Research in Autism Spectrum Disorders 109 (2023) 102279

Contents lists available at ScienceDirect

Research in Autism Spectrum Disorders

journal homepage: www.elsevier.com/locate/rasd

Examining the feasibility and effectiveness of PEERS for adolescents via telehealth during the COVID-19 pandemic

Chimei M. Lee [a,b,*], Connor Petricek [c], Morgan Haga [d], Samantha Smalley [b], Katherine Pelletier [c], Nimco Essa [a], Rebekah L. Hudock [a,b]

[a] Division of Clinical Behavioral Neuroscience, Department of Pediatrics, University of Minnesota, Minneapolis, MN 55455, USA
[b] Masonic Institute for the Developing Brain, University of Minnesota, Minneapolis, MN 55414, USA
[c] Department of Psychology, University of Minnesota, Minneapolis, MN 55455, USA
[d] University of Southern Mississippi, School of Psychology, Hattiesburg, MS 39401, USA

ARTICLE INFO

Keywords:
Social skills group
Telehealth
PEERS
Feasibility
Outcome

ABSTRACT

Background: The PEERS program is an evidence-based social skills intervention focusing on skills related to making and keeping friends as well as managing conflict and rejections. Because of the COVID-19 pandemic, social skills interventions have been moving to virtual settings, including PEERS; however, limited research on the feasibility and efficacy of telehealth group therapy has been done.

Method: Thirty-four families were referred through an autism specialty clinic to complete the online PEERS program, and fourteen families completed measures of social skills, emotional and behavioral symptoms, and executive functioning before and after participating in the program.

Results: The outcomes revealed significant improvements in participants' social skills knowledge, social communication, social motivation, and aspects of executive functioning. Participants also reported being satisfied with the online format, further supporting the hypothesis that the modified PEERS program, held virtually, is feasible and effective.

Conclusion: Our results support that the telehealth PEERS program offers a good alternative to the in-person modality and other social skills programs, especially for families who have difficulty accessing evidence-based programming for autistic adolescents due to geographical or transportation limitations as well as for families who prefer the convenience of participating in this program virtually.

1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic has had a profound impact on children with special needs, depriving them of numerous opportunities to improve their social skills and relationships as we followed the policy of physical distancing (Bitan et al., 2022; Eisengart et al., 2021; Cacioppo et al., 2021). Lockdowns implemented for public health reasons interrupted medical follow-up and rehabilitation, as well as social communication opportunities that these children require to further develop their abilities (Bitan et al., 2022; Cacioppo et al., 2021; Morelli et al., 2020). Recent research has shown that the lockdown significantly impacted the

* Correspondence to: Autism and Neurodevelopment Clinic, Masonic Institute for the Developing Brain, Division of Clinical Behavioral Neuroscience, Department of Pediatrics, University of Minnesota Medical School, 2025 E River Pkwy, Minneapolis, MN 55454, USA.
E-mail address: chimeil@umn.edu (C.M. Lee).

https://doi.org/10.1016/j.rasd.2023.102279
Received 27 June 2023; Received in revised form 12 September 2023; Accepted 23 October 2023
Available online 6 November 2023
1750-9467/

development of cognitive skills, sensory and motor functioning, emotional and behavioral regulation, as well as social interactions of approximately 50% of children with special needs (Morelli et al., 2020; Baweja et al., 2021). Fortunately, recent studies have demonstrated that telehealth can be effective in improving the care and support provided to children with special needs (Bitan et al., 2022; Simacek et al., 2021).

Telehealth existed prior to the COVID-19 pandemic, and its use rapidly increased as non-essential healthcare offices closed their doors in the spring of 2020. It has become a popular way to meet with patients across all specialties, including therapy. Even as healthcare professionals started conducting in-person appointments again, telehealth remains an important mode of healthcare for individuals who may be isolated or find it difficult to access facilities (Dow et al., 2022; MacEvilly & Brosnan, 2020). Since the recent rise in the popularity of telehealth, few studies have been published discussing how it may directly benefit individuals who receive interventions for social communication challenges (Soares et al., 2021; Simacek et al., 2021). Sutherland and colleagues (2018) looked into autism-focused therapies that target social skills utilizing telehealth. They found that individuals who received interventions via telehealth were reported to have improved in various social skills areas, including starting conversations, improved responses, and overall communication. Groups that received individualized coaching during telehealth sessions exhibited greater improvements than groups that did not (Sutherland et al., 2018).

Several studies have explored the feasibility of adapting and delivering these telehealth social interventions (MacEvilly & Brosnan, 2020; Mootz et al., 2022; Gale et al., 2021). Mootz et al. (2022) received feedback showing that parents value the accessibility of remote sessions during the pandemic and found their online program to support friend-building and increase social awareness. Simacek et al. (2021) performed a review of telehealth-delivered interventions for social communication and found that a majority of studies were feasible in terms of fidelity, acceptability, and early efficacy data. The need for high-quality social skills intervention delivered via telehealth remains a priority. Many programs have been developed to address social communication challenges among children and adolescents, including the UCLA Program for the Education and Enrichment of Relational Skills (PEERS®). The PEERS® for Adolescents program is an evidence-based, caregiver-assisted social skills group therapy intervention originally developed for children and adolescents with ASD (Laugeson et al., 2009). The program has been extensively studied and shown to be effective for both autistic individuals and individuals with other neurodevelopmental disorders (Gardner et al., 2019; Moody & Laugeson, 2020; Wolstencroft et al., 2021; Zheng et al., 2021). Previous research has demonstrated that participating adolescents exhibit improvements in social skills and social engagement, while also exhibiting reductions in social anxiety, problematic behaviors, and autism-related social difficulties (Matthews et al., 2018; Hua et al., 2022). Importantly, these gains have been shown to persist well after the completion of the program, likely due to the involvement of parents in the intervention, who learn alongside their children and receive training in effective social coaching techniques (Mandelberg et al., 2014).

