

Parent And Family Outcomes Of An Empirically Validated Social Skills Intervention For Adolescents With Autism Spectrum Disorders

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PARENT AND FAMILY OUTCOMES OF AN EMPIRICALLY VALIDATED
SOCIAL SKILLS INTERVENTION FOR ADOLESCENTS
WITH AUTISM SPECTRUM DISORDERS

by

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ABSTRACT
PARENT AND FAMILY OUTCOMES OF AN EMPIRICALLY VALIDATED
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AUTISM SPECTRUM DISORDERS

Jeffrey S. Karst, M.S.

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Past research has indicated that raising a child with an Autism Spectrum Disorder (ASD) is associated with increased parenting stress, decreased parenting self-efficacy, and increased family distress. While ASD therapies often include significant parental involvement and are typically time-intensive and expensive, studies of ASD treatment have not widely evaluated the impact of treatment on caregivers or the family. There is evidence that successful long-term treatment outcomes are dependent on healthy systemic functioning, and thus it is important to understand how any particular treatment adjunctively affects parents and the family system. The Program for the Education and Enrichment of Relational Skills (PEERS; Laugeson & Frankel, 2010) is a 14-week, manualized social skills intervention designed for adolescents with high-functioning Autism Spectrum Disorder. This study aimed to understand the impact of PEERS intervention on parenting stress, parenting self-efficacy, family distress, parent facilitation of teen autonomy, and parent-teen relational frustration, via a randomized, controlled trial.

Comparison of an experimental group and waitlist control group from pre- to post-intervention via mixed between-within analysis of variance (ANOVA) suggested a significant group by time interaction effect indicative of a decrease in family chaos following PEERS intervention. In addition, parents in the experimental group demonstrated a significant increase in parenting self-efficacy from pre- to post-intervention. There were not significant main or interaction effects found for parenting stress, teen autonomy, or relational frustration. Additional analyses examined the relationships between parent and teen functioning. Overall, these findings highlight adjunctive benefits resulting from PEERS intervention and suggest the need for increased study of this promising program.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	i
LIST OF TABLES.....	iii
LIST OF FIGURES.....	iv
CHAPTER	
I. INTRODUCTION.....	1
Impact of ASD on Parents and Families.....	2
Parenting stress.....	3
Parenting self-efficacy.....	6
Parent-child relationship.....	8
Effect of ASD on the family system.....	9
Social Skills Interventions for ASD.....	10
Summary and Objectives.....	12
II. METHODS.....	15
Participants.....	15
Procedure.....	17
Recruitment.....	17
Pre-Assessment.....	18
PEERS intervention.....	19
Post-Assessment.....	21
Parent Measures.....	21
Stress Index for Parents of Adolescents (SIPA)....	21
Parenting Sense of Competence Scale (PSOC)....	22

Confusion, Hubbub, and Order Scale (CHAOS).....	22
Parenting Relationship Questionnaire – Child and Adolescent (PRQ-CA).....	23
Parent-Child Relationship Inventory (PCRI).....	24
Adolescent Measures.....	25
Social Interaction Anxiety Scale (SIAS).....	25
Piers-Harris Self Concept Scale, Second Edition (Piers-Harris).....	25
III. RESULTS.....	27
Exploratory Analyses.....	27
Hypothesis 1.....	28
Parenting stress.....	30
Parenting self-efficacy.....	31
Family effects.....	32
Adolescent autonomy.....	33
Relational frustration.....	34
Clinically meaningful change.....	35
Hypothesis 2.....	36
Exploratory change analyses.....	36
IV. DISCUSSION.....	38
Conclusions.....	38
Hypothesis 1.....	38
Clinically meaningful change.....	41
Hypothesis 2.....	43

Implications.....	45
Limitations & Future Directions.....	47
Summary.....	50
V. REFERENCES.....	52

LIST OF TABLES

Table 1. Demographic Means and Standard Deviations.....	17
Table 2. Demographic Frequency Statistics.....	18
Table 3. Significant Bivariate Correlations among Variables of Interest Prior to Intervention.....	28
Table 4. Scale Means and Standard Deviations.....	29
Table 5. Mixed Between-Within Subjects ANOVAS.....	30
Table 6. Change Correlations (Experimental Group Only).....	37

LIST OF FIGURES

Figure 1. Total Stress T-Scores from the Stress Index for Parents of Adolescents (SIPA).....	31
Figure 2. Mean Parenting Self-Efficacy from the Parent Sense of Competence Scale (PSOC).....	32
Figure 3. Total Scores from the Confusion, Hubbub, and Order Scale (CHAOS).....	33
Figure 4. Parent-Child Relationship Inventory (PCRI) Autonomy Subscale T-Score.....	34
Figure 5. Parenting Relational Questionnaire (PRQ) Relational Frustration Subscale T-Score.....	35

Parent and Family Outcomes of an Empirically Validated Social Skills
Intervention for Adolescents with Autism Spectrum Disorders

Autism Spectrum Disorders (ASD) represent a spectrum of complex, neurological, and developmental disorders characterized by deficits in reciprocal social interaction and communication along with the presence of restricted, repetitive, and stereotyped interests and behaviors (American Psychiatric Association, 2000). These deficits typically manifest in early development and are pervasive in nature, impacting individuals throughout the lifespan across multiple domains of functioning. The exponential increase in ASD diagnoses (1 in 88 children: Center for Disease Control and Prevention, 2012) has contributed to a high level of demand for services, as individuals with ASD and their families seek both informative assessment processes and effective treatment programs (Lord & Bishop, 2010).

There is currently great variability in treatment options available for children and adolescents with ASD. Considerable disagreement remains regarding the type of outcome measures that should be utilized in determining empirical support for ASD interventions. Much of this debate has focused on outcomes directly related to the child, often ignoring the broader family context (Karst & Van Hecke, 2012). As a result, it has been difficult to assess the impact of different treatments on caregivers and families, leading to an incomplete picture of the benefits and/or costs of any particular treatment. It also remains unclear how parent and family transformations resulting from treatment, whether positive or negative, contribute to both immediate and long-term behavioral, socio-emotional, and functional child outcomes. Sikora et al. (2013) identified a strong association between parent and child behavioral and emotional functioning in children

with ASD, suggesting that both domains should be evaluated when assessing the outcomes of intervention.

The Program for the Education and Enrichment of Relationship Skills (PEERS; Laugeson & Frankel, 2010) is an empirically validated social skills intervention for adolescents with ASD that includes extensive parent involvement throughout treatment. The PEERS program has been offered through the Marquette Autism Clinic beginning in the spring of 2011 concurrent with research into a wide variety of child, parent, and family outcomes. This paper will first review the impact that having a child with an ASD can have on caregivers and families; followed by a discussion of social skills interventions, including the PEERS program specifically, and review the limited research on parent outcomes of such treatments. Finally, the current investigation will be presented, which sought to determine whether parents and families demonstrated benefit from PEERS intervention and explored the relationship between parent and child changes made during the course of treatment.

Impact of ASD on Parents and Families

The effects of having a child with an ASD on parents and families are, like the disorder itself, multifaceted and pervasive. Parents often report early concerns regarding their child's development, beginning at approximately 6 months of age (Bolton, Golding, Emond, & Steer, 2012; Howlin & Asgharian, 1999). Early deficits in social interaction and reciprocity can be particularly troubling for parents, who find themselves unable to engage in typical socio-emotional bonding routines with their child. Concern regarding deficits in early development is eventually followed by caregiver distress regarding the possibility of long-term functional limitations. Approximately 85% of individuals with

ASD present with cognitive and/or adaptive deficits which limit their ability to live independently, leading to the possibility that they will need some measure of care or assistance from their parents and families for the duration of their lives (Volkmar & Pauls, 2003). In addition, the understanding and conceptualization of ASD is rapidly changing (Rutter, 2011), and there is wide variability in the nature of interventions for children with ASD (Carlson, Carter, & Stephenson, 2013). As a result, families of children with ASD are faced with a disorder for which the etiology is unclear and optimal treatment is debated.

Raising and supporting a child with an ASD appears to have broad negative effects on parents and families regardless of the severity of symptomatology or the time since diagnosis (Pottie & Ingram, 2008). Ekas, Lickenbrock, and Whitman (2010) found that core ASD symptoms (i.e., deficits in social communication and restricted, repetitive interests and behaviors), associated deficits (i.e., functional limitations), and behavior problems associated with ASD all contributed significantly to negative maternal well-being, with approximately 12% of the total variance in maternal well-being explained by children's ASD deficits. Given the variability in ASD presentation, it is important to explore specific domains affected by having a child with ASD and gain deeper understanding of the deficits/behaviors that contribute to each particular area.

Parenting stress.

Parents of children with ASD have been shown to experience higher levels of parenting stress than parents of typically developing children (e.g., Duarte, Borden, Yazigi, & Mooney, 2005; Hayes & Watson, 2012; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009; Rao & Beidel, 2009) as well as parents of children with other

types of developmental delay or special health care needs (e.g., Estes et al., 2009; Estes et al., 2012; Schieve, Blumberg, Rice, Visser, & Boyle, 2007; Schieve et al., 2011). Factors contributing to parenting stress in caregivers of children with ASD are numerous and include the presence of child anxiety, behavior problems, disturbed mood or irritability, functional dependence, hyperactivity, noncompliance, lack of self-care abilities and low adaptive functioning, language deficits, learning disability, imposed limits on family opportunities, need for care across the life-span, inappropriate eating, toileting, and sexual expression, and broad social difficulties (Bebko, Konstantareas, & Springer, 1987; Brown et al., 2011; Gray, 1994; Hall & Graff, 2011; Ingersoll & Hambrick, 2011; Koegel et al., 1992; Lecavalier, Leone, & Wiltz, 2006; Lee, Harrington, Louie, & Newschaffer, 2008; Little & Clark, 2006; Lyons, Leon, Phelps, & Dunleavy, 2010; Tomanik, Harris, & Hawkins, 2004; Walsh, Mulder, & Tudor, 2013). Though cognitive impairment was once identified as one of the greatest contributors to elevated parenting stress (e.g., Bebko et al., 1987), Davis and Carter (2008) more recently found that cognitive deficits did not contribute uniquely to variance in parenting stress when assessed along with other child characteristics. Further, Rao and Beidel (2009) noted that higher intellectual functioning in “high-functioning” children with ASD did not ameliorate high levels of stress in parents. In addition, neither deficits in language and communication nor the presence of stereotyped behaviors appear to contribute directly to high levels of parenting stress (Davis & Carter, 2008; Tomanik et al., 2004), despite these two categories representing two of the core deficits of ASD. It therefore appears that the unique combination of emotional, functional, social, and behavioral problems common in children with ASD, in

conjunction with the pervasive nature of the disorder, affect parents more than the “core symptoms” of autism, per se.

