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To cite this article: Emily J. Helder, Frances X. Bailey, Ana Li Warners & Chloe Vallance (24 Jan 2024): Long-Term Follow-Up of the Program for the Education and Enrichment of Relational Skills (PEERS) with Adolescent Adoptees, *Adoption Quarterly*, DOI: [10.1080/10926755.2024.2304342](https://doi.org/10.1080/10926755.2024.2304342)

To link to this article: <https://doi.org/10.1080/10926755.2024.2304342>



Published online: 24 Jan 2024.



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Long-Term Follow-Up of the Program for the Education and Enrichment of Relational Skills (PEERS) with Adolescent Adoptees

Emily J. Helder^a, Frances X. Bailey^b, Ana Li Warners^b and Chloe Vallance^b

^aPsychology Department, Hope College, Holland, Michigan, USA; ^bPsychology Department, Calvin University, Grand Rapids, Michigan, USA

ABSTRACT

The present study sought to demonstrate the long-term impacts of the Program for the Education and Enrichment of Relational Skills (PEERS; Laugeson et al., 2010) among adolescent adoptees struggling to navigate peer relationships. Forty-one adolescents and their parents from Helder et al.'s (2023) previous study completed follow-up questionnaires 2.5–3.5 years following their initial participation in the PEERS program. Results indicated maintenance of gains from post-intervention to follow-up in adolescent reported hosted get-togethers and parent reports of their child's social anxiety, social skills, and empathy. Also, while parent reports of their adolescents' hosted or invited get-togethers did not initially increase immediately following the intervention, results from the present study indicated an increase over the follow-up period. In contrast, the gains that were observed from pre- to post-intervention in adolescent reports of social anxiety, depression, and self-concept were not maintained over the follow-up period. The PEERS program appears to have more robust and long-term impacts on explicit and specific targets of the intervention, namely social skills and social behaviors, and less impact on related factors, such as mood and self-esteem.

ARTICLE HISTORY

Received 1 August 2023
Revised 16 November 2023
Accepted 2 January 2024

KEYWORDS

Social skills; long-term outcomes; adoptees; adolescents, PEERS

While adoption may be viewed as an event occurring at an isolated moment in time, many have acknowledged the long-lasting psychosocial implications that this experience has on a person's life (Jordan & Dempsey, 2013). Despite the pronounced heterogeneity among adoptees, accumulating research has reported long-term social challenges for some adoptees (Paniagua et al., 2020). Currently, research regarding social interventions for adoptees is scarce and primarily focused on early childhood programs targeting attachment. Recently, we explored the impact of the Program for the Education and Enrichment of Relational Skills (PEERS), a social skills intervention, with adolescent adoptees and found positive short-term outcomes on social and emotional functioning based on adolescent, parent,

and teacher ratings (Helder et al., 2023). The current study is a long-term follow-up of the participants from Helder et al. (2023) to further investigate the trajectory of the participant's social, emotional, and behavioral functioning 2.5–3.5 years after completion of the intervention.

Social outcomes among adoptees

In addition to the sizable impact that trauma has on critical structures of the brain, the psychosocial implications of trauma, placement instability, and post-adoption stressors can put adoptees at an elevated risk for challenges related to social outcomes, including social competence and social skills (McLaughlin et al., 2014; Soares et al., 2019). While related, it is important to note that social competence is defined as the degree of effectiveness with which an individual navigates social situations while social skills refer to the set of requisite skills needed to attain social competence (Grover et al., 2020). Research has shown that adoptees' inflated risk for compromised social competence may be attributed to a multitude of factors surrounding adoption including the loss of time spent building attachment to a primary caregiver, frequent placement moves, increased time spent in institutionalized care often resulting in neglect, and internalization of abandonment (McLaughlin et al., 2014; Almas et al., 2015; Sherr et al., 2017). The presence of some of these risk factors varies depending on adoption type, as children adopted in the United States are primarily adopted through three primary channels: private infant adoption, domestic public adoption from foster care, and international/intercountry adoption. Additionally, literature suggests adoptees are at a heightened risk for internalizing (depression, anxiety) and externalizing difficulties (aggression, conduct difficulties) subsequently resulting in increased overall problem behaviors (Almas et al., 2020).

In the context of more severe forms of deprivation, such as poor quality institutional care, researchers have longitudinally documented the presence of quasi-autism symptoms in adopted youth (Rutter et al., 2007; Rodriguez Perez et al., 2023). Specifically, among children who spent early life in Romanian orphanages prior to adoption to the UK, approximately 10% had experienced clinically significant symptoms in the areas of communication, social functioning, and repetitive behavior that researchers classified as quasi-autistic and a further 10% had subclinical levels of symptoms in these areas by early adolescence (Rutter et al., 2007). Longitudinal follow-up into early adulthood suggested that these symptoms, especially social communication deficits, were quite persistent among individuals who had experienced severe early deprivation as young children (Rodriguez Perez et al., 2023).

