Self-Perception and Peer Relationships in a Summer Treatment Program for Children with ASD and/or ADHD

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Abstract

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The purpose of this study was two-fold. First, to examine perceptions of social and behavioral abilities among children with Autism Spectrum Disorder (ASD) and/or Attention Deficit Hyperactivity Disorder (ADHD). Second, to analyze the association between self-perception ratings and social relationships at a Summer Treatment Program among children with ASD and ADHD. Previous literature suggests that youth with ASD and ADHD overreport their competence when compared to other informants. The majority of the research has relied on difference of scores to examine overestimation. Recent research has highlighted methodological limitations to using difference of scores, and has encouraged the use of alternative methodological analysis. The current study examined the relationship between self and counselor ratings of social and behavioral abilities among a sample of 71 children and their teachers. Polynomial regression analysis was used, this method has been recommended by recent research as it provides the opportunity to examine the interaction between child and counselor ratings and

predictors. Using a polynomial regression analysis, this study examined the interaction between demographic factors and child and counselor reports. The results of this study demonstrated that the majority of children in this sample over-reported their abilities when compared to counselors. Additionally, within this sample, none of the demographic predictors were significantly associated with child self-perception ratings.

To examine the association between child and counselor ratings of social and behavioral abilities and social relationships throughout the STP, data from multiple timepoints was collected. During the first and last week of the summer camp, children were asked to complete a friendship survey that provided information regarding number of received friendship nominations and rejections. Following previous STP research among children with ADHD and ASD friendship research, reciprocal friendships, social preference, and friendship scores were analyzed. Children results demonstrated that during the first week of the program, teacher and child ratings were not significantly associated with any of the social relationships scores. Additionally, during the first week of the STP demographic factors were not significantly associated with child and teacher ratings. Results from the fifth week demonstrated that child self-perception ratings were not associated with any of the friendship predictors, counselor ratings were. Demographic factors were not significantly associated during the fifth week of the program for both child and counselor ratings. Results demonstrated that during the fifth week of the program, counselor ratings were significantly associated with child friendship results. These results demonstrate the importance of including multiple forms of ratings into future research and clinical activities. This study contributes to the literature by being the first to (1) include a sample with both children with ASD and/or ADHD, (2) use a polynomial regression method in a STP setting, (3) study examine social relationships of children with ASD within an STP setting.

Table of Contents

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Chapter 1: Introduction

Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD) are neurodevelopmental disorders associated with challenges in behavioral, emotional, and social development. ASD is a pervasive neurodevelopmental disorder that is associated with the presence of social communicative difficulties, restricted interests, and repetitive stereotyped behaviors (American Psychiatric Association, 2013). The prevalence of ASD is 1 in 59 (or 1.6%) for United Sates children by age eight, a significant increase in the last decade (Baio et al., 2018). On the other hand, Attention Deficit Hyperactivity Disorder (ADHD) is a disorder that is prevalent in 11 percent of children in the United States (Visser et al., 2014). Characteristics associated with ADHD include persistent developmentally inappropriate levels of attention, hyperactivity, and impulsivity (American Psychiatric Association, 2013). Symptoms associated with both ASD, and ADHD interfere with daily functioning and social development and often require social and behavioral interventions.

The diagnostic evaluation of ASD and ADHD, as well as treatment and intervention, often involves collecting ratings and data from multiple informants, including children. However, previous research has demonstrated that children with ADHD (Evangelista, Owens, Golden, & Pelham, 2008; Mikami, Calhoun, & Abikoff, 2010) and ASD (Johnson, Filliter, & Murphy, 2009) are more likely to overreport their abilities and underreport their symptomatology. Initial ADHD literature regarding the overreporting of abilities from children and adolescents utilized the term “positive bias” to describe the positive illusion that children and adolescents with ADHD have about their abilities (Evangelista et al., 2008; Hoza et al., 2004). A subsequent body of research then focused on the clinical implications of positive illusory bias, specifically in regard to development of peer relationships and treatment outcomes. A significant

body of studies regarding the clinical implications of impartments in self-perception were conducted within the context of the Summer Treatment Program (STP). The Summer Treatment Program (STP) is an empirically-based multicomponent intervention program that has been widely researched in the field of ADHD treatment (Evans, Owens, & Bunford, 2014; Pelham, Wheeler, & Chronis, 1998). Previous studies have found that overestimation of abilities was related to a higher likelihood of peer rejections, and overall poorer treatment outcomes (Mikami, Calhoun, & Abikoff, 2010). These studies have provided rationale for the importance of studying the clinical implications of children's self-perceptions.

A number of studies have focused on examining the relationship between over-reporting of abilities in youth with ADHD and peer relationships. Peer relationships are an important component of literature regarding treatment outcomes for children with ASD and ADHD. In comparison to typically developing children, previous research has demonstrated that children with ASD (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011) and ADHD (Mrug et al., 2012) are more likely to be rejected by peers, and have fewer reciprocal friendships. Social relationships have been identified as a protective factor for psychopathology (Goswami, 2012), and children who overreport their abilities have been reported to have poorer social outcomes (Mikami, Calhoun, et al., 2010), thus it is important to study peer relationships in relation to children's self-perceptions.

More recent research has demonstrated that the overreporting of abilities may not be true for all children with ADHD (Bourchtein et al., 2018; Fefer, Ogg, & Dedrick, 2018; Jia, Jiang, & Mikami, 2016), and that there may be other factors that contribute to disagreement between child ratings and parent or teacher ratings (De Los Reyes, Lerner, Thomas, Daruwala, & Goepel, 2013). Information about factors regarding agreement and disagreement between raters may

provide information regarding clinical implications, such as response to intervention. Understanding factors that are associated with agreement and disagreement between parent, child, and teacher reports may also support the process of treatment planning, goal setting, and provide information that will support the process of diagnostic and treatment evaluation (De Los Reyes et al., 2013; Laird & LaFleur, 2016). This research has highlighted the importance of studying predictive factors that may be associated with disagreement and agreement between child and parent or teacher ratings.

Statement of the Problem

A number of previous studies have demonstrated that children with ADHD and ASD overreport their abilities to a higher degree than typically developing children. However, recent research has highlighted issues related to the methodology that was employed in a significant number of studies addressing positive illusory bias, putting into question the validity of previous research. Recent research has demonstrated that the use of a discrepancy, which subtracts the child score from a parent or teacher score, to measure differences between raters may not be an accurate methodology (Bourchtein et al., 2018; Fefer et al., 2018; Laird & De Los Reyes, 2013; Sibley, Campez, & Raiker, 2019), and has called for the utilization of alternative statistical methodologies in research regarding differences of scores between raters. The lack of validity of the discrepancy methodology raises questions on whether the clinical implications that have been reported, such as implications regarding treatment outcomes and development of peer relationships, are accurate. This information suggests that research utilizing alternative statistical analysis is required in order to understand the implications of children's perceptions of their abilities. Thus, questions regarding predictive that factors may relate to differences between raters and clinical implications such as development of peer relationships remain.

Further, there is a paucity in research regarding the self-perception of abilities of children with ASD. Most of the studies regarding differences between individuals and parents or teachers have been conducted with adolescents. Consequently, there is a lack of understanding of whether children with ASD over or underreport their abilities when compared to parents and teachers. Lastly, a number of studies analyzing self-perception have not analyzed the association between self-perception scores and demographic factors, including severity of symptoms associated with ASD and ADHD.

Overview of Study

Within the context of a Summer Treatment Program (STP), this study will examine the social and behavioral self-perceptions of children with ASD and/or ADHD and their social relationships. Overall, this study has four aims. The first aim is to study whether children with ASD and/or ADHD overreport their social and behavioral abilities when compared to counselor and parent ratings, using a polynomial regression analysis. The second aim is to examine whether demographic differences, including gender, age, race/ethnicity, and diagnosis are associated with the overestimation or underestimation of social and behavioral abilities. The third aim is to explore whether children's individual perception of their social and behavioral abilities is related to peer relationships at a STP, peer relationships will be measured by analyzing the sociometric data at multiple time points at the STP. Lastly, the final aim is to study whether demographic differences relate to development of peer relationships throughout the STP.

Chapter 2: Literature Review

Characteristics of Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a heterogeneous pervasive neurodevelopmental disorder characterized with deficits in social communication, social interaction, and the presence of restricted and repetitive patterns of behavior (American Psychiatric Association, 2013). The current diagnosis rate for ASD is 1 in 59 children in the United States (Baio et al., 2018). A range neurological, genetic, and environmental risk factors have been associated with the presence of the disorder (Cohen et al., 2005; Hallmayer et al., 2011; Ozonoff et al., 2011; Rosenberg et al., 2009). Diagnosis of the disorder is developed using interdisciplinary assessment focused in observation and standardized assessment of social-communicative, behavioral, cognitive, and adaptive functioning (American Psychiatric Association, 2013). While a formal diagnosis can be ascertained by age two (Kleinman et al., 2008), previous population studies have demonstrated that nationally, the majority of children in the United States are diagnosed after age four (Baio et al., 2018). A range of demographic factors have been attributed to age of diagnosis (Dickerson et al., 2017; Durkin et al., 2010; Jo, Schieve, Rice, Kogan, & Boyle, 2015). Characteristics of ASD have been documented to persist throughout an individual's lifetime, however presentation and trajectory have been demonstrated to vary across individuals (Fountain, Winter, & Bearman, 2012; Lord, Bishop, & Anderson, 2015). An extensive body of research has documented the underpinnings of characteristics associated with ASD. A range of evidence-based practices have been demonstrated to support the development of social, emotional, and behavioral skills across areas of challenges.

Social Communication Challenges in Children with ASD

Social communication impairments are a core characteristic of ASD and occur in early development (American Psychiatric Association, 2013). Previous research has documented that in comparison to typically developing children, children with ASD exhibit delays early in infancy related to acquisition of a range of pivotal social communication abilities. Such as delays in imitation, responding to joint attention, and initiation of joint attention (Siller & Sigman, 2008; Stone, Ousley, & Littleford, 1997; Wu & Chiang, 2014; Young et al., 2011). The sequence in which children with ASD develop a range of social communication abilities has been demonstrated to differ in comparison to typically developing peers and may contribute to the acquisition of future social communication skills (Wu & Chiang, 2014). These studies highlight the differences in social communication development for children with ASD during the early stages of development and provide insight of early indicators of possible ASD.

In early childhood, children with ASD, may also experience challenges in their ability to orient and shift attention, for example shifting attention when their name is called (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998). Subsequently, children with ASD may experience difficulty engaging in shared attention (Dawson et al., 1998; Osterling, Dawson, & Munson, 2002). Delay in skills related to shared attention and engagement, may hinder children's ability to have reciprocal interactions with peers and adults, and limit opportunities to build foundational social communication skills. A number of studies have reported that acquisition of these foundational social communication skills are critical to the development of complex social communication abilities, including expressive language (Edmunds, Ibañez, Warren, Messinger, & Stone, 2017; Lobban-Shymko, Im-Bolter, & Freeman, 2017; Stone & Yoder, 2001). This could be predictive of positive long-term social communication development (Ellis Weismer &

Kover, 2015; Tager-Flusberg & Kasari, 2013). Development of early social communication skills are critical, and these studies highlight the importance of providing early social communication intervention services to children with ASD.

Behavioral Challenges for Children with ASD

Restrictive interests and repetitive behaviors and are other characteristics of ASD, and components of the diagnostic process. Behaviors may include restricted interests (e.g., specific knowledge about specific object or subject), repetitive motor movements, (e.g., hand-flapping), nonfunctional routines (e.g., rituals), and preoccupation with specific objects (American Psychiatric Association, 2013). A number of studies have reported that restrictive and repetitive behaviors may be reliably identifiable before the age of two, which facilitates the diagnostic process during early childhood. For example, a study by Watt (2008), demonstrated that with the use of observational assessments, clinicians were able to identify the presence of restricted and repetitive behaviors (e.g., preoccupation with specific objects, flapping, rubbing body) between 18 and 24 months. The presence and severity of restrictive and repetitive behaviors may be associated with the presence of disruptive and challenging behaviors (McClintock, Hall, & Oliver, 2003), highlighting the importance of early identification and intervention.

Aggression

A number of studies have reported that individuals with ASD have higher prevalence rates of exhibiting aggressive behaviors in comparison to children with other disabilities, and typically developing children (Farmer & Aman, 2011; Kanne & Mazurek, 2011; McClintock et al., 2003). A study by Kanne & Mazurek (2011), that included a large sample of children and adolescents with ASD who were recruited from multiple sites in North America, demonstrated that 68% of the sample engaged in some form of aggression. Furthermore, in a study by Matson,

Wilkins, & Ken, (2009) researchers studied the prevalence of challenging behaviors in children with ASD compared to typically developing children, and children with Axis 1 psychopathology (e.g., anxiety disorders, ADHD, OCD, depression). The results demonstrated that children with ASD were more likely to be reported to exhibit challenging behaviors in comparison to their peers. Specifically, 94% of children with ASD, were reported to exhibit challenging behaviors, with 63% of them exhibiting an externalizing challenging behavior, such as verbal and physical aggression, destruction of property, and elopement (Matson et al., 2009). These studies demonstrate the high rates of co-occurring behavioral disorders in children with ASD, and highlight the potential need for integration of behavioral interventions in their treatment.

Understanding predictive factors associated with aggression in children with ASD is an increasingly important area in the field. Previous research has demonstrated that aggressive behavior may be predictive of psychiatric-hospitalization for children with ASD (Mandell, 2008), highlighting the importance of identifying predictive factors to support the development and implementation of interventions. Using a large and geographically diverse community-based sample, Mazurek, Kanne, & Wodka, (2012) reported that individual characteristics such as self-injurious behavior, ritualistic behaviors, sleep challenges, and sensory difficulties may be predictive of aggression in children with ASD. In clinical and real-world settings, functional behavioral assessment is a method used to identify behavioral and environmental predictors associated with aggression. Previous research using this methodology has demonstrated that for children with ASD, predictors of aggression may be unique and different from peers without ASD. For example, in a study by Reese, Richman, Belmont, & Morse (2005), parents of children with and without ASD were asked to complete a functional assessment interview. Results demonstrated that parents of children with ASD were more likely to attribute the function of

disruptive behavior to access to items that allowed the child to engage in repetitive behavior and avoidance of sensory stimuli. While parents of typically developing children were more likely to attribute the function of disruptive behavior to attention-seeking and avoidance of non-preferred tasks (Reese, Richman, Belmont, & Morse, 2005). Further, results from a study by Kanne & Mazurek, (2011) demonstrated that predictive factors that are often related to aggression in typically developing children, such as family demographic factors, gender, intellectual functioning, and language ability, may not be predictive for children with ASD. Altogether, the results of these studies document the importance of continuing to examine factors that may be predictive of levels of aggression among children with ASD. These factors may be unique to this population and can continue to support the development and implementation of interventions.

Social Relationships in Children with ASD

Social impairments, including challenges with social interactions, are another core characteristic and component of the diagnostic criteria. Challenges may include difficulty with social-emotional reciprocity, having reciprocal conversations across settings, and developing and maintaining relationships (American Psychiatric Association, 2013). Peer relationships are important, as previous research has demonstrated that they may support the development of positive academic, behavioral, and emotional outcomes (Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004; Wentzel, & Caldwell, 1997). In comparison to typically developing classmates, elementary school-aged children with ASD are more likely to be on the peripheral of their classrooms social network, have fewer reciprocal friendships, have poorer quality relationships, and be more likely to be rejected by peers (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari et al., 2011; Locke, Kasari, Rotheram-Fuller, Kretzmann, & Jacobs, 2013). These studies suggest that children with ASD may experience less acceptance from peers and

may be less involved in their classrooms social structure. For children with ASD, lower levels of contribution to composition of the classroom's social network and higher peer rejections have been demonstrated to be present at the beginning of academic school year and persist throughout its remainder (Locke et al., 2013). Further, social involvement in the classroom for children with ASD may decline from elementary school to middle school (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Suggesting that children with ASD require support to develop and maintain social relationships throughout their educational trajectory, specifically as children get older, and social relationships may increase in complexity.