Though the extent to which any particular construct contributes to parenting stress likely changes over the course of the child’s development, Lecavalier et al. (2006) found that, overall, stress levels in parents of children with ASD are stable over time. Several researchers have found parenting stress to be significantly impacted by the type of coping strategies utilized and the extent of social support received by parents (Lee et al., 2008; Lyons et al., 2010; Pottie & Ingram, 2008; Tehee, Honan, & Hevey, 2009; Weiss, 2002), as well as parental perception of their child’s future (Faso, Neal-Beevers, & Carlson, 2013; Poon, Koh, & Magiati, 2013). Parenting stress also seems to be affected by whether parents put off or give up life plans and/or become isolated from family and friends (Wolf, Noh, Fisman, & Speechley, 1989). Thus, it stands to reason that treatments that facilitate increased parental support and those which increase hopefulness for parents could be particularly helpful in reducing caregiver stress. Further, there appears to be a relationship between parenting stress and broader autism phenotype (BAP), or sub-threshold characteristics of autism often noted in parents of children with ASD (Losh, Childress, Lam, & Piven, 2008), including impaired social abilities, poor eye contact, and restricted or narrow interests. Parental involvement in intervention could be directly helpful to parents with these “sub-clinical” deficits, as the concepts reviewed in treatment (e.g., social skills) may also be personally relevant.

There is evidence that high levels of parenting stress are associated with diminished child outcomes over time following intervention (Osborne, McHugh, Saunders, & Reed, 2008A). In addition, a recent study by Mandell et al. (2011)

suggested that increased parental respite was associated with decreased hospitalizations for children with ASD (while the same was not true for child therapeutic services). Thus, interventions which reduce parenting stress would likely reciprocally benefit children with ASD as well as the entire family.

Parenting self-efficacy.

Parenting self-efficacy (PSE), or one's belief in his or her ability to parent effectively, also appears important to assess given the high likelihood that parents of children with ASD experience decreased confidence in their parenting skills. A review of PSE in parents of typically developing children by Jones and Prinz (2005) suggested that PSE was predictive of actual parenting competence. These authors stated that "parents with higher PSE tend subsequently to demonstrate more effective parenting even in the face of challenging child behavior" (Jones & Prinz, 2005, p. 358). Low parenting self-efficacy has been associated with increased levels of parenting stress in parents of children with disabilities (Giallo, Wood, Jellett, & Porter, 2011), and may be uniquely affected by having a child with ASD for several reasons. Parents of children with ASD may lack confidence in helping their child address difficulties that they also experience (e.g., social anxiety or difficulties with nonverbal communication), or may simply be affected by the broad mental health concerns associated with raising a child with an ASD (e.g., increased depression and anxiety; Hastings & Brown, 2002). Further, the debate over ASD etiology, in conjunction with the plethora of different interventions available for ASD, often leaves parents feeling unsure and confused about the optimal course of treatment for their child (Mackintosh, Goin-Kochel, & Meyers, 2012). In addition, Sofronoff and Farbotko (2002) noted that the delay in ASD diagnosis (which, with

Asperger syndrome, can extend into the teenage years), often means parents of children with ASD have employed minimally effective parenting strategies for relatively long periods of time. Caregivers are often left frustrated with their child's behaviors and doubting of their own parenting abilities. Finally, PSE may be uniquely affected in parents of children with ASD due to the child's lack of reciprocal social communication, a hallmark deficit of autism. Parents may feel less able to meet the emotional wants or needs of their children with ASD, who are often unable to clearly express such needs due to impairments in both verbal and nonverbal communication.

Sofronoff and Farbotko (2002) emphasized the importance of targeting PSE in parents of children with ASD in their investigation of a parent management training program designed to increase parents' self-efficacy. They found that parents in a one-day workshop and parents attending individual treatment sessions both reported increased self-efficacy compared to control groups, with significantly greater improvement seen in maternal caregivers (Sofronoff & Farbotko, 2002). In addition, Keen, Couzens, Muspratt, and Rodger (2010) reported that a parent-focused intervention led to greater improvement in PSE relative to a self-directed intervention. These findings suggest that low PSE in parents of children with ASD is malleable and amenable to brief, targeted intervention. Sofronoff and Farbotko also found that parents reported fewer child behavior problems post-intervention, suggesting that increases in PSE in parents of children with ASD can have a direct impact on the diagnosed child. Taken in sum, there are many reasons to believe that parents of children with ASD suffer from decreased PSE compared to parents of typically developing children, though no longitudinal studies to date have confirmed this hypothesis. However, given that increases in PSE through interventions such as that

by Sofronoff and Farbotko (2002) seem to positively impact parents and their children with ASD, it is important to take this variable into account in understanding the overall impact of ASD interventions.

Parent-child relationship.

One domain in which parents of children with ASD appear to maintain relatively healthy functioning is within their relationship with their child (Beurkens, Hobson, & Hobson, 2013). Montes and Halterman (2007) reported that, despite increased stress levels and diminished quality of communication, mothers of children with ASD reported higher levels of relational closeness with their child than mothers in the general United States population. Further, mothers of children with ASD did not differ from mothers of typically developing children on a measure of emotional closeness with their children (Hoffman et al., 2009). For both “ASD” and “typically developing” groups, it was suggested that higher levels of problem behavior contributed to decreased relational closeness, while for parents of children with ASD, attachment was also negatively impacted by severity of ASD symptoms. Hoffman and colleagues (2009) hypothesized that the diagnosis of ASD itself may actually serve as a protective factor in the parent-child relationship, in that parents view their child as less responsible for his or her behavior. In support of this theory, Montes and Halterman (2006) found that parents of children with ASD were less likely to feel angry with their child, despite reporting that they were bothered by their child’s behavior. Additionally, Whittingham, Sofronoff, Sheffield, and Sanders (2008) found that parents of children with ASD attributed most of their child’s misbehavior to associated ASD symptoms, rather than their child’s personality or temperament. However, Hoffman et al. (2009) also noted that parents of

children with ASD might blame themselves, rather than their child, for any misbehavior, which in turn could contribute to decreased parenting efficacy and well-being. Further, Gau et al. (2011) suggested caution in interpreting high levels of parent-child relationship closeness as inherently positive, noting that it could represent enmeshed, or overly close, dyadic relationships between one or both parents and the child with an ASD. These abnormal relationship patterns could have a negative effect on siblings and the family as a whole, given that children with ASD often require more attention and support throughout their lifespan. It thus appears important to further understand how the development of autonomy in children, and the facilitation of this independence by parents, manifests in the parent-child relationship for children with ASD.

Effects of ASD on the family system.

The impact of having a child with an ASD extends beyond caregivers to the entire family system. The increase in parenting stress, demands associated with care, and child behavior problems contribute to decreased marital satisfaction compared to married parents of typically developing children (Brobst et al., 2009; Gau et al., 2011). Further, there is a much higher rate of divorce for parents of children with ASD than in families with only typically developing children (Brobst, Clopton, & Hendrick, 2009; Freedman, Kalb, Zablotsky, & Stuart, 2012; Hartley, Baker, Seltzer, Greenberg, & Floyd, 2011). Brothers and sisters of children with ASD also demonstrate numerous “difficulties” associated with their siblings’ diagnosis (Rivers & Stoneman, 2003), many of which are thought to be related to the attention focused on the child receiving intervention.

Kelly et al. (2008) noted that family conflict was actually predictive of ASD symptomatology and found that negative family relationships influenced ASD symptom

manifestation more than positive family interactions. These findings suggest that, despite lower levels of social awareness, children of ASD may pick up on and are negatively affected by parent conflict and family distress, highlighting the transactional nature of parent, family, and child difficulties. Further, families of children with ASD often limit family participation in community activities (Lam, Wong, Leung, Ho, & Au-Yeung, 2010), which can serve as a source of social learning and family bonding. The broad impact of ASD on the family thus also deserves attention when considering the impact of treatment, particularly when therapy places additional time demands or financial stress on the family.

Social Skills Interventions for ASD

The majority of interventions for adolescents and/or higher-functioning individuals with ASD focus on deficits in social impairment. This domain is an important target developmentally, and is also necessary to address given the significant negative outcomes associated with ostracism in adolescents with ASD (Sebastian, Blakemore, & Charman, 2009). There are a multitude of social skills interventions available for pre-teens and teenagers with ASD, some of which have demonstrated empirical evidence for improving social deficits (Reichow & Volkmar, 2010).

Unfortunately, White, Koenig, & Scahill (2007) also noted that many of the gains made in both individual and group social skill interventions appear to diminish over time. Rao, Beidel, and Murray (2008) indicated that one of the primary challenges for social skill groups is to help children with ASD generalize the skills learned in treatment to broader contexts, which may be more difficult without the incorporation of parents into the therapy process. When parents are involved, they are likely able to help facilitate

practice at home and provide feedback in the “real-world” social environment. The lack of parent and family involvement in many social skills treatments thus may be at least partially responsible for the limited maintenance of therapeutic gains. Many of the social skills programs which do include higher levels of parental involvement appear to show more evidence of long-term benefit, including the Program for the Education and Enrichment of Relationship Skills (PEERS; Laugeson, Frankel, Mogil, & Dillon, 2009).