Given the developmental challenges of adolescence, adoption related risk factors for decreased social competence can pose added obstacles for

adolescent adoptees to navigate. Despite the lack of research on social skill interventions with adolescent adoptees, the literature has established the importance of healthy peer relationships at this particular time of life (Orben et al., 2020). In the existing literature, several studies have examined social competence among adoptees and suggested an association between adoption and increased vulnerability to social difficulties with future relationships, difficulties with social interactions, lower perceived social status, lack of social belonging, repeated exposure to trauma, and heightened social anxiety (Brodzinsky, 2011, 2014; Soares et al., 2017; Soares et al., 2019; Whetten et al., 2011). Several studies exploring social competence among school-aged adoptees have found that adoptees are more likely to demonstrate challenges acquiring and maintaining peer relationships compared to their non-adopted peers (DeLuca et al., 2019). Research suggests that this may be attributed to a variety of factors including poorer communication skills, decreased emotional understanding, lack of social cue awareness, and deficits in executive functioning (Wade et al., 2020; Humphreys et al., 2019; Selcuk et al., 2018). In addition to acquiring peer relationships, adoptees are at a heightened risk for experiencing social rejection and bullying from peers (Palacios et al., 2013; Pitula et al., 2014). This may be especially prevalent among adoptees of color who are transracially adopted into predominantly white communities (Pitula et al., 2014). Interestingly, literature identifies exacerbated social challenges in adolescence compared to childhood, likely attributed to the complexity surrounding social expectations that emerges at this phase of development (Julian & McCall, 2016).

Given this association with negative social outcomes for a portion of adoptees, there is growing interest in interventions related to improving social competence among adolescent adoptees. In the current literature, researchers have stressed the importance of parent and teacher involvement in nurturing open communication and guidance on how to best support their adoptees' social needs (Soares et al., 2014). The work of Soares et al. (2014) has also emphasized the importance of acknowledging the profound impact adoption-related loss has on an adoptees' social competence. In summary, while much research has established elevated risk of difficulties with social competence among adolescent adoptees, only recently has there been initial research on specific interventions to aid this population (Helder et al., 2023).

Program for the education and enrichment of relational skills

The PEERS intervention curriculum was initially designed by Laugeson et al. (2009) as a group intervention intended to improve social skills and promote effective relationship building among adolescents with

autism-spectrum disorder (ASD). PEERS for Adolescents is a structured, manualized 16-week curriculum that is designed to teach ecologically valid social skills, such as conversation skills, hosting get-togethers, handling conflict, and responding to teasing and bullying. Delivered by certified clinical instructors, PEERS groups include concurrent adolescent and parent sessions, lasting 90 min each. The adolescent group sessions consist of psychoeducation, modeling, behavioral rehearsal, and reinforcement, along with out of session homework to practice particular skills. Parent sessions additionally focus on assisting parents to coach their child related to the out of session homework assignments. More recently, PEERS curriculums for preschoolers (Park et al., 2023) and young adults (Laugeson, 2017) have also been developed.

In Laugeson et al. (2009) pilot study, researchers sought to assess the program's efficacy on constructs including quality of play, social skills knowledge, friendship quality, and problem behaviors. Since then, PEERS literature has continued to further validate the effectiveness of the intervention and explore the extent of PEERS' impact through a variety of teen, parent, and teacher reported outcome measures. While social competence remains the focus of the program, research has explored its effects on the teens' loneliness, self-concept, depression, and empathy (Laugeson et al., 2012; Laugeson et al., 2015). In addition to the growing evidence expanding the outcomes of PEERS, recent research has also broadened the program's scope through demonstration of its success in a variety of populations beyond adolescents with ASD (Rose et al., 2021; Gilmore et al., 2023; Gonring et al., 2017; Hua et al., 2022). One study extended PEERS to college students with intellectual/developmental disorder(s) (IDD) with diagnoses ranging from ASD to Down syndrome, hydrocephalus, and other unspecified IDD (Rose et al., 2021). Despite not reaching significance, results indicated increased social skills knowledge, communication skills, and friendship skills from the PEERS program. Interestingly, another study evaluating the effectiveness of PEERS with participants ages 15–21 with an ASD or IDD diagnosis found significant gains in social skills knowledge among the entire sample, but only the IDD group had marginally significant gains in reported peer gatherings while the ASD group did not have any other significant gains.