The playground is another setting where extensive research regarding peer interactions has been conducted. Playgrounds provide children the opportunity to engage in naturalistic unstructured play (Lang et al., 2011) and support the development of pivotal social skills. For children with ASD the playground may be a difficult setting to navigate (Couper, 2013), specifically successfully initiating and responding to spontaneous peer interactions (Locke, Shih, Kretzmann, & Kasari, 2016). Studies of peer engagement during unstructured play time have documented that children with ASD spend longer periods of time engaged in solitary play, in comparison to typically developing children (Kasari et al., 2011; Locke et al., 2016; Macintosh & Dissanayake, 2006). In a study by Locke et al. (2016) results demonstrated that in comparison to their typically developing peers who spent 70% of a recess period engaged with peers, children with ASD spent 40% of their recess period engaged with peers. Similarly, a mixed-methods study by Gilmore, Frederick, Santillan, & Locke, (2019) found that while 25% of a sample of 55 children spent their time in the playground engaged in solitary play, 30% of children spent their time engaged with peers. While these studies demonstrate the discrepancies in engagement between children with ASD and typically developing peers, these results also

suggest that some children with ASD do engage with peers in the playground. A recent study by Locke, Williams, Shih, & Kasari (2017), examined the individual characteristics of children with successful peer relationships within a school context. Successful relationships were determined by examining classroom social networks and joint engagement with peers in the playground. Results demonstrated that approximately half of the children exhibited social success either on the social network measure or joint engagement measure. Further, several malleable factors, such as classroom size and number of peer connections were predictive of peer engagement (Locke et al., 2017). The results of these studies suggest that while children with ASD may be less likely to engage with peers and be socially involved in their classroom's social network, children with ASD do have the potential to engage successfully with peers in the playground setting, thus it is important to support the development of social skills across settings.

Characteristics of Attention-Deficit/Hyperactivity Disorder

Attention-Deficit Hyperactivity Disorder (ADHD) is characterized by developmentally inappropriate levels of inattention, hyperactivity, and impulsivity. Three subtypes comprise the diagnostic category of ADHD, predominately inattentive presentation, predominately hyperactive-impulsive, and combined presentation (American Psychiatric Association, 2013). ADHD has been documented as one of the most prevalent neurodevelopmental disorders in school-aged children in the United States. Currently, prevalence rates for children between the ages of 4 and 17 is 11% (Visser et al., 2014). ADHD prevalence has also been reported to be greater for boys (Danielson et al., 2018; Visser et al., 2014). Symptoms associated with ADHD, may result in impairment in social and academic activities, and hinder participation across settings (Barkley, 2006). Impairments in ADHD can persist from early childhood throughout adolescence and adulthood. However, previous studies have also demonstrated that severity of

symptoms can decline throughout time (Sasser, Kalvin, & Bierman, 2016), which highlight the importance of providing treatment services for children with ADHD. Challenges in emotional regulation (Bunford, Evans, & Langberg, 2018), disruptive behavior (Rabinovitz, O'Neill, Rajendran, & Halperin, 2016), social impairments (Normand, Schneider, Lee, Maisonneuve, & Robaey, 2013), and co-occurrence with other psychological disorders (Craig et al., 2015), have been associated with the presence of ADHD. The following review of literature will focus on ADHD research regarding social impairment and behavioral challenges across settings in school-age children.

Several theories have been proposed to provide rationale regarding contributing factors to ADHD symptomatology. Along with the executive dysfunction theory (discussed in a subsequent section), other theories regarding ADHD with less empirical research include the *Delay Aversion Theory* and the *Response Variability Theory*. These theories both highlight differences in inhibition and response times. In a study by Bitsakou, Psychogiou, Thompson, & Sonuga-Barke, (2009), the authors examined the differences between typically developing children and children with ADHD in three tasks associated with delay aversion. The tasks measured children's choices for immediate over delayed rewards, reaction time, and increased frustration. The results demonstrated that children with ADHD were significantly less likely to wait for the reward in comparison to typically developing peers (Bitsakou et al., 2009). Subsequently, the Response Variability Theory is supported by metanalytical research that has documented the significant variability in response time in tasks related to stop and go between children with ADHD and typically developing peers (Alderson, Rapport, & Kofler, 2007). Differences in performance in tasks related to inhibition and response time, support understanding of symptomatology associated with ADHD, such as impulsivity.

While there are several theories that support the understanding of ADHD, previous studies have suggested that due to the heterogeneity of the disorder there is not only one theory that is attributed to the disorder, rather that it is a combination of weakness in multiple domains (Barkley, 2006). This understanding has been suggested by the *Multiple-Pathway Model* and the *Multiple-Deficit Model*. The proposed Multiple-Pathway Model by Nigg, Willcutt, Doyle, & Sonuga-Barke, (2005), suggest that a combination of neuropsychological weaknesses contribute to the impairments in the disorder, and that neuropsychological deficits, such as executive functioning, may differ across individuals with ADHD. Similarly, the Multiple-Deficit Model suggests that weakness in one domain is not primarily responsible for impairment associated with ADHD, rather the combination and interaction between genetic, behavioral, and cognitive functions result in symptomatology and impairment related to ADHD (Willcutt et al., 2010). While research regarding theoretical concepts related to ADHD has existed for decades, there are still gaps in understanding how the proposed areas of deficits interact and relate to the heterogeneity in severity and presentation of the disorder.

Social Challenges in Children with ADHD

In comparison to typically developing children, children with ADHD may be less likely to have reciprocal and poorer quality friendships (Hoza et al., 2005; Marton, Wiener, Rogers, & Moore, 2015; Mrug et al., 2012). A study by Blachman & Hinshaw (2002), studied friendships in girls with ADHD who attended a five-week long summer camp. The results demonstrated that girls with ADHD not only had fewer reciprocal friendships than their typically developing peers, they were also less likely to maintain any reciprocal friendships throughout the camp period (Blachman & Hinshaw, 2002). These results suggest that children with ADHD may lack skills to develop and maintain friendships. Children with ADHD have also been reported to experience

difficulties engaging in unstructured play with peers, Normand et al., (2011) conducted an observational study of children with ADHD and compared their play interactions to a dyad of typically developing children. The results of the study demonstrated that the children with ADHD and their friend who was part of their dyad both reported less satisfaction with their friendship in comparison to their typically developing peers (Normand et al., 2011). Although social challenges aren't a core symptom of ADHD, the increased prevalence of impairments in social functioning in children with ADHD, highlight the need for social skills intervention for this population.

In a previous study, by Normand, Schneider, Lee, Maisonneuve, & Robaey, (2013), the researchers conducted a longitudinal study to explore the stability of friendships of children with ADHD. Results demonstrated that children with ADHD were less likely to maintain friendships, reported less positive friendship quality, and more conflict with their friends in comparison to typically developing peers (Normand et al., 2013). Further, previous research suggests that during observational play, children with ADHD are more likely to demonstrate increased levels of self-centered play, less negotiation with friends (Normand et al., 2013), less cooperative play, and engage in more in parallel play rather than joint play (Normand et al., 2019). A number of behavioral characteristics during play, such as violating game rules, have been reported to be associated with friendship rejection (Normand et al., 2013). Friendships have been documented to be a protective factor and related to positive long-term social outcomes for children with ADHD (Gest, Graham-Bermann, & Hartup, 2001), which encourage the development and implementation of social skills interventions that target cooperative and positive reciprocal interactions.

Behavioral and Emotional Challenges in Children with ADHD

Children with ADHD often experience a range of co-occurring psychological disorders (American Psychiatric Association, 2013; Elia, Ambrosoli, & Berrettini, 2008). Specifically, literature suggests that co-occurrence often occurs with behavioral disorders related to non-compliant, aggressive, and rule-breaking behaviors, such as Oppositional Defiant Disorder (ODD) and Conduct Disorders (CD) (Barkley, R.A., 2006; Tung et al., 2016). In a study by Elia et al., 2008, the researchers examined the percentage of co-occurring disorders in a sample of children with ADHD. Results demonstrated that approximately 40% of the sample met criteria for ODD, in this study ODD was the most prevalent co-occurring disorder (Elia et al., 2008). Further, in a study by (Wilens et al., 2002), the authors examined the prevalence of co-occurring disorders, in preschool children (ages 4 to 6) and elementary school-aged children (ages 7 to 9) with ADHD. Results demonstrated that 75% of preschool children and 80% of school-aged children with ADHD had a co-occurring disorder (Elia et al., 2008). The most common co-occurring disorder for both age groups was ODD, 62% of preschool children met criteria for ODD, while 59% of school aged children met criteria for ODD (Wilens et al., 2002). Behaviors associated with ODD include defiance, refusal, escalated negative behavior, anger, and frequent arguing, and are associated with increased risk of substance use and delinquent activity (American Psychiatric Association, 2013). Furthermore, a number of studies have reported that aggressive and rule breaking behavior may lead to rejection from peers (Normand et al., 2013), and poor social outcomes (Hoza et al., 2005). All together, these results demonstrate the increased prevalence of behavioral disorders in children with ADHD and provide insight about how they may contribute to poorer social outcomes.

In comparison to typically developing peers, individuals with ADHD have been reported to demonstrate lack of awareness in social situations, difficulty with behavioral control during escalated emotional states, emotional inflexibility, and difficulty regulating emotions when feeling upset (Bunford et al., 2018; Melnick & Hinshaw, 2000). Challenges with emotional regulation may increase engagement in disruptive behavior (Bunford et al., 2018). Research suggests that higher levels of reactive temperament in early childhood, such as anger and frustration, may be predictive of ADHD symptom severity (Rabinovitz et al., 2016). With this understanding, a large body of literature has focused on the development of treatment to support social and behavioral skills in school-aged children with ADHD (Evans, Owens, & Bunford, 2014; Pelham & Fabiano, 2008; Melnick & Hinshaw, 2000). The growth of this body of literature has documented the efficacy and positive long-term outcomes of participation in ADHD treatment.

Co-occurrence Between ASD and ADHD

The most prevalent co-occurring disorder for children with ASD has been documented to be ADHD (American Psychiatric Association, 2013). Previous research has demonstrated that in comparison to children with only ASD, children with co-occurring ASD and ADHD present with higher levels of severity of ASD symptomatology (Cooper, Martin, Langley, Hamshere, & Thapar, 2014; Goldin, Matson, Tureck, Cervantes, & Jang, 2013; Grzadzinski et al., 2011; Holtmann, Bölte, & Poustka, 2007), and greater levels of cognitive and adaptive functioning impairment (Rao & Landa, 2014). Children with co-occurring ADHD & ASD, may be at greater risk for developing more severe emotional and sleep problems (Antshel, Zhang-James, Wagner, Ledesma, & Faraone, 2016), which may impact children's daily functioning abilities across settings. In a study by Craig et al., (2015), the researchers examined the levels of internalizing

and externalizing behaviors in children with ADHD, ASD, ASD & ADHD, and typically developing children. While children with ASD and ADHD both reported higher levels of externalizing and internalizing symptoms than typically developing children, children with co-occurring ASD and ADHD demonstrated highest severity levels in symptomatology related to internalizing and externalizing behaviors (Craig et al., 2015). Research regarding assessment of the disorders continues to expand, as overlapping symptomatology may complicate the diagnostic process (Grzadzinski, Dick, Lord, & Bishop, 2016). Understanding characteristics of the disorders independently and the presentation of symptomatology of co-occurring ASD and ADHD is imperative, as it may facilitate the diagnostic process, and inform treatment developments. This is crucial because children with co-occurring ASD and ADHD may require more intensive treatment.

Executive Dysfunction Theory

One theory that has been widely studied in children with both ADHD and ASD, is the executive dysfunction theory. Based on information provided regarding co-occurrence of the disorders, this review of the executive dysfunction theory focuses on research for both disorders. A number of studies have proposed that challenges in social and behavioral development for children with ASD and ADHD may be related to executive functioning abilities (Barkley, R.A., 2006; Craig et al., 2016; Griffith et al., 1999; Ozonoff, Pennington, & Rogers, 1991). Executive functioning is encompassed by subset of cognitive processes related to inhibition, working memory, and cognitive flexibility (Diamond, 2013; Friedman et al., 2008; Miyake et al., 2000). Self-regulatory and decision-making abilities, that often require planning, problem-solving, organization, and attention to detail have been reported to be associated with executive

functioning (Diamond, 2013). Development of these skills are essential as they may contribute to social, academic, and daily functioning.

In a study by Ozonoff & Jensen, (1999) the authors studied differences in executive functioning abilities between children with ASD, ADHD, and Tourette's Syndrome. The results of the study demonstrated that children with ASD demonstrated significant challenges in tasks that required planning and cognitive flexibility, while children with ADHD demonstrated challenges in measures related to inhibition (Ozonoff & Jensen, 1999). Previous studies comparing children with ASD, ADHD, and typically developing children suggest that in comparison to children with ADHD and typically developing peers, children with ASD may experience significant challenges in tasks related to inhibition, working memory, and cognitive flexibility (Corbett, Constantine, Hendren, Rocke, & Ozonoff, 2009). Further, comparing children with ASD and typically developing peers to children with ADHD, deficits in vigilance, which relates to attention, response inhibition, and impulsivity were apparent (Corbett et al., 2009). These studies indicate that while both children with either ASD and/or ADHD may experience challenges in executive functioning, development of specific executive functioning skills, may vary across ASD and ADHD.

Furthermore, studies focusing on children with ASD have suggested that executive functioning difficulties may be predictive of the development of social-communication abilities (Ellis Weismer & Kover, 2015; Pellicano, 2010; Torske, Nærland, Øie, Stenberg, & Andreassen, 2018). While difficulties in executive functioning may persist over time (Vogan et al., 2018), previous research has demonstrated that the trajectory of executive functioning abilities varies across individuals, (Happé et al., 2006). Research regarding the contribution of executive functioning is continuing to grow, as there are still gaps in understanding how individual

characteristics interact with the development of executive functioning abilities (Demetriou et al., 2018; Ellis Weismer & Kover, 2015). Well-developed executive functioning abilities have been associated with positive long-term, academic, behavioral, and social outcomes in school-aged children (Jacobson, Williford, & Pianta, 2011), suggesting that development of executive functioning abilities should be supported across settings for children with ASD and ADHD.

Evidence-Based Practices for Children with ASD and/or ADHD

There are a range of cognitive, behavioral, and medical interventions currently used to support social and behavioral development for children with a diagnosis of ASD and ADHD. With the growth of research regarding treatments, importance has been placed on integrating empirical results and identifying evidence-based practices for both disorders. In 2005, the American Psychological Association Presidential Task Force on Evidence-Based Practice released a report delineating components of research evaluation, and considerations for future research. The APA Task Force defined evidence-based practices as "the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences" (American Psychological Association, 2005).