Due to the COVID-19 pandemic, PEERS® was modified in 2020 for telehealth (referred to as the telehealth PEERS® program) and provided for trained professionals to support families in need (Estabillo et al., 2022). Modifications include offering homework assignments online, utilizing PowerPoint slides for the didactics, and adding rules for online interactions to foster social communication in virtual settings (Estabillo et al., 2022). The transition to the online format also consists of ensuring that participants know what to expect during a telehealth session, such as reviewing privacy rules, utilizing technologies to interact with members in the session, watching pre-recorded social skills videos, and participating in behavioral rehearsals in breakout rooms over telehealth platforms. In a recent study, Estabillo and colleagues (2022) examined the efficacy of the telehealth PEERS® program. They found that participants enrolled in the telehealth program demonstrated significant improvements in social skills knowledge, social responsiveness, overall social skills and problem behaviors, and social engagement. These findings are similar to in-person delivery, with a greater increase in get-togethers following the telehealth format than following in-person instruction. The authors concluded that autistic adolescents were able to learn and exhibit significant gains through the telehealth format, and ongoing implementation of telehealth delivery is encouraging to expand access to evidence-based interventions and improve the lives of autistic youth and their families (Estabillo et al., 2022).

To date, research examining telehealth adaptations to group social skills interventions for children and adolescents with social communication challenges has been limited. It is encouraging that PEERS® via telehealth delivery demonstrated positive outcomes and strong efficacy. It is also important to examine the effectiveness of the telehealth PEERS® in real-life clinical practice. The current study aimed to examine the feasibility and effectiveness of the PEERS® for Adolescents program via telehealth delivery among a clinically referred sample. With the past exploration of the feasibility and effectiveness of PEERS® and other social communication interventions, we hypothesized that social skills knowledge would significantly increase post-treatment and that the intervention would be acceptable to our population.

2. Methods

2.1. Participants

Families with adolescents aged 10 to 18 were referred for social skills intervention by their pediatricians, neuropsychologists, psychiatrists, as well as other professionals who work closely with the families (i.e., speech pathologists, occupational therapists) to an autism specialty clinic where PEERS® is conducted. Participants were eligible for the study if they demonstrated a significant need and motivation to make friends and participate in the program, had fluent verbal skills, could speak and understand English fluently, resided in the state of Minnesota, had access to two devices with proper Wi-Fi capabilities, and did not have a history of intellectual disability.

The telehealth PEERS® intervention was provided by two licensed psychologists who completed the PEERS® certified training for

adolescent, young adult, and teleconference groups through the UCLA PEERS Clinic. Co-facilitators included undergraduate and graduate students studying psychology who were trained and supervised by the PEERS-certified licensed psychologists. During Winter 2020-Fall 2021, a total of four telehealth PEERS® groups (one in Winter 2020, two in Summer 2021, and one in Fall 2021) were provided to 34 families. Among the 34 families enrolled in the telehealth PEERS® groups, five dropped out from the Summer 2021a group, four dropped out from the Summer 2021b group, and six dropped out from the Fall 2021 group. As a result, 19 families completed the telehealth PEERS® program, attending 16 concurrent 90-minute telehealth sessions with at least one parent via Zoom (Yuan, 2011). Among the 19 families, 14 families (73.7%) completed the pre- and post-group measurements (Table 1).

2.2. Procedures

Study procedures were approved by the University of Minnesota Institutional Review Board (IRB). Prior to the enrollment, families interested in participating in the PEERS® program completed an individual intake appointment with a licensed psychologist to assess their group appropriateness. The intake appointment included record review, a clinical interview around current concerns and services, questionnaires screening for emotional and behavioral functioning, and a structured observation for social communication skills (Autism Diagnostic Observation Schedule, Second Edition, ADOS-2 when the group intake was conducted in person prior to 2020, or Brief Observation of Symptoms of Autism, BOSA when the group intake conducted via telehealth; Lord et al., 2012; Dow et al., 2022). Based on adolescents' age, cognitive abilities, verbal fluency, and schedule availability, families were scheduled into one of four telehealth PEERS® groups. To assess treatment outcomes, adolescents and their caregivers were invited to complete standardized measures within two weeks prior to and after the 16-session telehealth PEERS® intervention.

2.3. Measures

2.3.1. Satisfaction surveys

Based on Bowen et al.'s (2010) framework for designing feasibility studies, we aimed to measure two of the eight focus areas: acceptability and implementation. To measure acceptability, immediately after each session, we collected satisfaction data on the telehealth visit using REDCap to assess participants' overall satisfaction with the session as well as the helpfulness and usefulness of the session. Both adolescents and their caregivers rated anonymously using a 5-point Likert scale of ratings anchored from "*Completely true*" to "*Not at all true*" using a descriptive scale (Likert, 1932). To measure implementation, we recorded if the patient attended their telehealth visit as well as their rating of the technology used and overall rating of the session using a 5-point Likert scale of ratings anchored from "*Excellent*" to "*Poor*". The questions of the survey are listed in Table 2.

2.3.2. Social skills knowledge and social responsiveness

The updated version of the Test of Adolescent Social Skills Knowledge (TASSK; utilized by the recent UCLA studies; Estabillo et al., 2022; Laugeson & Frankel, 2010) is a 30-item binary rating scale used to evaluate changes in social skills and awareness taught in the

Table 1
Participants' demographic information.

Variables	Mean (N)	Standard Deviation (%)
Adolescents' Age (Years)		
Pre-group	14.83	1.47
Range	12–17	
Adolescents' Gender	(N = 14)	
Male	9	64.3
Female	5	35.7
Adolescents' Race/Ethnicity		
Caucasian	10	71.1
African American	1	7.1
Hispanics/Hispanic or Latino-American	1	7.1
Other	1	7.1
Diagnoses		
ASD	10	71.4
Anxiety	8	57.1
ADHD	8	57.1
Other	6	42.9
Group Completion Rate (N of enrollment = 34)	19	55.9
Winter 2020 (N = 5)	5	100.0
Summer 2021a (N = 9)	4	44.4
Summer 2021b (N = 9)	5	55.6
Fall 2021 (N = 11)	5	45.5
Questionnaires Completion Rate (N of completion = 19)	14	73.7
Winter 2020	4	28.6
Summer 2021a	2	14.3
Summer 2021b	3	21.4
Fall 2021	5	35.7

Table 2
Assessing feasibility using the satisfaction survey: rating percentage among parent, adolescent, and overall reports.