Venturing beyond the IDD population, several studies have sought to assess the versatility of PEERS among a broader range of populations. Gilmore et al. (2023) advanced PEERS literature by focusing on adolescents with acquired brain injuries or cerebral palsy. Researchers found that participant scores demonstrated higher social knowledge and reported increased invited get-togethers compared to those who did not receive the PEERS intervention. Gonring et al. (2017) extended PEERS into the behavioral health sector by utilizing PEERS social skills intervention for

participants with Attention-Deficit/Hyperactivity Disorder (ADHD). Post-test results following the 14-week intervention indicated a significant decrease in parental stress and a significant increase in parent-adolescent communication. More recently, another study further explored the effectiveness of PEERS in young adults with depression utilizing a randomized-control design (Hua et al., 2022). Despite condensing the curriculum to fit within a 6-week period, post-test results indicated that the group who received the PEERS intervention, in comparison to those receiving conventional care, had significantly decreased social anxiety and avoidance.

In our initial study using PEERS with adolescent adoptees who were experiencing difficulties with peer relationships, pre- to post-intervention gains were noted across a variety of measures (Helder et al., 2023). Specifically, improvements in teacher and parent rated social skills and parent rated empathy and social anxiety were observed. Among measures completed by adolescent participants we found increased social knowledge and number of peer get togethers, improved self-concept, friendship quality and social satisfaction, and reduced depression and social anxiety symptoms.

Current PEERS longitudinal studies

While literature providing evidence for the increased generalizability of the PEERS social skills intervention continues to surface, research examining the long-term maintenance of PEERS is sparse. Of the existing literature, evidence supporting the sustained long-term outcomes of PEERS has only been established in a few studies—most of which focus on the ASD population. The original creators of PEERS were the first to investigate the prolonged impact of the intervention among adolescents with ASD following a 14-week span of time since last participating in the intervention (Laugeson et al., 2012). Follow-up data validated the durability of PEERS, finding that most gains made from pre- to post-test had been maintained following the 14-week period since participants discontinued the intervention. Specifically, they found that participants had decreased problem and externalizing behaviors and increased social awareness. Since then, few PEERS studies have reported on longitudinal outcomes and much of the literature has limited the follow-up period to 14–16 weeks after the intervention is complete. The vast majority of these shorter-term follow-up studies have found significant improvements from pretest to follow-up in most, and oftentimes, all measures (Rabin et al., 2018; Matthews et al., 2018; Yoo et al., 2014; Shum et al., 2019; Yamada et al., 2020; Veytsman et al., 2023). However, despite indicating significant gains from pretest to post-test, some studies have found a significant loss in initial gains at follow-up in several measures such as number of hosted get-togethers (Laugeson et al., 2015; Płatos et al., 2022).

Mandelberg et al. (2014) was the first to expand the follow-up period beyond 6 months by investigating the long-term outcomes of PEERS at 1–5 years following the intervention, in adolescents with ASD. Based on the self-reported adolescent data, findings indicated that not only had the participants retained many of the gains made from pre-test to post-test but the frequency of problem behaviors continued to decline from post-test to follow-up. Additionally, the participants' social skills knowledge, social responsiveness, and frequency of peer get-togethers demonstrated continuous improvement from baseline to follow-up. Parent data corroborated adolescents' self-reported data by indicating that the applicational gains such as being invited to and hosting get-togethers had been maintained.

More recently, Tripathi et al. (2022) explored the long-term outcomes 1–5 years post PEERS intervention among preschoolers with ASD through parent-reported outcome measures. Due to the age of the participants, only data on parental perceptions of their child's social responsivity, quality of play, and social skills were collected. In addition to the parent-reported measures, parents were asked to complete a self-reported assessment intended to measure their degree of parental stress. Substantiating the previous studies' findings, the gains demonstrated from pre-test to post-test on the Quality of Play Questionnaire (Frankel & Mintz, 2011) and Social Responsivity Scale (Constantino & Gruber, 2012) did not continue to increase but were maintained at follow-up. However, in contrast to the Mandelberg et al. (2014) study, follow-up data collected on parent-reported problem behavior of their child indicated that the gains made from pretest to post-test were not maintained over a longer period of time. Additionally, the original decrease in parental stress from pre-test to post-test was not upheld at the time of the follow-up suggesting that PEERS may have a longer lasting effect on participants rather than their caregiver.