Evidence-Based Treatments for ASD

To support the understanding of evidence-based practices for children with ASD, in 2009, the National Autism Center at the Mayo Institute conducted a multi-year project, *The National Standards Project.* Most recently, a second phase of the project was conducted with literature published between 2007 and 2012 (National Autism Center, 2015). A total of 14 interventions met criteria to be classified as established treatments (e.g., Behavioral Interventions, Cognitive Behavioral Intervention Package, Modeling, Parent Training, Scripting, and Social Skills Package), 18 practices in the emerging category (e.g., music therapy, exercise),

and 13 practices in the unestablished category (e.g., Animal-assisted therapy, gluten-free diet, shock therapy) (National Autism Center, 2015). Additionally, The *National Professional Development Center on Autism* has conducted rigorous reviews of literature to identify evidence-based focused interventions. Focused interventions are specific instructional strategies that can be implemented by practitioners to support skill acquisition across areas of cognitive, social, and behavioral development for children with ASD (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010; Wong et al., 2015). Most recently, Wong et al., (2015), evaluated literature published between 1990 and 2011. The researchers identified 27, focused interventions (e.g., prompting and reinforcement) with empirical support to classified as evidence-based practices (Wong et al., 2015). This literature review focuses on symptomatology related to behavior and social skills, with the established interventions discussed in the following section that are specific to addressing disruptive behavior and development of interpersonal and social skills.

Established Interventions for Problem Behaviors in Children with ASD

Results from the most recent publication of the *National Standards Project* demonstrated that behavioral interventions were the most prominent interventions published in ASD intervention literature (National Autism Center, 2015). Behavioral interventions have been documented to decrease disruptive behaviors in children with ASD, and often include strategies such as reinforcement, prompting, and self-monitoring (National Autism Center, 2015; Wong et al., 2015). Often, behavioral interventions include token economies or rewards system. Token economies involve praising and rewarding children for demonstrating appropriate behavior, as well as using cost response systems in which children lose a "token" for engaging disruptive behaviors (McGoey & DuPaul, 2000). Additionally, implementation of noncontingent reinforcements, which are fixed reinforcers that occur through a consistent period, have also

been shown to support reduction of disruptive behaviors (Noel & Getch, 2016). Understanding the association between behavior and environment prior to implementing an intervention for children with ASD is important. This understanding provides information regarding the interaction between environment, antecedents, and function of a behavior (Reeves, Ferro, Umbreit, & Liaupsin, 2017). Function-based interventions often integrate differential reinforcement, which focus on manipulating antecedent environmental conditions to increase a desired behavior and have been shown to be effective in reducing disruptive behaviors in children with ASD (LeGray, Dufrene, Sterling-Turner, Olmi, & Bellone, 2010). All together, these interventions highlight the importance of understanding environmental factors that contribute to presence of problem behaviors in children with ASD, and the importance of utilization strategies that provide children with opportunities to learn and receive feedback on their behavior.

Established Interventions for Interpersonal Skills in Children with ASD

To support development of interpersonal and play skills, interventions that provide children the opportunity to learn, practice, and apply skills, such as naturalistic teaching strategies, participation is social skills groups, and peer mediated instruction interventions have been demonstrated to have positive outcomes (National Autism Center, 2015). By supporting the opportunity to practice initiation of conversations, turn-taking, as well as recognition of others' facial expressions, these interventions support the development of interpersonal skills. Studies regarding social skills interventions, often include multi-component intervention packages, which integrate a number of interventions. For example, a study by (McFadden, Kamps, & Heitzman-Powell, 2014) demonstrated that a multi-component intervention that included, priming (e.g., providing student information about an activity before it occurs), prompting (e.g.,

providing reminders of when to use a skill), and reinforcement, supported school-aged children's social behaviors and peer interactions. The efficacy of multi-component interventions demonstrates the importance of providing children with multiple supports and learning opportunities. Further, previous randomized-controlled studies which include social skills interventions, consisting of modeling, didactic instruction, immediate feedback, and peer meditated interventions, have shown that these interventions support peer engagement and improve peer relationships in schools (Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012; Kretzmann, Shih, & Kasari, 2015). These studies have highlighted the importance of providing children with the opportunities to learn and practice skills in naturalized settings, such as school settings to support the generalization of skills (Kretzmann et al., 2015). With the understanding that children with ASD can develop social skills and improve social relationships, it is imperative that they are provided continuous opportunities to foster relationships with peers across settings.

Evidence-Based Treatments for ADHD

An extensive body of literature has documented the treatments for ADHD including pharmacological treatment, behavioral treatments, and a combination of pharmacological and behavioral treatments. While several studies have published findings that support the understanding of the efficacy of pharmacological treatments, and the benefits of combining behavioral and pharmacological treatments (MTA Group, 1999), the following review will focus on behavioral treatments. Recently, Evans, Owens, & Bunford, (2014) evaluated literature regarding ADHD treatment using the evaluation criteria of established by the *Society of Clinical Child and Adolescent Psychology*. The results of the study confirmed that behavioral parent trainings and classroom management interventions met criteria to be classified as well-

established interventions. Further, results demonstrated that while social skills instruction in clinic settings did not meet criteria, behavioral peer-interventions in recreational settings (which substantially consisted of research regarding the Summer Treatment Program), met the criteria to be classified as a well-established treatment. The results of this study and previous metanalytical research regarding social skills interventions for ADHD (Pelham & Fabiano, 2008), highlight the importance of delivering social interventions in naturalized settings, and providing children with ADHD the opportunity to practice and generalize their skills.

Behavioral Parent Training for ADHD

Behavioral parent training has been classified as an empirically based practice since the first review of empirically based treatments for ADHD (Pelham, Wheeler, & Chronis, 1998). Studies included in the most recent review by (Evans et al., 2014), were mostly conducted on manualized parent training programs (e.g., *The Defiant Child, Community-Oriented Parenting Education program*), which are delivered in group settings, and last between eight and twelve weeks. Manualized parenting programs for children with ADHD focus on the development and implementation of contingency strategies and positive social interactions in the home setting (Evans et al., 2014). In comparison to parents on waitlists, parents who participate in parent training programs have been shown to report a decrease of disruptive child behavior (Chacko et al., 2009; Fabiano et al., 2012; Van Den Hoofdakker et al., 2007). Additionally, research focused on the relation between behavioral parent training participation and parenting stress levels has suggested that participation in parent behavioral training decreases parent stress (Gerdes, Haack, & Schneider, 2012). Together, these studies support the efficacy of behavioral parenting strategies to support youth and highlight the need of including parents in ADHD treatment.

The Daily Report Card Intervention

The Daily Report Card (DRC) is a tool that is utilized to document progress and reinforce prosocial behavior for children with disruptive behaviors (Owens et al., 2012; Pyle & Fabiano, 2017). DRC's are developed using frequency data of operationally defined behaviors, which are used to guide the development of goals for the child. In collaboration with parents, rewards and privileges for meeting goals are created and communicated to the child. Children receive immediate feedback about their performance when a behavior is observed, and frequency of behavior is documented. At the end of each day, teachers communicate child performance with parents, and communicate if a reward was earned. The DRC has been used in general education, special education, and summer camp settings (Fabiano, Schatz, & Pelham, 2014; Fabiano et al., 2010; LeBel, Chafouleas, Britner, & Simonsen, 2013). Previous research suggests that the implementation of DRC's support the increase of on-task behavior during academic periods (Fabiano et al., 2010), reduce disruptive behaviors (LeBel et al., 2013; Pyle & Fabiano, 2017), and facilitate parent-and teacher communication (Vannest, Davis, Davis, Cole, Mason, Benjamin, & Burke, 2010). The DRC is an example of a low-cost, sustainable, and empirically supported intervention that can be adapted, implemented, and individualized to support individual needs of each child.

The Summer Treatment Program (STP)

The Summer Treatment Program (STP) is a manualized multi-component intervention program implemented in a naturalistic environment. The STP is comprised of a number of evidence-based practices that support social, emotional, and behavioral development. Specifically, the program focuses on supporting areas of impairment that are often present in children with ADHD, including emotional and behavioral regulation (Pelham, 2004). The STP is

an intensive summer day program, that mirrors the structure of a summer camp setting. A number of evidence-based treatments comprise the program such as, an extensive reinforcement system, daily report cards, visual schedules, social skills training, and a parent training component (Chronis et al., 2004). Behaviors targeted related to development and application of prosocial behaviors towards peers and adults (e.g., helping, sharing, and participating) and reducing the occurrence disruptive behaviors (e.g., noncompliance, verbal abuse, and aggression) (Pelham, 2004, 2012). Since its development, the STP has been implemented in settings across the United States (Fabiano et al., 2014; Graziano, Ros, Hart, & Slavec, 2018; Mitchell, Mrug, Patterson, Bailey, & Bart Hodgens, 2015), and internationally (Yamashita et al., 2011). The STP was a central component to the behavioral intervention examined in one of the largest longitudinal studies conducted to date (MTA Group, 1999).

STP Theoretical Orientation

The STP is grounded in elements of Applied Behavior Analysis and the Social Learning Theory (Fabiano et al., 2014). A critical component of the program is to identify antecedents of a target behavior, understand the function of the behavior, and provide consequences (Pelham, 2004). The STP is driven by the implementation of an extensive token economy system. Positive and negative consequences are utilized to increase the occurrence of positive behaviors and decrease instances of negative behavior (Pelham, 2004). Progress monitoring of the behavior happens consistently throughout the day, and decisions regarding target behaviors are developed using data-driven and observational information (Fabiano et al., 2014).

Furthermore, the program borrows from concepts of the Social Learning theory. The Social learning theory is founded on the understanding that learning can occur from observation of others and reinforcement (Bandura, 1977). The Social Learning Theory suggests that learning

happens when behavior is modeled and when either positive or negative consequences are observed. Further, it suggests that reinforcement increases the motivation to engage in the observed behavior (Bandura, 1977). The STP provides copious opportunities for children to observe peers, learn what behaviors receive positive reinforcement, and what behaviors receive negative reinforcement. The STP integrates an extensive point system (Pelham, 2004). After each activity, children learn how many points each peer in the group earned. This allows children to observe and understand what behaviors lead to earning the most points. Additionally, a core component of the program is the teaching and modeling of appropriate social skills from counselors. Throughout the day, children are provided with the opportunity to practice the behaviors that are modeled and receive immediate positive reinforcement when observed engaging in positive behavior (Fabiano et al., 2014). This provides children with the opportunity to observe, learn, and practice prosocial behavior.

Empirical Research on Efficacy of STP

The STP program was specifically designed for children with ADHD, thus, the majority the existing literature focuses on children with ADHD. A number of studies, however, have reported outcomes of children with ASD (Mitchell et al., 2015; Mrug & Hodgens, 2008; Wymbs et al., 2005), and behavioral disorders such as Oppositional Defiant Disorder and Conduct Disorder (Bansal et al., 2018). An extensive body of literature suggests that participation in the STP relates to a decrease of disruptive behaviors such as noncompliance, verbal aggression, and physical aggression (Chronis et al., 2004; Fabiano et al., 2007; MTA Group, 1999; Mitchell et al., 2015; Pelham et al., 2005, 2000) while in the STP setting. Further, previous studies suggest participation in the STP supports academic participation (Yamashita et al., 2011, 2010), development of peer relationships (Lopez-Williams et al., 2005; Mrug & Hodgens, 2008; Pelham

et al., 2000), and increase sports knowledge and participation (Lopez-Williams et al., 2005; O'Connor et al., 2014). Together, these studies suggest that participation in the STP supports the development of skills that may increase peer engagement and participation across recreational activities in home, school, and community settings.

To further study the relationship between behaviors and the STP, Chronis et al., (2004), conducted a B-A-B treatment withdrawal, within-subjects design. During the 6th week of the STP, groups in the intervention were randomly assigned two days to withdraw from treatment. During the treatment withdrawal period, children received verbal feedback about their behavior, but were not notified about award losses or earnings, and activity rules were not reviewed before activities. Based on behavioral data collected at the STP and counselor data, the results demonstrated that during the withdrawal of the intervention, children were significantly less likely to meet their goals (effect size= -3.10), had an increase of noncompliance (effect size= -7.38), negative verbalizations (effect size= -6.63), and increase in conduct problems (effect size=- 3.50). Furthermore, the results demonstrated that medication, did not significantly interact with outcomes. The results of the study demonstrated the association of the STP intervention with behavioral outcomes, the importance of combined treatments, and need for continuous treatment for children with ADHD.

To date, there is a paucity of research regarding efficacy of the STP for children with ASD. Including qualitative studies, (Mrug & Hodgens, 2008), case studies (Wymbs et al., 2005), and quantitative studies (Lopata, Thomeer, Volker, Nida, & Lee, 2008; Mitchell et al., 2015). All of these studies have demonstrated positive outcomes for children with ASD. The largest sample of children with ASD was in a study by (Lopata et al., 2008), which included a sample of 54 children with ASD. This study demonstrated that both parents and STP counselors

reported improvement in social skills after participating in a six week STP program. Additionally, Mitchell et al., (2015) analyzed the outcomes of 20 boys with high-functioning ASD. The results showed that children demonstrated improvement in several prosocial skills and a decrease in disruptive behaviors. For example, the average of correct responses to attention questions increased from 60% in the first week to 78% in the last week, following activity rules increased from 75% to 83%, contributing to group discussion increased from 18% to 26%, and complaining and whining decreased from 2.9% to 1.3%. Additionally, moderate to large improvements were reported with compliance and verbal abuse (Mitchell et al., 2015). While there is a paucity of empirical research supporting the STP for children with ASD, the limited extant literature demonstrates that children with ASD may show improvements after participation.

Self-Perception and Evaluating Behaviors of ASD and ADHD

While evaluation of evidence-based treatment programs, such as the STP, initially included observational data, parent rating scales, and counselor ratings, later research began to include child and peer measures. Inclusion of child self-report measures provides the opportunity for the analysis of discrepancies between children and other informants prior to treatment (De Los Reyes et al., 2010), and provides an additional source of information that may provide insight into treatment outcomes and development of social relationships. Through this research, previous studies have demonstrated that children with ADHD often overreport their abilities compared to their parents and camp counselors (Evangelista et al., 2008; Hoza, Pelham, Dobbs, Owens, & Pillow, 2002). Other studies have also demonstrated that children with ASD are also more likely to overreport their abilities than typically developing children (Johnson et al., 2009). The inclusion of child self-perception measures have supported the growth in understanding the

clinical implications of children's self-perceptions, as well as the implications of differences between child and adult ratings.

Clinical Implications of Self-Perception in Children with ADHD

Children with ADHD have been documented to overly estimate their social and behavioral abilities in comparison to ratings from parents, teachers, and behavioral observations (Diner & Millich, 1997; Evangelista et al., 2008; Hoza et al., 2004, 2002; Owens & Hoza, 2003). The positive self-perception that children with ADHD present has traditionally been referred to in other research as the "Positive Illusory Bias" (PIB) (Hoza et al., 2004; Hoza, Waschbusch, Pelham, Molina, & Milich, 2000). Higher levels of PIB have been demonstrated to occur in children with higher symptom severity, such as conduct problems (Hoza et al., 2004). This suggests that level of severity may either relate to child awareness of their abilities or relate to children intentionally rating their abilities higher in areas they experience greater challenges.

For children with ADHD, the presence of PIB has been attributed to cognitive immaturity, lack of awareness, and self-protection theories (McQuade, Mendoza, Larsen, & Breaux, 2017; Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). To date, most of the theories have not been directly evaluated. The self-protection theory (Owens et al., 2007). posits that children with ADHD overreport their abilities to protect themselves in areas in which they experience greater difficulty, rather than because a lack of understanding and awareness (Evangelista et al., 2008). While there is some research to support the self-protection theory, there are still gaps in the literature regarding what leads to overestimation of abilities (McQuade et al., 2017). Further, there is also a need for understanding if specific individual characteristics contribute to overestimation of abilities in children with ADHD.