The PEERS treatment curriculum (Laugeson & Frankel, 2010) was developed as an extension of Children’s Friendship Training (CFT; Frankel & Myatt, 2003). Children’s Friendship Training has demonstrated empirical support in treating social deficits in children with ADHD and ASD (Frankel et al., 2010; Frankel & Whitham, 2011), but was designed primarily for younger children. The primary topics addressed in PEERS include trading information, conversational skills, electronic communication, choosing appropriate friends, appropriate use of humor, peer entry and exit strategies, hosting get-togethers, good sportsmanship, and handling negative events such as bullying, teasing, arguments, and rumors. Laugeson et al. (2009) identified three core features of PEERS intervention. The first primary feature is the small group format of PEERS, which is recommended to include between 5 and 10 teenagers. Secondly, Laugeson et al. noted that parent involvement is crucial and allows for direct instruction of social skills, supervision and practice throughout intervention, and support of the child’s attempts to develop appropriate friendship networks. Finally, the lessons presented in PEERS are founded on social etiquette rules germane to modern-day adolescent relationships. These skills are presented in concrete, directed lessons in accordance with the optimal learning style of children with ASD (Laugeson & Frankel, 2010). Preliminary research on PEERS

has identified significant social skills and friendship improvements in adolescents with ASD both immediately following intervention and at 14-week follow-up (Laugeson, Frankel, Gantman, Dillon, & Mogil, 2011).

Summary and Objectives

As noted earlier, very few studies of ASD interventions have assessed parental outcomes. Predominantly, such research has assessed parent training programs for parents of children with ASD. These studies suggest that parents benefit from intervention in a variety of ways, including an increase in ASD-related knowledge and therapeutic skill (McConachie & Diggle, 2008); improved responsiveness and emotional regulation (Whittingham, Sofronoff, Sheffield, & Sanders, 2009), reduced levels of stress, depression, and overall improved mental and physical health (McConachie & Diggle, Roberts & Pickering, 2010; Solomon et al., 2004; Tonge et al., 2006), and greater parenting self-efficacy (Leef, 2005; Sofronoff & Farbotko, 2002; Whittingham et al.). These outcomes are promising, but not universal, as Drew et al. (2002) did not find differences in parenting stress compared to a control group following a pilot trial of a parent training intervention. However, it is clear that for the most part, parents benefit from interventions for ASD in which they are taught skills to help them deal with their child's particular challenges. These benefits appear to hold true even when parent training programs are adjunctive to primary programs for children (e.g., Solomon et al.'s (2004) social skills program with added parent training). However, comprehensive evaluation of parent outcomes is extremely limited in ASD intervention research, and practically non-existent in research of social skills programs.

Thus, the primary aim of this study was to understand the impact of involvement in PEERS on parenting stress, parenting self-efficacy, family chaos, and the parent-child relationship. Within this scope, it was predicted that, following 14 weeks of PEERS intervention: 1) Parents in the experimental group would demonstrate significantly decreased levels of total parenting stress compared to parents in the waitlist control group, as measured by the Stress Index for Parents of Adolescents (SIPA; Sheras, Abidin, & Konold, 1998); 2) Parents in the experimental group would demonstrate significantly increased levels of parenting self-efficacy compared to parents in the waitlist control group, as measured by the parenting self-efficacy subscale of the Parenting Sense of Competence Scale (PSOC; Gibaud & Wandersman, 1978, as cited in Johnston & Mash, 1989); 3) Families in the experimental group would demonstrate decreased levels of family chaos compared to those in the waitlist control group, as measured by the Confusion, Hubbub, and Order Scale (CHAOS; Matheny, Wachs, Ludwig, & Phillips, 1995), and 4) Parents and their teens in the experimental group would demonstrate changes in the parent-child relationship, specifically showing decreases in relational frustration, as measured on the Parenting Relationship Questionnaire – Child and Adolescent (PRQ-CA; Kamphaus & Reynolds, 2006) and increases in teen autonomy, as measured on the Parent-Child Relationship Inventory (PCRI; Gerard, 1994). In addition to determining whether changes in parenting stress were statistically significant, it was hypothesized that the majority of the parents in the experimental group would demonstrate clinically meaningful change (Jacobson & Truax, 1991) in their total parenting stress levels, as evidenced by both a return to the “normal” range of functioning as well as by making statistically reliable change.

A secondary aim of this study was to gain preliminary understanding of the relationship between parent change and adolescent change following intervention, which is hypothesized to be a bidirectional relationship in which parent change allows continued child progress. It was predicted that there would be a positive, significant correlation between parenting stress (on the SIPA) and teen social anxiety (as measured by the SIAS) from pre- to post-intervention for the experimental group (i.e., the group receiving treatment). In addition, it was predicted that there would be a positive, significant correlation between parenting self-efficacy (as measured by the PSOC) and overall teen self-concept (as measured by the Piers-Harris).

Methods

Participants

The larger project encompassing this study, which is evaluating several domains of PEERS outcomes, was approved through the Marquette University Institutional Review Board (HR-2020). The presented study includes data from 50 adolescent-caregiver dyads. To control for time and maturational effects, a 16-week delay (i.e., the duration of the PEERS intervention) took place between the time parents and teens in the waitlist control group completed the pre- and post-treatment measures.

Inclusion for enrollment in PEERS and this study included meeting several criteria. First, the adolescent had to clearly state interest in participating in the group. The focus of PEERS is on building skills to help make and keep friends, and sessions did not include work on building motivation for friendships. Thus, the child had to be inherently motivated to participate, learn, and practice skills from PEERS. Second, the teen and his or her parent(s) needed to attend most weekly sessions for the duration of PEERS, with a maximum of two absences allowed. In addition, the child needed to obtain a Verbal and Full Scale IQ score on the Kaufman Brief Intelligence Test – Second Edition (Kaufman & Kaufman, 2004) of greater than or equal to 70. The PEERS program is highly verbal and requires understanding of complex concepts, making it inappropriate for lower-functioning children. Teens enrolled in PEERS were also required to be free of other significant physical or mental health disorders that would preclude them from being able to participate fully in the program. However, teens were allowed to participate as long as other diagnoses were not judged to reduce the likelihood

of the child and family benefitting from participation (e.g., one teen participated despite having significant visual impairment). Further, teens needed to be between the ages of 11 and 16 years old at the time of their intake, and be enrolled in either middle school or high school. The latter criterion was in place to ensure that the PEERS program curriculum, which focuses heavily on identifying potential groups for friendship at school and initiating friendships within these groups, would be appropriate for each individual. Finally, the child had to meet criteria for a diagnosis of either Autism or Autism Spectrum Disorder on the Autism Diagnostic Observation Schedule – General (ADOS-G; Lord, Rutter, DiLavore, & Risi, 2002), Module 4. This measure is a gold standard of ASD evaluation (Ozonoff, Goodlin-Jones, & Solomon, 2005) and provided a confirmation of diagnosis, though most families reported a prior formal diagnosis of an Autism Spectrum Disorder. Trained members of the PEERS team who had established ADOS coding reliability completed administration of the ADOS-G.

The final sample consisted of a total of 50 parent-child dyads, 23 of who were in the experimental group (20 female caregivers, 3 male caregivers) and 27 of who were in the waitlist control group (23 female caregivers, 4 male caregivers). Data analysis was conducted using SPSS statistics, version 19 (IBM, 2010). A small number of parents from both groups were removed from analysis due to lack of completed forms at pre- or post-treatment. T-test and Chi-Square analyses suggested no significant differences on key demographic variables between parents who completed parenting measures and those who did not. Primary analyses were also conducted with male caregivers removed from both groups, with no major differences emerging in the outcomes reported in this paper. Parents in the final sample ranged from 32 years to 56 years of age with an average of

45.9 years of age, teens ranged from 11 to 16 years of age with an average of 13.7 years of age at the time of intake. There were no significant differences on parent age or teen age between the experimental and waitlist groups. In addition, no significant differences between groups were found for teen intellectual functioning (as measured on the KBIT-2) or ASD symptom severity (as measured on the ADOS-G, Module 4). For additional demographic information, please see table 1 and table 2.

Procedure

Recruitment.

Families were recruited for participation in PEERS through local ASD support, service, and diagnostic agencies, advertisements in the Autism Society of Southeast Wisconsin (ASSEW) newsletter, and through word of mouth from families with previous participation.

Table 1. Demographic Means and Standard Deviations

	EXP (<i>n</i> = 23)	WL (<i>n</i> = 27)
Parent Age	45.00 (<i>5.14</i>)	45.96 (<i>5.75</i>)
Child Age	14.13 (<i>1.29</i>)	13.33 (<i>1.62</i>)
# of Siblings	1.30 (<i>1.10</i>)	1.37 (<i>1.00</i>)
Verbal SS	96.91 (<i>18.45</i>)	98.04 (<i>17.96</i>)
Non-Verbal SS	96.48 (<i>15.70</i>)	103.44 (<i>15.06</i>)
Full Scale IQ	96.78 (<i>16.55</i>)	101.15 (<i>17.20</i>)
ADOS Communication	3.91 (<i>1.78</i>)	3.67 (<i>1.57</i>)
ADOS Social Interaction	7.83 (<i>2.04</i>)	7.89 (<i>2.49</i>)
ADOS Total Score	11.83 (<i>3.55</i>)	11.44 (<i>3.62</i>)

EXP = Experimental Group

WL = Waitlist Control Group

SS = Standard Score

Table 2. Demographic Frequency Statistics

	Marital Status	Education Level	Income	Parent Race/Ethnicity
EXP	Married = 18	High School = 1	Under 25K = 1	Asian = 1
	Divorced = 4	Some College = 2	25k – 50k = 4	Black Non-Hispanic = 2
	Unmarried = 1	College Degree = 18	50k – 75k = 3	White Non-Hispanic = 20
		Advanced Degree = 5	75k – 100k = 5	
		100k+ = 9		
WL	Married = 19	High School = 2	Under 25k = 1	Black Non-Hispanic = 1
	Divorced = 4	Some College = 3	25k – 50k = 3	White Non-Hispanic = 26
	Separated = 2	College Degree = 20	50k – 75k = 7	
	Unmarried = 2	Advanced Degree = 2	75k – 100k = 2	
100k+ = 12				

EXP = Experimental Group

WL = Waitlist Control Group

Upon calling to express interest in PEERS, families were provided with a brief synopsis of the program and, if interested, participated in a telephone “screening” process to ensure that teens met criteria for initial inclusion in PEERS. At this point, families were placed on a call list for the next available round of intake appointments, which were held twice annually in August and January. A maximum number of 20 children were accepted for each round of intakes, allowing for a maximum of 10 adolescents in each intervention group, the highest number recommended by Laugeson & Frankel (2010).

