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EXAMINATION OF A PARENT-ASSISTED, FRIENDSHIP-BUILDING PROGRAM
FOR ADOLESCENTS WITH ADHD

by

Denise M. Gardner, M.S.

A Dissertation submitted to the Faculty of the Graduate School,
Marquette University,
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the Degree of Doctor of Philosophy

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ABSTRACT
EXAMINATION OF A PARENT-ASSISTED, FRIENDSHIP-BUILDING PROGRAM
FOR ADOLESCENTS WITH ADHD

Denise M. Gardner, M.S.

Marquette University, 2015

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common childhood disorder that often contributes to impairment in multiple domains, including peer functioning. Specifically, youth with ADHD tend to have fewer friends and lower quality friendships, experience greater peer victimization, and engage in more inappropriate social behaviors than typically developing peers. Researchers have highlighted the need for long-term interventions that directly address peer difficulties, emphasize dyadic friendship-building, and include a parent component. Thus, the current pilot study will examine the effectiveness of PEERS, a parent-assisted, friendship-building program, at establishing mutual friendships and improving current peer relationships in adolescents with ADHD.

Participants in the study included 20 adolescents with ADHD (ages 11-16) and their parents. At baseline, adolescents completed measures related to friendship quality, social knowledge, social self-efficacy, get-togethers, and peer conflict. They also participated in a brief observation task as a measure of social interaction behavior. Parents completed measures related to get-togethers and peer conflict. All families completed the Program for the Evaluation and Enrichment of Relational Skills (PEERS), a 14-week intervention. Following the intervention, families completed post-treatment measures and responded to a question regarding the initiation of a new friendship.

Analyses were conducted using a series of paired-samples t-tests examining differences from baseline to post-treatment. Results indicated that the majority of parents and adolescents reported the initiation of a new friendship over the course of treatment. Additionally, there was a significant improvement in adolescent social knowledge and a significant increase in hosted get-togethers. Effect sizes for these variables were large. While the remaining variables demonstrated changes in the expected direction, none of the analyses were significant. Effect sizes ranged from small to moderate.

The current pilot study demonstrated that, following participation in PEERS, adolescents demonstrated improvement in several peer functioning variables. While some analyses were not significant, moderate to large effect sizes were established for some variables, indicating that small sample size may have contributed to non-significant results. A larger sample will allow for better understanding of the effectiveness of PEERS for youth with ADHD and may highlight components of the program that require modification in order to better target the ADHD population.

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INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common childhood disorder affecting between 3% and 7% of school-aged children (American Psychiatric Association [APA], 2000). Between 50% and 85% of children with ADHD continue to meet diagnostic criteria and experience impairment in adolescence (Barkley, Fischer, Edelbrock, & Smallish, 1990; Hurtig, Ebeling, Taanila, Miettinen, et al., 2007). In addition to symptoms of inattention and hyperactivity/impulsivity, children and adolescents with ADHD experience significant functional impairment in academic, familial, and peer functioning (APA, 2000). They tend to have fewer friends and lower quality friendships and experience greater peer victimization than typically developing peers (Hoza, 2007). While previous research has demonstrated that many children with ADHD continue to meet diagnostic criteria and experience impaired peer relationships in adolescence, the majority of treatment research continues to focus on school-aged populations (Hurtig et al., 2007). Given that adolescence is typically the time when teens begin to take more responsibility for the development and maintenance of their peer relationships, adolescence may be a crucial time to assess peer functioning and implement peer interventions for teens with ADHD (Mikami, 2010).

Historically, interventions aimed at improving peer functioning in children with ADHD have been implemented as part of larger behaviorally-focused interventions that also include parent training, with few programs focusing solely and intensively on dyadic friendship-building (Frankel, Myatt, Cantwell, & Feinberg, 1997; Hoza, 2007; MTA Cooperative Group, 1999). Recently, researchers have highlighted the need for long-term

interventions that directly address peer relationship difficulties with an emphasis on dyadic peer relationships, rather than peer group acceptance (Hoza, 2007; Mikami, 2010; Normand, Schneider, Lee, Maisonneuve, Kuehn, et al., 2011). Although friendship-building programs, such as the Program for the Evaluation and Enrichment of Relational Skills (PEERS), which targets dyadic peer relationships, have demonstrated positive outcomes for several populations, there are no published studies on the effectiveness of PEERS or other similar programs for adolescents with ADHD (Frankel & Myatt, 2007; Frankel & Whitham, 2011; Laugeson, Frankel, Mogil, & Dillon, 2009). Thus, the current study will examine the effectiveness of PEERS, a parent-assisted, friendship-building program, at establishing mutual friendships and improving current peer relationships in adolescents with ADHD.

ADHD in Children and Adolescents

ADHD is one of the most common disorders of childhood, accounting for 1/3 to 1/2 of all referrals for mental health services (Mash & Wolfe, 2013). Therefore, children with ADHD are likely to be present in nearly every classroom in the United States (Hoza, 2007; McQuade & Hoza, 2008). Considerable gender differences have been observed in the prevalence of ADHD, with higher prevalence rates in boys than girls (Faraone, Sergeant, Gillberg, & Biederman, 2003). The APA has identified three subtypes of ADHD, including Predominantly Inattentive Presentation (ADHD-I), Predominantly Hyperactive/Impulsive Presentation (ADHD-HI), and Combined Presentation (ADHD-C; APA, 2013). In order to meet criteria for one of the ADHD subtypes, children must exhibit at least six symptoms of inattention and/or hyperactivity/impulsivity in two or

more settings, as rated by parents and teachers (APA, 2013). Additionally, the symptoms of inattention and/or hyperactivity/impulsivity must cause significant impairment in academic, socioemotional, and/or familial functioning (APA, 2013).

ADHD is best diagnosed through a comprehensive assessment battery that includes structured and unstructured interviews with parents and teachers, symptom questionnaires, observations of the child, and cognitive testing (Barkley, 2006; 1997). Common treatment recommendations for ADHD include stimulant medication and behavior modification programs, which typically consist of parent training and a school intervention (Barkley, 2006). Previous research has demonstrated that the most effective treatment for some children with ADHD is a combination of stimulant medication, behavior modification, and social skills training (Mrug, Hoza, & Gerdes, 2001, MTA Cooperative Group, 1999). Research has demonstrated that stimulant medication functions to reduce negative behaviors in the classroom and peer contexts, whereas behavioral approaches serve to teach and reinforce appropriate behaviors and skills (Hoza, 2007). Further review of specific peer functioning interventions will be provided in detail later.

Peer Relationships and Friendships in Children and Adolescents with ADHD

Importance of childhood peer relationships and friendships

As children age, they spend increasingly more time in the company of peers. By the time they reach adolescence, individuals spend nearly one third of their day with peers (Sibley, Evans, & Serpell, 2010). Previous research has examined peer relationships according to both dyadic and group contexts (Bagwell, Brooke, Molina,

Pelham, & Hoza, 2001; Blachman & Hinshaw, 2002; Mikami, 2010; Normand et al., 2011). A dyadic relationship, or friendship, refers to a voluntary connection created between two children with expectations for mutual support, validation, and companionship (Schneider, Weiner, & Murphy, 1994). Conversely, peer group acceptance is defined as the status of being liked by the majority of one's peer group and being disliked by few members of one's peer group (Mikami, 2010). Recently, researchers have highlighted the importance of distinguishing between dyadic friendship and peer group acceptance when examining children's peer functioning (Hoza, 2007; Mikami, 2010).