In a study by Evangelista, Owens, Golden, & Pelham, (2008) the authors examined the perceptions that children with and without ADHD had about their own and others' abilities. Results demonstrated that there were no significant differences between children with and without ADHD in ratings regarding others' academic or social abilities, and that reports were accurate. However, unlike their typically developing peers, children with ADHD over-estimated their own abilities when compared to teacher ratings (Evangelista et al., 2008). The results of this study suggest that children with ADHD may have the ability to understand levels of competence across social and academic abilities, and that overestimation of their own abilities may not be a result of lack of awareness. Additionally, previous studies have found that when children with ADHD receive positive feedback about their social performance, their overestimations decline, and become more consentient with teacher reports (Diner & Millich, 1997; Ohan & Johnston, 2002). As such, children with ADHD may report higher abilities in areas where they exhibit greater challenges, not due to lack of awareness, rather to protect themselves.

Self-Perception of ADHD and STP Outcomes

Several studies regarding the self-perception of children with ADHD have been conducted within the context of the STP, one study has examined the relation between self-perception and STP treatment outcomes. In a study by Mikami, Lerner, Griggs, McGrath, & Calhoun, (2010), the authors examined the relation between self-perception of children with ADHD and their response to the STP. Children and counselors completed a pre-and post-measure regarding perceptions of competence in social acceptance and behavioral domains. Researchers also collected behavioral data, peer sociometric data, and a self-reported depression measure from the participants. The results of the study demonstrated that while participation in the STP did not change accuracy of self-perception, higher overestimation of abilities (compared

to counselor ratings), was related with greater conduct problems, and was predictive of poorer response to intervention. Further, children who overreported their behavioral competence, had fewer friendship nominations (Mikami, Calhoun, et al., 2010). The association between overestimation of abilities and friendships, and overall response to intervention suggest that research focused on intervention outcomes and moderators should consider child perceptions of abilities.

Self-Perception of Children with ASD

Currently, there is limited research regarding self-perception of elementary school-aged children with ASD. While there is a paucity of research regarding differences between child and parent reports for children with ASD, several studies have documented that when the self-reports of children and adolescents with ASD are compared to parent and teacher ratings, discrepancies between raters often exists (Knott et al., 2006; Renk & Phares, 2004). Additionally, children often report less severe symptoms in comparison to parent and teachers (Johnson et al., 2009; Russell, Steer, & Golding, 2011). While the research regarding self-perception in the field of ASD is minimal, the evidence suggests that children and adolescents with ASD may overreport their abilities.

Further, in a study by Verhoeven et al., (2012), the authors evaluated the relation between self-awareness of social, adaptive, and behavioral abilities, and treatment outcomes for adolescents with ASD. Results demonstrated that after one year in a treatment targeting social, problem-solving, and daily living skills, adolescents who had higher self-awareness at the beginning of treatment demonstrated more positive treatment outcomes with regard to social functioning. Parents of adolescents who demonstrated an increase in self-awareness after treatment, reported an increase in daily living skills (Verhoeven et al., 2012). An increase of self-

awareness was also related to an increase in reports regarding daily living and psychological problems, suggesting, that an increase in awareness, may relate to an increase in understanding of what skills they need to improve (Verhoeven et al., 2012). While there currently isn't research regarding the clinical implications of overestimation of abilities in children with ASD, these studies suggest that children's self-perceptions may have clinical implications and should continue to be examined.

Measurement of Overestimation of Abilities of in Children With ADHD

To analyze positive self-perception, several statistical methodologies have been employed across studies, with more recent research focusing on the validity of the statistical analysis used in previous literature. The most common methodology to analyze the presence of overestimation of self-perception in ADHD research, is to take parent or teacher reports and subtract their scores from the child's score in each specific domain (Evangelista et al., 2008; Hoza et al., 2004, 2002; Owens & Hoza, 2003; Swanson, Owens, & Hinshaw, 2012; Tu, Owens, & Hinshaw, 2019). However, recent research has cautioned researchers about using the discrepancy scores from multiple informants for analysis (De Los Reyes et al., 2015). Research suggests that studies using the discrepancy methodology can be biased and a stronger reflection of one of the informant reports, rather than both (Edwards, 2001). Several studies have analyzed the presence of positive self-perception of children with ADHD by conducting group-level analyses when compared to typically developing peers (Diner & Millich, 1997; Hoza et al., 2004, 2002, 2000; Jia et al., 2016; Kaiser et al., 2008). Children with ADHD may inherently have higher levels of impairment in social and behavioral domains and their reports may be more likely to demonstrate a discrepancy (Bourchtein, Langberg, Owens, Evans, & Perera, 2017). These results suggest that previous research focusing on understanding child self-perception may

not be providing a comprehensive result of whether children with ADHD overreport their abilities. For example, in a study by Linnea, Hoza, Tomb, & Kaiser, 2012, the authors compared social interactions with unfamiliar peers of children with ADHD who based on the discrepancy method had positive bias and didn't have positive bias, and a control group. The results demonstrated that rates of positive bias were higher among children with higher levels of ADHD impairment, rather than across all children with ADHD. Further, the results of the study demonstrated that children who demonstrated agreement about their low competence levels with teachers, also had high levels of ADHD symptomatology (Linnea et al., 2012). The results of the study highlighted the association between levels of social impairment and positive bias, rather than diagnosis and positive bias. These results demonstrate the importance of integrating levels of impairment to future positive bias research, rather than comparing groups of children with ADHD and without ADHD, as significant differences may exist within groups, and may not be generalizable to all children with ADHD. The variety in symptom severity may also contribute to differences in reporting (eg. a lack of thoroughness when filling out self-ratings scales). Further, these results provide rational for furthering research in the field and measuring ADHD symptomatology and social and behavioral abilities in multiple forms, as they can be integral to the analysis.

Alternative Methodologies

To address limitations regarding previous measurement of positive bias, recent literature has suggested using a statistical analysis that does not focus on using discrepancy scores. One of the recent methodological approaches utilized in recent literature is a latent profile analysis (Bourchtein et al., 2017, 2018). In a recent study by Bourchtein et al., (2018) the authors examined the presence of PIB in elementary school children with and without ADHD employing

a Latent Profile Analysis (LPA). The results of the study demonstrated that children with ADHD were more likely to be in the low competence/self-aware group. However, within this group, they were not more likely to present with PIB when compared to peers without ADHD. The results of this study suggests that positive bias may be related to low competence rather than an ADHD diagnosis (Bourchtein et al., 2018). In this study, children who were biracial or from multicultural backgrounds were more likely to be in the low competence/self-aware profile. The results of recent studies highlight the need for employing different methodological approaches to study overestimation of abilities with children with ADHD, as it may provide more information regarding the interaction between individual characteristics and perception of social and behavioral abilities.

Another analysis methodology, a polynomial regression analysis, allows for the analysis of a third-dimensional relationship between multiple raters (Laird & De Los Reyes, 2013; Laird & LaFleur, 2016), and provides the opportunity to test possible interaction terms. In positive bias literature the use of polynomial regressions has allowed for the analysis of child positive bias when compared to teacher ratings, as well as the relationship between teacher ratings and likelihood for positive bias. By examining their data using both a difference of scores methodology and a polynomial regression analysis, a number of studies have demonstrated the differences in statistical results and clinical implications between both methodologies (Fefer et al., 2018; Laird & LaFleur, 2016; Sibley, Smith, Evans, Pelham, & Gnagy, 2012). Specifically, by demonstrating the appropriateness of the model fit of their data, several studies have delineated the mathematical constraints associated with the use of difference of scores (Laird & LaFleur, 2016; Sibley et al., 2019). For example, in a study by Sibley, Campez, & Raiker (2019), researchers analyzed predictors that may contribute to underreporting in adolescents with

ADHD and examined differences in model fit between models that used polynomial regression and differences of scores. The results demonstrated that in comparison to the polynomial regression model, the use difference of scores resulted in poor model fit. Further, the statistical results yielded from the difference of scores model demonstrated that half of the predictors analyzed were statistically significant. However, none of the predictors were statistically significant using the polynomial regression methodology (Sibley et al., 2019). The results of the study provide further evidence for the need to continue to study the differences in child self-perception research with alternative methodology to the traditional difference of scores methodology.

Gaps in ADHD Self-Perception Literature

Previously, a number of studies examining positive self-perception of children with ADHD have been conducted with samples consisting of only male participants (e.g., Hoza et al., 2002; Kaiser et al., 2008). Similarly, race and ethnicity have not been accounted for in several studies (e.g., Hoza et al., 2002, 2000; Kaiser et al., 2008; Mikami & Hinshaw, 2006; Volz-Sidiropoulou et al., 2016) and when it is included, often the interaction of race has not been evaluated (e.g., Evangelista et al., 2008; Jiang & Johnston, 2017; McQuade et al., 2017; Tu, Owens, & Hinshaw, 2019). Similar to previous literature that evaluated the significance of race and ethnicity (Hoza et al., 2004), a recent study found no significant differences on race and ethnicity and overestimation of self-perception (Bourchtein et al., 2017). Yet, another recent study found significant differences on profiles based on race and showed that children from biracial and multicultural backgrounds were more likely to be on the Low Competence/Self Aware profile (Bourchtein et al., 2018). Some studies have included these demographic characteristics into the analysis and have found no significance between the overestimation of

self-perception of children with ADHD and gender (Bourchtein et al., 2017; Evangelista et al., 2008; Hoza et al., 2004; McQuade et al., 2017; Mikami & Hinshaw, 2006; Owens & Hoza, 2003). Contrarily, one study recently reported that the positive self-perception may be less prevalent in girls with ADHD than boys with ADHD (Tu et al., 2019). The mixed results regarding the association of individual characteristics highlight the importance of analyzing these variables in future research.

Currently, there is limited research regarding the prevalence of overestimation of abilities in children with ADHD and/or ASD that employ a methodological analysis that does not solely rely on the use of a discrepancy score. Further, there is a limited research regarding the connections between child self-perception and peer relationships. It is important to examine this relationship, as it may provide information regarding the clinical implications of child self-perception and peer relationships and provide rationale for including child and peer ratings to evaluation and development of treatment and/or interventions. Further, there is limited research regarding social relationships of children with ASD within an intensive intervention setting, as most of the research has been conducted in schools and classrooms. The examination of social relationships in interventions may also contribute to understanding of the development and maintenance of peer relationships across intervention settings.

The Present Study

By addressing a critical gap in ASD and ADHD literature, this study builds on previous literature to examine how individual characteristics relate to self-perception of social and behavioral abilities for children with ASD, ADHD, and co-occurring ASD and ADHD. This study will employ an alternative statistical analysis approach to the discrepancy method. To examine differences in levels of agreement between informants, this study will use a polynomial

regression analysis. The second goal of this study is to examine the relation between self-perception and peer relationships at a Summer Treatment Program. This study is unique, given that the setting in which the data was collected included a neurodiverse sample of children with either ASD and/or ADHD, and includes data from multiple timepoints during a five-week intervention program.

The first aim of this study is to examine the prevalence of children's overestimation and underestimation of social and behavioral abilities, when compared to counselor and parent ratings. Additionally, this study will evaluate to what extent individual factors (e.g., age, diagnosis, gender, race, and ethnicity, level of impairment) relate with self-perception ratings.

The second aim of this study is to evaluate whether self-perception is associated with peer relationships. This study will analyze whether self-perception is associated with friendships at the beginning and at the end of the Summer Treatment Program.

To this end, the present study addresses the following research questions and hypotheses:
Question 1:

a) In comparison to counselor ratings, what is the prevalence of children overreporting social and behavioral abilities in this sample?
b) Do individual child characteristics (e.g., diagnosis, age, gender, race/ethnicity) and level of impairment, as reported by parent symptom ratings, relate to overreporting of social and behavioral abilities?

Study 1 Hypotheses: It is expected that not all children in the sample will overreport their abilities when compared to teacher ratings. This is expected since ASD, ADHD, are heterogenous disorders with varying levels of impairment. Further, girls have demonstrated varying levels of presence of positive bias, and race/and ethnicity may be associated with self-

perception. Consistent with previous research, it is predicted that lower competence levels, per counselor and parent reports, may relate to prevalence of overreporting of abilities. Lastly, it is predicted that overreporting abilities will not be predicted by the diagnostic category. This is predicated on previous research that demonstrates that the presence of positive bias may be associated with impairment level rather than diagnosis.

Question 2:

a) Do child and counselor self-perception of social and behavioral abilities during the first and last week of the STP relate to peer social preference, number of friendships, and number of reciprocal friendships? In other words, do higher self-perception scores relate to higher peer social preference scores, friendships, and number of reciprocal friendship for children with ASD and/or ADHD throughout participation in the STP?
b) Are individual child characteristics (e.g., diagnosis, age, gender, race/ethnicity, level of impairment) associated with peer social preference, number of friendships, and number of reciprocal friendships?

Study 2 Hypotheses: Social preference scores, number of friendships, and number of reciprocal friendships are predicted to be associated with the level of impairment reported by parent ratings, rather than child perception of social and behavioral abilities. Previous studies have demonstrated that youth with ADHD, and high positive bias, are less likely to show prosocial behaviors and have lower social preference among peers. However, a significant proportion of these studies used a discrepancy methodology to examine positive bias. Therefore, it is difficult to make predictions based on the paucity of current research that integrate alternative methods for studying differences between ratings to the discrepancy method. Similarly, for children with

ASD there is a paucity of research regarding the association between self-perception and peer relationships, thus it is difficult to make a prediction. For children with ASD, previous research has demonstrated that characteristics such as level of impairment, have been associated with social success. Thus, it is predicted that development of peer relationships throughout the STP will vary across children with different levels of impairment. Additionally, previous research has demonstrated that for children with ASD, social network salience decreases with age. It is noteworthy to mention that a significant number of previous research regarding social networks and ASD has been conducted in classroom settings, where the majority of participants are typically developing peers. Thus, it is predicted that our results may differ because this data was collected in a treatment setting that focused on supporting social skills development. Finally, research on social networks and peer relationships for children with ASD and ADHD have often been conducted independently from each other, thus it is difficult to predict the association between child characteristics and peer relationships in a sample that includes both children with ASD and/or ADHD.

Chapter 3: Methods

The present study was approved by the University of Washington's Institutional Review Board (see Appendix D). Data was collected at a Summer Treatment Program in a northwestern city in the United Sates. In collaboration with the University of Washington Autism Center and Seattle Children's PEARL clinic, the STP was implemented over a 5-week period in a naturalized recreational setting. The program implemented at the University of Washington is an adapted version of the Summer Treatment Program that was originally introduced by Pelham and Hoza (1996). Rather than being an 8-week program that runs for 8 hours a day, the UW program is a 5-week program that runs for 6 hours a day. A structured schedule was followed each day.

Daily activities included, morning discussion, social skills instruction, social skills instruction, snack, board game period, lunch, sports game, counselor's choice activity, and point store visit. Information about the components of the program are provided in Appendix A. Children received immediate feedback about their behavior and notification of points earned and lost from 9:00am to 3:00pm on a daily basis. After each activity, all children were notified about their point earnings for that specific activity.

Participants

A total of 71 children and families with ASD and/or ADHD gave their consent to participate in this research study. Children in the study ranged from 8 to 12 years-old with a mean age of 8.85 (SD=1.20). The majority of the participating children were white (64.6%), followed by multiracial (13.4%), Asian (11%), Black (2.4%), Latinx (2.4%), and other (4.9%). Overall, 34.1% of the sample was from a minority racial or ethnic minority background. Additionally, 6 counselors were randomly selected (one from each group) completed ratings of each child.

Procedures

Participants were recruited through various avenues. Including referrals from primary care providers, specialty care providers, and referrals from two university based medical centers that specialize in ASD and ADHD. Additional recruitment brochures were made available on the program's website. Individuals interested in participating were asked to complete pre-application forms on the programs' website. Upon completion of pre-application materials, individuals completed an eligibility screening. All parents of participating children attended a parent orientation prior to the beginning of the program. Parents were provided with information about the program and the research objectives. In addition, parents were provided with information

regarding the research study during the program's open house. Parents were informed that participation was voluntary. All parents of participating children in this study provided consent and children gave assent.