Present study

The present study was conducted to address several gaps in the literature, including scarce longitudinal research on PEERS, especially outside of the ASD context, and the relative absence of literature pertaining to social skills interventions for adolescent adoptees who are struggling with peer relationships. The current study sought to conduct a longitudinal follow-up utilizing the same battery of measures with the adolescent and parent participants who had previously completed the PEERS intervention as a part of the Helder et al. (2023) study, 2.5–3.5 years prior. As previous studies have demonstrated the maintenance of gains and, in some cases, continued improvements of outcomes following the PEERS intervention among individuals with ASD, our study sought to extend the literature to

adolescent adoptees. It was hypothesized that adolescent adoptees' gains from pretest to post-test, initially documented in Helder et al. (2023), would be maintained at this follow-up study.

Methods

Participants

The participants who were invited to enroll in the current study were all adoptees who completed PEERS and their parents who attended concurrent caregiver sessions in our previous study (Helder et al., 2023). Initial eligibility criteria for Helder et al. (2023) had included youth who had been adopted by unrelated parent(s), with a minimum age of 13 years, who had self and parent reported difficulties with peer relationships. The participants' parents were contacted via email and phone and they and their child were invited to complete follow-up questionnaires. Of the original 45 families who completed PEERS in Helder et al.'s (2023) study, 41 participated in the current follow-up study. The four families who did not participate in the follow-up study included three families who did not respond to invitations to participate and one adolescent participant who had passed away. The four adolescent participants who were not a part of this follow-up study did not differ from the 41 participants who completed this follow-up study in terms of the immediate post-intervention outcomes collected as a part of Helder et al. (2023). Those who did not participate in this follow-up study were significantly older when they had completed PEERS ($M=16.5 \text{ years} \pm 2$) than those who did complete follow-up measures ($M=14.2 \pm 1.62$), $t(43) = -2.66$, $p = .011$.

The 41 participants that completed the follow-up questionnaires included 26 females and 15 males (M age at follow-up = 17.2 years, $SD=1.8$). In terms of race and ethnicity, 29% of the participants identified as Asian American, 27% as African American/Black, 24% as white, and 19.5% as Latinx/Hispanic. Sixty-three percent of the sample were internationally adopted, 29% were domestically adopted through foster care, and 7% were domestic private infant adoptions. Internationally adopted participants had been adopted from a range of regions including Asia ($n=10$, China, Thailand, Philippines), Eastern Europe and Russia ($n=5$, Ukraine, Russia), Africa ($n=3$, Ethiopia, Uganda), and Central and South America ($n=8$, Guatemala, Columbia, Guiana). The mean age at adoption was 4.37 years ($SD=4.81$, Range = birth - 16 years). Adoptive families were headed by a single parent for 12.2% of the participants and by heterosexual, married couples in 87.8% of the sample. Household size ranged from 3 to 10 ($M=5.22$, $SD=2.09$). Household yearly income distribution was as follows: <\$5,000 (2.4%), \$25,000–34,999 (7.3%), \$35,000–49,999 (9.8%),

\$50,000–74,999 (22%), \$75,000–99,999 (22%), and >\$100,000 (36.6%). All adoptive parents of participants in the sample identified as white.

Measures

Parent and adolescent participants completed the same set of measures for the current follow-up study as they had completed previously for Helder et al. (2023) for the pre- and post- intervention comparisons.

Follow-up measures completed by adolescents

Social skills knowledge. The Test of Adolescent Social Skills Knowledge (TASSK; Laugeson & Frankel, 2010) was specifically designed by the PEERS creators to assess the extent of participants' social skills knowledge regarding content covered in the intervention. Consisting of 30 items, participants were asked to select one of two answer choices for each item. Internal reliability at follow-up was acceptable ($\alpha = .66$).

Peer get-togethers. The Quality of Socialization Questionnaire (QSQ-A; Laugeson & Frankel, 2010) consists of 12 items that asked teens to report the number of get-togethers they had both hosted and been invited to in the past month. Adolescents were asked to further reflect on the quality of their get-togethers through their responses to 10 items on a 4-point Likert scale. The number of hosted and invited get-togethers were utilized as outcome measures in the current study.

Friendship quality. The Friendship Quality Scale (FQS; Bukowski et al., 1994) consists of 23 items that asked participants to identify their closest friend and answer a series of questions using a 5-point Likert scale. Each item corresponds to one of the five subscales: companionship, conflict, helpfulness, security, and closeness. The total score was used as an outcome measure and had good internal reliability at follow-up ($\alpha = .84$).

Self-concept. The Piers Harris-3 (Piers et al., 2018) is a 58-item questionnaire used to assess self-concept by asking participants to indicate if they resonate with statements by selecting “yes” or “no”. Each item contributes to one of six sub-scores: behavioral adjustment, freedom from anxiety, happiness and satisfaction, intellectual and school status, physical attributes, and social acceptance. A total score was calculated and converted to a T-score ($M=50$, $SD=10$) using age-based norms, with higher scores indicating better self-concept.