Questions	Rating	All %	Parent %	Adolescent %
Overall, how would you rate this session?	Excellent	33.6	35.3	31.5
	Very Good	46.3	54.0	34.8
	Good	17.9	8.6	31.5
	Fair	0.9	0.7	1.1
	Poor	1.3	1.4	1.1
How would you rate the technology used to host this session?	Excellent	34.5	41.0	24.7
	Very Good	46.7	46.0	48.3
	Good	17.5	11.5	25.8
	Fair	0.9	0.7	1.1
	Poor	0.4	0.7	0.0
I believe the session was helpful to me/my child.	Completely True	43.2	54.7	25.8
	Very True	28.4	30.9	24.7
	Moderate True	21.4	10.8	37.1
	Somewhat True	5.7	2.2	11.2
	Not at all True	1.3	1.4	1.1
	Not Applicable	0.0	0.0	0.0
I plan to use what I learned in today's session.	Completely True	46.7	55.4	32.6
	Very True	31.4	30.2	33.7
	Moderate True	16.2	10.1	25.8
	Somewhat True	3.9	2.9	5.6
	Not at all True	1.3	0.7	2.2
	Not Applicable	0.4	0.7	0.0
Overall, I was satisfied with today's session.	Completely True	50.2	59.7	36.0
	Very True	27.9	25.9	30.3
	Moderate True	19.2	10.8	32.6
	Somewhat True	1.7	2.9	0.0
	Not at all True	0.9	0.7	1.1
	Not Applicable	0.0	0.0	0.0

PEERS® program. The TASSK scores range from 0 to 30 with higher scores reflecting greater knowledge of adolescent social skills. According to Laugeson et al. (2009), the TASSK has a moderate level of internal consistency.

The Social Responsiveness Scale, Second Edition (SRS-2) is a measure assessing social communication and restricted, repetitive behaviors relating to autism (Constantino & Gruber, 2012). It consists of 65 items, uses a 4-point Likert style scale (ranging from 1 point being "*not true*", 2 being *"sometimes true"*, 3 being *"often true"* and 4 points being "*almost always true*"), and assesses five subdomains, including Social Communication, Social Cognition, Social Awareness, Social Motivation, and Restricted Interests/Repetitive Behavior (RRB). Higher T-scores reflect greater challenges, where a score of 60–65 reflects a mild level, 66–75 reflects a moderate level, and 76 or higher reflects a severe level of concern. Previous studies have reported satisfactory reliability and validity of the SRS-2, including high internal consistency, test-retest reliability, sensitivity, and specificity for the identification of children with ASD (Constantino & Gruber, 2012).

2.3.3. Emotional and behavioral functioning

The Achenbach System of Empirically Based Assessment (ASEBA) is a collection of questionnaires used to assess adaptive and maladaptive behavior and overall functioning in individuals (Achenbach, 1966). The Child Behavior Checklist (CBCL) is one of the assessment tools for caregivers to report their children's emotional and psychological well-being. The Youth-Self Report (YSR) is an extension of the CBCL administered to the child or adolescent aged 11–18 to describe their own functioning. Both CBCL and YSR evaluate behaviors related to anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. The behavior symptoms are then broken into two higher-order categories of internalizing problems and externalizing problems, as well as an overall total problems, which then correlate to the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria of affective problems, anxiety problems, somatic problems, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant problems, and conduct problems. Both CBCL and YSR consist of 113 questions and are scored using a 3-point Likert scale (where a 0 indicates that the behavior symptom is *"absent,"* a 1 indicates that the behavior symptom occurs *"sometimes"*, and a 2 indicates that the behavior symptom occurs *"often"*), with higher scores reflecting greater difficulties. These measures have been shown to have satisfactory reliability and validity (Ferdinand, 2008).

To further assess anxiety and depressive presentation, the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder Assessment (GAD-7), and the Social Anxiety Scale for Children Revised (SASC-R) were used in this study. The PHQ-9 is a self-administered survey based on the DSM-IV criteria for assessing the severity or incidence of depression (Kroenke et al., 2001). It consists of nine questions scored using a 4-point Likert scale ranging from 0 to 3 (0 indicates that the participant experiences symptoms *"not at all"*, a 1 indicates that the participants experience the symptoms *"several days"*, a 2 indicates *"more than half the days"*, and a 3 indicates that the participant experiences the symptoms *"nearly every day")*. The higher the total score of the nine questions represents greater depressive presentation, with a score between 5 and 9 representing *"mild depression"*, 10–14 representing *"moderate depression"*, 15–19 representing *"moderately severe depression"*, and over 20 representing *"severe depression"*. Titov et al. (2011) found the

scale to have strong validity and adequate internal consistency.

The Generalized Anxiety Disorder Assessment (GAD-7) is a 7-item scale to assess anxiety (Spitzer et al., 2006). It consists of 7 items and uses a 4-point Likert style scale (ranging from a 0 indicating that the participant experiences symptoms *"not at all"*, 1 indicating that the participants experience the symptoms *"several days"*, 2 indicating *"more than half the days"*, and a 3 indicating that the participant experiences the symptoms *"nearly every day"*). The scores are then added up out of 21 and are placed in a range of 0–4, 5–9, 10–14, and 15–21, which respectively measure the degree of anxiety as *"minimal anxiety"*, *"mild anxiety"*, *"moderate anxiety"*, and *"severe anxiety"*. The GAD-7 has been found to have high internal consistency and convergent validity (Rutter & Brown, 2017; Spitzer et al., 2006).