Parents of participating children completed the CBCL and demographic survey as part of the application process. The counselor ratings were collected on the 4th day of camp. One counselor from each group was selected to complete the Self-Perception Profile for Children-Teacher Measure for each child in their group. On the same day of camp, research assistants, separate from the counselors, read the questions of the Self-Perception Profile for Children-Child Measure, and completed the friendship survey with each child individually. Children completed the friendship survey with the support of research assistants once a week throughout the five-week camp period.

Measures

Demographic Survey. A demographic questionnaire was completed by the child's parents prior to the beginning of the Summer Treatment Program. The questionnaire inquired about the child's diagnoses, gender, ethnic background, grade, medication, special education services, and previous and current treatment services.

Self-Perception Profile for Children (Harter, 1985, 1999,2012). The SPPC- child form is a 36-item assessment of children's perception of competence across six domains: scholastic competence, social competence, athletic competence, physical competence, behavioral conduct, and global self-worth. Specific subscales of interest may be lifted from the instrument based on research interest and analyzed independently. Each subscale contains six items, all six items on the given subscales must be administered to yield a score for the subscale. For the purpose of this study, the social competence, and behavioral competence subscales were administered. Ratings

are measured on a 4-point scale, with higher scores indicating higher competence. To ensure children don't provide random responses, half of the items are worded with statements that reflect low competence, and half of the items begin with statements that reflect high perception of competence. Each item consists of two statements, children are instructed to ask themselves "what am I like" and choose the statement that they think they are more like. Then, children are instructed to select whether that statement is "really true for me" or "sort of true for me". For example, an item on the social domain is, "Some kids find it hard to make friends BUT other kids find its pretty easy to make friends." The SPPC is not normed, therefore raw scores are calculated by averaging raw scores. The subscales of the SPPC has demonstrated high and adequate internal consistency reliability, and test-retest reliability. In the manual, the authors report that across eight samples, the social competence subscale, internal reliability ranged from .75 to .84. For the behavioral conduct subscale, internal reliability ranged from .71 to .87. The self-perception measure has been commonly used across research measuring self-perception and positive bias (Harter, 2012). The child measure is used in conjunction with the teacher measure.

Teacher's Rating Scale of Child's Actual Behavior (Harter, 1985, 2012). The teacher rating scale parallels the self-perception profile for children. The teacher rates their observation of the child's actual behavior in each domain, rather than what they believe the child thinks about their competence. The teacher form consists of three items per scale, as this is the number of items has demonstrated can obtain highly reliable judgements of competence. Items are formatted in a similar manner to the children's form, the wording of the statements are different as they are meant to represent the teacher's perspective. Further, items are also scored on a 4-item scale, with higher scores indicating higher competence. Domain scores are calculated by generating an average score of the three measures. The scores from the teacher ratings can be

compared directly to the child's score across domains. The measure has demonstrated high and adequate reliability (Evangelista et al., 2008; Watabe, Owens, Serrano, & Evans, 2018). One counselor from each group was also randomly selected to provide ratings for the child.

Child Behavior Checklist- Parent Form (Achenbach, 1991, 2001). The Child Behavior Checklist (CBCL) is a 113-item measure that assess adaptive and maladaptive functioning in school-aged children. The CBCL provides five empirically based syndrome scales measures (e.g., anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule breaking behavior and aggressive behavior), five DSM-oriented measures (e.g., Depressive Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems, Conduct Problems) and yields a score of internalizing, externalizing, and total problems. The test-retest reliability of the CBCL is high as indicated by test-retest Pearson r of .90. The internal consistency of the competence scales is supported by alpha coefficients score of .63 to .70. Further, the empirically based problem scales ranged from .78 to .97. Parents completed the CBCL before the STP intervention to provide information on level of impairment. Additionally, parents completed the measure after the intervention.

Friendship Survey. Each week, all participants were asked to identify which "campers" they liked to hang out with (friendships), identify their top three friends, identify their best friend, and identify campers whom they didn't like to hang out with (rejections). Children were instructed to identify individuals regardless if they were in their group at the STP. Then, children were asked to select their top 3 friends, and select their best friend from that list. Based on the names provided by participants, children who received friendship nominations and friendship rejections were determined. Consistent with previous studies focusing on friendships within an

STP context, proportion friendship scores were created to examine peer social preference and friendships (Mikami, Calhoun, & Abikoff, 2010).

From the list of received friendship nominations and rejections, a *peer social preference score* was developed. A peer social score takes into consideration the number of received friendship nominations *and* rejections. By accounting for positive and negative nominations, a peer social preference score integrates perspectives from all of the individuals in a group. Additionally, it accounts for unique cases where a child might have a high number of received friendship nominations and also a high number of rejections, and vice versa. Peer social preference was determined by following procedures recommended by Coie, Dodge, & Coppotelli (1983). To develop a peers social preference score, a proportion score for received friendship nominations and rejections was created. To create the proportion scores, the number of received friendship nominations and rejections was divided by the number of individuals in each group. Then, to calculate the peer social preference score, the friendship proportion score was subtracted by rejection proportion score.

Additionally, using the list of received friendship nominations and rejections, a *friendship score* was developed. Continuing to follow procedures recommended by (Coie et al., 1983), and previous STP friendship research (Mikami et al., 2010), a friendship score was developed. A friendship score provides information about how often peers nominated a child as friend. To normalize the data between different groups, a proportion score was developed by dividing the total number of received nominations by the number of peers in each group.

Lastly, using data from the friendship survey, the number of *reciprocal friendships* each child had was calculated. After children reported their list of friends, children were instructed to state who their top 3 friends were, and who their best friend was. Children were considered to have

reciprocal friendships if they selected each other as top 3 friends. This method has been used in studies examining social networks across school settings that include children with ASD (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). To account for differences among bunks, a ratio score was developed. Children's reciprocal friendship score was divided by the highest reciprocal friendship score in each bunk.

Data Analytic Plan

The first research question, which analyzed the differences between child and counselor ratings on the Self-Perception Profile for Children measure (Harter,1985), was analyzed using Discrepancy analysis and the polynomial regression method described by (Laird & La Fleur, 2016). The association between overestimation of abilities with demographic factors and level of impairment, was measured by using the Total Problems composite score from the CBCL (Achenbach, 2001), and was analyzed using the polynomial regression method described by (Laird & La Fleur, 2016) as follows:

$$C = b0 + b1\mathrm{T} + b2\mathrm{P} + b3\mathrm{PT} + e \quad 12.$$

C= Child score on the Self-Perception Profile for Children- Teacher measure, T = Counselor score on the Self-Perception Profile for Children measure, and P= predictors (demographic factors (e.g., age, diagnosis, gender, and parent CBCL ratings). In the model, all of the scores were centered by subtracting their means. Initially, all the demographic variables were included in the model, the variables that were not significant were reported in the analysis. Polynomial regressions provide the opportunity to test the interactions among the terms.

To examine the results of the second aim of this study, child and counselor self-perception ratings were analyzed using multiple linear regression with a simultaneous predictor

entry. Multiple regressions allow for the prediction of the degree that one outcome variable (e.g., peer social friendship score, friendship score, and number of reciprocal friendship) was associated with the independent variables, which included child and counselor ratings on both social and behavioral domains. Each independent variable was examined in a separate equation, with the friendship variable as the dependent variable and was analyzed using the following model.

$$Y = b0 + b1\text{CS} + b2\text{CB} + b1\text{TS} + b2\text{TB} + e \quad 12$$

Y= Friendship variable, CS = Child score on the Social Domain of the Self-Perception Profile for Children measure, and CB = Child score on the Behavior Domain of the Self-Perception Profile for Children measure, TS = Counselor score on the Social Domain of the Teacher's Rating Scale of Child's Actual Behavior, and TB = Counselor score on the Behavior Domain of the Teacher's Rating Scale of Child's Actual Behavior. Additionally, participants were drawn from groups (6 groups) to ensure that the assumption of independence is tenable age was used as a proxy for group and the significance was analyzed using multiple linear regression with a simultaneous predictor entry. Multiple regressions allowed for the prediction of the degree that one outcome variable (e.g., peer social friendship score, friendship score, and number of reciprocal friendship) was associated with several predictor variables, including, age, diagnosis, gender, race, and parent CBCL ratings.

Chapter 4: Results

Sample Characteristics

The final analytic sample contained 71 participants. Table 1 displays demographic characteristics (i.e., gender, diagnosis, race and ethnicity, and age) of the children in the analytic sample. Parents of all participants provided information regarding demographic information and

completed a CBCL. Six counselors completed Harter's Teacher's Rating Scale of the Child's Actual Behavior rating scale.

Table 1.
Demographic Variables of Child Participants in Analytic Sample(N=71)

Measure	*n*	*%*
Gender		
Female	16	22.50
Male	55	77.50
Age		
8	23	32.40
9	26	36.60
10	15	21.10
11	5	7.00
12	2	2.80
Diagnosis		
ASD	35	48,6
ADHD	65	66.20
Race		
Asian	8	11.30
Black	2	2.80
Latinx	1	1.40
Multiracial	9	12.50
White	48	67.70
Other	3	4.20

Data Quality

SPSS 21 statistical software was used for all analysis. Correlations and descriptive statistics were calculated first. Listwise deletion was used for missing data, which resulted in 71 participants in the analysis for question one and 65 participants for the analysis of question two. For all continuous study variables in each model, normality, linearity, homoscedasticity, and independence was assessed. Visual analysis of histograms and P-P plots indicated that across all models, data approximated a normal distribution. Linearity was visually assessed using the

residual scatter plots, across all models none of the residual plots showed curvilinearity, demonstrating that linearity was tenable. Similarly, homoscedasticity was visually assessed using scatter plots of the regression values against the regression residuals. Across all variables there was no increase or decrease of variable spread, indicating that homoscedasticity was tenable. Variable means, standard deviations, skew indices and kurtosis indices also supported this finding. Independence of residuals is tenable since group membership was accounted for in the model and the intervention was implemented in one setting. STP group membership was accounted for in the data by creating ratio scores for the number of received friendships and reciprocal friendship scores specific to each group. A sensitivity power analysis was conducted for the analyses using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). With an alpha level of .80 and a sample size of 71 the effect size was determined to equal 0.32, indicating a small effect (Cohen, 1988).

Discrepancy analysis and polynomial regression methods were both conducted to measure agreement and disagreement about competence, and how this related to demographic predictors. First, the base rates of discrepancies between child and counselor ratings of competence in social and behaviors domains were examined to determine the presence of agreement and disagreement. Shanock, Baran, Gentry, Pattison, & Heggestad, 2010, recommend this step should be conducted prior to conducting a polynomial regression analysis to provide a rationale for further exploring the discrepancies between raters. Difference scores were calculated by subtracting the counselor rating for the child rating in each domain. As proposed in previous literature, scores with a competence rating one-half a standard deviation above or below the other competence rating was considered discrepant (Shanock et al., 2010). Percentages of agreement and disagreement were examined for both the social and behavior domains (see Table

3). The presence of discrepancies between self and counselor ratings, provides a rationale for moving forward with a polynomial regression analysis (Shanock et al., 2010). The polynomial regression analysis required data preparation. First, ratings from both child and counselor social and behavior ratings were mean centered prior to analysis. Potential predictors were: CBCL Parent ratings, diagnosis, age, race, and gender. CBCL scores were developed by following the CBCL scoring manual. The score on the Total Score composite was standardized and then included in the regression model. For ease of results interpretation diagnostic category (ASD and ADHD), gender, and race were dummy coded, and age was standardized. Each predictor was examined in a separate equation with child-reported competence as the dependent variable.

Results for Question #1a: Prevalence of Overestimation of Abilities

Compared with counselors, during week one of the program, children reported significantly less severe social and behavioral abilities. Regarding social abilities, 98.6% of participants overreported their abilities, while 1.4 underestimation their abilities compared to counselors. From the children that over overreported their abilities, 91.7% overreported their abilities by at least half a standard deviation. From the 1.4% of children who underestimated their abilities, 1.4 % underestimated their abilities by at least half a standard deviation. Similarly, 94.4% of participants overreported their behavioral abilities, while 2.8% underestimated, and 2.8% provided similar ratings. From the children that over overreported their abilities, 86.1% overreported their abilities by at least half a standard deviation. From the 2.8% of children who underestimated their abilities, 1.4 % underestimated their abilities by at least half a standard deviation.

Table 2.

Frequencies of SPPC Scores Over, Under, and In- Agreement With SPPC-TRS Scores.

Agreement Groups	n	% of sample	*M* SPPC	*M* SPPC-TRS
Social Domain	n = 67		16.75	7.71
Child overestimation	66	91.7		
In agreement	0	0.00		
Child underestimation	1.00	1.40		
Behavior Domain	n = 67		17.48	9.20
Child overestimation	62	86.10		
In agreement	4	0.00		
Child underestimation	1.00	1.40		

Note. Both the SPPC and SPPC-TRS are measured on a 4-point scale with higher numbers representing greater competence ratings. SPCC= Self-Perception profile for Children; SPCC-TRS= Self-Perception Profile for Children- Teacher Rating Scale (Harter, 2012,). Percent of sample overreported or underestimated by .5 SD.

Figure 1.

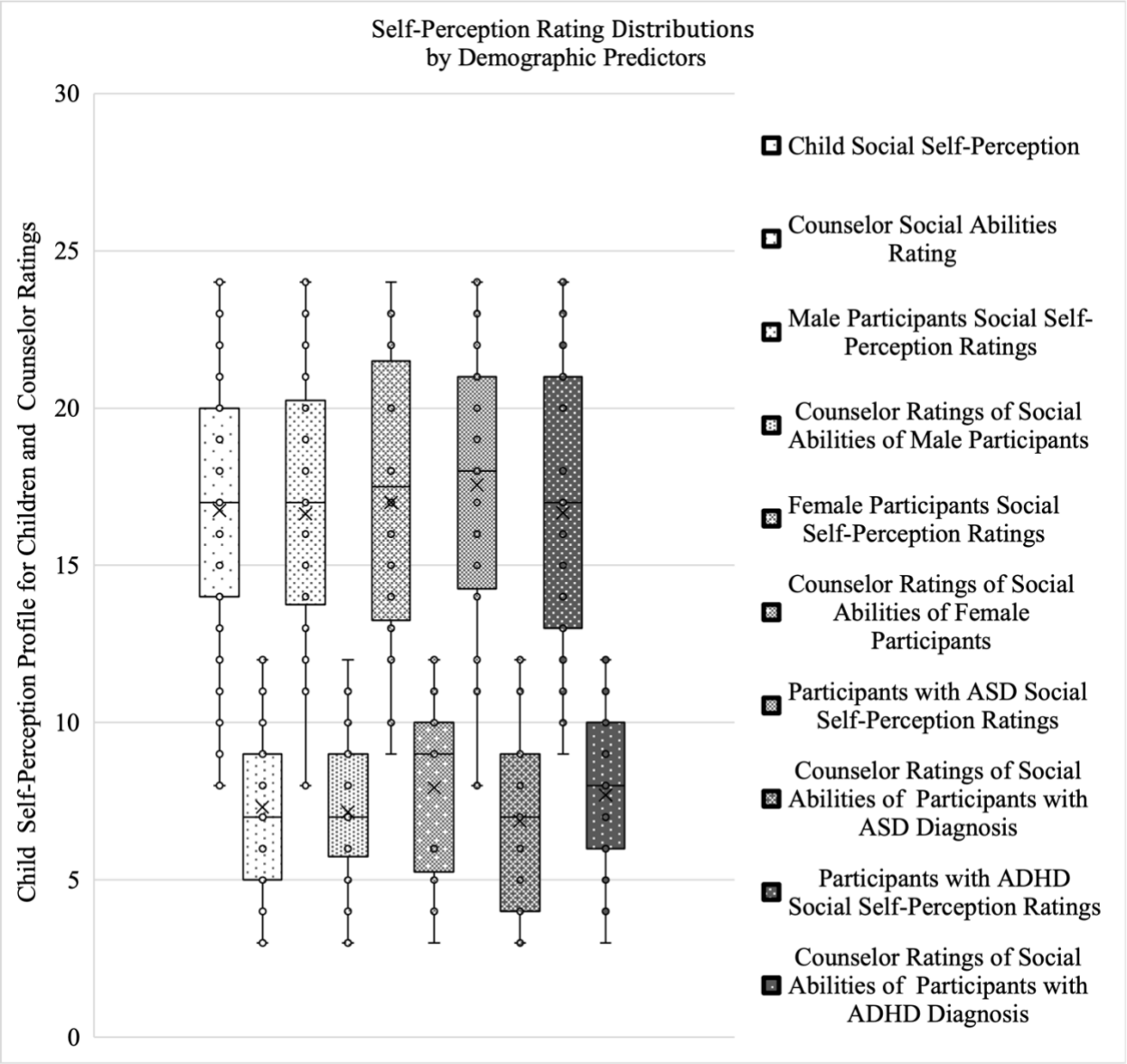

Figure 1. Difference Between Child and Counselor Ratings Across Demographic Predictors