Previous studies have provided mixed results on the protective function of mutual friendships against future negative peer relationships (Bollmer, Milich, Harris, & Maras, 2005; Frankel & Whitham, 2011; Mrug, Molina, Hoza, Gerdes, et al., 2012; Newcomb & Bagwell, 1995). For example, Bollmer and colleagues (2005) found that the presence of at least one mutual friendship during childhood appeared to compensate for the consequences of peer rejection and victimization and lead to better adjustment and acquisition of social competence. These results have been replicated in clinical populations as well. For example, Cardoos and Hinshaw (2011) found that the presence of one mutual friendship reduced the likelihood of peer victimization in girls with ADHD. In contrast, Mrug and colleagues (2012) found that the presence of a mutual friendship did not appear to protect against the negative impact of peer rejection. One potential explanation for these findings is that friendship quality and characteristics are important factors in protection against negative outcomes, and that friendships lacking these qualities may be insufficient in buffering against peer rejection (Mrug et al., 2012).

In addition to its potential protective factors, researchers have highlighted the importance of friendship in children's social development. Specifically, Furman and Robbins (1985) argue that the positive gains provided by dyadic friendships, such as validation, trust, and companionship, are stronger than those provided by peer group acceptance. Furthermore, close friendships allow children to learn conflict resolution strategies and social problem-solving skills (Mikami, 2010; Nelson & Aboud, 1985). As such, when children are deprived of constructive socialization experiences, they may have difficulty developing appropriate social skills, which may put them at a greater disadvantage during peer interactions in adolescence (Bagwell et al., 2001).

Negative peer relationships in children and adolescents with ADHD

Previous research has demonstrated that approximately 82% of children with ADHD experience negative peer relationships, which highlights the significance of social impairment for this population (Hoza et al., 2005). Negative peer relationships in children with ADHD are often well-established by age 7, are almost immediately evident in new social situations, and are difficult to overcome (Hoza, 2007; Hoza et al., 2005). Furthermore, negative peer relationships and negative reputations often continue into adolescence and remain a significant source of impairment identified by parents and teachers, even when adolescents no longer meet diagnostic criteria for ADHD (Bagwell et al., 2001; Klein & Manuzza, 1991; Mrug et al., 2012; Sibley et al., 2010). Due to the swiftness with which children and adolescents with ADHD develop enduring, negative social reputations, it may be difficult to change peer group perceptions and the negative outcomes associated with them. Negative peer relationships may be defined in variety of

ways, including absence of mutual friendships/poor-quality friendships, peer stigmatization, and peer neglect/rejection.

Absence of mutual friendships/poor quality friendships. Previous research has demonstrated that between 56% and 76% of children with ADHD have no mutual friendships, compared to 10%-32% of typically developing children (Hoza et al., 2005). Furthermore, the friendships of children with ADHD tend to be characterized by fewer positive features, more negative features, and less stability than those of typically developing peers (Blachman & Hinshaw, 2002; Hoza et al., 2005; Normand, et al., 2011). Specifically, Blachman and Hinshaw (2002) found that girls with ADHD reported fewer friendships than typically-developing girls. Furthermore, girls with ADHD were more likely to report lower quality friendships and greater conflict and relational aggression in existing friendships (Blachman & Hinshaw, 2002). According to Heiman (2005), the manner with which children with ADHD tend to define friendships also may influence friendship quality. Specifically, children with ADHD tend to describe a best friend as someone who is “fun” and “mutually entertaining,” whereas typically developing children tend to describe a best friend as someone who provides emotional support and “a sense of security” (Heiman, 2005). Thus, children with ADHD tend to value certain characteristics in friendships, which may conflict with those valued by their peer group, leading to decreased likelihood of developing mutually satisfying friendships and increased likelihood of peer stigmatization.

Peer stigmatization. Previous research also has demonstrated that children hold negative attributions about peers with ADHD, which may result in stigmatization (Swords, Heary, & Hennessy, 2011; Walker, Coleman, Lee, Squire, & Friesen, 2008).

Walker and colleagues (2008) conducted a large-scale national survey to assess children's perceptions of peers with depression, ADHD, and asthma. The results of the study indicated that on average, children hold more negative attributions for peers with ADHD than for peers with asthma or depression (Walker et al., 2008). Specifically, children were significantly more likely to attribute items, such as "gets in trouble more often" and "is more violent" to peers with ADHD than to peers with depression or asthma (Walker et al., 2008). Additionally, children were less likely to hold positive attributions, such as "is smarter" for peers with ADHD than for peers with depression or asthma (Walker et al., 2008). Furthermore, Swords and colleagues (2011) examined the variables that predict peer acceptance of children with internalizing disorders (depression) and externalizing disorders (ADHD). The results of the study indicated that one of the most important predictors of peer acceptance among children is perceived responsibility for the peer's behavior (Swords et al., 2011). More specifically, greater belief in the peer's responsibility for his/her behavior was associated with decreased acceptance, particularly for male peers (Swords et al., 2011). Negative social reputations are likely related to the experience of peer neglect and rejection among youth with ADHD.

Peer neglect and rejection. Children with ADHD tend to experience greater peer neglect (i.e. being ignored and socially isolated) and active rejection than typically developing children (Hoza, 2007; Hoza et al., 2005; Pelham & Bender, 1982). For example, results of the MTA study demonstrated that 52% of children with ADHD fall into the rejected category and 60% of children with ADHD have peer rejection scores two or more standard deviations above the mean (Hoza, 2007; Pelham & Bender, 1982).

Similar findings have emerged in adolescent populations. For example, Bagwell and colleagues (2001) found that childhood ADHD is a predictor of peer rejection in adolescence, and that adolescents with ADHD were more likely to experience peer rejection than were typically developing adolescents. Additionally, research has demonstrated that peer rejection of children with ADHD is likely to occur within several hours, or even minutes, of interacting with unfamiliar peers (Hodgens et al., 2000; Pelham & Bender, 1982). For example, Hodgens and colleagues (2000) found that children with ADHD were more likely than typically-developing controls to receive peer nominations on items describing being teased or excluded by peers following three 20-minute play sessions. Sibley and colleagues (2010) observed a similar phenomenon in a sample of adolescents with ADHD. Furthermore, ADHD subtype has been shown to influence children's experience of peer neglect and rejection; specifically, children with ADHD-C are more likely to be actively rejected, whereas children with ADHD-I are more likely to be neglected and socially isolated (Hodgens, Cole, & Boldizar, 2000).

Previous research also has demonstrated that the experience of peer neglect and rejection in childhood and adolescence may be related to future negative outcomes, such as internalizing symptoms, school avoidance and dropout, substance abuse, and delinquency which may impact future peer interactions (Buhs, Ladd, & Herald, 2001; Mrug et al., 2012). Furthermore, these effects may persist into adulthood and may manifest as poor educational, interpersonal, and occupational success (Bagwell, Newcomb, & Bukowski, 1998; Mikami & Hinshaw, 2006). More specifically, Mikami and Hinshaw (2006) found that peer rejection and ADHD in childhood predicted decreases in adolescent academic achievement, even while controlling for childhood

academic achievement. Additionally, the study found that perceived academic competence in childhood appeared to function as a protective factor against externalizing behavior and internalizing symptoms in adolescence (Mikami & Hinshaw, 2006).

Primary skills deficits in children and adolescents with ADHD

Behavioral and cognitive characteristics shared by children and adolescents with ADHD, such as aggression and poor problem-solving skills, may contribute to their experience of negative peer relationships. According to the ADHD literature, the primary skills deficits experienced by children and adolescents with ADHD can be categorized into two broad domains: disruptive/inappropriate social behaviors and sociocognitive/social problem-solving deficits.