The Social Anxiety Scale for Children Revised (SASC-R) is adapted by Watson and Friend (1969) from the Social Avoidance and Distress Scale for assessing social phobia in children. It measures three categories of social phobia, relating to fear of negative evaluation (FNE), social avoidance and distress in novel situations (SAD-N), and generalized social avoidance and distress (SAD-G; Caballo et al., 2019). The SASC-R consists of 22 items on a 5-point Likert scale, where a score of 1 indicates that the participant *"never"* experiences the condition and a 5 indicates that the participant *"always"* experiences the condition. For the present study, the adolescents completed the SASC-R for self-evaluation, and their parents completed the SASC-R with respect to their adolescents. According to La Greca and Stone (1993), the scale has strong internal consistency and strong concurrent validity.

2.3.4. Executive functioning

The Behavioral Rating Inventory of Executive Function, Second Edition (BRIEF-2; Gioia et al., 2015) is a rating scale evaluating everyday behaviors associated with executive function (EF) for children and adolescents aged 5–18. It consists of parent and self-report forms that can be administered manually or digitally. The parent form includes 63 items assessing domains of Inhibit, Self-monitor, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Task-monitor, and Organization of Materials. The self-report consists of 55 items contributing to seven scales, including Inhibit, Self-monitor, Shift, Emotional Control, Task Completion, Working Memory, and Plan/Organize. Four composite indexes were generated, including Behavioral Regulation (BRI), Emotional Regulation (ERI), Cognitive Regulation (CRI), and Global Executive Composite (GEC). Respondents record their answers via a Likert-type format with *"never"*, "*sometimes"*, or "*often"* that reflect the frequency to which the child being evaluated performs an indicated behavior. Higher scores on the scales and composite indexes indicated more challenges in the area assessed. For the present study, the adolescents completed the self-report version, and their parents completed the parent form regarding their observation of the adolescent. The BRIEF-2 has strong internal consistency and moderate to strong internal and concurrent validity (Hendrickson & McCrimmon, 2019).

2.4. Analytic approach

Data collected through the pre- and post-intervention measures were entered, coded, and checked for errors and logic using a standardized procedure. Subsequently, the entered data were transferred to R-Studio (version: 1.4.1717) to perform range checking and internal consistency checking. Demographic information was compared using descriptive statistics to examine age, gender, race/ethnicity, diagnoses, group association, and drop-out rates. Continuous variables, such as the sum or mean score of measures were compared between pre- and post-intervention by using paired samples t-tests in R-Studio (using the "t.test" package). Cohen's d was used to calculate the effect size for all significant and nonsignificant results. Effect sizes were considered small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) based on benchmarks suggested by Cohen (Cohen, 1988).

3. Results

3.1. Feasibility

To assess the acceptability and implementation of the telehealth PEERS® for Adolescents program, we invited all participants and their caregivers to complete our satisfaction survey at the end of each one of the 16 weekly sessions. A total of 229 satisfaction survey responses were collected, with 140 responses from caregivers and 89 responses from adolescents. Over 70% of the respondents (71.6%, N = 164/229) stated that sessions were helpful to them (i.e., responded with "*Completely True"* or "*Very True"*), and 78.1% of respondents (N = 179/229) rated that they would use what they learned in each session (i.e., responded with "*Completely True"* or "*Very True"*). Most respondents (78.1%, N = 179/229) rated the experience with telehealth sessions very positively (i.e., responded with "*Completely True"* or "*Very True"*) when asked about their overall satisfaction with the session (Table 2). When asked about the use of technology in sessions, 81.2% of respondents (N = 186/229) reported "*Excellent"* or "*Very Good"*, and close to 80% of the respondents (79.9%, N = 183/229) endorsed the overall rating of the sessions as "*Excellent"* or "*Very Good"*.

Although satisfaction was high, the completion rate of the telehealth PEERS® for Adolescents program was not optimal. Of the 34 families that enrolled in the program, 19 families (55.9%) completed the program, with a higher drop-out rate for the later groups (Table 1). The common dropout reasons were mental health issues, telehealth fatigue, and scheduling challenges. Many families cited the significant stress related to the COVID-19 pandemic as a factor that impacted family functioning, mental health, and capacity to complete this 16-week program.

The satisfaction surveys allowed participants to share anonymous comments and suggestions about the program, adding to information about the acceptability and implementation of the program. The responses indicated that participants appreciated the flexibility of the telehealth program because it reduced transportation and time barriers. Many comments addressed their satisfaction

with the content and organization of the adapted intervention. Participants also suggested improvements to the program, such as shortening each session, providing session breaks, and switching the meeting interface to avoid technical challenges.

3.2. Social skills knowledge and social responsiveness

Among 19 families who completed the telehealth program, 14 families completed the measures at pre- and post-intervention timepoints (Table 1). When examining the pre- and post-measures, adolescents reported a significant increase in their social knowledge from their pre-intervention (total score of TASSK; $M = 14.67$, $SD = 3.72$) to the post-intervention rating ($M = 18.83$, $SD = 2.93$; $t = -3.08$, $p = 0.027$, $d = -1.244$; Fig. 1). In terms of social responsiveness, parents reported an overall improvement in total scores on the SRS-2, which yielded a nearly significant result ($t = 2.13$, $p = 0.055$, $d = 0.464$). Their parents also reported significant improvement in social communication ($t = 2.91$, $p = 0.013$, $d = 0.626$), social motivation ($t = 2.61$, $p = 0.023$, $d = 0.338$), and the overall rating of social communication and interaction ($t = 2.78$, $p = 0.017$, $d = 0.526$) on the SRS-2. The pre- and post-intervention differences in total score and the other subscales of social awareness, social cognition, as well as restricted interests, and repetitive behavior were not statistically significant (p values ranging from 0.274 to 0.422; d values ranging from $d = 0.231$ to $d = 0.272$; Table 3).