Results for Question #1b: Polynomial Regression Predictor Models

Bivariate correlations are presented for all measures in Table 3. No Indications of multicollinearity were detected. For the self-report of social abilities, polynomial predictions models were non-significant for level of impairment, indicating that level of impairment, age, diagnosis, race, gender, did not influence the extent to which children matched with counselor

ratings (R^2 =.031, *SE*=0.03, *p*=.584), age (R^2 =.068, *SE*=0.225, *p*=.609), ASD (R^2 =.126, *SE*=0.405, *p*=.329), ADHD (R^2 =.097, *SE*=0.410, *p*=.099), race (R^2 =.117, *SE*=0.427, *p*=.424), and gender (R^2 =.088, *SE*=0.432, *p*=.126). For behavioral abilities, polynomial prediction models were non-significant for level of impairment (R^2 =.010, *SE*=0.26, *p*=.800), age (R^2 =.069, *SE*=0.190, *p*=.614), ASD (R^2 =.060, *SE*=0.367, *p*=.541), ADHD (R^2 =.047, *SE*=0.375, *p*=.538), race (R^2 =.035, *SE*=0.405, *p*=.612), and gender (R^2 =.063, *SE*=0.680, *p*=.106) were not significant (see Table 3).

Table 3.
Child Report x Predictor Interactions for Polynomial Regression Equations.

Measure	*b*	*SE*	*β*	*p*
Child Report on Social Abilities				
Counselor Report X CBCL Total Score	-0.02	0.03	-0.07	0.584
Counselor Report X Age	-0.12	0.23	-0.07	0.609
Counselor X ASD	0.40	0.41	0.18	0.329
Counselor Report X ADHD	-0.69	0.41	-0.31	0.099
Counselor Report X Nonminority	0.34	0.43	0.17	0.424
Counselor Report X Gender	0.67	0.43	0.33	0.126
Child Report on Behavior				
Counselor Report X CBCL Total Score	0.01	0.03	-0.04	0.800
Counselor Report X Age	0.10	0.19	0.07	0.614
Counselor X ASD	-0.23	0.37	-0.12	0.541
Counselor Report X ADHD	-0.23	0.38	-0.13	0.538
Counselor Report X Nonminority	-0.21	0.41	-0.12	0.612
Counselor Report X Gender	-1.11	0.68	-0.69	0.106

Note. *b* = unstandardized regression coefficient; *SE* = standard error; β = standardized regression coefficient; *p* = statistical significance.
*p < .05.

Results for Question #2a: Self-perception of Social and Behavioral Abilities and Peer Relationships

Multiple linear regression with simultaneous predictor entry was used to examine the association between self-perception of social and behavioral abilities and friendship variables. Across child and counselor reports from week one, none of the predictors (reciprocal friendships, social preference score, and friendship scores) were not significantly correlated, and as such, each predictor likely contributes uniquely to the model. Means, standard deviations, and zero-order correlations among all variables are provided in Tables 4, 5, and 6.

During the first week of the STP, as shown in Table 7, self-perception scores and the reciprocal friendship ratio scores was significant $R^2 = .082$, *SE*=0.40 *p*=0.276. Counselor self-perception on social skills did not uniquely contribute to the model (*p*=.179). Counselor behavior ratings did not uniquely contribute to the model (*p*=0.859). Child self-perception of social abilities did not significantly contribute to the model (*p*= 0.190). Child self-perception of behavioral abilities did not significantly contribute to the model, *p*=.722. Thus, only child self-perception uniquely contributed to the model.

As shown in Table 8, the model analyzing the relationship between child and counselor ratings and social preference was non-significant $R^2 = .040$, *SE*=0.16, *p*= 0.635. Counselor social abilities ratings were insignificant (*p*=.127). Similarly, counselor behavior ratings did not significantly contribute to the model (*p*=.723). Child self-perception of social abilities did not significantly contribute to the model (*p*=.926). Child self-perception of behavioral abilities did not significantly contribute to the model, (*p*=.961). None of the relationships between child and counselor ratings and social preferences uniquely contributed to the model.

As shown in Table 9, child and counselor ratings and the friendship score was not significant ($R^2 = .022$, *SE*=0.16, *p*= 0.853). Counselor self-perception on social skills did not

significantly contribute to the model (p=.354). Counselor behavior ratings did not uniquely contribute to the model (p=0.843). Child self-perception of social abilities did not significantly contribute to the model (p=.679). Child self-perception of behavioral abilities did not significantly contribute to the model, (p=.581).

Results for Question #2b: Peer Relationships and Demographic Factors

The results demonstrated that that during week one of the STP, across child and counselor reports, demographic predictors (age, diagnosis, gender, race, level of impairment) were not significantly correlated, and as such, multicollinearity is unlikely. Means, standard deviations, and zero-order correlations among all variables are given in Tables 10, 11, and 12. During the first week of the STP, reciprocal friendship ratio scores were not significantly associated with any of the demographic model, R^2 =.066, SE=0.40 p=0.690 (see Table 13). Similarly, peer social preference scores were not significantly associated with demographic factors, R^2 =.052, SE=0.15 p=0.784 (see Table 14). Lastly, friendship scores were not significantly associated with demographic factors, R^2 =.096, SE=0.17 p=0.437 (see Table 15). None of the predictor variables were correlated with the outcome variables.

Table 4.
Week 1 Self-Perception Predictors and Reciprocal Friendship Ratio Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	*M*	*SD*	*Skewness*	*Kurtosis*	*[Min, Max]*
Outcomes									
Reciprocal Friendship Ratio	--				0.35	0.40			
Predictors									
Counselor Report of Social Abilities	.23	--			7.31	2.59	0.00	-0.95	[3, 12]
Counselor Report of Behavior Abilities	.01	.25	--		9.23	2.75	-0.81	-0.39	[3, 12]
Child Self-Perception of Social Abilities	.22	.25	-.04	--	16.81	4.29	-0.06	-0.78	[8, 24]
Child Self-Perception of Behavior Abilities	.03	.00	.12	.42	17.41	4.00	-0.14	-0.74	[8, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5.
Week 1 Self-Perception Predictors and Social Preference Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	5.	M	SD	Skewness	Kurtosis	[Min, Max]
Outcomes										
Social Preference Score	--					0.16	0.16			
Predictors										
Counselor Report of Social Abilities	.19	--				7.31	2.55	0.00	-0.95	[3, 12]
Counselor Report of Behavior Abilities	.00	.24	--			9.34	2.74	-0.81	-0.39	[3, 12]
Child Self-Perception of Social Abilities	.03	.23	-.05	--		16.75	4.25	-0.06	-0.78	[8, 24]
Child Self-Perception of Social Abilities	-.02	-.01	.13	.39	--	17.48	3.99	-0.14	-0.74	[8, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 6.
Week 1 Self-Perception Predictors and Friendship Score Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	5.	*M*	*SD*	*Skewness*	*Kurtosis*	*Min, Max*
Outcomes										
Friendship Score	--					0.24	0.16			
Predictors										
Counselor Report of Social Abilities	.12	--				7.29	2.58	0.00	-0.95	[3, 12]
Counselor Report of Behavior Abilities	.07	.24	--			9.28	2.75	-0.81	-0.39	[3, 12]
Child Self-Perception of Social Abilities	.00	.25	-.05	--		16.78	4.26	-0.06	-0.78	[8, 24]
Child Self-Perception of Social Abilities	.06	-.01	.14	.40	--	17.51	4.05	-0.14	-0.74	[8, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 7.
Multiple Linear Regression with Standard Predictor Entry Reciprocal Friendships Week and Self-Perceptions Profile Ratings Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Reciprocal Friendship Ratio	0.08	0.02	1.31	0.276					
Counselor Report of Social Abilities					0.18	0.02	1.36	0.179	0.03
Counselor Report of Behavior Abilities					-0.02	0.02	-0.18	0.856	0.00
Child Self-Perception of Social Abilities					0.19	0.01	1.33	0.190	0.03
Child Self-Perception of Social Abilities					-0.05	0.01	-0.36	0.722	0.00

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 8.
Multiple Linear Regression with Standard Predictor Entry Social Preference and Self-Perceptions Profile Ratings Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Social Preference	0.40	-0.02	0.64	0.635					
Counselor Report of Social Abilities					0.21	0.01	1.55	0.127	0.04
Counselor Report of Behavior Abilities					-0.05	0.01	-0.36	0.723	0.00
Child Self-Perception of Social Abilities					-0.01	0.01	-0.09	0.926	0.00
Child Self-Perception of Social Abilities					-0.01	0.01	-0.05	0.961	0.00

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 9.
Multiple Linear Regression with Standard Predictor Entry Friendship Score and Self-Perceptions Profile Ratings Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Friendship Score	0.02	-0.04	0.34	0.853					
Counselor Report of Social Abilities					0.13	0.01	0.93	0.354	0.01
Counselor Report of Behavior Abilities					0.03	0.01	0.20	0.843	0.00
Child Self-Perception of Social Abilities					-0.06	0.01	-0.42	0.679	0.00
Child Self-Perception of Social Abilities					0.08	0.01	0.56	0.581	0.01

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 10.
Reciprocal Friendships Ratio Week 1 and Predictors Correlation Table

Measure	1.	2.	3.	4.	5.	6.	7.	*M*	*SD*	*Skewness*	*Kurtosis*	
Outcomes												
Reciprocal Friendship Ratio Week 1	--							0.33	0.40			
Predictors												
ASD	.22	--						0.50	0.50	0.03	-2.06	[0, 1]
ADHD	.16	.58	--					0.66	0.48	-0.70	-1.56	[0, 1]
Nonminority	.12	.14	.14	--				0.71	0.46	-0.77	-1.45	[0, 1]
Male	.03	.19	.09	.03	--			0.76	0.43	-1.34	-0.20	[0, 1]
ZscoreAge	.10	.15	.04	.20	.07	--		0.25	0.83	0.80	0.21	[-0.71, 2.63]
Parent CBCL Total ZScore	.04	.06	.13	.06	.06	.15	--	0.10	1.01	-1.36	3.37	[-4.16, 1.88]

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score
* $p < .05$, ** $p < .01$, *** $p <$ .001.

Table 11.

Social Preference Score Week 1 and Predictors Correlation Table

Measure	1.	2.	3.	4.	5.	6.	7.	*M*	*(SD)*	*Skewness*	*Kurtosis*	*[Min, Max]*
Outcomes												
Social Preference Week 1	--							0.15	0.15			
Predictors												
ASD	.09	--						0.49	0.50	0.03	-2.06	[0, 1]
ADHD	.15	.55	--					0.65	0.48	-0.70	-1.56	[0, 1]
Nonminority	.06	.14	.20	--				0.69	0.47	-0.77	-1.45	[0, 1]
Male	.04	.17	.10	.05	--			0.77	0.43	-1.34	-0.20	[0, 1]
ZscoreAge	.15	.11	.05	.17	.09	--		0.21	0.83	0.80	0.21	[-0.71, 2.63]
Parent CBCL Total ZScore	.01	.01	.13	.18	.05	.11	--	0.09	1.02	-1.36	3.37	[-4.16, 1.88]

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 12.

Friendships Score Week 1 Predictors Correlation Table

Measure	1.	2.	3.	4.	5.	6.	7.	*M*	*SD*	*Skewness*	*Kurtosis*	*[Min, Max]*
Outcomes												
Friendship Score Week 1	--							0.23	0.16			
Predictors												
ASD	.13	--						0.49	0.50	0.03	-2.06	[0, 1]
ADHD	.01	.54	--					0.65	0.48	-0.70	-1.56	[0, 1]
Nonminority	.19	.11	.17	--				0.70	0.46	-0.77	-1.45	[0, 1]
Male	.11	.18	.10	.04	--			0.76	0.43	-1.34	-0.20	[0, 1]
ZscoreAge	.03	.13	.06	.16	.08	--		0.23	0.83	0.80	0.21	[-0.71, 2.63]
Parent CBCL Total ZScore	.13	.03	.16	.22	.04	.12	--	0.07	1.03	-1.36	3.37	[-4.16, 1.88]

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 13.

Multiple Linear Regression with Standard Predictor Entry Reciprocal Friendships Score and Demographics Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Reciprocal Ratio Score	0.07	-0.04	0.65	0.690					
ASD					-0.16	0.13	-0.99	0.33	0.02
ADHD					0.04	0.14	0.26	0.79	0.00
White					0.11	0.12	0.78	0.44	0.01
Male					0.01	0.12	0.09	0.93	0.00
ZscoreAge					0.10	0.07	0.76	0.45	0.01
Parent CBCL Total Score Zscore					0.03	0.05	0.19	0.85	0.00

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 14.

Multiple Linear Regression with Standard Predictor Entry Social Preference Score and Demographics Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Social Preference Score	0.05	-0.05	0.53	0.784					
ASD					0.00	0.05	0.02	0.99	0.00
ADHD					0.14	0.05	0.86	0.39	0.01
White					0.07	0.04	0.48	0.63	0.00
Male					0.07	0.05	0.55	0.59	0.00
ZscoreAge					0.17	0.02	1.25	0.22	0.03
Parent CBCL Total Score Zscore					-0.02	0.02	-0.02	0.99	0.00

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 15.

Multiple Linear Regression with Standard Predictor Entry Friendship and Demographics Week 1

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Friendship Score	0.10	0.00	1.00	0.437					
ASD					-0.22	0.05	-1.44	0.16	0.03
ADHD					-0.06	0.05	-0.41	0.69	0.00
White					-0.19	0.05	-1.46	0.15	0.03
Male					0.13	0.05	0.99	0.33	0.02
ZscoreAge					0.09	0.03	-0.69	0.49	0.01
Parent CBCL Total Score Zscore					-0.10	0.02	-0.77	0.45	0.01

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

During the fifth week of the STP, as shown in Table 19, self-perception scores collected on the first week were significantly associated with the reciprocal friendship ratio scores collected on the fifth week of the program $R^2 = .195$, *SE*=0.32, *p*=0.009. Counselor self-perception on social skills did not uniquely contribute to the model (*p*=.168) and contributed to 2.5% of the variance in the model. Counselor behavior ratings did not uniquely contribute to the model (*p*=0.089) and contributed to 3.5% of the variance in the model. Child self-perception of social abilities uniquely contributed to the model (*p*= 0.020) and contributed to 7.4% variance of the model. Child self-perception of behavioral abilities did not significantly contribute to the model, p=.074, and contributed to the model by 4.2%.