Pre-Assessment.

Following enrollment in PEERS, families were randomly assigned to either the “experimental” or “control” group. Random assignment was done for each “set” of intakes, comprising between 14 and 20 families each (i.e., 7 to 10 adolescents per group). The only contingency to random assignment was that no PEERS group could contain only one child of either gender. Prior to the first intake appointment, the parent or

parents who planned on attending PEERS sessions were asked to attend this appointment with their teen. For both groups, the intake process consisted of the following: First, parent consent and teen assent for participation in PEERS and the research associated with PEERS were reviewed and signed. Parents also signed additional consent allowing for teens to share phone numbers with other group members, have measures completed by teachers, and allow videos to be filmed for training purposes. Next, in a separate room from their teen, parents completed questionnaires for this study as well as measures pertaining to their child's social skills, emotional and adaptive functioning, and behavior. Concurrently, teens were administered the ADOS-G and KBIT-2 to ensure that they met criteria for enrollment in PEERS. Parents were informed immediately regarding their teen's eligibility for participation. The teens were then provided with a variety of questionnaires regarding their social skills, experiences, and self-perception. Following administration of these questionnaires, teens participated in other components of the broader investigation of PEERS, including assessment of neural functioning via electroencephalogram, vagal nerve regulation of heart rate via 3-channel electrocardiogram, and a video-taped, in-vivo social interaction with a typically developing teenager (completed at a separate session). At the conclusion of the intake process, families were notified of their assignment to either the experimental or waitlist group to ensure that responses were not biased by group assignment.

PEERS intervention.

Following completion of the intake process, parents and teens in the Experimental group attended 14 weekly sessions of PEERS spaced out over a 16-week period to allow time for holiday breaks and post-assessment measures. Parent and teen sessions

consisted of concurrent, 90-minute, didactic sessions that strictly adhered to the treatment outline in the PEERS manual (Laugeson & Frankel, 2010). Regular fidelity checks were conducted by trained undergraduate assistants to ensure treatment remained adherent to the PEERS manual and was equivalent between groups. Teen sessions were led by Master's level doctoral students in the Marquette University Clinical Psychology Doctoral program, under the supervision of Amy Vaughan Van Hecke, Ph.D., a certified PEERS provider. Teen group leaders were assisted by trained undergraduate psychology students, who acted as "coaches" during behavioral rehearsal of skills learned in PEERS and assisted in role-play presentations of rules. Parent sessions were conducted by advanced graduate students in the Clinical Psychology Doctoral Program, again under the supervision of Dr. Van Hecke. The sessions were held in two separate rooms within the Marquette Psychology Department's mental health clinic, with teens seated at a table in a conference room and parents seated around a large therapy room. The teen sessions followed a regular format beginning with homework review, followed by presentation of the new didactic lesson, therapist and coach "role play," behavioral rehearsal, review of new homework, and re-unification with parents (which includes a review of the lesson and homework assignment). Similarly, parent sessions included homework review and "troubleshooting", discussion of that week's didactic lesson, and review of homework for the upcoming week prior to re-unification. The final week of PEERS consisted of a graduation ceremony and party, where parents reviewed major concepts of the group and discussed plans for moving forward after PEERS, while teens were rewarded with prizes and games dependent on the level of individual and group participation over the course of treatment. During the treatment period, the waitlist control group was free to access

community services and resources as needed. Parents were asked to report on the use of such services for themselves, their family, or their child at the time of their follow-up appointment with the administration of a brief survey.

Post-Assessment.

After the experimental group had completed the PEERS program, both the waitlist and experimental groups completed the same measures and procedures as during the intake session. The outtake sessions were mostly similar to the intake sessions; though consent and assent procedures and administration of the ADOS-G and KBIT-2 did not take place. Teens were again asked to complete their forms in a separate room from their caregiver and had a graduate or undergraduate research assistant available to answer questions about any items.

Parent Measures

Stress Index for Parents of Adolescents (SIPA).

The SIPA (Sheras et al., 1998) is a screening and diagnostic instrument that identifies areas of stress in parent-adolescent interactions and is appropriate for parents of adolescents ranging in age from 11 to 19 years. The SIPA consists of 90 items assessing the amount of stress experienced by a parent as a function of specific characteristics of his/her adolescent life (i.e. Adolescent Domain), functioning that relates to a parent's distress as he/she interacts with the adolescent (i.e. Parent Domain), and the perceived quality of the relationship that the parent has with the adolescent (i.e., Adolescent-Parent Relationship Domain). These scales combine to form a Total Parenting Stress score. There is also a 22-item scale that measures the number of stressful life events the

parent has experienced in the past year. The majority of subscale coefficient alphas range from the high .80s to .90, and test-retest reliability estimates for a 4-week interval range from .74 to .93 for SIPA subscales (Sheras et al., 1998). Parenting stress as assessed by the SIPA has been found to relate to the quality of parents' perceptions of their parenting alliance, other psychological measures of adolescent and parent functioning, and the quality of the marital relationship and family system (Sheras et al., 1998). Ozonoff and colleagues (2005) identified the SIPA as a psychometrically sound measure for use with parents of adolescents with ASD. Within this study, Cronbach's alpha suggested good internal consistency at pre (.88) and post (.88) intervention.

Parenting Sense of Competence Scale (PSOC).

The Parenting Efficacy subscale of the PSOC (Gibaud-Wallston and Wandersman, 1978, as cited in Johnston & Mash, 1989) is a 7-item, parent-report measure of parenting self-efficacy. The measure includes a six-point Likert-scale ranging from "Strongly Disagree" (6) to Strongly Agree (1) on statements such as "I meet my own personal expectations for expertise in caring for my child" (Johnston & Mash, 1989, p. 171). Reverse scoring is used such that higher scores indicate greater levels of parenting self-efficacy. Johnston and Mash (1989) reported good internal consistency within the parenting efficacy subscale ($\alpha = 0.76$) and as well as good divergent construct validity from the other subscale of the PSOC (Parenting Satisfaction). Cronbach's alpha suggested good internal consistency at pre (.88) and post (.80) intervention for this study.

Confusion, Hubbub, and Order Scale (CHAOS).

The CHAOS (Matheny et al., 1996) is a 15-item, parent-report measure assessing environmental chaos in the home. Items are presented on a 6-point Likert scale from “Strongly Agree” to “Strongly Disagree,” with higher scores indicating greater reported chaos. Examples of items include “Your family almost always seems to be rushed” and “The atmosphere in your home is calm.” Matheny et al. (1995) reported good internal consistency (0.79) among items. Further, Coldwell, Pike, and Dunn (2006) confirmed significant bi-variate correlations between household chaos, as measured by the CHAOS, and parenting factors such as warmth, enjoyment, anger, hostility, and parent-child positivity and negativity. Additionally, Coldwell et al. found that household chaos, as measured by the CHAOS, predicted problem behavior in children over and above parenting factors, suggesting strong construct validity of the CHAOS. Cronbach’s alpha suggested internal consistency ranged from good (.87) to acceptable (.77) at pre and post intervention, respectively.

Parenting Relationship Questionnaire – Child and Adolescent (PRQ-CA).

The PRQ-CA (Kamphaus & Reynolds, 2006) consists of 71 items rated on a 4-point Likert scale. These items are designed to capture a parent’s perspective on the parent-child relationship, with subscales assessing attachment, communication, discipline practices, involvement, parenting confidence, satisfaction with school, and relational frustration. The PRQ-CA demonstrates moderate to high levels of internal consistency, with alphas ranging from .78 to .93, as well as strong test-retest reliability with a correlation coefficient of .79 for the child and adolescent version (Kamphaus & Reynolds,

2006). Further, the PRQ-CA demonstrates strong convergent validity with similar measures assessing the parent-child relationship (Rubinic & Schwickrath, 2010). No existing studies were found using the PRQ-CA with parents of children with ASD. Internal consistency for the PRQ was excellent at pre- and post-intervention (Cronbach's $\alpha = .90$ pre-treatment and $.91$ post-treatment), with the relational frustration subscale also demonstrating good reliability (Cronbach's $\alpha = .86$ pre-treatment and $.82$ post-treatment).

Parent Child Relationship Inventory (PCRI).

The PCRI (Gerard, 1994) is a 78-item self-report inventory consisting of questions rated on 4-point Likert scale. Responses on the PCRI, which range from "Strongly Agree" to "Strong Disagree," assess how parents view the task of parenting and how they feel about their children. Designed for use of mothers or fathers of 3- to 15-year old children, the PCRI was standardized on more than 1,100 parents across the United States and covers dimensions such as parental support, satisfaction with parenting, involvement, communication, limit setting, autonomy, and role orientation. The PCRI includes two validity scales assessing social desirability and inconsistency (Gerard, 1994). Coffman, Guerin, and Gottfried (2006) reported acceptable internal consistency for PCRI subscales and also suggested strong temporal reliability and construct validity. However, Coffman et al. noted that PCRI scores from fathers did not demonstrate convergent validity with adolescent report. Osborne, McHugh, Saunders, and Reed (2008B) and Beurkens et al. (2013) both found good internal reliability (alphas from $.76$ to $.88$) and test-retest reliability (alpha of $.81$) when using the PCRI with parents of children with ASD. Within this study, the PCRI demonstrate acceptable reliability (Cronbach's α

= .71 at pre-intervention, .74 at post-intervention), with the adolescent autonomy subscale in the questionable range (Cronbach's alpha = .69 at pre-intervention and .63 at post-intervention).

Adolescent Measures

Social Interaction Anxiety Scale (SIAS).

The SIAS (Mattick & Clark, 1998) is a 20-item measure assessing symptoms of anxiety related to general social interactions. Respondents provide answers to statements about dyadic or group social interaction, noting how true each statement on the SIAS is for them on a scale from 0 (not at all true) to 4 (extremely true). These ratings are summed (three items are reverse scored) to provide an overall score in which higher scores indicate greater levels of social anxiety. The SIAS appears to offer sufficient discriminant validity, sensitivity, and specificity with regard to clinical levels of social anxiety or social phobia (Brown et al., 1997; Peters, 2000), in addition to high internal consistency (alpha range = .88 - .93; Brown et al, 1997). For this study, SIAS reliability was excellent (Cronbach's alpha = .93 at pre- and post-intervention).