Disruptive/inappropriate social behaviors. Children and adolescents with ADHD are more likely to engage in inappropriate behaviors, such as impulsivity, intrusiveness, and hostility, and less likely to engage in appropriate social skills, such as sharing, cooperation, and turn-taking than their typically-developing peers (Mrug et al., 2001; Wehmeier, Schacht, & Barkley, 2010). These negative behaviors are more likely to occur in unstructured and unsupervised situations, such as during play, and typically lead to impaired peer relationships (Cordier, Bundy, Hocking, & Einfeld, 2010; Hodgins, Cole, & Boldizar, 2000). For example, Cordier and colleagues (2010) examined the play behavior of children with ADHD during a 20-minute free play session. During a cooperative play task, children with ADHD-HI and ADHD-C demonstrated significantly less sharing and support of others than did children with ADHD-I. More specifically, the researchers found that children with ADHD-HI and ADHD-C demonstrated low scores in several categories, including “sharing”, “supporting the play of others”, and “social play”

(Cordier et al., 2010). Additionally, children with ADHD-HI and ADHD-C demonstrated high scores in the “mischief” and “clowning” categories, suggesting that play behavior in children with ADHD may vary based on subtype diagnosis (Cordier et al., 2010).

An additional area of impairment for children and adolescents with ADHD is peer group entry (Ronk, Hund, & Landau, 2011). According to a seminal theory developed by Dodge and colleagues (1983), socially competent children attempt to gain peer group entry by employing a sequence of behaviors that evolve from “low-risk” to “high-risk”. For example, a child may begin the peer group entry process by standing near a new peer group to gain a better understanding of the group’s norms (Dodge, Schlundt, Schocken, & Delugach, 1983). The child may then attempt to match the group members’ behavior prior to joining the group by mirroring the group’s activity alongside the group (Dodge et al., 1983). Children who are not classified as socially competent are more likely to begin by using intrusive, high-risk behaviors, such as engaging in off-topic conversation, and will likely be perceived by peers as socially inappropriate (Dodge et al., 1983). In a recent study, Ronk and colleagues (2011) examined peer group entry behaviors in boys with ADHD during a one-hour simulated play date with two typically-developing peers (“hosts”). Results of the study indicated that boys with and without ADHD used the same number of competent peer entry strategies, but that boys with ADHD used twice as many attention-getting strategies and talked significantly more about themselves than boys without ADHD (Ronk et al., 2011). Overall, boys with ADHD were rated as using an “excessive” number of high-risk entry strategies and received significantly fewer host initiation responses than their typically-developing peers (Ronk et al, 2011). The absence

of appropriate peer entry strategies utilized by boys with ADHD indicates a lack of appropriate social knowledge and sociocognitive skills.

Sociocognitive and social problem-solving deficits. Children acquire appropriate social knowledge and skills through observational learning and attention to social feedback, a skill which is commonly impaired in children with ADHD (Bacchini et al., 2008; Hoza, 2007; McQuade & Hoza, 2008). Poor attention in social interactions may lead to misattributions about the behavior and intentions of peers (Cadesky, Mota, & Schachar, 2000; Sibley et al., 2010). Additionally, poor attention to social feedback may lead to inaccurate interpretations of social success and failure for children and adolescents with ADHD. For example, Hoza and colleagues (2000) examined responses to social success and failure in boys with and without ADHD. In the study, boys with ADHD participated in two experimental interactions with a typically developing confederate. Confederates were instructed to respond either positively (success condition) or negatively (failure condition). Interactions were coded by trained raters for twenty behaviors, including participant responsiveness, frustration, effectiveness, and self-disclosure. Results of the study indicated that boys with ADHD were rated as less socially effective than typically developing controls (Hoza et al., 2000). Additionally, boys with ADHD were more likely than controls to rate themselves favorably on measures of social competence following an unsuccessful interaction (Hoza et al., 2000).

An additional area of social impairment for children and adolescents with ADHD is inadequate social problem-solving and perspective-taking skills. For example, Sibley and colleagues (2010) found that adolescents had difficulty generating appropriate and effective responses to hypothetical peer interaction situations and performed poorly on

social comprehension tasks. Additionally, King and colleagues (2009) found that children with ADHD generated more hostile and aggressive responses to hypothetical peer provocation scenarios than did typically developing children. These findings support previous research results indicating that children with ADHD are particularly reactive to provocation from peers (King et al., 2009). Furthermore, children with ADHD tend to have poor social perspective taking skills and demonstrate less empathy toward peers (Barkley, 2006). Barkley (2006) hypothesized that poor inhibitory control, related to frontal lobe impairment, may contribute to difficulty in inhibiting one's own responses long enough to consider and understand another child's perspective. Additionally, results of a study conducted by Marton and colleagues (2009) indicated that children with ADHD were rated as less empathic and having poorer social perspective-taking skills than children without ADHD (Marton et al., 2009). Furthermore, children with ADHD were able to generate fewer strategies to solve social dilemmas than typically developing controls (Marton et al., 2009).

Finally, children with ADHD tend to have poor self-monitoring skills and have difficulty evaluating their own social behavior (Hoza et al., 2000). In fact, many children with ADHD tend to overestimate their social competence, which has been demonstrated when comparing self-reports to parent and teacher reports (Bagwell et al., 2001; Heiman, 2005; Hoza et al., 2004, 2002; Ohan & Johnston, 2011). This phenomenon is known as positive illusory bias, which has been defined as a child's overestimation of his/her social competence in relation to his/her actual social competence (Ohan & Johnston, 2011). Researchers have hypothesized that the positive illusory bias may function as a protective mechanism, which may serve to conceal feelings of inadequacy (Diener & Millich, 1997;

Hoza et al., 2000). Hoza and colleagues (2002) found that boys with ADHD tended to overestimate their competence significantly more in areas of greatest impairment, providing further support for the theory that positive illusory bias functions as a protective mechanism against low self-esteem (Hoza et al., 2002). In an extension of the existing literature, Ohan and Johnston (2011) found that girls with ADHD overestimated their social competence relative to parent and teacher reports and a coded laboratory observation task (Ohan & Johnston, 2011). Hoza and colleagues (2002) postulate that overestimation of social competence may be the result of inadequate knowledge of appropriate social behaviors, which may lead to inaccurate monitoring of successful and unsuccessful social interactions. Thus, interventions aimed at increasing appropriate social knowledge and self-monitoring skills may help to address these deficits.

Peer Functioning Interventions for ADHD

Social skills training and friendship-building programs

The limited number of studies examining peer functioning interventions for youth with ADHD can be classified as examinations of social skills training programs, with the exception of the Children's Friendship Training (CFT) program. The primary goal of social skills training programs is to teach appropriate social skills and behaviors to children with peer functioning difficulties (Mrug et al., 2001). Many social skills interventions involve didactic group instruction, as well as opportunities for behavioral rehearsal of new skills with other group members (Mrug et al., 2001). Social skills interventions have demonstrated effectiveness in 70%-80% of nonclinical samples (see Hoza et al., 2005 for reviews). However, between 40% and 50% of children participating

in these programs did not demonstrate improvement on peer nomination measures (Hoza et al., 2005). Additionally, a meta-analysis examining the results of social skills interventions found that, overall, participants demonstrated only an 8% improvement over a no-treatment condition (see Hoza et al., 2005 for reviews). As a result of unsatisfactory outcomes, researchers have examined the effectiveness of modified social skills programs in the context of the Summer Treatment Program for children and adolescents with ADHD (Antshel & Remer, 2003; Hoza et al., 2003; Mrug et al., 2001; Pfiffner & McBurnett, 1997).