As shown in Table 20, the model analyzing the relationship between child and counselor ratings and social preference was significant $R^2 = .210$, *SE*=0.175, *p*=0.005. Counselor social abilities ratings significant and uniquely contributed to the model (*p*=.037). Counselor social skills ratings accounted for 5.8% of the variance. Counselor behavior ratings uniquely contributed to the model significantly (*p*=.015) and contributed to 8.0% of the variance in the model. Child self-perception of social abilities did not significantly contribute to the model (*p*=.395). Child self-perception of behavioral abilities did not significantly contribute to the model, (*p*=.607).

As shown in Table 21, child and counselor ratings and the friendship score were not significant $R^2 = .091$, *SE*=0.16, *p*=0.197. Counselor self-perception on social skills did not significantly contribute to the model (*p*=.094). Counselor social skills ratings accounted for 4.24% of the variance. Counselor behavior ratings did not uniquely contribute to the model (*p*=0.564). Child self-perception of social abilities did not significantly contribute to the model

(p=.323). Child self-perception of behavioral abilities did not significantly contribute to the model, (*p*=.480).

Result demonstrated that that during week five of the STP, across child and counselor reports, demographic predictors (age, diagnosis, gender, race, level of impairment) were not significantly correlated, and as such, each predictor will likely contribute uniquely to the model. Means, standard deviations, and zero-order correlations among all variables are given in Tables 22, 23, and 24. During the fifth week of the STP, reciprocal friendship ratio scores were not significantly associated with any of the demographic model, $R^2 = .040$, *SE*=0.36. *p*=0.872 (see Table 25). Similarly, peer social preference scores were not significantly associated with demographic factors, $R^2 = .066$, *SE*=0.20 *p*=0.668 (see Table 26). Lastly, friendship scores were not significantly associated with demographic factors, $R^2 = .034$, *SE*=0.17 *p*=0.914 (see Table 27).

Table 16.
Week 5 Self-Perception Predictors and Reciprocal Friendship Ratio Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	5.	*M*	*SD*	*Skewness*	*Kurtosis*	*[Min, Max]*
Outcomes										
Reciprocal Friendship Ratio	--					0.49	0.34			
Predictors										
Counselor Report of Social Abilities	.29	--				7.70	2.78	-0.38	-0.58	[0, 12]
Counselor Report of Behavior Abilities	.23	.22	--			9.21	2.93	-0.74	-0.10	[0, 12]
Child Self-Perception of Social Abilities	.28	.28	.10	--		17.25	4.30	-0.01	-1.02	[9 24]
Child Self-Perception of Behavior Abilities	-.05	.06	.20	.43	--	17.58	4.51	-0.28	-0.56	[7, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile For Children (Harter, 2012).

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 17.
Week 5 Self-Perception Predictors and Social Preference Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	5.	M	SD	Skewness	Kurtosis	[Min, Max]
Outcomes										
Social Preference	--					0.22	0.19			
Predictors										
Counselor Report of Social Abilities	.35	--				7.70	2.78	-0.38	-0.58	[0, 12]
Counselor Report of Behavior Abilities	.35	.22	--			9.21	2.93	-0.74	-0.10	[0, 12]
Child Self-Perception of Social Abilities	.18	.28	.10	--		17.25	4.30	-0.01	-1.02	[9 24]
Child Self-Perception of Behavior Abilities	.06	.06	.20	.43	--	17.58	4.51	-0.28	-0.56	[7, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 18.
Week 5 Self-Perception Predictors and Friendship Score Bivariate Correlation Matrix.

Measure	1.	2.	3.	4.	5.	*M*	*SD*	*Skewness*	*Kurtosis*	*[Min, Max]*
Outcomes										
Friendship Score	--					0.31	0.16			
Predictors										
Counselor Report of Social Abilities	.27	--				7.70	2.78	-0.38	-0.58	[0, 12]
Counselor Report of Behavior Abilities	.12	.22	--			9.21	2.93	-0.74	-0.10	[0, 12]
Child Self-Perception of Social Abilities	.17	.28	.10	--		17.25	4.30	-0.01	-1.02	[9 24]
Child Self-Perception of Social Abilities	-.01	.06	.20	.43	--	17.58	4.51	-0.28	-0.56	[7, 24]

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 19.

Multiple Linear Regression with Standard Predictor Entry Reciprocal Friendships and Self-Perceptions Profile Ratings Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Reciprocal Friendship Ratio	0.20	0.14	3.75	0.009					
Counselor Report of Social Abilities					0.17	0.02	1.40	0.168	0.03
Counselor Report of Behavior Abilities					0.21	0.01	1.73	0.089	0.04
Child Self-Perception of Social Abilities					0.32	0.01	2.39	0.020	0.07
Child Self-Perception of Social Abilities					-0.23	0.01	-1.82	0.074	0.04

Note. N=71. Counselor Report= Counselor Ratings Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 20.

Multiple Linear Regression with Standard Predictor Entry Social Preference and Self-Perceptions Profile Ratings Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Social Preference	0.21	0.16	4.12	0.005					
Counselor Report of Social Abilities					0.26	0.01	2.14	0.037	0.06
Counselor Report of Behavior Abilities					0.30	0.01	2.51	0.015	0.08
Child Self-Perception of Social Abilities					0.11	0.01	0.86	0.395	0.01
Child Self-Perception of Social Abilities					-0.07	0.01	-0.52	0.607	0.00

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 21.

Multiple Linear Regression with Standard Predictor Entry Friendship Score and Self-Perceptions Profile Ratings Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(2,64)$	p	b	SE	$t(62)$	p	sr^2
Friendship Score	0.09	0.03	1.56	0.197					
Counselor Report of Social Abilities					0.22	0.01	1.70	0.094	0.04
Counselor Report of Behavior Abilities					0.07	0.01	0.58	0.564	0.00
Child Self-Perception of Social Abilities					0.14	0.01	1.00	0.323	0.01
Child Self-Perception of Social Abilities					-0.10	0.01	-0.71	0.480	0.01

Note. N=71. Counselor Report= Counselor Ratings on Teacher's Rating Scale of Child's Actual Behavior (Harter, 2012). Child Self-Perception Social and Behavior Ratings= Ratings on Self-Perception Profile for Children (Harter, 2012).

Table 22.

Reciprocal Friendships Ratio Week 5 and Predictors Correlation Table

Measure	*M*	*(SD)*	*Skewness*	*Kurtosis*	*[Min, Max]*	1.	2.	3.	4.	5.	6.	7.
Outcomes												
Reciprocal Friendship Ratio	0.48	(0.35)				--						
Predictors												
ASD	0.49	(0.50)	0.03	-2.06	[0, 1]	.14	--					
ADHD	0.65	(0.48)	-0.70	-1.56	[0, 1]	.18	.56	--				
White	0.69	(0.47)	-0.77	-1.45	[0, 1]	.04	.14	.20	--			
Male	0.77	(0.43)	-1.34	-0.20	[0, 1]	.05	.17	.10	.05	--		
ZscoreAge	0.21	(0.83)	0.80	0.21	[-0.71, 2.63]	.03	.11	.05	.17	.09	--	
Parent CBCL Total ZScore	0.09	(1.02)	-1.36	3.37	[-4.16, 1.88]	.01	.01	.13	.18	.05	.11	--

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 23.

Social Preference Score Week 5 Correlation Table

Measure	1.	2.	3.	4.	5.	6.	7.	M	SD	Skewness	Kurtosis	[Min, Max]
Outcomes												
Social Preference Week 5	--							0.23	0.19			
Predictors												
ASD	.14	--						0.49	0.50	0.03	-2.06	[0, 1]
ADHD	.14	.56	--					0.65	0.48	-0.70	-1.56	[0, 1]
White	.03	.14	.20	--				0.69	0.47	-0.77	-1.45	[0, 1]
Male	.11	.17	.10	.05	--			0.77	0.43	-1.34	-0.20	[0, 1]
ZscoreAge	.11	.11	.05	.17	.09	--		0.21	0.83	0.80	0.21	[-0.71, 2.63]
Parent CBCL Total ZScore	.07	.01	.13	.18	.05	.11	--	0.09	1.02	-1.36	3.37	[-4.16, 1.88]

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 24.

Friendships Score and Predictors Week 5 Correlation Table

Measure	1.	2.	3.	4.	5.	6.	7.	M	SD	Skewness	Kurtosis	[Min, Max]
Outcomes												
Friendship Score Week 5	--							0.23	0.16			
Predictors												
ASD	-.13	--						0.49	0.50	0.03	-2.06	[0, 1]
ADHD	-.01	.54	--					0.65	0.48	-0.70	-1.56	[0, 1]
White	-.19	.11	.17	--				0.70	0.46	-0.77	-1.45	[0, 1]
Male	.11	.18	.10	.04	--			0.76	0.43	-1.34	-0.20	[0, 1]
ZscoreAge	-.03	.13	.06	.16	.08	--		0.23	0.83	0.80	0.21	[-0.71, 2.63]
Parent CBCL Total ZScore	1.32	.03	.16	.22	.04	.12	--	0.07	1.03	-1.36	3.37	[-4.16, 1.88]

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Nonminority= White Racial Background, Parent CBCL Score= Child Behavior Checklist Total Score

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 25.
Multiple Linear Regression with Standard Predictor Entry Reciprocal Friendships Score and Demographics Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Reciprocal Ratio Score	0.04	-0.06	0.41	0.872					
ASD					-0.05	0.11	-0.33	0.07	0.00
ADHD					0.16	0.12	1.02	0.31	0.02
White					-0.08	0.10	-0.58	0.57	0.01
Male					-0.03	0.11	-0.22	0.83	0.00
ZscoreAge					0.00	0.06	0.02	0.99	0.00
Parent CBCL Total Score Zscore					-0.02	0.05	-0.15	0.88	0.00

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 26.
Multiple Linear Regression with Standard Predictor Entry Social Preference Score and Demographics Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Social Preference Score	0.07	-0.03	0.68	0.668					
ASD					-0.09	0.06	-0.58	0.56	0.01
ADHD					0.12	0.06	0.74	0.46	0.01
White					-0.08	0.05	-0.58	0.57	0.01
Male					-0.10	0.06	-0.76	0.45	0.01
ZscoreAge					-0.16	0.03	-1.20	0.23	0.02
Parent CBCL Total Score Zscore					-0.08	0.02	-0.64	0.52	0.01

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 27.

Multiple Linear Regression with Standard Predictor Entry Friendship and Demographics Week 5

	R^2_{total}	$R^2_{adjusted}$	$F(6,55)$	p	b	SE	$t(62)$	p	sr^2
Friendship Score	0.34	-0.66	.388	0.914					
ASD					-0.15	0.05	-.093	0.93	0.00
ADHD					0.14	0.05	0.94	0.35	0.01
White					-0.10	0.05	-.737	0.46	0.00
Male					-0.14	0.05	-.109	0.91	0.00
ZscoreAge					-0.88	0.03	-0.66	0.51	0.00
Parent CBCL Total Score Zscore					-0.54	0.02	-0.54	0.68	0.00

Note. N=71. ASD=Autism Spectrum Disorder, ADHD=Attention Deficit Hyperactivity Disorder, Parent CBCL Score= Child Behavior Checklist Total Score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Chapter 5: Discussion

To support the understanding of symptomatology of children with ASD and ADHD, information from multiple raters is often gathered. Previous research has demonstrated that in comparison to counselors, teachers, or parents, children with ADHD are more likely to overreport their social and behavioral abilities. While the literature in the field of ASD is smaller, and limited to adolescents, previous studies have highlighted that adolescents with ASD often overreport their social and behavioral abilities. With this understanding, ratings from children with ASD and ADHD are often interpreted with caution, or not gathered at all. A large body of literature has analyzed the difference between children and parent or counselor ratings by employing a discrepancy method, in which the child's score is subtracted from the counselor and parent score. Recent literature has cautioned the use of this methodology in this field and has supported the utilization of a statistical methodology that allows for the analysis of the *interactions* between child and counselor ratings and predictive factors. Recent literature has demonstrated that there may be predicting factors, such as level of impairment, that are related to children overreporting their social and behavioral abilities. Continuing to explore what predicting factors are associated with overreporting provides clinical and practical implications for the administration and interpretation of child self-reports for children with ASD and ADHD.

Another way children's self-reports have been examined is by analyzing social relationships. This allows for *both* children and peers to provide their perspectives of their friendships. While gathering information about social relationship provides the opportunity to collect data from additional informants (e.g., peers), it also provides children another avenue to self-report on their social abilities. Examining children's self-report rating of social and behavioral abilities in conjunction to their reports on social relationships supports the

understanding on how much children's self-perception ratings contribute to their social functioning in real-world settings. This provide additional information regarding predictors that may be related to children's with ASD and ADHD reporting's of social and behavioral abilities.

Overview of Study Findings

This study had four overarching goals. First, to learn about the prevalence of overreporting of abilities in children with ASD and/or ADHD. Second, to evaluate the interaction between overreporting and demographic factors. Third, to learn about the association between self-perception of social and behavioral abilities and social relationships at multiple time points. Lastly, to evaluate the association between social relationships and demographic characteristics. Across the research questions, it was hypothesized that predictive factors may relate to both overreporting and social relationships. To our knowledge, this is the first study to analyze differences in reporting and social relationships with a sample that includes both children with ASD and ADHD. This is also the first study to examine self-perception within a summer treatment program using a polynomial regression methodology. Study findings are summarized and interpreted.

Prevalence of Overreporting of Social and Behavioral Abilities

The results demonstrated that the majority of the sample (86.1%) overreported social and behavioral abilities compared with counselors by at least one half of a standard deviation. Only a small portion had agreement with the counselor or underestimated their social and behavioral competence, These findings are consistent with previous research that has demonstrated that youth with ADHD (Bourchtein et al., 2018; Fefer, Ogg, & Dedrick, 2018) and ASD (Foley Nicpon, Doobay, & Assouline, 2010; Johnson, Filliter, & Murphy, 2009) may overreport abilities when compared to other informants. It is noteworthy to mention that the sample of this

study only included a clinical sample of youth with ASD and ADHD. It may be that the restriction of range due to the sample of convenience may relate to the lack of variability within the results for this clinical sample. Additionally, these results suggest that while self-reports of children with ASD or ADHD may need to be interpreted with caution, gathering child self-reports on their social and behavioral abilities provides the opportunity to learn about their perception and awareness of their current abilities.

Interaction Between Child Social and Behavioral Self-Reports and Demographic Factors

Following recommendations from recent research (Laird & LaFleur, 2016; Sibley, Campez, & Raiker, 2019) this study employed a polynomial regression to examine the interaction between child and counselor reports and a number of predictor variables. The predicting variables included demographic factors and child level of impairment, as reported by children's parents. Overall, the results of this study demonstrated that there was not a significant interaction between the demographic factors and the child and counselor reports of social and behavioral abilities. While previous research has examined the relations between demographic factors and child and reporting from other informants (Bourchtein et al., 2018; Jia, Jiang, & Mikami, 2016), this study is one of the first studies to examine demographic factors that include diagnosis, gender, and racial background using a polynomial regression analysis. These results provide a rationale for the continuation of employment of polynomial regressions to examine the interaction between child and counselor or parent reports. This study highlights the methodological factors that contribute to this body of literature and their limitations, such as the restriction of range within this study's sample. It provides a further understanding of predicting factors that may contribute to differences in reporting.