Piers-Harris Self Concept Scale, Second Edition (Piers-Harris).

The Piers-Harris (Piers, Harris, & Herzberg, 2002) is a multi-dimensional scale assessing mental and emotional well-being and self-concept in children and adolescents (Puckett, 2008). The measure consists of 60 items assessing self-concept with either "yes" or "no" answers provided by the respondent. The Piers-Harris provides an overall measure of self-concept along with subscales related to physical appearance, intellectual and educational functioning, happiness, anxiety, adjustment, and popularity. The Piers-

Harris has demonstrated adequate to high reliability (alpha range .60 - .93) and both content and convergent validity as a measure of self-concept and has been used in a wide variety of clinical and research settings (Puckett, 2008). Internal consistency in this study ranged from acceptable at pre-intervention (Cronbach's alpha = .77) to poor at post-intervention (Cronbach's alpha = .55).

Results

Exploratory Analyses

Exploratory bivariate correlational analyses were conducted to assess for linear relationships among variables of interest for the total sample prior to intervention for the experimental group or 14-week delay period for the waitlist control group. When assessing parent report across both groups, Pearson's r correlations suggested a significant inverse relationship between parenting self-efficacy (PSOC) and total parenting stress (SIPA), $r = -.47$, $n = 50$, $p = .001$) as well as between parenting self-efficacy and family chaos (CHAOS), $r = -.48$, $n = 50$, $p < .001$). Parenting stress and family chaos demonstrated a trend toward a positive association ($r = .27$, $n = 50$, $p = .063$). There was also evidence for a significant, positive correlation between parenting self-efficacy and Parental Support (PCRI), or the level of emotional and social support a parent receives ($r = .57$, $n = 50$, $p < .001$), and between parenting self-efficacy and Satisfaction with Parenting (PCRI; $r = .59$, $n = 50$, $p < .001$), or the amount of pleasure and fulfillment an individual derives from being a parent. In addition, there was a positive linear relationship between parenting self-efficacy and Communication (PRQ; $r = .42$, $n = 50$, $p = .002$), or the "quality of information exchanged between the parent and child and the parent's listening skills that promote a trusting relationship" (Kamphaus & Reynolds, 2006, p. 3). Total parenting stress was negatively associated with Parental Support ($r = -.65$, $n = 50$, $p < .001$), Satisfaction with Parenting ($r = -.58$, $n = 50$, $p < .001$), and Communication ($r = -.34$, $n = 50$, $p = .016$), and positively associated with Autonomy (PRQ; $r = .42$, $n = 50$, $p = .003$), which "assesses the ability of a parent to

promote a child's independence" (Gerard, 1994, p. 1). Finally, family chaos was negatively correlated with Parental Support ($r = -.41, n = 50, p = .003$), Satisfaction with Parenting ($r = -.52, n = 50, p < .001$), and Communication ($r = -.43, n = 50, p = .002$). See Table 3 for complete summary of pre-intervention analyses.

Table 3. Significant Bivariate Correlations among Variables of Interest Prior to Intervention ($n = 50$)

	SIPA-TS	PSE (PSOC)	CHAOS
SIPA – TS	--	-.473**	.265
PSE (PSOC)	--	--	-.483**
PCRI: Parental Support	-.645**	.565**	-.412**
PCRI: Satisfaction with Parenting	-.584**	.594**	-.520**
PCRI: Autonomy	.417**	-.275	-.098
PRQ: Communication	-.340*	.421**	-.428**
Parent Age	-.058	-.175	-.040
Teen Age	.133	-.165	-.011
# of Siblings	-.022	-.017	-.033
FSIQ (KBIT-2)	.060	.041	-.022
ADOS-G Total Score	.115	-.146	.032

* $p < .05$

** $p < .01$

SIPA – TS = Stress Index for Parents of Adolescents – Total Parenting Stress

PSE = Parenting Self-Efficacy; PSOC = Parenting Sense of Competence Scale

CHAOS = Confusion, Hubbub, and Order Scale

PCRI = Parent-Child Relationship Inventory

PRQ = Parenting Relationship Questionnaire

KBIT-2 = Kaufman Brief Intelligence Test, Second Edition

ADOS-G = Autism Diagnostic Observation Schedule, General

Hypothesis 1

To assess the first set of hypotheses regarding significant change in the experimental group versus the waitlist control group from pre to post-intervention, five mixed

between-within subjects analysis of variance (ANOVA) were conducted (see table 4 for scale means and standard deviations and table 5 for ANOVA results).

Table 4. Scale Means and Standard Deviations

	EXP – Pre	EXP – Post	WL – Pre	WL - Post
SIPA – Total Stress T-Score	54.26 (6.87)	51.17 (7.22)	55.37 (10.67)	55.44 (9.58)
SIPA – Adolescent Domain T-Score	58.13 (8.24)	53.74 (7.90)	60.26 (9.65)	60.59 (9.67)
SIPA – Parent Domain T-Score	50.26 (7.26)	49.39 (7.88)	50.19 (12.35)	50.15 (11.98)
SIPA – APRD T-Score	48.61 (6.86)	46.52 (5.94)	49.78 (9.78)	50.04 (8.70)
PSOC – Parenting Self-Efficacy (Mean)	4.03 (.77)	4.33 (.61)	4.43 (.89)	4.40 (.66)
CHAOS – Total Score*	41.87 (12.50)	39.35 (9.52)	36.52 (10.33)	40.15 (13.11)
PRQ – Relational Frustration T-Score	56.89 (7.42)	54.39 (4.71)	54.81 (9.80)	55.35 (9.39)
PCRI – Adolescent Autonomy T-Score	49.81 (5.30)	50.91 (5.49)	52.44 (8.42)	50.78 (8.75)

* = Significant interaction effect (group x time) at $p < .05$

EXP = Experimental Group

WL = Waitlist Control Group

SIPA = Stress Index for Parents of Adolescents

APRD = Adolescent-Parent Relationship Domain

PSOC = Parenting Sense of Competence Scale

CHAOS = Confusion, Hubbub, and Order Scale

PRQ = Parenting Relationship Questionnaire

PCRI = Parent Child Relationship Inventory

Table 5. Mixed Between-Within Subjects ANOVAS

Scale	<i>df</i>	<i>F</i>	η	<i>p</i>
SIPA: Total Stress				
Main Effect: Time (Within Subjects)	1, 48	1.136	.023	.292
Main Effect: Group (Between Subjects)	1, 48	1.675	.034	.202
Interaction: Time x Group	1, 48	1.251	.025	.269
PSOC: Parenting Self-Efficacy				
Main Effect: Time (Within Subjects)	1, 48	.940	.019	.337
Main Effect: Group (Between Subjects)	1, 48	2.114	.042	.153
Interaction: Time x Group	1, 48	1.442	.029	.236
Confusion, Hubbub, and Order Scale				
Main Effect: Time (Within Subjects)	1, 48	.182	.004	.672
Main Effect: Group (Between Subjects)	1, 48	.579	.012	.450
Interaction: Time x Group	1, 48	5.606	.105	.022
PCRI: Autonomy				
Main Effect: Time (Within Subjects)	1, 47	.045	.001	.833
Main Effect: Group (Between Subjects)	1, 47	.601	.013	.442
Interaction: Time x Group	1, 47	1.028	.021	.316
PRQ: Relational Frustration				
Main Effect: Time (Within Subjects)	1, 47	.696	.015	.408
Main Effect: Group (Between Subjects)	1, 47	.074	.002	.787
Interaction: Time x Group	1, 47	1.684	.035	.201

SIPA = Stress Index for Parents of Adolescents

PSOC = Parenting Sense of Competence Scale

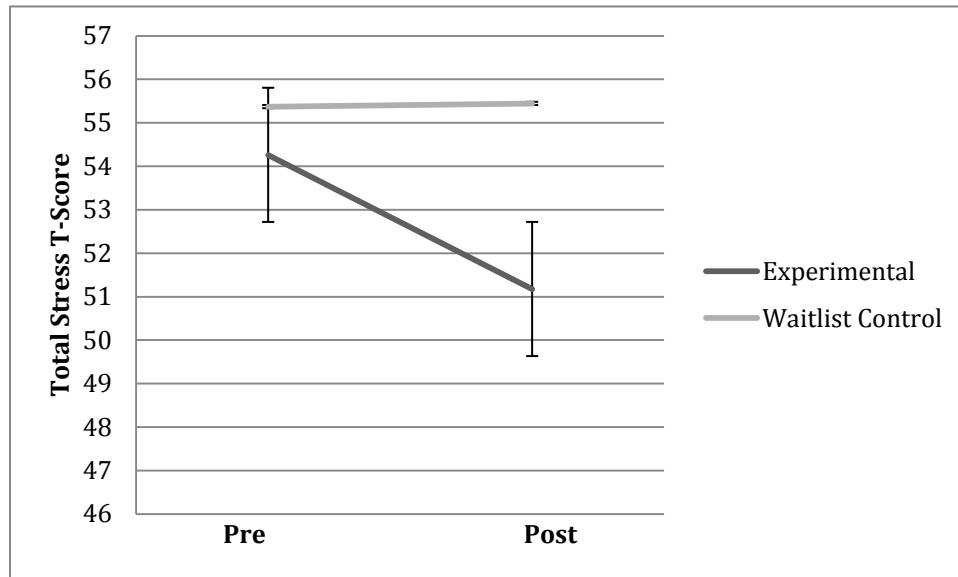
PCRI = Parent Child Relationship Inventory

PRQ = Parenting Relationship Questionnaire

Parenting stress.

In assessing the impact of PEERS on total parenting stress T-scores from the SIPA, there was not a significant main effect for time or group. There also was not a significant interaction effect between time and group (Wilks Lambda = .975, $F(1, 48) = 1.25$, $p = .27$, partial eta squared = .025), suggesting no significant difference between groups over time in total parenting stress (see figure 1).