3.3. Emotional and behavioral functioning

Both parents' and adolescents' reports on emotional and behavioral functioning (CBCL and YSR) did not reveal statistically significant differences between pre- to post-intervention across domains assessed (p values ranging from 0.186 to 0.946; Table 4), except for marginal findings on parent-reported Somatic Complaints ($t = 1.99$, $p = 0.087$, $d = 0.412$) and adolescent-reported Externalizing Problems ($t = 3.05$, $p = 0.093$, $d = 0.405$). When examining anxiety and depressive presentation using the PHQ-9, GAD-7, and SASC-R, one nearly significant increase in symptoms was found on the self-reported SASC-R of the SAD-G ($t = -2.67$, $p = 0.056$, $d = -0.342$). All other parent and adolescent ratings did not reach statistically significant differences between pre- to post-intervention (p values ranging from 0.162 to 0.920; d values ranging from −0.026 to 0.299; Table 4).

3.4. Executive Functioning

Scores on the parent report and the adolescent report of the BRIEF-2 did not show a significant change from pre- to post-intervention across the composite indexes, including behavior regulation index, emotion regulation index, cognitive regulation index, and global executive composite (p values ranging from 0.132 to 0.569; d values ranging from 0.252 to 0.422; Table 5). On domains of executive functioning, parents reported significant improvement in Initiation ($t = 2.60$, $p = 0.029$, $d = 0.585$) compared to the pre-intervention assessment, and adolescents reported marginal improvement in Self-monitor ($t = 2.58$, $p = 0.082$, $d = 1.311$). Comparisons on the other domains of the BRIEF-2 for both parents' and adolescents' reports did not reveal statistically significant results (p values ranging from 0.082 to 0.880, d values ranging from 0.029 to 0.531; Table 5).

4. Discussion

There has been a surge in research on delivering mental health interventions remotely due to the availability of telehealth platforms and the needs during the COVID-19 pandemic. However, research on telehealth interventions for autistic individuals and individuals with related neurodevelopmental disorders is still in its early stages. The present study is one of few studies focused on the feasibility and effectiveness of the telehealth PEERS® for Adolescents program during and after the COVID-19 pandemic. Our findings suggest

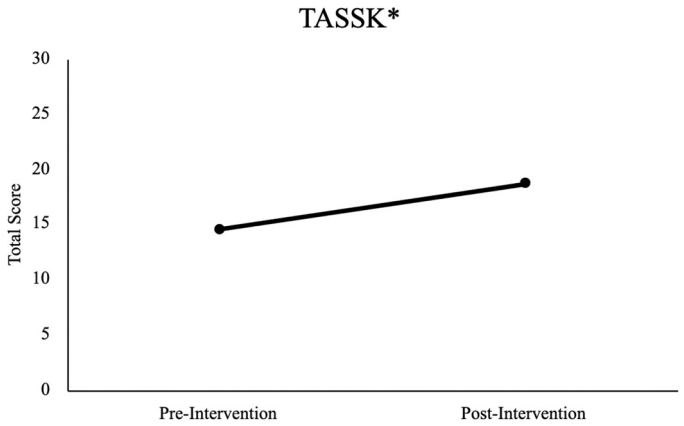

Fig. 1. Comparisons between ratings on social knowledge assessed by the total scores of the Test of Adolescent Social Skills Knowledge (TASSK) across pre- and post-interventions. Note: *$p < 0.05$.

Table 3
Comparisons of social responsiveness across pre- and post-intervention.

Composite/Subscales (Mean±SD)	Pre-group	Post-group	Comparisons		
			t value	*p value*	*Cohen's d*
SRS-2					
Social Awareness	63.46 ± 12.6	60.92 ± 8.1	1.02	0.327	0.240
Social Cognition	66.00 ± 7.3	63.77 ± 9.0	1.15	0.274	0.272
Social Communication**	71.62 ± 15.3	66.31 ± 9.3	2.91	0.013	0.626
Social Motivation**	68.69 ± 15.3	63.82 ± 13.2	2.61	0.023	0.338
Restricted Interests and Repetitive Behavior	68.69 ± 13.3	65.69 ± 12.6	0.83	0.422	0.231
Social Communication and Interaction**	70.62 ± 8.2	66.15 ± 8.7	2.78	0.017	0.526
Total*	70.69 ± 9.1	66.46 ± 9.2	2.13	0.055	0.463

Note: Composites and subscales from the Social Responsiveness Scale, Second Edition (SRS-2); Cohen's *d* was used to calculate the effect size; *$p < 0.1$, ** $p < 0.05$.

Table 4
Comparisons of emotional and behavioral functioning across pre- and post-interventions.

Composite/Subscales (Mean±SD)	Pre-group	Post-group	Comparisons		
			t value	*p value*	*Cohen's d*
CBCL					
Anxious/Depressed	67.38 ± 10.8	65.38 ± 10.6	0.46	0.661	0.186
Withdrawn/Depressed	69.13 ± 9.6	64.50 ± 12.4	1.21	0.266	0.417
Somatic Complaints*	59.25 ± 8.2	56.00 ± 7.5	1.99	0.087	0.412
Social Problems	64.13 ± 7.8	61.38 ± 6.7	1.05	0.329	0.378
Thought Problems	65.75 ± 7.0	65.88 ± 7.2	-0.06	0.951	-0.018
Attention Problems	61.38 ± 9.1	62.00 ± 12.0	-0.33	0.753	-0.059
Rule-Breaking Behavior	56.25 ± 7.7	55.13 ± 6.3	0.41	0.693	0.160
Aggressive Behavior	54.13 ± 5.4	56.25 ± 8.2	-0.71	0.501	-0.305
Internalizing Problems	66.63 ± 8.1	63.50 ± 9.1	1.20	0.270	0.362
Externalizing Problems	51.25 ± 11.1	51.50 ± 12.1	-0.07	0.946	-0.022
Total Problems	63.00 ± 5.9	61.13 ± 5.9	0.63	0.551	0.263
YSR					
Anxious/Depressed	54.3 ± 6.7	60.7 ± 7.6	-1.46	0.281	-0.888
Withdrawn/Depressed	60.3 ± 9.0	69.0 ± 16.7	-0.98	0.430	-0.646
Somatic Complaints	53.3 ± 4.0	56.3 ± 6.8	-1.73	0.225	-0.536
Social Problems	56.3 ± 5.7	56.7 ± 9.9	-0.09	0.937	-0.041
Thought Problems	56.3 ± 1.5	58.3 ± 6.7	-0.48	0.678	-0.414
Attention Problems	65.0 ± 6.9	60.7 ± 11.0	0.94	0.448	0.472
Rule-Breaking Behavior	51.7 ± 2.1	50.3 ± 0.6	1.51	0.270	0.873
Aggressive Behavior	52.3 ± 2.5	51.3 ± 1.2	1.00	0.423	0.511
Internalizing Problems	54.7 ± 6.4	62.7 ± 4.5	-1.98	0.186	-1.441
Externalizing Problems*	47.7 ± 9.5	44.0 ± 8.7	3.05	0.093	0.405
Total Problems	54.3 ± 3.8	56.7 ± 7.2	-0.73	0.539	-0.404

