator for the relation between sustained attention in fourth grade and fifth grade self-control. Lastly, there was not a significant relation between sustained attention in fourth grade and fifth grade peer competence.

In support of previous research, the findings suggest that as sustained attention skills increase for male students, assertion skills also increase (Van der Oord, Van der Meulen, Prins, Oosterlaan, Buitelaar, Emmelkamp, 2005). However, the same relation does not hold for girls. The difference between boys and girls for assertion may be explained by the tendency for male students to demonstrate more externalizing behaviors and female students to exhibit more internalizing behaviors as well as the lack

of inhibition skills students with impaired attention exhibit (Abikoff et. al, 2002; Barkley, 1997; Harris, Milich, Corbitt, Hoover, & Brady, 1992). For instance, it may be that boys with impaired attention exhibit more externalizing behaviors (such as calling out or physical aggression), and in turn, these behaviors are perceived as demonstrating assertion. On the other hand, it may be that girls with impaired attention exhibit more internalizing behaviors (such as depression or anxiety) which is perceived as lacking assertion.

Also, consistent with previous research are the findings regarding cooperation skills. The findings of this study suggest that as sustained attention skills increase for male students, cooperation skills will also increase (DuPaul, McGoey, Eckert, & VanBrakle, 2001). The same is not true for girls. This finding may be due to girls being generally perceived as relationally oriented (Currie, Kelly, & Pomerantz, 2007) and, thus perhaps, more cooperative. However, increases in attention in boys may result in greater gains in perceived cooperation because boys are generally rated lower in cooperation and have more room to grow. Nevertheless, one of the fit indices for the cooperation model did not indicate good fit, and results should be interpreted with caution.

Further, sex does not appear to interact with attention to effect self-control. In other words, sex is not a moderator for the relation between attention and self-control. While these findings are unlike the findings for assertion and cooperation, they seem to support the research regarding lack of inhibition for children with impaired attention in general. Previous research emphasizes the influence of attention on the ability to delay gratification, lack of inhibition, and negatively impacted self-control skills for both male

and female children (Barkley, 1997). The current results seem to reiterate such outcomes.

Contrary to previous research, the current findings suggest that the relation between fourth grade attention skills and peer competence skills in fifth grade was not significant for boys or for girls. This finding is surprising considering the strong relations between attention and social competence as established by previous research (Brown et al., 2008; Eisenberg et al., 1993; Eisenberg et al., 1998; Huitt & Dawson, 2011) but may be explained by the fact that the current study measured social skills at fifth grade. It is possible that students have developed additional skills to be socially successful by this age to help them navigate social situations. Additionally, it is possible that by the time a child is in fifth grade they have been able to develop friendships and relationships for many years within their school and community which may in turn impact the view of a child's social or peer competence as seen by their parents or teacher.

Overall, the current research was limited due to the use of the NICHD dataset. The study may have been more exhaustive had it measured attention at other times in a child's development rather than simply fourth grade. It may have proven useful to have additional measures of sustained attention rather than only the CPT. It should also be noted that the majority of the sample was White. This factor may have had an impact on the results of the current study. Additionally, despite its overarching presence in the previous research, the current research did not include inhibition as a variable in the analysis. Future research may want to address inhibition directly, gather a more diverse sample, or use other variables to measure attention and/or social skills to explore the relation between attention and social skills further.

Despite limitations to the research, the importance of this study holds strong. It is important to note the current study used a latent variable to measure social skills by using data from the child's mother, other adult, and the child's teacher. The use of data from multiple raters may be a strength of this study, as information was able to be utilized from three adults which help contribute to a more accurate understanding of the child's social skills. Additionally, the findings can help educators, parents, and families to understand the potential social outcomes for their children who struggle with attention but may not have an ADHD diagnosis. These findings can also help to develop possible interventions to promote positive social outcomes and reduce negative social outcomes for children. Such interventions may be used in the home, school, or both. In sum, findings from the current research give key players in a child's life the knowledge and starting point to help ensure every child experiences social success.

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