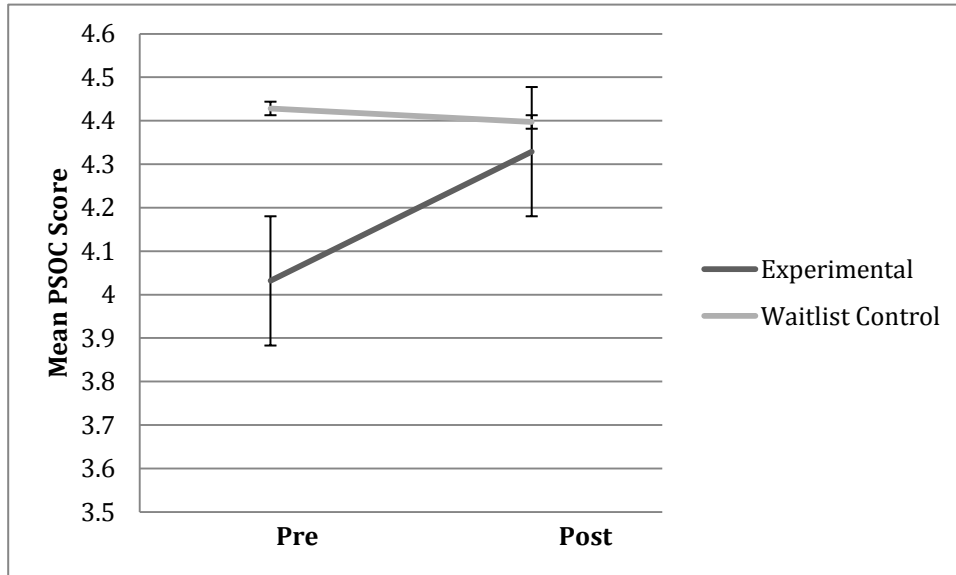
Figure 1. Total Stress T-Scores from the Stress Index for Parents of Adolescents (SIPA)



Parenting self-efficacy.

There was not a significant main effect for time or group when evaluating parenting self-efficacy from the PSOC. Additionally, there was not a significant interaction between time and group (Wilks Lambda = .971, $F(1, 48) = 1.44$, $p = .25$, partial eta squared = .029), suggesting no significant difference between groups over time in the domain of parenting self-efficacy (see figure 2). Post-hoc analysis via paired samples t-test revealed a significant increase in parenting self-efficacy in the experimental group ($t(22) = -2.18$, $p = .04$).

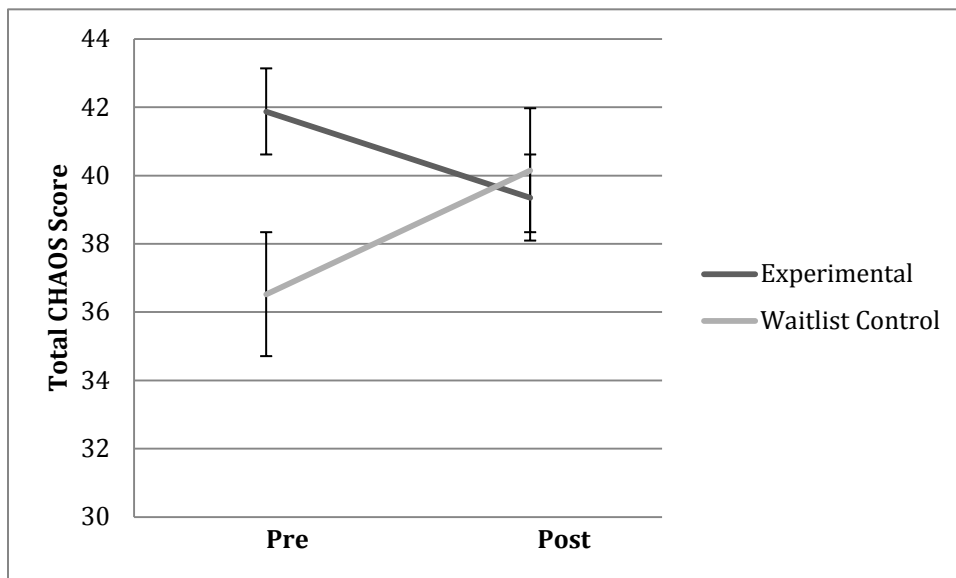
Figure 2. Mean Parenting Self-Efficacy from the Parent Sense of Competence Scale (PSOC)



Family effects.

In assessing overall family disruption from the CHAOS, there was not a significant main effect for time or group. However, there was a significant interaction effect between time and group (Wilks Lambda = .895, $F(1, 48) = 5.61$, $p = .02$, partial eta squared = .105), suggesting a significant difference between groups over time in the domain of family disruption and distress, with the experimental group showing a significant decrease in family chaos over time in comparison to the waitlist control group (see figure 3).

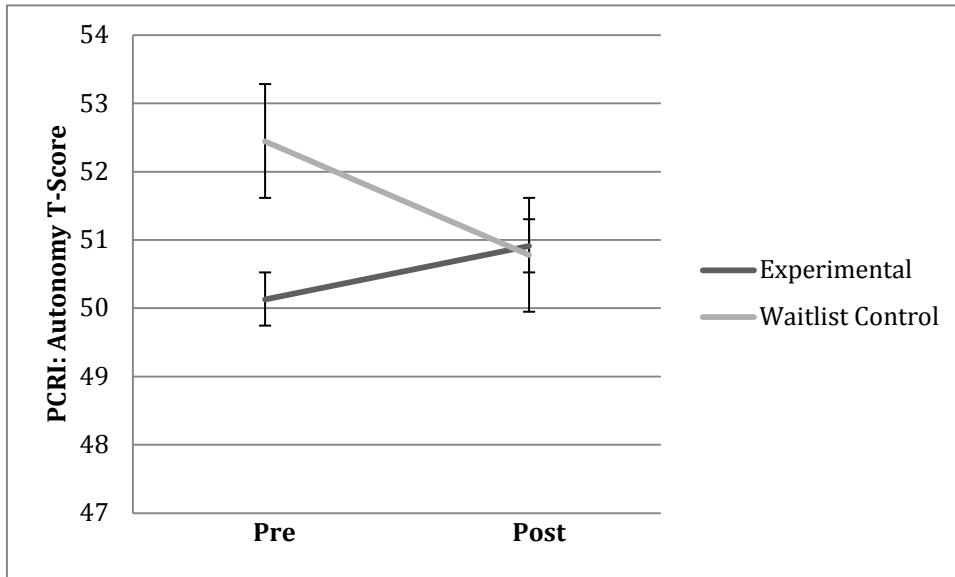
Figure 3. Total Scores from the Confusion, Hubbub, and Order Scale (CHAOS)



Adolescent autonomy.

To assess for changes in parent facilitation of adolescent autonomy as measured on the PCRI, there was not a significant main effect for time or group. There also was not a significant interaction effect between time and group (Wilks Lambda = .979, $F(1, 47) = 1.028$, $p = .32$, partial eta squared = .021), suggesting no significant difference between groups over time with regards to promotion of adolescent autonomy (see figure 4).

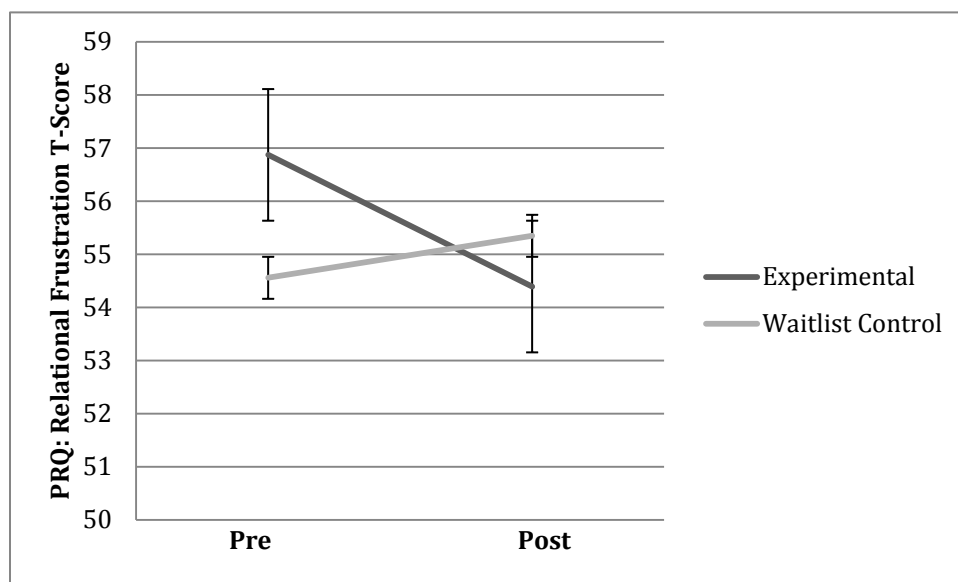
Figure 4. Parent-Child Relationship Inventory (PCRI) Autonomy Subscale T-Score



Relational frustration.

In evaluating the effect of PEERS on relational frustration from the PRQ, there was not a significant main effect for time or group. There also was not a significant interaction effect between time and group (Wilks Lambda = .965, $F(1, 47) = 1.68$, $p = .201$, partial eta squared = .035), suggesting no significant difference between groups over time in the domain of relational frustration (see figure 5).

Fig 5. Parenting Relationship Questionnaire Relational (PRQ) Frustration Subscale T-Score



Clinically meaningful change.

Within the experimental group, clinically meaningful change for total parenting stress on the SIPA was evaluated using Jacobson and Truax's (1991) method, which assesses for change from clinical to non-clinical levels of functioning. Parenting stress total raw scores were evaluated in comparison to normative data available in the SIPA Professional Manual (Sheras et al., 1998). None of these parents in this sample met criteria for clinically significant levels of total parenting stress (i.e., 1.5 standard deviations above the normative group mean) prior to beginning PEERS intervention. However, fifteen of the 23 parents in the experimental group demonstrated a decrease in total parenting stress, and the average change for the experimental group sample was a raw score decrease of -15.18. Following intervention, one parent moved from the non-clinical range into the clinical range, while all other parents remained in the non-clinical group.