Summer Treatment Program (STP). The STP is an intensive 8-week treatment program for children and adolescents (ages 5-15) with ADHD. Participants in the STP receive behavior modification training in classroom, recreational, and peer contexts with the goal of improving peer functioning and compliance with adult instructions (Pelham & Hoza, 1996). The STP is primarily child-focused, but does include weekly group parent training sessions, which serve to assist with the generalization of behavior modification techniques to the home environment. Brief group-based social skills training sessions also are provided daily to participating youth. During social skills training, children learn new skills, such as validation, cooperation, and communication, and engage in behavioral rehearsal with other group members. Children receive positive reinforcement of appropriate social skills from counselors and other group members throughout the program day (Pelham and Hoza, 1996). Overall, outcome results of the STP have demonstrated that, despite improvements in behavioral functioning in both recreational and classroom contexts, participants did not demonstrate long-term improvements in peer functioning, as measured by peer nominations (Hoza et al., 2005).

Previous research has provided evidence to suggest that parent involvement may be related to greater effectiveness in peer functioning over primarily child-focused interventions by assisting with generalization of social interaction skills outside of the treatment setting (Frankel et al., 1997; Mikami, 2010; Pfiffner & McBurnett, 1997). Researchers have examined the effectiveness of modified versions of traditional social skills training programs, including a parent component, in the context of the STP. For example, Pfiffner and McBurnett (1997) modified the social skills program to include a parent generalization component. The study compared the treatment effects of a traditional social skills group to a social skills group with a parent generalization component. Children in both conditions attended eight 90-minute group sessions, which included a didactic component, role playing, and behavioral rehearsal. Additionally, children were assigned weekly homework relevant to each skill lesson (Pfiffner & McBurnett, 1997). Parent sessions included review of the skill lesson and observation of the child group through a one-way observation window. Additionally, parents were instructed to prompt their child to use his/her social skills throughout the week. Results of the study indicated that children in the social skills only group and the social skills plus parent generalization group demonstrated improved social interaction skills as rated by parent report (Pfiffner & McBurnett, 1997). However, children in the social skills only group demonstrated less generalization to other settings than children in the parent generalization group. Additionally, the treatment gains in the parent generalization group were maintained at four months post-treatment (Pfiffner & McBurnett, 1997); this outcome was not observed in the social skills only group.

In response to researcher recommendations of targeting dyadic friendship formation rather than peer group acceptance, the STP also has targeted dyadic peer relationships through a “buddy system” intervention (Hoza et al, 2003; Mrug et al., 2001). For the study, each participating child was paired with another child from the program based on the children’s friendship preferences. Children participated in a variety of shared activities with their buddies, including being partners during recreational activities and classroom projects, sitting together during lunch time and field trips, and sharing points earned through the behavior modification system (Hoza et al., 2003). Additionally, parents were asked to arrange get-togethers with the two children outside of the program environment. Overall, children whose parents consistently followed through with the “buddy system” intervention demonstrated greater overall improvement (as rated by STP counselors) at the end of the program (Hoza et al., 2003; Mrug et al., 2001). The authors also highlighted the importance of teaching parents how to supervise get-togethers in order to minimize conflict and promote positive interactions (Hoza et al., 2003). This provides support for the importance of get-togethers and parental involvement in psychosocial interventions. The authors highlight the importance of developing “buddy system” interventions that can be implemented outside of the STP setting (e.g. community or school settings), independent of larger behavioral intervention programs (Mrug et al., 2001).

Children’s Friendship Training (CFT). The CFT program, developed by Frankel and Myatt (2003), is a twelve-week group-based intervention designed for school-aged children with peer functioning difficulties. The CFT program consists of 90-minute structured sessions for both children and their parents (Frankel & Myatt, 2003).

Parent and child sessions are led by a trained professional or paraprofessional who is assisted by two behavior “coaches” (typically undergraduate research assistants). Parent and child groups are held concurrently and include both didactic and behavioral rehearsal components (Frankel & Myatt, 2003). Each child session consists of homework review, a didactic lesson, behavioral rehearsal, and a coached play interaction, during which children receive feedback on socialization skills. Throughout the program, children are taught a variety of socialization skills, including conversational skills, peer group entry, good sportsmanship, appropriate responses to teasing, and conflict resolution (Frankel & Myatt, 2003). Parent sessions consist of homework review, discussion of the didactic lesson, and discussion of anticipated problems with homework tasks. Homework completion is an essential component of the CFT program. Parents and children are given weekly homework assignments to assist with the acquisition of new skills learned during CFT sessions. Homework assignments typically involve making phone calls to other group members and hosting get-togethers with peers outside of the group.

Frankel and colleagues (1997) conducted a treatment study to examine the effectiveness of the CFT program for children, ages 6-12, with ADHD. The results of the study indicated that following the intervention, 82.4% of children in the treatment group demonstrated significantly better outcomes on all treatment variables compared to the average waitlist control child (Frankel et al., 1997). Furthermore, studies have demonstrated that treatment gains were maintained for three months following the intervention (Frankel & Myatt, 2007; Frankel et al., 1997).

The CFT program addresses several limitations of other peer functioning programs (e.g., social skills training within the STP) by providing a stand-alone

intervention for improvement of peer relationships and including a parent component to promote generalization of skills; however, the CFT program focuses solely on school-aged children, does not assess dyadic friendship-building at post-treatment, and has not been replicated by another group. Friendship-building programs, such as PEERS, address all of the limitations of previous interventions by providing a long-term, stand-alone program, including a parent component, and focusing on dyadic friendship-building rather than peer group acceptance.

Program for the Evaluation and Enrichment of Relational Skills (PEERS)

The primary goal of PEERS is to assist children and adolescents in developing social competence and close, dyadic friendships (Laugeson, Frankel, Mogil, & Dillon, 2009). Due to the fact that negative social reputations may be difficult to change, attempting to change peer status through a peer functioning intervention may be a difficult and unrealistic goal (Mikami, 2010). Therefore, it may be more beneficial to use dyadic friendship formation as the primary outcome measure for peer intervention studies. Furthermore, social competence and skills appropriate for dyadic interactions may be more beneficial than acceptance by the entire peer group, as this approach requires changing the perception of only one peer (Mikami, 2010; Normand et al., 2011).

PEERS, adapted from CFT, is an intensive 14-week friendship-building intervention designed to assist adolescents in learning appropriate social skills, expanding their peer network, and managing peer conflict (Laugeson & Frankel, 2010). PEERS is structured similarly to the CFT program with didactic and behavioral rehearsal components, as well as structured out-of-group homework assignments. The primary

outcome of PEERS is for adolescents to develop at least one close, dyadic friendship (Laugeson et al., 2009). PEERS has been implemented with several clinical populations, including adolescents with ASD (Laugeson et al., 2009). Results of a study conducted by Laugeson and colleagues (2009) demonstrated that adolescents with ASD exhibited improvement in social knowledge, frequency of hosted get-togethers, friendship quality, and overall social skills compared to adolescents in the waitlist control group. According to parent and teacher reports, treatment gains generalized outside of the classroom and were maintained at 3-months post-treatment (Laugeson et al., 2009). Favorable outcomes of PEERS for adolescents with ASD provide promising evidence for its potential effectiveness with other adolescent populations, such as teens with ADHD. Currently, there are no published studies examining the effectiveness of PEERS for adolescents with ADHD.