Social satisfaction. The Loneliness and Social Dissatisfaction Scale (L & SD, Asher et al., 1984) consists of 24 items on a 5-point Likert scale. Eight filler

items are included to conceal the measurement's purpose while 16 items correspond to one of three subscales: loneliness, social competency, and perception of peer status. Internal reliability of the total score, which was utilized as the outcome measure in the current study, was good at follow-up ($\alpha = .95$).

Social anxiety. The Social Anxiety Scale-Adolescents (SAS-A; La Greca, 1998) includes 18 items on a 5-point Likert scale that assess social anxiety symptoms across three subscales: fear of negative evaluation, general social avoidance and distress, and social avoidance and distress in new situations. The total score was used as the outcome measure and internal reliability was good at follow-up ($\alpha = .92$).

Depression. The Child Depression Inventory-2 (CDI-2; Kovacs, 2011) is composed of 28 items assessing depressive symptoms across four domains: negative mood/physical symptoms, negative self-esteem, ineffectiveness, and interpersonal problems. For each item participants were asked to select one answer among three choices. Raw scores are converted to T-scores using age-based norms and the total score was used as an outcome measure.

Follow-up measures completed by parents

Social skills. The Social Skills Improvement System Rating Scales (SSIS-P, Gresham & Elliot, 2008) is a 79-item instrument designed to assess parents' perception of their child's social skills. For each item, parents are presented with a brief description of behavior and asked to indicate the frequency of each behavior. Each item corresponds to one of the thirteen subscales that comprises three main scales: social skills, problem behaviors, and autism spectrum total. The total social skills scale was used as the outcome measure for this study, after conversion to Standard Scores ($M=100$, $SD=15$) using age-based norms. Higher scores on this outcome indicate better social skills. The Social Responsiveness Scale – 2 (SRS-2, Constantino & Gruber, 2012) is a parent-reported instrument including 65 items assessing parent perception of their child's receptivity in social situations. Each item corresponds to one of six subscales: social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behaviors. Following conversion to T-scores using age-based norms, the total score was used as the main outcome measure. Higher scores on the total score indicate more difficulties with Social Reciprocity.

Empathy. The Empathy Quotient (Baron-Cohen & Wheelwright, 2004) consists of 40 items that assess parents' perception of how their child

emotionally relates to their peers. Parents are presented with a series of statements pertaining to their child and asked to respond using a 4- point Likert scale. The total score was used as the outcome measure and internal reliability at follow-up was good ($\alpha = .81$).

Quality of social interaction. Identical to the QSQ-A, parents were asked to complete the Quality of Socialization Questionnaire–Parent (QSQ–P, Laugeson & Frankel, 2010) assessing the quantity and quality of their adolescent’s hosted and invited get-togethers over the last month. The total number of hosted and invited get together were used as outcome measures.

Social anxiety. Echoing the items and format of SAS-A, parents were asked to complete the Social Anxiety Scale–Parent (SAS–P; Laugeson & Frankel, 2010). This parent version adapted each item to assess parents’ perception of their child’s social anxiety. The total score was used as the outcome measure and internal reliability at follow-up was good ($\alpha = .95$).

Procedure

Eligibility for the current study was limited to the adolescents and parents who had participated in the previous study examining the effectiveness of PEERS for adopted adolescents (Helder et al., 2023). PEERS is a 16-week, group psychosocial curriculum initially intended as an intervention to improve the social skills of adolescents with autism-spectrum disorder (Laugeson et al., 2012). Helder et al.’s (2023) initial study was facilitated by five certified PEERS therapists and a team of research assistants and consisted of 6 cohorts ($n=6-10$ teens each, and accompanying caregiver) that met once per week for 90 min across 16 weeks. Cohorts 1 ($n=7$) and 2 ($n=8$) were completed beginning in winter 2020, Cohorts 3 ($n=6$) and 4 ($n=7$) were completed during the fall 2020, and Cohorts 5 ($n=7$) and 6 ($n=10$) were completed in spring 2021. Due to public health requirements due to COVID-19 case counts, Cohorts 1 and 2 completed 10 weeks of the intervention in-person and 6 weeks virtually and Cohorts 3 and 4 completed 14 weeks in-person and 2 weeks virtually. Virtual delivery was completed using the telehealth guidelines published by Laugeson (2020). Cohorts 5 and 6 were able to complete all 16 weeks in-person.

Each teen session included a didactic lesson, group discussion, interactive activity, and concluded with a homework assignment. Designed with a collaborative approach, the caregivers/parents of adolescents met in a separate room to discuss their adolescents’ progress and learn how to supplement the weekly content at home.