Interaction Between Child Social and Behavioral Self-Reports and Diagnosis

The results demonstrated that there were no differences in reporting between children with ADHD and ASD. Previous research examining child-self-perception has primarily been conducted with children with ADHD (Evangelista, Owens, Golden, & Pelham, 2008; Fefer et al., 2018; Mikami, Calhoun, & Abikoff, 2010). There is limited research for children with ASD. The results of this study revealed that within the Summer Treatment Program, ASD and ADHD were not significantly predictive of reporting when compared to counselor reports. This suggests that overreporting within this sample occurred across children ASD and ADHD, and that overreporting was not only observed in children with ADHD, but also ASD. Contrary to previous studies such as Bourchtein et al., (2018), level of impairment, as reported by parents was not significantly predictive of child and counselor reports. While Bourchtein et al., (2018) used a latent profile analysis in their study, differences in results may be because this sample was a clinical sample. All the children in this sample may have had higher levels of impairment to begin with and that may have reduced the likelihood for differences. However, in future studies or studies with different sample makeups, it is important to account for how level of symptom severity may interact with the child and counselor ratings. It may be that within this sample there was a lack of variability of level of ADHD or ASD symptom severity. This information would provide clinical information about interpretating child reports, and understanding the awareness that children may have of their abilities. Including level of severity as a predictor in future research is important because, as shown in this study and previous research, it may be that some children with ASD and ADHD may provide reports that are in agreement with other raters.

Interaction Between Child Social and Behavioral Self-Reports and Gender

Our results demonstrated that gender was not significantly associated with child and counselor reports. This sample was limited in representation of gender, significantly, there were more boys than girls. This may have inhibited our abilities to find differences between groups. While some research has suggested that gender may relate to self-perception among children with ADHD, consistent to the results of this study, a number of studies have found that gender was not a significant predictor (Tu, Owens, & Hinshaw, 2019). Given the limitation in gender diversity of this sample, and in previous ASD and ADHD literature, it is important for future research to continue to examine the relations between gender and self-perception. Specifically, given the social differences in gender in children with ASD (Dean et al., 2014), and presentation of symptomatology of in children with ADHD (Skogli, Teicher, Andersen, Hovik, & Øie, 2013), future research should continue to include gender as a predictor. This information may provide insight on whether gender is related to self-reports of social and behavioral abilities of children with ASD and/or ADHD.

Interaction Between Child Social and Behavioral Self-Reports and Age

Another predictor that was analyzed was age. Differences in child and counselor ratings did not differ by age, and persisted between the ages of eight and twelve, suggesting that overestimation continues across these age groups. For individuals with ADHD previous research has demonstrated that overestimation continues through adolescence (Sibley et al., 2019). Thus, understanding the relationship between age and agreement and disagreement between youth and other informants is important. For children with ASD and ADHD it may be that lack of awareness continues throughout adolescence. Within this sample there was a restricted range between age groups, which may be why it was difficult to detect differences. However, it may

also be that overreporting of social and behavioral abilities persists among children with ASD and ADHD, highlighting the importance of including age as a predictor in future studies.

Interaction Between Child Social and Behavioral Self-Reports and Race

The results of this study demonstrated that race was not significantly associated with differences in ratings between children and counselors. The results differ from recent literature (Bourchtein et al., 2018) that demonstrated children from racial minority backgrounds were more likely to rate themselves as having lower competence. The lack of consistent findings may be due to the limited racial diversity within this studies sample. While this sample had limited racial diversity and did not demonstrate significant results, the results highlight the need to continue to study the association of racial and ethnic background in ASD and ADHD research. Specifically, research in this area has historically had a low representation of diverse racial and ethnic participants within samples. In more recent studies demographic information has been considered, however there are limited studies that examine the interaction of race and ethnicity using a polynomial regression analysis. It's important for future research to continue to include race and ethnic background as a predictor to expand the literature on the interaction of race as a predictor of overreporting of social and behavioral abilities with children with diagnosis of ASD or ADHD.

Self-Perception Ratings and Social Relationships Week One

This study examined whether child and counselor self-perception of social and behavioral abilities during the first and last week of the STP related to peer social preference, number of friendships, and number of reciprocal friendships. The results of this study suggest that at the beginning of the summer treatment program, counselor and children ratings were not significantly associated with any of the predictors. This may be because data from the first week was collected during the 4th day of the program. It may be that children had not developed an

understanding of their friendships. Within the STP, previous research has shown that children with ADHD with greater levels of disagreement between counselor and self-reports have more difficulty developing friendships at the beginning of the STP program, and maintaining their friendships throughout the program (Mikami et al., 2010). One explanation for the difference in results may be related to differences in methodological analysis. This study examined the association between child and counselor reports independently with the friendship variables, whereas previous studies have used the discrepancy score in the regression model. Due to the methodological limitations of using the discrepancy score in regression model (Sibley et al., 2019), this study refrained from using the discrepancy score as part of the analysis. Overall, the results from the friendship data from the first week of the program demonstrated that child and counselor reports were not associated with children's peer relationships. Suggesting that both child and counselor reports of children's social and behavioral abilities, did not significantly relate to the number of friendships and friendship rejections reported by children and their peers.

Self-Perception Ratings and Social Relationships Week Five

Results demonstrated that on the fifth week of the summer treatment program counselor ratings of the child's social and behavioral competence was significantly associated with reciprocal friendships. Specifically, the results demonstrated that the higher the children's self-report on social skills was associated with a higher number of reciprocal friendships. It may be that by week five, overall within the STP, children developed more reciprocal friendships. These results provide rationale to further study children's self-perception and friendship concurrently throughout multiple points of the STP program. Additionally, these results show that while children with ASD and ADHD may overreport their abilities, and their rating should be interpreted with caution, it is still clinically important to gather information from their

perspectives. Specifically, information such as friendship data may provide children with another avenue to express their perspectives on their social relationships.

Contrary to the first week, counselor ratings significantly contributed to models for social preference scores. The social preference score accounts for the number of rejections that children receive. These results demonstrate that children may be able to identify individuals whom they perceive as friends, and children who they don't want to be friends with. The significant relationship between the counselor score and the child's reporting of their peers, suggests that children may have a better understanding of their social relationships. Additionally, within the STP fostering social relationships is a component of the program. The questions of "who do you like to hang out with" and "who do you not like to hang out with" may be easier for children to report on, because at the STP they are consistently engaging in social activities with peers.

Social Relationships and Demographic Factors

Contrary to Azad, Locke, Kasari, & Mandell, (2017) the results of this study demonstrated that demographic factors including, age, gender, race and ethnicity, did not relate to any of the friendship measures. Noteworthy is that this study included a sample with limited racial diversity. One explanation for our lack of significance by age may be the difference in setting. While Azad et al., (2017) found that older children had poorer social outcomes and that these outcomes were exacerbated for racially diverse children with ASD, the results of this study demonstrated that neither race nor age were significantly related to friendship scores. Another explanation may be the differences in settings of data collection. While many previous studies have examined social relationships within school settings, it may be that within this study, demographic factors did not contribute to social relationships because this sample was collected within a clinical setting. All children were receiving the same level of behavioral and social-

emotional intervention and support with making friendships, which may have contributed to the lack of difference between demographics factors due to a standardization that may not be prevalent in other settings.

This is the first study to our knowledge to study social relationships within a clinical sample that includes both children with ASD and/or ADHD. These results suggests that within the Summer Treatment Program setting, the number of reciprocal friendships a child developed, their social preference in their group, and number of received friendship nominations were not correlated to the child's diagnosis, age, racial background, and level of impairment. The results of the study highlight the importance of continuing to examine the association between child's social relationships and demographic predictors, as they can continue to provide insight on whether interventions may require adaptations for different populations. Alternatively, understanding the association between social relationships and demographic factors may also provide information that continues to demonstrate that demographic factors are not predictive of social relationships within the STP settings. To better understand the relationship between demographic factors and social relationships within clinical intervention programs it is important for future research to focus on conducting studies that include more diverse samples.

Clinical Implications

These results provide context for clinical implications, specifically that they continue to demonstrate that children's ratings of symptomatology need to be interpreted with caution. Additionally, these results provide rationale for incorporating multiple forms of data to understand the level of impairment in children with ASD and ADHD impacts their self-perception. With the inclusion of friendship data and analysis of social relationships, children are given another avenue to provide their perspectives. While children may overreport their abilities,

due to the significant relationship between counselor ratings and child friends reports, children might be able to provide information about their social functioning, such as friendships. Our inclusion of peer data provided the opportunity to examine reciprocal friendships as well as understanding the child's standing within a social structure by including information about their rejections. Future studies may consider using multiple informants data for studying the self-perception in children because they may require questions that are applicable to the setting that they are in, and might struggle to answer questions that are more abstract. Additionally, by including counselor, child, parent, and peer data in this study, we were able to understand the important and meaningful contribution each rater makes. These results encourage the use of multiple informants in future research.

Limitations and Future Research

The results should be considered in light of the limitations of this study. The first limitation of this study is the sample size and racial diversity of the sample. In order to conduct latent profile analysis as suggested by previous studies and to conduct a robust polynomial regression analysis, larger sample sizes are required. While this study examined race as a predictor, the majority of the sample was White. Due to the limited literature in overall ASD and ADHD research, specifically regarding self-perception, future research is recommended to replicate these analyses with a more racially and ethnically diverse sample. Lastly, this sample only included children with ASD and or ADHD, future research should aim to include a group of typically developing youth, for a more robust analysis of the association between diagnosis and self-perception ratings.

Another limitation of this study was the lack of demographic data on the counselors of the STP. Previous research has highlighted bias that may be present with clinicians (Sell,

Giarelli, Blum, Hanlon, & Levy, 2012), thus it is important that future research consider informant demographic backgrounds. This study also only collected data from one counselor in each group. Following procedures for previous research (Mikami et al., 2010), future studies should collect data from all counselors in a group to analyze interrater agreement as part of the analysis process. Counselor ratings, specifically the first week of the program, may vary on the exposure and interactions that counselors have had with participants and understanding the interrater agreement may provide a more holistic report on child abilities. Increasing the sample size may address some of the methodical limitations inherent in this study. Other methodical limitations in this study includes missing data during week five of the program. Additionally, this study used age as a proxy for a group and it is recommended that future research using a model that accounts for nested data such as this.

The next limitation pertains to measurements used in the study. This study focused on perception of social and behavioral abilities. Future research should provide more information about a child's perception of other areas of social-emotional functioning to gather additional information on what other predictors may be interacting with the self-reporting. Additionally, this study did not gather information on child's family background such as socio-economic status, parent education level, and parent demographics. Future research should focus on gathering this additional information to examine if there are other interacting factors to the child's reporting.

Throughout their participation in the Summer Treatment Program, participants are provided with consistent feedback about their social and behavioral abilities. This study did not consider examining children's self-perception in conjunction with children's progress in the STP. Future research within the STP could examine if children's perceptions are associated with

progress in the STP. Specifically, whether differences between child and counselor ratings are associated with treatment outcomes (e.g., reduction of conduct problems). Future research should consider employing a polynomial regression analysis or alternative analysis to the discrepancy model to study the association between children's self-perception and STP treatment outcomes.

Lastly, due to constraints of the study, independent assessments to confirm diagnosis of autism and ADHD were not performed. This study relied on parent records to verify an autism and ADHD classification. As a result, the lack of confirmatory ASD and ADHD classifications significantly limits the generalizability of our findings to the larger population. Lastly, data regarding children's cognitive, executive functioning, and social-emotional functioning was not assessed. Future research should include additional predictors to examine if there may be other individual predictors that are associated with children's reporting of their perceptions of their abilities.

Conclusion

Youth with ASD and ADHD may overreport abilities when compared with other informants. Polynomial regression models demonstrated that child and counselor reports were not significantly associated with the demographic predictors. Differences between child and counselor reports were not associated to any of the children's demographic predictors. Meaning, that no matter the difference in the child's age, gender, race, and diagnosis the difference between the child's self-report and the counselor's report did not significantly change. Additionally, results demonstrated that during the first week of the summer treatment program neither child or counselor ratings were associated with social relationships. During the fifth week of the program, counselor ratings were associated with friendship ratings. These results highlight the importance of continuing to collect multiple forms of data from among other informants

including children and peers. Lastly, these results suggest the importance of continuing to examine children's perceptions of their abilities. Specifically, using statistical methods that allow to examine the interaction between child and counselor reports with predictors, such as polynomial regression analysis.

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Appendix A

The Summer Treatment Program at the University of Washington (STP-UW)

Staff Training. Counselors were recruited through national university listservs, flyers, and the program's website. Counselors included undergraduate students, graduate students, and working professionals in the fields of education, mental health, and medicine. All staff members attended a mandatory two-week (35hrs per week) training prior to the start of camp. Training included lectures from university professors regarding the etiology of neurodevelopmental disorders, evidence-based practices, and research in the field. Further, training focused on learning the components of the Summer Treatment Program (Pelham, 1997, 2004), and implementing the program with fidelity. Training included reading, quizzes, practice sessions, and supervision from program directors and licensed psychologists.

Components of the STP-UW Model

Peer Interventions. At the beginning of each day, counselors prepare a social skills lesson, which includes didactic instruction, modeling, and practice. Each week counselors focus on one skill. Four skills are emphasized throughout the 5-week program include: communication, participation, validation, and cooperation. Children discuss ways to integrate the skills throughout the daily activities each week, asked to practice using the skills with peers, and reinforced when they are observed using them.

Group Problem Solving Discussions. Whenever a group problem is identified, a counselor calls for a problem solving discussion. Together, children in each group are required to identify the problem, discuss solutions, and develop a plan to address the problem as group.

Sports Skills Training. Each day, children participate in recreational sports activity, which include a sports skills practice, and a game. Children are provided with coaching about the sport, as well as opportunities to cooperate with peers.

Timeout from Positive Reinforcement. Children receive a timeout from positive reinforcement if they engage in intentional aggression, intentional destruction of property, or repeated non-compliance. Children lose points for engaging in the disruptive behavior, and then are on a break from receiving positive reinforcement. Children step away from the activity, and watch their peers participate in the activity. Once children serve their timeout, they rejoin the activity, and immediately start receiving positive reinforcement.

Individualized Programs. If children are not demonstrating progress (based on behavioral data and counselor observation) a functional behavioral analysis is conducted by a counselor or consulting psychologists. An individualized program is then developed including the addition of new components (e.g., social story).

Daily Report Card. The daily report card is a goal tracking sheet developed by using behavioral data, parent input, and counselor observation. Individualized target goals are provided to children from week 2 through week 5 of the program. Each day, counselors individually review goals with children, and notify the children whether they met their goal. Daily Reports are completed on a daily basis and shared with parents at the end of each day.

Parent Training. Each week, parents are invited to participate in an optional parent training session. Parent training sessions review behavioral principles, and support parents with the implementation of behavioral strategies (e.g., command sequences, reinforcement systems) in the home settings. Parent training was offered once a week for a one hour period.

Friday Field Trips. Each Friday, children attend a field trip in a community setting (e.g., zoo, bowling, etc.) the goal of the field trip is to allow children to practice and generalize their skills in community settings. During the field trip, children are provided with continuous feedback about behavior, however, they don't earn or lose points. During the field trip, children are notified about the number of rule violations. For field trips, counselors develop a group contingency and specify the maximum number of rule violations that can be recorded throughout the field trip day, in order for the group to earn a privilege (e.g., extra recess).

Appendix B

Friendship Survey:

1. Ask the camper: “Who do you like to hang out with?”
2. Instruct the camper to circle the top 3 kids they like to hang out with from the list they generated
3. Then instruct the camper to put a star next to the name of the kid on the list who they like hanging out with best (to indicate who their “best friend” is).
4. Next, ask the camper: “Who do you not like to hang out with?” Write these names in List B.

List A: “Who do you like to hang out with

1) _____
2) _____
3) _____
4) _____
5) _____
6) _____
7) _____
8) _____
9) _____
10) _____

List B: “Who do you not like to hang out with”

1) _____
2) _____
3) _____
4) _____
5) _____
6) _____
7) _____
8) _____
9) _____
10) _____

Appendix C

IRB approval number: 52244