Current Study

Peer relationship difficulties represent a significant area of impairment for youth with ADHD. While traditional and modified social skills training has been implemented through programs such as the STP, results have been mixed and many participants have not demonstrated favorable improvements at post-treatment. As a result, researchers have highlighted the importance of dyadic peer relationships, rather than peer group status, as a focus of treatment and an outcome measure of peer functioning interventions. Additionally, researchers have recommended the inclusion of a parent component as a means of assisting with generalization of skills outside of the treatment context. Finally, researchers have recommended that peer interventions be implemented independent from

other behavioral programs in order to allow for greater focus on the improvement of peer relationships. The programs implemented through the STP provided several of these recommended elements; however, all of these elements have not been included in the same program. While the CFT program also included several recommended elements, the intervention focused solely on school-age children, did not assess dyadic friendship-building at post-treatment, and has not been replicated by another group. Thus, the current pilot study examined the effectiveness of PEERS at establishing mutual friendships and improving current peer relationships in a population that has yet to be examined - adolescents with ADHD.

Following PEERS, it was predicted that 1) parents and adolescents would report the initiation of at least one mutual friendship (as measured by identification of one mutual friend); 2) adolescents would report significantly higher quality of existing friendships relative to baseline (as measured by the total score on the Friendship Qualities Scale); 3) adolescents would demonstrate significantly improved social knowledge relative to baseline (as measured by the Test of Adolescent Social Skills Knowledge); 4) adolescents would report significantly higher social self-efficacy relative to baseline (as measured by the social acceptance subscale on the Self-Perception Profile for Children/Adolescents); 5) parents and adolescents would report increased frequency of hosted get-togethers (Part 1) and significantly lower levels of peer conflict during get-togethers relative to baseline (as measured by the Quality of Socialization Questionnaire-Revised; Part 2); 6) adolescents would exhibit significantly higher frequency of positive affect, overall involvement, and overall rapport, and significantly lower frequency of

kinesic arousal and social anxiety during an interaction with a typical (non-ADHD) peer relative to baseline (as measured by the Contextual Assessment of Social Skills).

METHOD

Recruitment

Four recruitment methods were utilized. Eligible families who had previously completed a parent training intervention through the Marquette University ADHD Clinic received a letter explaining the study, which was followed by a telephone call from one of the researchers. Additionally, several mental health professionals in the Milwaukee area were contacted and asked to distribute recruitment flyers to eligible families. In addition, guidance counselors and special education teachers at various Milwaukee area high schools were contacted and asked to distribute recruitment flyers to eligible families. Finally, upon completion of the group, participating families were given recruitment flyers and were asked to distribute the flyer to another family with a potential interest in participating. Twenty-five families were initially recruited for the study; however five families dropped out of the study prior to completing treatment and are not included in the analyses. Reasons for drop-out included: teen discontinued due to loss of interest in participating (n=3), parent discontinued due to loss of interest in participating (n=1), and family chose to participate in alternative peer intervention program (n=1).

Participants

Participants included 20 adolescents, ages 11-17 years, and their parent(s) who met inclusion criteria. First, participating adolescents had to definitively state interest in participating in the group. Adolescent interest and motivation for participation also were assessed through a structured interview during the pre-assessment. Second, adolescents and parents had to express willingness to attend all weekly sessions for the duration of PEERS, with a maximum of two absences allowed. Third, adolescents and parents had to be able to speak English and be without any cognitive or developmental delays that would affect reading comprehension and understanding of treatment material. Finally, adolescents had to receive a previous diagnosis of ADHD and exhibit current functional impairment in peer relationships, which was confirmed during the parent interview and on the peer functioning scale of the ADHD-FX Scale, which assesses functional impairment in peer relationships (e.g. “is ignored, rejected and/or teased by peers,” Haack, Gerdes, & Lawton, 2014).

Interested families contacted the researchers to complete a telephone screening. During the telephone call, families were provided with a brief overview of the program, and if interested, completed a brief telephone screening to ensure that adolescents met criteria for inclusion in PEERS. Families who met the inclusion criteria scheduled a two-hour intake appointment at the Marquette University (MU) Center for Psychological Services (CPS). Once the intake had been scheduled, pre-assessment questionnaire packets used to confirm current functional impairment in peer relationships were sent to families to complete and return at their intake appointment.

Descriptive statistics for demographic characteristics are displayed in Table 1. Adolescents were predominantly male (70%) and Caucasian (65%) with a mean age of

12.4 years. The majority of adolescents were between 11-13 years of age, with the exception of one teen who was 16 years old. Participating parents were primarily mothers (80%) who were married (78.9%) and had completed at least a bachelor's degree (55.5%).

Table 1. Demographic Characteristics

Teen Demographics	
Age (M \pm SD)	12.4 \pm 1.31
Gender (n, %)	
Boys	14 (70)
Girls	6 (30)
Ethnicity (n, %)	
Caucasian	13 (65)
Latino/Hispanic	3 (15)
African American	3 (15)
Asian	1 (5)
Parent Demographics	
Marital Status (n, %)*	
Married	15 (78.9)
Unmarried	3 (15.8)
Divorced	1 (5.3)
Education (n, %) *	
Partial high school/Graduated high school/GED	2 (11.2)
Partial college/training	6 (33.3)
Standard college degree	4 (22.2)
Graduate/professional training or degree	6 (33.3)

Note: * denotes missing values

n = 20

Procedure

Pre-Assessment

Adolescents and parents who planned on attending PEERS sessions attended a two-hour intake session at the MU CPS approximately 2-3 weeks prior to their first treatment session. Informed parental consent and adolescent assent were obtained for all participants upon arrival at the intake appointment, in addition to consent forms allowing for teens to share phone numbers with other group members. Following the consent procedures, parents and adolescents completed the remainder of the intake procedures separately. Parents completed an unstructured interview focused on the adolescents' current peer functioning and other relevant psychosocial information. Parents also completed measures about themselves and their adolescent's peer functioning and overall behavior. In a separate room, adolescents completed a structured interview focused on interest in PEERS and current peer functioning. Adolescents also completed measures about themselves and about their relationship with their parent(s). At the end of the intake session, families were given a packet of measures to be completed by the adolescent's primary teacher and mailed back to the researcher within two weeks of the first PEERS session. If teacher measures were not returned within the specified time period, the researchers contacted teachers directly to inquire about the status of the measures. In a separate visit, prior to the first treatment session, adolescents also completed a brief interaction task (Contextual Assessment of Social Skills; detailed below) with an adolescent confederate. The interactions were videotaped and later coded by trained coders.

PEERS Intervention

Following the intake procedures, adolescents and their parent(s) attended 14 weekly sessions of PEERS. Parent and adolescent sessions consisted of concurrent, 90-minute sessions which included both didactic and behavioral rehearsal components (Laugeson & Frankel, 2010). Parent and adolescent sessions were led by trained Master's level graduate students, under the supervision of Alyson Gerdes, Ph.D., a certified PEERS provider. Adolescent group leaders were assisted by two undergraduate "coaches," who assisted with behavior management and monitoring the behavioral rehearsal of skills learned in PEERS. Throughout the program, adolescents were taught a variety of socialization skills, including conversational skills, peer group entry, good sportsmanship, appropriate responses to teasing, and conflict resolution (Laugeson & Frankel, 2010). Regular fidelity checks were conducted to ensure strict adherence to the treatment outline in the PEERS manual (Laugeson & Frankel, 2010). Parent sessions included homework review and discussion of anticipated problems, discussion of the weekly didactic lesson, and review of homework for the upcoming week.

Outcome Measures

Adolescent Measures.

Question about initiation of a new mutual friendship

Adolescents responded to a question indicating the initiation of a new mutual friendship ("Have you initiated a mutual friendship since beginning PEERS? If so, please provide his/her first name and last initial.")