For the current study, all adolescents and parents who had previously participated (Helder et al., 2023) were contacted through email and phone

call and briefed on the follow-up study. Informed consent for caregivers and assent for teens was formally obtained electronically via Qualtrics.

Adolescents were then directed to a battery of measures on Qualtrics assessing their social knowledge, frequency of get-togethers, friendship quality, self-concept, social satisfaction, social anxiety, and depression. Similarly, parents were directed to a battery of measures on Qualtrics assessing their adolescent's social skills, empathy, frequency of get-togethers, and social anxiety. The time elapsed between the end of the intervention and collection of follow-up data varied by cohort. Cohorts 1 and 2 had 3.5 years between initial participation and follow-up, Cohorts 3 and 4 had 3 years, and Cohorts 5 and 6 had 2.5 years. Following completion of the Qualtrics measures, parents and teens were each sent a \$50 gift card to thank them for their time in participating.

Data analysis

In order to conduct a complete analysis, only data from the 41 participants who completed pre-intervention, post-intervention (during Helder et al., 2023) and follow-up measures (current study) were utilized. A series of repeated measures ANOVAs comparing pre-intervention, post-intervention, and follow-up ratings were conducted for each outcome in order to examine participants' change in functioning over time, in particular between post-intervention and follow-up. Where the overall ANOVA was significant, post hoc tests were then inspected to determine patterns of significant change between time points.

Results

In order to examine our hypothesis that gains in outcomes initially observed from pre- to post-interventions would be maintained over the follow-up period, repeated measures ANOVAs and relevant post hoc tests were examined for each outcome (see Table 1). Several different patterns of change over time were noted across outcomes.

For some outcomes, as hypothesized, improvements were observed from pre-intervention to post-intervention and performance then remained stable from post-intervention to follow-up. This was observed in the context of maintained gains in adolescents' reports of hosted get-togethers ($F(2, 38)=4.89, p=.01$) and parents' reports of social skills on both the SSIS ($F(2, 38)=13.2, p<.001$) and SRS-2 ($F(2, 38)=14.9, p<.001$), social anxiety ($F(2, 38)=9.18, p<.001$), and empathy ($F(2, 38)=12.7, p<.001$). Each of these had significant improvements between pre- and post-intervention and when comparing pre-intervention and follow-up, with no significant difference between the post-intervention and follow-up.

Table 1. Comparison of pre-, post-, and follow-up results for outcome measures ($n=41$).

Measure	Pretest <i>M</i> (<i>SD</i>)	Post-test <i>M</i> (<i>SD</i>)	Follow-up <i>M</i> (<i>SD</i>)	<i>F</i>	<i>p</i>	η^2
Teen Measures Social Knowledge (TASSK Total Raw Score)***	15.7 (2.95)a	23.5 (3.47)b	19.4 (3.71)c	68.6	<.001	0.65
Hosted Get-togethers (QSQ-A Total Raw Score)*	1.44 (2.29)a	3.33 (3.68)b	5.35 (8.03)b	4.89	0.011	0.132
Invited Get-togethers (QSQ-A Total Raw Score)*	1.09 (1.58)a	1.65 (1.89)a	3.79 (7.11)a	4.39	0.016	0.121
Friendship Quality (FQS Total Raw Score)	92.6 (10.3)a	95.1 (11.5)a	92.3 (11.9)a	1.34	0.27	0.046
Self-Concept (Piers-Harris-3 Total T-score)**	44.5 (12.1)a	49.9 (9.87)b	47.7 (10.7)a,b	6.15	0.004	0.153
Social Satisfaction (L & SD Total Raw Score)	59.7 (13.7)a	63.3 (8.49)a	61.2 (13.8)a	2.05	0.136	0.053
Social Anxiety (SAS-A Total Raw Score)	47.5 (16.1)a	42.3 (14.4)b	46.2 (16.8)a,b	2.67	0.076	0.069
Depression (CDI-2 Total T-score)*	60.3 (16.4)a	53.3 (12.0)b	54.1 (12.7)a,b	3.66	0.031	0.092
Parent Measures Social Skills Improvement System (Total Standard Score)***	78.2 (12.5)a	86.0 (12.1)b	85.6 (13.5)b	13.2	<.001	0.253
Social Responsiveness Scale (Total T-score)***	69.7 (9.90)a	63.0 (7.92)b	63.6 (9.43)b	14.9	<.001	0.282
Empathy (EQ Total Raw Score)***	22.3 (7.79)a	29.4 (10.8)b	29.2 (11.3)b	12.7	<.001	0.246
Hosted Get-togethers (QSQ-P Total Raw Score)*	1.17 (2.19)a	2.00 (2.29)a,c	2.36 (2.47)b,c	3.34	0.041	0.085
Invited Get-togethers (QSQ-P Total Raw Score)*	0.821 (1.35)a	1.08 (1.51)a,c	1.67 (2.1)b,c	4.22	0.019	0.12
Social Anxiety (SAS-P Total Raw Score)***	54.2 (15.4)a	49.0 (11.5)b	48.8 (14.8)b	9.18	<.001	0.191

Note. Means sharing a common subscript are not statistically different at $\alpha < .05$.