Note. Composites and subscales from the Child Behavior Checklist (CBCL) and Youth-Self Report (YSR); Cohen's *d* was used to calculate the effect size; *$p < 0.1$, ** $p < 0.05$.

that the implementation of the telehealth PEERS® program was highly acceptable to families with children and adolescents who experience social challenges. The telehealth PEERS® program is a promising method for teaching social skills as it significantly improves social skills knowledge, social communication, social motivation, and overall social interaction. Additionally, parents reported improvement in the initiation of tasks and reduced somatic complaints, and adolescents reported decreased externalizing problems. Our finding is especially important in providing evidence for the use of telehealth delivery for social skills intervention beyond the COVID-19 pandemic.

The telehealth PEERS® program was highly acceptable among adolescents and their caregivers, with the majority reporting the benefits of timesaving. Caregivers especially appreciated that the telehealth modality reduced transportation and time barriers. Participants were overall satisfied with the relevance and organization of the session content. Despite families' reports of being satisfied with the technology used to host the sessions, technical issues, such as audio malfunctioning, were experienced by a few adolescents and caregivers. We found participants were less satisfied with Session 2 Conversation Skills II – Two-Way Conversations. We received feedback regarding audio issues, concluding the session on time, requesting a break during the session, and confirming that group facilitators were properly educated on the topic. We also found that participants were more satisfied with Sessions 3 Electronic Communication and the last session Graduation. This is most likely because Session 3 focused on phone/video calls and online communication, aspects of social skills that were prominent during the COVID-19 pandemic. The last session was most likely rated highly because of graduating and completing the program. We received feedback including the families' appreciation for the individual attention of each participant and recognition that the families will continue to use the PEERS information. While the

Table 5
Comparisons of executive functioning across pre- and post-interventions.

Composite/Subscales (Mean±SD)	Pre-group	Post-group	Comparisons		
			t value	*p value*	*Cohen's d*
BRIEF-2 Parent report					
Inhibit	60.4 ± 12.0	57.7 ± 11.9	1.20	0.259	0.226
Self-Monitor	64.4 ± 11.8	59.3 ± 11.1	1.81	0.103	0.445
Shift	70.2 ± 14.5	67.5 ± 15.5	1.08	0.310	0.180
Emotional Control	59.2 ± 11.9	54.1 ± 11.9	1.70	0.123	0.429
Initiate**	68.3 ± 10.7	62.6 ± 8.7	2.60	0.029	0.585
Working Memory	61.9 ± 9.8	61.6 ± 10.7	0.16	0.880	0.029
Plan/Organize	67.6 ± 10.6	65.0 ± 11.7	0.80	0.445	0.233
Task-Monitor	60.1 ± 12.5	59.7 ± 14.6	0.29	0.780	0.029
Organization of Materials	60.4 ± 11.1	57.5 ± 9.8	1.31	0.224	0.276
Behavior Regulation Index (BRI)	62.6 ± 12.2	59.0 ± 11.7	1.51	0.164	0.301
Emotion Regulation Index (ERI)	65.2 ± 12.4	61.1 ± 13.6	1.46	0.179	0.315
Cognitive Regulation Index (CRI)	65.4 ± 10.3	62.7 ± 11.1	1.41	0.191	0.252
Global Executive Composite (GEC)	65.6 ± 9.7	62.4 ± 10.3	1.66	0.132	0.320
BRIEF-2 Self-report					
Inhibit	51.5 ± 8.9	50.5 ± 9.5	0.32	0.767	0.109
Self-monitor*	48.8 ± 4.2	44.0 ± 2.9	2.58	0.082	1.311
Shift	55.5 ± 8.2	53.0 ± 8.1	0.73	0.519	0.531
Emotional Control	57.0 ± 14.0	54.3 ± 9.6	0.51	0.642	0.229
Task-Monitor	57.5 ± 20.3	51.5 ± 7.9	0.79	0.489	0.389
Working Memory	50.3 ± 10.6	48.0 ± 7.2	0.34	0.755	0.249
Plan/Organize	52.3 ± 7.2	49.3 ± 6.7	0.75	0.510	0.433
Behavior Regulation Index (BRI)	50.0 ± 6.3	47.5 ± 5.6	1.00	0.391	0.422
Emotion Regulation Index (ERI)	57.0 ± 11.7	53.8 ± 9.6	0.70	0.533	0.304
Cognitive Regulation Index (CRI)	53.5 ± 12.6	49.5 ± 6.5	0.64	0.569	0.401
Global Executive Composite (GEC)	53.8 ± 10.8	50.3 ± 7.0	0.69	0.538	0.384

Note. Composites and subscales from the Behavioral Rating Inventory of Executive Function, Second Edition (BRIEF-2); Cohen's *d* was used to calculate the effect size; *$p < 0.1$, ** $p < 0.05$.

telehealth program eliminates the geographical barrier for families in rural or underserved areas, it might face additional challenges for those with lower access to a stable internet, with insufficient cellular data for virtual visits, or without smartphones that would allow the completion of virtual visits (Darrat et al., 2021).