Friendship Qualities Scale (FQS; Bukowski, Hoza, & Boivin, 1994)

The Friendship Qualities Scale is a 23-item adolescent-report measure designed to assess five domains of friendship quality, including Companionship, Closeness, Help,

Security, and Conflict. Respondents are asked to identify their best friend and to keep him/her in mind while answering the yes/no questions (e.g. “My friend and I spend all of our free time together.”) The FQS yields a total score ranging from 0 to 115, with higher scores indicating better quality friendships. According to Bukowski and colleagues (1994), the FQS demonstrates good internal consistency for all subscales, ranging from .71 to .86. For the current study, the internal consistency for the FQS was .84 (pre-treatment) and .93 (post-treatment)

Test of Adolescent Social Skills Knowledge (TASSK; Laugeson & Frankel, 2006)

The Test of Adolescent Social Skills Knowledge is a 26-item adolescent-report measure designed to assess adolescents’ knowledge of specific social skills taught during the Program for the Education and Enrichment of Relationship Skills (PEERS; Laugeson & Frankel, 2006). Each didactic lesson in PEERS is represented by two questions on the TASSK. Adolescents are presented with sentence stems and are required to choose between one of two possible answers. The total score on the TASSK ranges from 0-26, with higher scores indicating greater social knowledge. Laugeson and colleagues (2009) reported that the internal consistency on the TASSK is moderately good ($\alpha = .56$). For the current study, the internal consistency for the TASSK was .31 (pre-treatment) and .77 (post-treatment). It is likely that poor social knowledge at pre-treatment contributed to less consistent responding among teens, leading to low internal consistency.

Self-Perception Profile for Children (SPPC, Harter, 1985)

The Self-Perception Profile for Children is a 36-item child-report measure utilized with children 8-13 years of age that assesses five domains of self-concept, including academic competence, social acceptance, athletic competence, physical appearance, and

behavioral conduct; the SPPC also contains a measure of global self-worth (Harter, 1985). The current study will only examine the social acceptance scale. Each item includes pairs of statements that describe perspectives on particular aspects of self-evaluation (e.g., “Some kids wish their body was different, but other kids like their body the way it is.”) Respondents are required to choose which statement best describes them and then to rate how well the statement describes them on a 4-point Likert scale ranging from “sort of true” to “really true.” The mean scores are then computed, with higher scores indicating more positive self-perceptions.

The scales of the SPPC demonstrate good internal consistency, with Cronbach’s alphas ranging from .80 to .90 (Harter, 1990). Test-retest reliability at the subscale level is estimated to range from .40 to .65 at one year to one month intervals (Harter, 1990). Scores on the SPPC have demonstrated good convergent validity with parent, teacher, and peer ratings and correlate negatively with symptoms of psychopathology (Muris, Meesters, & Fijen, 2003). For the current study, the internal consistency for the SPPC was .79 (pre-treatment) and .87 (post-treatment).

Self-Perception Profile for Adolescents (SPPA; Harter, 1988)

The Self-Perception Profile for Adolescents is a 45-item adolescent-report measure utilized with adolescents 14-18 years of age that assesses eight domains of self-concept, including academic competence, athletic competence, social acceptance, physical appearance, behavioral conduct, close friendship, romantic appeal, and job competence; the SPPA also contains a measure of global self-worth (Harter, 1988). The current study will only examine the social acceptance scale. Similar to the SPPC, adolescents choose which statement best describes them and rate how well the statement

describes them. The mean scores are then computed, with higher scores indicating more positive self-perceptions. According to Harter (1988), the internal consistency of the SPPA ranges from .74 to .93. For the current study, the internal consistency for the SPPA was .82 (pre-treatment) and .81 (post-treatment).

Quality of Socialization Questionnaire-Revised (QSQ-R; Adapted from Frankel et al., 2010)

The Quality of Socialization Questionnaire is a 12-item self-report measure adapted from the Quality of Play Questionnaire (Frankel et al., 2010). The QSQ-R is designed to assess young adults' frequency of hosted and invited get-togethers over the past month, as well as peer conflict during get-togethers. Adolescents are asked to identify the friend who hosted each get-together, as well as use a 4-point Likert scale from 0 ("not true at all") to 3 ("very much true") to rate their own peer conflict during the get-togethers. According to Frankel and colleagues, the conflict scale on the QSQ-R has demonstrated good internal consistency ($\alpha = .87$) and good convergent validity on with the Problem Behaviors scale on the Social Skills Rating Scale ($\rho = .35, p < .05$). For the current study, the internal consistency for the QSQ-R teen report was .70 (pre-treatment) and .81 (post-treatment)

Contextual Assessment of Social Skills (CASS; Ratto, et al., 2010)

The Contextual Assessment of Social Skills is an interaction task that requires participants to engage in a brief conversation with a typically-developing confederate. The task was modified for the current study to consist of one 5-minute conversation with an engaged confederate. Participants and confederates were paired into gender-matched dyads for the interaction task. Prior to participation, confederates received brief training related to the nature of the task and confidentiality procedures. Prior to the start of the

interaction, the participant and the confederate were given brief instructions about the interaction by the researcher. Interactions were coded for five verbal and nonverbal behaviors, including Positive Affect, Kinesic Arousal, Social Anxiety, Overall Involvement/Interest, and Overall Quality of Rapport. The coding system is a Likert scale ranging from 1 to 7 with lower scores indicative of greater impairment and higher scores indicative of less impairment. According to Ratto and colleagues (2010), the CASS has demonstrated good internal consistency ($\alpha = .83$) across all subscales.

For the current study, the principal investigator trained two coders, a graduate student and an undergraduate research assistant, using the training methods outlined by the authors (Ratto et al., 2010). Interrater reliability was calculated using percent agreement within one point (per author guidelines), with .90 or greater representing acceptable reliability. An examination of percent agreement among Coder 1 and Coder 2 demonstrated that 94% - 97% of ratings were within one-point agreement for the five target behaviors. Descriptives for all outcome measures are displayed in Table 2.

Parent Measures.

Question about initiation of a new mutual friendship

Parents responded to a question indicating the initiation of a new mutual friendship (“Has your adolescent initiated a mutual friendship since beginning PEERS? If so, please provide his/her first name and last initial.”)

Quality of Socialization Questionnaire - Revised (QSQ -R; Adapted from Frankel, et al., 2010)

The Quality of Socialization Questionnaire is a 12-item parent-report measure adapted from the Quality of Play Questionnaire (Frankel et al., 2010). The QSQ-R is designed to assess young adults’ frequency of hosted and invited get-togethers over the

past month, as well as peer conflict during get-togethers (conflict scale). Parents are asked to identify the friend who hosted each get-together, as well as use a 4-point Likert scale from 0 (“not true at all”) to 3 (“very much true”) to rate their adolescent’s conflict with peers during the get-togethers. According to Frankel and colleagues, the conflict scale on the QSQ-R has demonstrated good internal consistency ($\alpha = .87$) and good convergent validity on with the Problem Behaviors scale on the Social Skills Rating Scale ($\rho = .35, p < .05$). For the current study, the internal consistency of the QSQ-R parent-report was .82 (pre-treatment) and .47 (post-treatment).