Pretest and post-test data collected for Helder et al. (2023), follow-up data collected for the current study.

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

For other outcomes, there was no initial improvement (pre- to post-), but further improvement on these outcomes occurred over the follow-up period. Specifically, a significant improvement between pre-intervention and follow-up was found in parents' reports of hosted get-togethers ($F(2, 38)=3.34$, $p=.04$) and invited get-togethers ($F(2,38)=4.22$, $p=.019$); though there was not a significant difference between pre- and post-intervention, or post- and follow-up.

A third pattern of results for some outcomes was initial improvement between pre- and post-intervention followed by a small decline in functioning between post-intervention and follow-up, resulting in a follow-up value that was intermediate between pre-intervention and post-intervention scores. Adolescents' reports of depression ($F(2, 38)=3.66$, $p=.031$), self-concept ($F(2, 38)=6.15$, $p=.004$), and social anxiety ($F(2, 38)=2.67$, $p=.076$) showed this pattern of significant improvement on post hoc tests from pre-intervention to post-intervention but follow-up performance was between the pre- and post-intervention and not significantly different from either. Relatedly, significant improvement was seen from pre- to post-intervention for adolescents' social knowledge (TASSK), and there

was also a significant decrease from post- to follow-up ($F(2, 38)=68.6$, $p<.001$). However, follow-up social knowledge still remained significantly higher than pre-intervention social knowledge.

Lastly, when examining our post hoc analysis some outcomes did not show significant improvement from pre- to post-intervention or from post-intervention to follow-up, which included adolescents' reported invited get-togethers ($F(2, 38)=4.39$, $p=.02$), friendship quality with their best friend ($F(2, 38)=1.34$, $p=.27$), and social satisfaction ($F(2, 38)=2.05$, $p=.13$). However, the adolescents' reported invited get togethers post hoc comparison between pre- intervention and follow-up was at the trend level ($p=.06$).

Discussion

The current study sought to examine the long-term outcomes of adolescent adoptees who had previously participated in the PEERS program to address challenges in friendship making and social functioning (Helder et al., 2023). Notable conclusions from this follow-up study indicate that across several outcomes, gains in social functioning that were achieved from pre-intervention to post-intervention were maintained over the follow-up period. Adolescents' hosted get-togethers, and parents' reports of their child's social skills, social anxiety, and empathy improved from before the intervention to immediately after the intervention and then were stable across the follow-up period of 2.5–3.5 years. Also, parents' reports of hosted get-togethers and invited get-togethers initially did not show improvement from pre- to post-intervention, but over the follow-up period there was continued significant improvement in these outcomes. Adolescents' social knowledge specific to the content covered in the intervention was also significantly higher at follow-up compared with pre-intervention, though there was a significant decline from post-intervention, indicating some forgetting of session content over the years since the intervention.

In contrast to these areas of maintained or continued gains, several outcomes that had initially improved from pre- to post-intervention did show declines over the follow-up period to the point where they were not significantly different from pre-intervention values. This included adolescents' reports of their depression and social anxiety symptoms and self-concept. These outcomes were not a specific focus in the PEERS intervention curriculum but have been shown to be related to social functioning more generally (Kamper-DeMarco et al., 2020). Thus, it appears that the indirect effects on emotional well-being and self-esteem that had been initially observed after the intervention were less likely to be sustained over time as compared to the outcomes more directly targeted by PEERS, such as social skills and social behavior.

Last, three outcomes that showed significant improvement from pre- to post-intervention in Helder et al. (2023) did not show significant improvement across any of the time periods in the current follow-up study. This is related to the fact that these outcomes had the smallest effect sizes in Helder et al. (2023) and significant findings were not maintained in the slightly smaller sample of participants who had also completed follow-up measures. Thus, at least in this subset of the Helder et al. (2023) sample, the PEERS intervention did not seem to significantly improve adolescents' reports of invited get-togethers, friendship quality with best friend, and social satisfaction.