Consistent with the previous study by Estabillo et al. (2022), the current results suggest that the telehealth PEERS® for Adolescents program improves social skills knowledge and social responsiveness. Specifically, the adolescents were able to demonstrate significant improvements in their social knowledge, suggesting that they had a better understanding of what to do in socially ambiguous situations and were able to communicate their analyses of social signals. Additionally, the caregivers reported seeing improvements in their adolescent's ability in social communication, social motivation, and general social interaction and engagement after receiving the PEERS® for Adolescents via telehealth delivery. These changes indicate that the program effectively targets and reduces autism-related social deficits and is able to generalize outside of clinical applications. Our results provide evidence in favor of utilizing telehealth instruction for teaching and practicing social skills among adolescents with ASD and social challenges.

Furthermore, both the parents and the adolescents reported improvement in executive functioning. The caregivers endorsed significant improvement in their adolescents' initiation. Adolescents with initiation challenges typically want to succeed at and complete tasks, but they have trouble getting started, requiring extensive prompts or cues to begin a task or activity. Our findings suggested that caregivers observed their adolescents having a stronger ability to initiate tasks such as generating ideas, starting activities, or implementing problem-solving strategies (Gioia et al., 2015). In addition, the adolescents communicated marginal improvement in self-monitoring, revealing a better capacity to observe and evaluate their behavior as others experience it. This finding suggested that the adolescents had a better understanding of their strengths and weaknesses, started to be aware of their effectiveness in problem-solving, observed the outcomes of their intended behaviors, and noticed their behavior's impact on others. During the PEERS program, Socratic questioning was used to elicit active thinking and self-reflecting in social situations. Also, participants were taught to generate conversation topics to find common interests, initiate interactions with specific steps, identify potential friends by joining appropriate social groups, and host get-togethers with regular friends. In the telehealth modality, the same elements of didactic lessons, role plays, behavioral rehearsals, and weekly assignments were translated to remote instruction and continued to be effective methods for maximizing the practice of social skills. It is likely that a better understanding of how to approach ambiguous social settings could increase the likelihood of initiating social interactions and that participation in various practice opportunities embedded in the program itself could enhance the frequency of involvement in activities. Regardless of the mode of treatment delivery, parents play a crucial role in facilitating social opportunities and supporting the generalization of social skills beyond the treatment setting. (Estabillo et al., 2022).

Regarding emotional and behavioral functioning, both parents and adolescents reported marginal results of reducing somatic complaints and decreasing externalizing problems. The findings revealed the positive effects of the telehealth PEERS program on emotional and behavioral issues. However, several adolescents reported increased social avoidance and distress on the SASC-R, as well

as higher anxiety symptoms, more social withdrawal, and greater internalizing problems on the YSR with large effect sizes. It is important to note that this is a small but heterogeneous group of individuals with the majority of members diagnosed with anxiety. It is likely that individuals may respond differently to the same intervention. The PEERS program is not designed to target issues relating to emotional, behavioral, attention, and executive functioning; the participants were enrolled in the program based on their social needs and did not specifically work on strategies to address emotional or behavioral challenges. It is possible that some elements of the telehealth PEERS program (e.g., homework assignments of calling/video chatting with other group members, joining social activities, having get-togethers) force the adolescents to face situations that illicit their anxiety so that their anxiety escalated as they are not master the social skills yet. It is also likely that some of the adolescents are not equipped with adequate skills to overcome their anxiety, and additional individual therapy is needed before the PEERS program. Because PEERS is not designed to target these factors, the criteria for evaluation may not have been specific enough to reflect the sample and account for improvements.

4.1. Limitations and suggestions for future research

This study contains several limitations. One limitation is the limited sample size of the study. Four telehealth PEERS cohorts were included in this study to increase the sample size. Because not all families completed pre-group and post-group measures and several dropped out of the program, 20 families were not included in the analysis, leading to a small sample size of 14 families. The previous study at UCLA had an estimated dropout rate of 24% (Estabillo et al., 2022), whereas the current study had a higher dropout rate of 44% during the later phases of the COVID pandemic. It is likely that this study's participants did not receive additional incentives for group participation, which may have contributed to a high dropout rate in the sample. Families reported high dropout rates were due to scheduling conflicts as well as being overwhelmed with stressors related to the COVID-19 pandemic, school, work, and other general life pressures. For example, many families reported increased mental health concerns, increased family stress, difficulties completing additional remote programming after participating in a day of online schooling, and difficulty committing to a 16-week program that meets for 90 minutes each week when experiencing these additional stressors. These withdrawal rates and family feedback suggest that the families enrolled in telehealth PEERS programs through this clinic were experiencing high levels of pandemic-related stress at this particular phase of the pandemic, which made it difficult to participate in ongoing therapy.

Another limitation of this study was increased challenges with attention during telehealth sessions. The use of telehealth allowed for distractions in the home environment for both caregivers and adolescents, including multitasking, sibling interruptions, favorite objects at home, as well as webpages that are easily accessible through the device used for telehealth. Whether due to the format of the intervention or the timing of the COVID-19 pandemic, participants expressed difficulties with staying engaged for the full 90-minute sessions. The telehealth format of the group was also somewhat limited to traditional methods that facilitators may use for behavior management during in-person programming. Thus, facilitators needed to provide additional structure to the group and get creative in the methods available via Zoom (e.g., the use of chat functioning and breakout rooms) to maintain engagement and manage off-task behavior.

Further, because there was a global pandemic that experienced peaks during these sections of the program, the results of the outcome measures could have been affected in this study. The subscale of social awareness on the SRS-2 could have been affected by the pandemic and, specifically, the social isolation that many were experiencing during this study. In addition, the results of the emotional and behavioral screening may have specifically been affected as this was a time of heightened anxiety and emotional distress throughout the country. The SRS-2 subscale of Restricted and Repetitive Behaviors may have been affected by the telehealth modifications of PEERS. When the PEERS program is delivered online, it is more difficult for facilitators to observe these behaviors. With the ability of participants to mute themselves or turn their cameras off, their behaviors could not be entirely monitored. This could account for some of the increases in these measures as well.