To assess for the presence of reliable change, which assesses whether change made during intervention is likely to be sustained, a reliable change index (RCI) was calculated for each participant by dividing the difference between their pre- and post-treatment raw scores on the SIPA by the standard error of the difference between all pre and post raw scores. Six of the 15 parents who demonstrated a decrease in parenting stress showed a sufficient decrease to be classified as having reliably changed (an RCI of greater than ± 1.96), though all of these parents began treatment in the “functional range.”

Hypothesis 2

To evaluate the second set of hypotheses, correlational analyses were conducted to assess for linear relationships in the experimental group between change in 1) parenting stress (SIPA) and teen anxiety (SIAS), and 2) parenting efficacy (PSOC) and adolescent self-concept (P-H; see Table 6) from pre to post-intervention. For all variables, change scores were calculated by subtracting the pre-intervention score from the post-intervention score. There was not a significant relationship between change in parenting stress and change in teen anxiety ($r = -.301$, $n = 23$, $p = .16$), nor was there a significant correlation between change in parenting efficacy and change in adolescent self-concept ($r = -.12$, $n = 23$, $p = .59$).

Exploratory change analyses.

Exploratory bivariate correlational analyses were also conducted for the experimental group only to assess relationships between pre-PEERS functioning and change during the group. Analyses suggested a significant positive association between adolescent age and

parenting efficacy change ($r = .49$, $n = 23$, $p = .018$), suggesting that parents of older adolescents demonstrated a more substantial increase in their parenting efficacy. In addition, family chaos change had a significant positive relationship with ADOS total score, a measure of the severity of each teen's verbal and nonverbal communication and social deficits prior to intervention ($r = .65$, $n = 23$, $p = .001$), suggesting decreases in chaos concurrent with PEERS participation were more likely in parents with adolescents who demonstrated fewer symptoms of autism on the ADOS.

Table 6. Change Correlations (Experimental Group Only)

	PSE Change	CHAOS Change	SIAS Change	P-H Change
SIPA Total Stress Change	-.086	-.203	-.306	.229
PSE Change		-.346	-.376 #	-.119
CHAOS Change			.226	.083
SIAS Change				-.340

* $p < .05$

$p < .08$

SIPA = Stress Index for Parents of Adolescents

PSE = Parenting Self-Efficacy

CHAOS = Confusion, Hubbub, and Order Scale

SIAS = Social Interaction Anxiety Scale (Teen)

P-H = Piers-Harris Self-Concept Scale (Teen)

Finally, a marginally significant inverse relationship existed between change in parenting efficacy and change in adolescent social anxiety (SIAS; $r = -.38$, $n = 23$, $p = .077$), indicating a possible association between increased parenting efficacy and decreased adolescent social anxiety following PEERS intervention.

Discussion

Prior research suggests that parents of children with ASD experience elevated levels of parenting stress compared to parents of both typically developing children and children with other developmental disabilities. Further, there is evidence that having a child with ASD is associated with decreased parenting self-efficacy and increased family distress. It thus stands to reason that comprehensive interventions for ASD should address these larger systemic issues, either directly or indirectly, in hopes of ensuring an improved environment for the child after treatment. This study assessed 50 families of adolescents with high-functioning ASD to determine whether involvement in the PEERS program would facilitate decreased parenting stress, increased parenting efficacy, decreased family chaos, and an improvement in select domains of the parent child relationship, including increased promotion of adolescent autonomy and decreased relational frustration.

Conclusions

Hypothesis 1.

Findings with regards to the primary hypotheses were mixed. Parents in the experimental group demonstrated a mean reduction in total parenting stress (as measured on the SIPA) following PEERS, while parents in waitlist control group did not. However, large variance in the overall sample and a small effect size likely contributed to a lack of statistical significance when assessing the time (pre to post intervention) x group (experimental vs. waitlist control) interaction. We thus could not reject the null hypothesis that parents participating in PEERS experienced a decrease in parenting stress

that was significant over and above that of a waitlist control group. A priori analysis via G-Power (Faul, Erdfelder, Buchner, & Lang, 2009) suggested a sample size of 36 would be needed for between-within subject analysis provided a medium (.25) effect size. However, as the effect sizes found in this study were smaller than expected given our preliminary analyses, it is believed that our sample size did not provide adequate power to detect a difference between groups over time. Nonetheless, the direction of the effect seen suggests that the effect of participation in PEERS on parenting stress warrants further evaluation.

With respect to parenting self-efficacy, there was an increase in mean parenting self-efficacy (as measured on the PSOC) in the experimental group, while the waitlist group's mean self-efficacy score remained essentially unchanged. Paired sample t-test analysis suggested that the increase in parenting self-efficacy from pre to post-treatment in the experimental group was statistically significant at $p < .05$. However, mixed between-within ANOVA analysis suggested that the time x group interaction effect was not statistically significant. Thus, while there did appear to be a statistically significant increase in parenting self-efficacy for the experimental group following PEERS intervention, this change was not significant over and above a no-intervention waitlist control group. It is believed that the increased variance in the waitlist group contributed at least somewhat to the lack of a statistically significant finding in this domain. Again, this finding warrants further investigation with an increased sample size, and it is encouraging that participation in PEERS did appear to increase parenting self-efficacy. Further research in this domain will be particularly important given the mediating effect

established for parenting self-efficacy between child behavior problems and maternal mental health concerns (Hastings & Brown, 2002).

In contrast to parenting stress and self-efficacy, there was a significant time x group interaction effect found for family chaos (as measured on the CHAOS), with the experimental group showing a decrease in family chaos while the waitlist control group actually demonstrated an increase in chaos. The difference in change within the domain of family chaos demonstrated a medium to large effect size (Cohen, 1988; eta squared = .105). This finding reflects an important, and in some ways counterintuitive, benefit of PEERS intervention. Throughout PEERS, families are asked to take on numerous “homework” tasks, including out-of-group phone calls and get-togethers. The additional time burden necessitated by completing these tasks each week (in addition to attending PEERS for 90 minutes each week) is a necessary component of the intervention process. The fact that these requirements did not mitigate the systemic benefits of improved adolescent socialization is extremely encouraging and suggests that these families found these tasks meaningful and/or helpful despite the extra work required. Further, it could be that the homework assignments had an “organizational effect” on families, making it necessary to integrate more structure into the home and therefore reducing chaos.

Finally, no significant time x group interaction effect was found for either relational frustration (from the PRQ) or adolescent autonomy (from the PCRI). T-scores obtained from these measures suggested a decrease in relational frustration in the experimental group with an increase in the waitlist control group, while parent facilitation of adolescent autonomy increased in the experimental group and decreased in the waitlist control group. Thus, changes in each of these domains were in the direction

hypothesized for the group who received PEERS intervention, but did not change significantly over and above changes seen in the waitlist control group from pre- to post-treatment.

Clinically meaningful change.

In addition to assessing for statistical significance, we evaluated changes in parenting stress in the PEERS experimental group in terms of clinically meaningful change, as described by Jacobson and Truax (1991). Surprisingly, while 15 of the 23 parents in this subsample endorsed higher levels of parenting stress than the normative mean from the SIPA, none of the parents in the experimental group demonstrated clinically elevated levels of total parenting stress as defined by a score higher than 1.5 standard deviations above the mean. This finding is in part due to relatively high variance for the SIPA normative sample ($SD = 49.7$). However, this outcome was still unexpected given the large amount of literature suggesting elevated parenting stress in parents of children with ASD (e.g. Duarte et al., 2005; Hoffman et al., 2009; Rao & Beidel, 2009; Schieve et al., 2011). We were thus unable to evaluate the number of parents who moved from the clinically impaired into a normal range of functioning, though one parent unfortunately moved into the impaired range following intervention. The second component of clinically meaningful change assesses whether changes made by parents were reliable. In this analysis, 6 of the 15 parents who demonstrated a decrease in parenting stress showed a sufficient decrease to be classified as having reliably changed. Thus, over one third of parents experiencing decreased parenting stress made changes that were likely sustainable beyond treatment. This is an especially important finding given the hope that sustained parent change will lead to improved

maintenance of treatment gains from children with ASD. It will be important for future research to determine specific factors that contributed to reliable reductions in parenting stress seen in these individuals, both specific to the PEERS intervention and more broadly to identify factors that enhance therapeutic benefit for parents.

Analysis of linear relationships among the entire sample ($n = 50$) prior to intervention also revealed very interesting and meaningful associations among variables of interest. Replicating a finding by Giallo et al. (2011), parenting self-efficacy was negatively associated with parenting stress, suggesting that parents who feel less confidence in their abilities feel more overwhelmed by the many demands of raising a child with an ASD. In addition, there was an inverse correlation between parenting self-efficacy and family chaos, a relationship that warrants further analysis. It is possible that parents with less confidence in their own abilities provide less structure and order for the family, or conversely that a chaotic household leaves parents feeling less in control and thus less efficacious. Parenting efficacy was positively correlated with both parental social support and satisfaction with parenting. The relationship between parenting self-efficacy and social support is consistent with earlier findings (Weiss, 2002). Further, social support was negatively correlated with family chaos and parenting stress. The fact that social support assessed prior to intervention was related to self-efficacy, parenting stress, and family chaos highlights the importance of parents of children with ASD finding avenues for family and community support at the practical and emotional level (which may be an adjunctive benefit of the “parent group” during PEERS). The inverse relationship found between parenting stress and parent-teen communication highlights what is likely a bidirectional relationship between overall parent and child functioning.

Caregivers experiencing strain associated with parenting may withdraw from sustained interactions with their child, as each interaction leads to increased stress. The child, likely already impaired in their social-communicative abilities, also struggles to facilitate positive interactions and thus loses out on the opportunity for beneficial interaction which could also serve as “practice” for outside social situations. This lack of communication is directly addressed during PEERS intervention, as weekly homework often requires parents and teens to “role-play” social situations in order to build upon skills learned during group sessions.