Table 2. Means, Standard Deviations, and Ranges of Outcome Measures

	Pre-treatment Mean (SD) Range	Post-treatment Mean (SD) Range
Teen Measures		
Friendship Qualities Scale (FQS)	89.25 (11.53) 68-114	89.95 (18.28) 31-115
Test of Adolescent Social Skills Knowledge (TASSK)		
Total Score	11.45 (2.65) 6-17	20.75 (3.68) 13-26
Self-Perception Profile for Children/Adolescents (SPPC/A)		
Social Acceptance Score	2.32 (.77) 1.4-4	2.43 (.86) 1-4
Quality of Socialization Questionnaire-Revised (QSQ-R)		
Hosted Get-togethers	0.90 (1.55) 0-5	6.10 (7.23) 0-29
Peer Conflict Score	5.50 (4.99) 1-14	3.00 (3.59) 0-11
Contextual Assessment of Social Skills (CASS)		
Positive Affect	4.69 (.93) 2.5-6	4.83 (.86) 2.5-6
Kinesic Arousal	4.50 (.89) 2-6	4.67 (.75) 3-5.5

Social Anxiety	4.64 (.92) 2.5-6.5	4.81 (1.20) 1.5-6
Overall Involvement/Interest	4.86 (.76) 3-6	4.83 (1.08) 2-6
Overall Quality of Rapport	4.72 (1.00) 2.5-6	4.78 (1.13) 2-6

Parent Measures

Quality of Socialization Questionnaire-Revised (QSQ-R)

Hosted Get-togethers	1.12 (1.70) 0-6	2.82 (1.33) 0-6
Peer Conflict Score	4.80 (3.58) 0-10	3.60 (2.07) 0-7

RESULTS

Data Analytic Plan

The proposed hypotheses were examined using a series of paired-samples t-tests (Hypotheses 2, 3, 4, 5 and 6). Hypothesis 1 was examined by calculating the percentage of parents and adolescents that identified the initiation of a mutual friendship at post-treatment. Due to the pilot nature of the study, effect sizes (as measured by eta squared) also were examined for all outcome measures. Post-hoc power analyses indicated that power (given $n=20$, moderate effect size) for the current study is .70.

Primary Analyses

Exploratory analyses examining Hypothesis 1 indicated that 78.9% of parents and 68.4% of adolescents reported the initiation of a mutual friendship at post-treatment. One parent and one teen response to the friendship initiation question are missing ($n=19$).

To examine Hypothesis 2, a paired-samples t-test was conducted to examine differences in friendship quality from baseline to post-treatment as measured by the FQS. While the observed changes in post-treatment scores relative to baseline were in the expected direction, results did not reach statistical significance.

To examine Hypothesis 3, a paired-samples t-test was conducted to examine differences in adolescent social skills knowledge from baseline to post-treatment as measured by the TAASK. As shown in Table 3, there was a statistically significant increase in TAASK scores from baseline to post-treatment, $t(19) = -12.50, p < .001$. The eta squared statistic (.89) indicates a large effect size.

To examine Hypothesis 4, a paired-samples t-test was conducted to examine differences in adolescent social self-efficacy from baseline to post-treatment as measured by the SPPC/SPPA. While results did not reach statistical significance, a moderate effect size emerged ($\eta^2 = .06$).

To examine part one of Hypothesis 5, two paired-samples t-tests were conducted to examine differences in frequency of hosted get-togethers from baseline and post-treatment as reported by parents and adolescents on the QSQ-R. The QSQ-R question regarding hosted get-togethers had minimal missing data (n=19 pre-treatment, n=18 post-treatment). There was a significant increase in the frequency of hosted get-togethers reported by both parents ($t(16) = -3.28, p < .05$) and adolescents ($t(19) = -3.38, p < .01$; see Table 3). Furthermore, 94.4% of parents and 90% of adolescents reported that the adolescent had hosted at least one get-together over the past month. The eta squared statistics (.40 and .38, respectively) indicated a large effect size.

To examine part two of Hypothesis 5, two paired samples t-tests were conducted to examine differences in peer conflict during get-togethers from baseline to post-treatment as reported by parents and adolescents on the QSQ-R. The peer conflict score on the QSQ-R is computed only if the adolescent reported hosting a get-together in the past month; thus, analyses were conducted on a smaller sample of parents (n=10) and adolescents (n=8). While results did not reach statistical significance, a large effect size emerged for parent-reported peer conflict during get-togethers ($\eta^2 = .12$).

To examine Hypothesis 6, a series of paired-samples t-tests were conducted to examine differences in adolescent social interaction behaviors from baseline to post-treatment as measured by the CASS. The CASS analyses were conducted on a sample of

18; interaction data was missing for two adolescents due to refusal to participate in the task ($n=1$) and equipment malfunction resulting in inability to code observation ($n=1$). While observed changes in post-treatment scores were in the expected direction, with one exception, results did not reach statistical significance. Effect sizes ranged from small to moderate ($\eta^2=.02-.07$) for three of the target behaviors on the CASS, including Positive Affect, Kinesic Arousal, and Social Anxiety. Results of the paired-samples t-test results are presented in Table 3.

Table 3. Mean Differences in Adolescent and Parent Measures from Baseline to Post-treatment

	Pre-Treatment	Post-Treatment	<i>t</i>	η^2
Teen Measures				
Friendship Qualities Scale (<i>M,SD</i>)	89.25 (11.53)	89.95 (18.28)	-.18	.002
Test of Adolescent Social Skills				
Knowledge (TASSK)	11.45 (2.65)	20.75 (3.68)	-12.50***	.89
Self-Perception Profile for				
Children/Adolescents (SPPC/A)				
Social Acceptance Score	2.31 (.77)	2.43 (.86)	-1.14	.06
Quality of Socialization				
Questionnaire-Revised (QSQ-R)				
Hosted Get-togethers	0.90 (1.55)	6.10 (7.23)	-3.38**	.38
Peer Conflict Score	5.50 (4.99)	3.00 (3.59)	1.05	.05

Contextual Assessment of Social

Skills (CASS)

Positive Affect	4.69 (.93)	4.83 (.86)	-.59	.02
Kinesic Arousal	4.50 (.89)	4.67 (.75)	-1.14	.07
Social Anxiety	4.64 (.92)	4.81 (1.2)	-.95	.05
Overall Involvement/Interest	4.86 (.76)	4.83 (1.08)	.13	.001
Overall Quality of Rapport	4.72 (1.00)	4.78 (1.13)	-.28	.01

Parent Measures

Quality of Socialization

Questionnaire-Revised (QSQ-R)

Hosted Get-togethers	1.12 (1.69)	2.82 (1.33)	-3.28*	.40
Peer Conflict Score	4.80 (3.58)	3.60 (2.07)	1.12	.12

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

.01 = small effect, .06 = moderate effect, .14 = large effect (Cohen, 1988)

DISCUSSION

The current study examined the effectiveness of PEERS, a parent-assisted, friendship-building program, at establishing mutual friendships and improving peer relationships in adolescents with ADHD. The primary purpose was to collect pilot data with a new population in order to establish effect sizes for a future waitlist control study with a larger sample size. It was hypothesized that adolescents (and parents when examined) would report a significantly higher quality of existing friendships, improved social knowledge, higher social self-efficacy, increased frequency of get-togethers, decreased peer conflict during get-togethers, higher frequency of positive social behaviors, and lower frequency of negative social behaviors at post-treatment relative to baseline. In addition, exploratory analyses were conducted to examine parent- and adolescent-report of the initiation of at least one new friendship at post-treatment. Overall, results were in the expected direction with several analyses reaching statistical significance. Moderate to large effect sizes were observed for many outcome measures.