Comparison with PEERS literature

Notably, this is the first PEERS follow-up study to explore the long-term outcomes of PEERS outside the context of ASD. Additionally, most pre-existing longitudinal research on PEERS had limited their adolescent outcome measures to the TASSK and QSQ-A or QPQ-A (Mandelberg et al., 2014; Laugeson et al., 2012; Laugeson et al., 2015; Shum et al., 2019; Yamada et al., 2020). Consistent with the findings of these follow-up studies investigating PEERS for adolescents, our study also demonstrates significant gains in frequency of hosted get-togethers from pre-intervention to follow-up. Also, our pattern of findings related to social knowledge gains is consistent with another study that had similar length of time between post-test and follow-up periods (Mandelberg et al., 2014). Additionally, our parent rated findings related to maintained gains in social skills are consistent with what has been found in the vast majority of follow-up studies (Laugeson et al., 2012; Laugeson et al., 2015; Mandelberg et al., 2014; Rabin et al., 2018; Matthews et al., 2018; Yoo et al., 2014; Płatos et al., 2022; Shum et al., 2019; Veytsman et al., 2023; Yamada et al., 2020). While Helder et al. (2023) and the current study were conducted through portions of the COVID-19 pandemic, these similar findings in the magnitude and maintenance of gains compared with previous research is helpful in interpreting the impact of the pandemic on our findings. However, future research that examines longitudinal outcomes of PEERS during periods of less social disruption would be helpful in increasing confidence in the validity and replicability of our findings.

No existing follow-up studies on PEERS have included a broader range of teen and parent measures, as were used in the current study, so comparison with existing PEERS literature for long-term impacts on factors such as social anxiety, depression, self-concept, and empathy were not possible.

Limitations

A number of limitations are important to acknowledge regarding the current study. First, we have a relatively small sample and also were not

able to follow-up with all participants who had originally participated in our PEERS intervention. In particular, we had less participation from participants who were older, likely because they were now living independently from parents and were difficult to contact. This led to several non-significant findings from pretest to post-test on outcomes that had been significant, though with small effect sizes, in the Helder et al. (2023) study. Second, although our sample was all within a rather narrow age range at the time of the PEERS intervention (ages 13–17) and all had endorsed difficulties with peer relationship building, our sample was heterogeneous regarding pre-adoptive environment, adoption type, and age at adoption. Our previous study (Helder et al., 2023) had found that verbal reasoning and presence of attachment difficulties was not a significant predictor for the majority of post-intervention outcomes, thus our initial evidence suggests the intervention could be helpful for a wide range of adoptees though more research on this is needed.

Additionally, we did not have a control group to provide comparison to our intervention group, which prevented us from controlling for potential threats to internal validity, such as maturation, history threats, or placebo effects. However, our results are quite comparable to randomized clinical trials utilizing a wait-list control group completed by the founders of PEERS (Laugeson et al., 2009, 2012, 2015). Last, we were not able to include teacher ratings in the current study as many participants no longer had contact with the teacher or coach who had initially completed their ratings for the Helder et al. (2023) study.

Implications and future directions

Given the long-term improvements from pre-intervention to follow-up in many of the parent and adolescent reported outcomes, the PEERS social skills intervention appears to have been helpful for our participants even after several years since program completion. There continues to be a scarcity of social skills interventions catered toward adoptees, adolescents in particular. Yet, a growing amount of literature suggests adoptees are at a greater risk to experience social difficulties (Soares et al., 2019; Brodzinsky, 2011, 2014; Soares et al., 2017; Whetten et al., 2011). With accumulating empirical evidence suggesting that adoptees are at a heightened risk for experiencing social difficulties, coupled with the inherent vulnerability accompanying adolescence, there is a pressing need for much more research on social supports catered toward this specific population (Orben et al., 2020)

While our study demonstrates the overall positive impact of PEERS on many outcomes for adolescent adoptees, the lack of maintenance from

post-intervention to follow-up on adolescent reported social anxiety, depression, and self-concept outcomes indicates that initial gains for areas that are less central to the intervention's focus tended to gradually decline with time. Perhaps additional engagement beyond the 16-week curriculum may minimize the decline of skills and may even continue to enhance the gains acquired during the intervention.

Alternatively, an intervention that continues to incorporate ecologically valid social skill training while also more explicitly and comprehensively addressing some of the underlying reasons why some adolescent adoptees may struggle with friendship making (i.e., experiences of adoptive and/or microaggressions from peers, foundational aspects of trust following trauma) may be helpful.

Disclosure statement

We have no conflicts of interest to disclose.

Funding

Support for delivery of the PEERS intervention and data collection and analysis for the follow-up study was provided by the Michigan Health Endowment Fund, Adoptive Family Support Network, Calvin University Office of the Provost, and Calvin University STEM Division

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