In addition, it is notable that neither adolescent intellectual functioning (as measured by scores on the KBIT-2) nor ASD symptomology (as measured by total score on the ADOS-G) were associated with parenting stress, parenting self-efficacy, or family chaos. This finding replicates earlier research which demonstrated no difference in parenting stress for parents of children with or without cognitive deficits (Davis & Carter, 2008; Rao & Beidel, 2009) or for parents of children with varying severity of social and communicative impairment (Tomanik et al., 2004). The fact that parenting stress and self-efficacy do not appear related to these domains of child functioning highlights the need for parent involvement in treatment even when teens are classified as “higher-functioning.” Further, the lack of a relationship among these variables emphasizes the need for enhanced understanding of the factors, such as behavioral, functional, and social difficulties, which do contribute to parent distress.

Hypothesis 2.

Given the transactional nature of the parent-child relationship, an additional objective of this study was to better understand the relationship between parent changes

and teen changes following PEERS intervention. These analyses did not suggest a significant bivariate relationship between changes in parenting stress and teen social anxiety nor between changes in parenting efficacy and adolescent self-concept. The lack of a relationship among these variables was counter to our hypotheses. However, it is possible that parent changes immediately following intervention become more influential for their adolescent children in the post-intervention phase rather than during intervention. Throughout PEERS, teens have weekly encouragement, instruction, and structure provided by the teen group leader. However, after intervention ends, it becomes more important for parents to take on this role (and this, in fact, is strongly encouraged during the final parent session; Laugeson & Frankel, 2010). Thus, the relationship between these variables may have been better captured by evaluating the relationship between parent changes immediately following intervention and teen changes at a long-term follow-up (e.g., 6 months) point. This data is being collected for our sample, and will be important to analyze when available to better understand the relationship between parent and teen outcomes. Finally, it is notable that there was a trend toward a significant negative relationship between parent self-efficacy change and teen social anxiety change, suggesting an increase in self-efficacy was associated with a decrease in teen social anxiety. This relationship also warrants further study, as it is possible that parents with greater gains in self-efficacy following PEERS project greater confidence in helping their teen face social situations, minimizing the amount of anxiety experienced by the adolescent in these scenarios.

Exploratory correlational analyses from the experimental group data revealed several interesting findings worthy of note regarding change during intervention.

Parenting self-efficacy change and adolescent age were positively associated, suggesting that parents with older adolescents demonstrated greater increases in self-efficacy following PEERS. This finding appears important given that adolescent age and parenting self-efficacy were inversely related prior to intervention. This association highlights the benefit of PEERS in addressing low parenting self-efficacy, which may otherwise decrease as children grow older. The premise that parents can experience increased difficulty as their teen develops is augmented by data from the entire sample assessed prior to intervention, which suggested an inverse relationship between teen age and parenting satisfaction. Clearly, the dynamic process of teen development leads to changes in parent functioning, and it is important for interventions to address parental concerns that arise during this time. Further analysis of change scores suggested that decreases in family chaos were associated with lower severity of ASD symptoms (i.e., pre-PEERS ADOS scores). Thus, it appears that the reduction in family chaos found for the experimental group following PEERS intervention is more substantial for families of adolescents with more minimal impairment in their social and communication skills. This finding is understandable when considering that these teens are likely more able to implement the skills autonomously, requiring less parental oversight and thus reducing strain on the family.

Implications

Overall, results from this study suggest that the PEERS intervention offers promising adjunctive benefits in addition to the improved social skill knowledge and increased frequency of teen get-togethers identified by Laugeson et al. (2011). A decrease in family chaos following participation in PEERS highlights the way in which

the intervention, through the use of concurrent parent and teen sessions, can provide a positive and lasting impact for families heavily burdened by their child's diagnosis and impairments. This change could very well improve the home environment post-treatment, making this setting more conducive to social gatherings, decreasing family disruption that often impedes social opportunities, and helping eliminate conflict that exacerbates ASD symptomology (Kelly et al., 2008). In addition, the fact that parenting self-efficacy showed a statistically significant increase following PEERS intervention (though this was not significant over and above the waitlist control group) appears very important given the relationship between parenting self-efficacy and child behavior problems (Sofronoff & Farbotko, 2002). While the hypothesized associations between parent and child change following PEERS did not demonstrate statistical significance, the fact that both parents and teens both have shown significant improvements following PEERS suggests that social skills interventions may benefit from routine caregiver involvement. Ultimately, it may be beneficial to better understand whether there is a relationship between parent and teen change, and if so, what domains appear related. The "direction" of the effects may also be important to delineate in order to determine the optimal amount and format of parent and teen involvement in treatment. However, simply understanding that PEERS has a positive impact at the family, parent, and teen level provides important evidence that multiple domains of functioning can be addressed through systemic intervention.

Another important implication of this study comes from the methodology of including parents in the intervention evaluation process. It appears critical that interventions for children and adolescents with ASD be evaluated in terms of their benefit

for the child as well as their parents and families (Karst & Van Hecke, 2012). The time-intensive and costly nature of many therapies is likely a burden for families, and though most are no doubt willing to put forth this effort to help their child, it is important that the strain on the family resulting from their participation is not so great as to minimize or eliminate therapeutic benefits. Parent and family factors will become increasingly important to assess as increased diagnostic rates collide with continued cuts in funding for interventions (Lord & Bishop, 2010). The combination of these two factors will likely place a larger onus on parents to carry out treatment plans once “covered” services expire. If a brief intervention can help to decrease stress, increase self-efficacy, and reduce chaos in the family, it is exceedingly more likely that parents and caregivers will be successful in helping maintain and extend gains their child has made.

Limitations & Future Directions

There are several notable limitations to the present study, many of which can be addressed in our future research. One limitation was the lack of a typically developing control group. While previous literature has demonstrated significant differences between parents of children with ASD and those without a diagnosis, assessing parents of typically developing children may have provided more robust data than simply using normative information for each measure. In assessing parent-child relationships, such investigation could include analysis comparing the relationship between parents and their typically developing children to their child diagnosed with ASD. Additionally, this study did not compare PEERS outcomes to those of another form of intervention. At present, there is no “gold standard” for social skills intervention, as no current format has yet to meet Chambless et al. (1996) criteria to be considered empirically validated. Further,

minimal analysis has been done to date of how parents and families benefit from any type of ASD intervention, much less those targeting social skills in adolescents. Thus, it was not possible to compare parent and family outcomes of PEERS to a similar treatment.

An unavoidable limitation resulted from the fact that the control group was in no way restricted from participating in other available interventions. However, parent report suggested that adjunctive therapy for the waitlist control group was very minimal (i.e., only a few participants with psychopharmacological intervention). Another limitation related to the control group is that at the time of intake, while parents did not know which group they would be assigned to, they DID know that they would be enrolled in an intervention at some point in the near future if their child met criteria on the KBIT-2 and ADOS-G. While a brief waiting period was likely stressful compared to immediate enrollment, the paucity of therapies available for adolescents with ASD also means that even parents in the control were likely more positive about their child's prospects than parents not enrolled at all. Thus, the promise of a research-supported and free intervention was essentially made to all participants meeting inclusion criteria, which may have altered parent report prior to intervention across groups. Gathering data from a community sample of parents of children with ASD who were not able to participate in this intervention may have also been beneficial. In addition, the mere fact that our intervention was offered free of charge to families (in exchange for their research participation) eliminated a common stressor associated with therapy for families, somewhat limiting the generalizability of these findings.

The fact that data was gathered over the course of four rounds of intervention also means that the experimental groups and waitlist control groups were "clustered" within

four different time periods. While the PEERS intervention is manualized and regular fidelity checks were completed to ensure adherence to the treatment manual, it is possible that differing group dynamics somehow altered the overall intervention experience. However, each round of intakes included random group assignment, and thus there were likely no history effects over time that should have differed between the experimental and waitlist control groups. In addition, given the importance of mediating/moderating factors such as social support and coping techniques when assessing the effects of having a child with an ASD (Weiss, 2002; Weitlauf, Vehorn, Taylor, & Warren, 2012), this study would likely have benefited from more thorough understanding of the type of and amount of support available to parents.

This study was also limited by the lack of continuous data collection throughout PEERS, or at least at a mid-point during the intervention. As noted earlier, PEERS intervention requires weekly homework assignments which include having adolescents enroll in one or two extracurricular activities, call friends from social groups at school or in the community, and having parents and teens to facilitate regular “get-togethers.” These activities are often stressful for parents and anxiety provoking for teens, as they often necessitate approaching difficult tasks that have long been avoided. Anecdotally, there appears to be a slow rise in both parent stress and teen anxiety early in the intervention followed by a decrease as teens begin developing meaningful relationships. This trajectory is simply hypothesized, however, and a more regular assessment of teen and parent functioning would help identify if this was the case. If this pattern does occur, it is possible that parenting stress continues to decrease after intervention. Along a similar vein, the lack of parent data collected at the 6-month follow up phase was an

additional limitation. Future studies should include long-term collection of both parent and teen data, which would allow for analysis of maintenance of treatment gains. In addition, longitudinal data collection may extend understanding of the relationship between parent and teen changes made in treatment.

It also should be noted that our sample was relatively homogenous, consisting primarily of Caucasian families. Though PEERS intervention for this study was offered free of charge, the majority of the parents were also well-educated and reported relatively high incomes. It is hoped that future studies will include families from more diverse racial, ethnic, cultural, and socioeconomic backgrounds. Further, because inclusion criteria included meeting a minimum IQ composite score on the KBIT-2, our sample consisted only of “high-functioning” adolescents with ASD. Thus, our sample may not be generalizable to the greater ASD population. Finally, we included both mothers and fathers in our parent sample (with a much larger representation of maternal caregivers). Post-hoc analyses suggested that the primary findings presented did not differ with male caregivers removed from the dataset. Further, Tehee et al. (2009) noted that the relationship between caregiver gender and levels of distress is likely mediated by level of involvement. Thus, it is believed that male caregivers who did attend PEERS were more likely to be actively involved in their child’s care and thus would more likely be directly impacted by their child’s difficulties.

Summary

This study extends the research base regarding PEERS intervention and suggests that the benefits of PEERS extend beyond the adolescent to the entire family system, specifically in the reduction of family chaos. Data also suggest that parents benefit from

PEERS in terms of increased confidence in their own parenting abilities. While a clear relationship regarding the association between parent and teen changes following treatment was not identified, the bidirectional nature of the parent-child relationship warrants further consideration in understanding the systemic impact of treatment for ASD.

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