One of the most important findings that emerged from the current study was the large number of adolescents and parents who reported the initiation of a new, mutual friendship at post-treatment. As noted earlier, researchers have highlighted the importance of focusing on dyadic friendship formation rather than peer group acceptance as an outcome measure for peer interventions (Hoza, 2007; Mikami, 2010; Normand et al., 2011). While results have been mixed, researchers argue that the presence of at least one mutual friendship may function as a protective factor against the consequences of negative peer interactions (Bollmer et al., 2005; Cardoos & Hinshaw, 2011) and allow

youth to build social competence within a supportive relationship (Mikami, 2010; Nelson & Aboud, 1985). Thus, the establishment of a new mutual friendship following participation in PEERS provides initial support for the effectiveness of the program for adolescents with ADHD.

Notably, there also was a statistically significant improvement in adolescent social knowledge at post-treatment relative to baseline. These findings are similar to those reported by Laugeson and colleagues (2009) who found that adolescents with ASD demonstrated improved social knowledge at post-treatment. In addition to the significance of improvement, the effect size was large and comparable to those reported by Frankel and colleagues (1997) for school-aged children with ADHD participating in the CFT program. Researchers have consistently illustrated the importance of appropriate social knowledge in contributing to successful social interactions and positive peer relationships (Hoza et al., 2000; Ronk et al., 2011), which highlights the significance of this finding in providing additional support for the effectiveness of PEERS in forming positive peer relationships for teens with ADHD.

Additionally, parents and adolescents reported a significant increase in the frequency of hosted get-togethers at post-treatment relative to baseline. Again, these findings parallel those reported by Laugeson and colleagues (2009) with their sample of adolescents with ASD. Furthermore, the observed effect size for this change was large. Previous research has demonstrated that school-aged children whose parents consistently organized get-togethers demonstrated greater overall improvement at the end of the program than children whose parents were not consistent in planning get-togethers (Hoza et al., 2003; Mrug et al., 2001). This research, along with the current finding, provides

support for the importance of get-togethers as a component of effective peer interventions for school-aged children and adolescents.

Contrary to hypotheses, adolescents did not report a significantly higher quality of existing friendships at post-treatment relative to baseline. Examination of pre-treatment means indicated that, on average, adolescents reported moderately high-quality friendships at baseline suggesting that there was less opportunity for improvement at post-treatment. Additionally, this finding may illustrate that improvement in friendship quality may require additional time to develop beyond the final treatment session. In order to investigate this hypothesis, it would be necessary to assess treatment outcomes at a follow-up session three to six months post-treatment.

It also is important to consider the potential impact of the positive illusory bias (PIB) in the pre-treatment estimation of friendship quality. As discussed earlier, youth with ADHD tend to overestimate their social competence relative to observer ratings of their actual social competence (Bagwell et al., 2001; Heiman, 2005; Hoza et al., 2004, 2002; Ohan & Johnston, 2011). Researchers have hypothesized that PIB may function as a protective mechanism, in order to conceal feelings of inadequacy (Diener & Millich, 1997; Hoza et al., 2000) or may be the result of inadequate social knowledge, leading to inaccurate monitoring of social interactions (Hoza, 2002). Thus, it is important to consider the accuracy of adolescent-reported friendship quality and may indicate that additional respondents are necessary for future studies.

Interestingly, adolescents also did not report statistically significantly higher social self-efficacy at post-treatment; however, results were in the expected direction and a moderate effect size emerged. It is possible that results will reach statistical

significance with a larger sample size. Previous research has demonstrated that youth with ADHD tend to develop negative social reputations, which may be difficult to change (Hoza, 2007; Hoza et al., 2005) and persist despite no longer meeting diagnostic criteria (Bagwell et al., 2001; Mrug et al., 2012; Sibley et al., 2010). While adolescents in this group likely began experiencing some positive social interactions during participation in PEERS, they also may have continued to experience negative and unsuccessful interactions, which could have impacted their ratings of social self-efficacy.

Parents and adolescents also did not report significant decreases in peer conflict during get-togethers at post-treatment. Despite lack of significance, results were in the expected direction and small (teen-report) to large (parent-report) effect sizes were observed. Since many adolescents had not hosted get-togethers at baseline, these analyses were conducted with an even smaller sample size. Analyses conducted using a larger sample likely would have resulted in statistically significant decreases in peer conflict at post-treatment.

Lastly, analyses examining social interaction behaviors during a coded interaction with a typical peer were not significant. Overall, results were in the expected direction for positive affect, kinesic arousal, social anxiety, and overall rapport, and small to moderate effect sizes were established. Interestingly, examination of scores indicated that, on average, adolescents demonstrated average social interaction scores at baseline suggesting that there may have been less opportunity for improvement at post-treatment. Additionally, while improvements were made on all but one target variable, incremental increases on the CASS scale (e.g. from a 4 to a 5) may not be accurately assessed through t-tests. Improvements in social interaction behaviors may be better assessed through

analysis of clinically meaningful change, which could allow for examination of improvements at the individual level. This type of analysis could be accomplished should test-retest reliability become available for the measure.

Limitations

Although the current study has incorporated recommendations from the literature and has demonstrated the effectiveness of PEERS as a peer functioning intervention for adolescents with ADHD, there are several limitations. First, while the purpose of the study was to collect pilot data in order to establish effect sizes, the sample size was small. This likely had an effect on the significance level of some of the results. A second limitation is the absence of a wait-list control (WLC) group, which would allow for comparison of outcomes at post-treatment in order to establish whether PEERS is more effective than a WLC condition. Although this line of work is worth pursuing, the literature suggests that due to the typical severity of peer functioning difficulties among youth with ADHD, spontaneous remission would not be expected without intervention. A third limitation is related to ADHD subtype diagnosis and comorbidity. While several treatment variables improved over the course of the intervention, the study did not examine differences in effectiveness relative to subtype or comorbid diagnoses. Previous research has demonstrated that children with ADHD may exhibit different peer interaction difficulties based on subtype (Cordier et al., 2010; Hodgins et al., 2000) and comorbidity (Wilens et al., 2001). Examination of outcomes relative to subtype could allow for a more comprehensive understanding of the effectiveness of PEERS for the ADHD population.

Clinical Implications and Future Directions

Despite these limitations, the current findings have several important clinical implications. The current pilot study expands upon existing clinical interventions for youth with ADHD by examining the effectiveness of PEERS with an ADHD sample. PEERS includes all of the elements recommended by experts, including a focus on dyadic friendship formation, a parent component, and a stand-alone peer functioning intervention. Initial findings suggest that PEERS is an effective clinical intervention for improving dyadic friendship formation, social knowledge, and frequency of hosted get-togethers in teens with ADHD.

Future research could incorporate a waitlist control (WLC) group in order to investigate whether PEERS improves peer functioning in comparison to a WLC condition. Future research also could examine outcomes relative to ADHD subtype and comorbidity. As previously noted, youth with ADHD exhibit different social difficulties related to ADHD subtype and these differences could be examined in the context of PEERS. Future research on the effectiveness of PEERS for adolescents with ADHD should include follow-up sessions at three months post-treatment and six months post-treatment. Previous studies have used follow-up sessions as a means of assessing maintenance of treatment gains (Frankel & Myatt, 2007; Frankel et al., 1997; Laugeson et al., 2009; Pffifner & McBurnett, 1997). In addition to examining maintenance of treatment gains, follow-up sessions could allow for assessment of treatment variables that could require additional time to reach significance beyond the final treatment session. Finally, future research should examine whether modification to the current PEERS

program could increase effectiveness for youth with ADHD. Since PEERS was created for adolescents with ASD, there may be specific components of the program that require modification (addition or deletion) in order to better target youth with ADHD. For example, PEERS introduces the concept of “geek” culture, which could be more applicable to teens with ASD. Careful examination of session content and professional consultation could facilitate the modification of the program, which could later be pilot tested.

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