Because a sample size is a critical factor when comparing means pre- and post-group, it would be important to replicate this study with a larger sample size. A majority of the sample used in this study was Caucasian, which is not representative of the larger community in which this clinic is based, or of the broader makeup of the country. This study should be replicated with a larger, more diverse sample in order to examine outcomes that would be more generalizable to the larger population. Although Estabillo and colleagues (2022) conducted a study comparing in-person and telehealth sections of the PEERS program, it would be beneficial for future studies to also look at this relationship in order to determine the participants' characteristics for optimal treatment outcomes between in-person or telehealth modalities.

4.2. Study strengths and implications

Although the PEERS telehealth adaptation warranted many limitations, there are important strengths to consider. The COVID-19 pandemic created additional struggles for families who were already experiencing social challenges. This study adapted an existing evidence-based resource in order to provide families with high-quality social skills instruction during this difficult time. Another strength included the study's procedures for data collection. Group facilitators were conscientious of participant burden and individually supported families in completing group measures whenever possible. Despite the pandemic, we maintained a strong research and facilitation team who were highly dedicated to supporting the families who enrolled in this program.

4.3. Conclusion

The PEERS telehealth model proved to be feasible in terms of acceptability and implementation for this clinical-referred

population. The telehealth program also demonstrated significant increases in participants' social skills knowledge, social communication, social motivation, general social interaction, and aspects of executive functioning. The findings further support the hypothesis that the modified PEERS program, held virtually, is feasible and effective. The telehealth PEERS program offers a good alternative to the in-person modality and other social skills programs, especially for families who have difficulty accessing evidence-based programming for autistic adolescents due to geographical or transportation limitations and for families to prefer the convenience of participating in this program virtually. This program may significantly affect other aspects of participants' emotional or behavioral difficulties; however, further experimentation is needed in these areas.

CRediT authorship contribution statement

C.M.L, C.P., S.S., K.P., and N.E. completed the first draft of the manuscript. C.M.L and C.P. performed data analyses. C.M.L., C.P., M. H., and R.L.H. provided critical reviews and refined the manuscript for distribution. C.M.L. and R.L.H. were responsible for the study design and supervision of the project. C.M.L., R.L.H., C.P., S.S., and N.E. completed program implementation and data collection. All authors contributed to the conceptualization and revisions of the manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Data will be made available on request.

Acknowledgments

We extend our heartfelt appreciation to the participating families whose time and effort made this study possible. Their contribution has been invaluable, and their willingness to participate is essential to advancing research in this field.

References

Achenbach, T. M. (1966). The classification of children's psychiatric symptoms: A factor analytic study. *Psychological Monographs, 80*(615).

Baweja, R., Soutullo, C. A., & Waxmonsky, J. G. (2021). Review of barriers and interventions to promote treatment engagement for pediatric attention deficit hyperactivity disorder care. *World Journal of Psychiatry, 11*(12), 1206–1227. https://doi.org/10.5498/wjp.v11.i12.1206. PMID: 35070771; PMCID: PMC8717033.

Bitan, D. T., Krieger, I., & Weinstein, O. (2022). Challenges of the COVID-19 pandemic among individuals with autism spectrum disorder. *JAMA Psychiatry, 79*(5), 389–390. https://doi.org/10.1001/jamapsychiatry.2022.0237

Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., Bakken, S., Kaplan, C. P., Squiers, L., Fabrizio, C., & Fernandez, M. (2010). How we design feasibility studies. *American Journal of Preventive Medicine, 36*(5), 452–457. https://doi.org/10.1016/j.amepre.2009.02.002

Caballo, V. E., Arias, B., Salazar, I. C., Calclereo, M., Irutia, M. J., & Ollendick, T. H. (2019). A new self-report assessment measure of social phobia/anxiety in children: The social anxiety questionnaire for children (SAQ-C24). *Behavioral Psychology, 20*(3), 485–503.

Cacioppo, M., Bouvier, S., Bailly, R., Houx, L., Lempereur, M., Mensah-Gourmel, J., Kandalaft, C., Varengue, R., Chatelin, A., Vagnoni, J., Vuillerot, C., Gautheron, V., Dinomais, M., Dheilly, E., Brochard, S., & Pons C ECHO Group. (2021). Emerging health challenges for children with physical disabilities and their parents during the COVID-19 pandemic: the ECHO French survey. *Annals of Physical and Rehabilitation Medicine, 64*, Article 101429. https://doi.org/10.1016/j.rehab.2020.08.001

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York, NY: Routledge Academic.

Constantino, J. N., & Gruber, C. P. (2012). *Social Responsiveness Scale-Second Edition (SRS-2)*. Torrance, CA: Western Psychological Services.

Darrat, I., Tam, S., Boulis, M., & Williams, A. (2021). Socioeconomic disparities in patient use of telehealth during the coronavirus disease 2019 surge. *JAMA, 147*(3), 287–295. Doi:10.1001/jamaoto.2020.5161.

Dow, D., Holbrook, A., Toolan, C., McDonald, N., Sterrett, K., Rosen, N., Kim, S. H., & Lord, C. (2022). The brief observation of symptoms of autism (BOSA): Development of a new adapted assessment measure for remote telehealth administration through COVID-19 and beyond. *Journal of Autism and Developmental Disorders, 52*(12), 5383–5394. https://doi.org/10.1007/s10803-021-05395-w

Eisengart, J. B., Esler, A., Ellinwood, M., Hudock, R. L., King, K., Klein, T. L., Lee, C., Morton, J., Stephens, K., Ziegler, R., & O'Neill, C. (2021). Issues of COVID-19-related distance learning for children with neuronopathic mucopolysaccharidoses. *Molecular Genetics and Metabolism, 134*(1–2).

Estabillo, J. A., Moody, C. T., Poulhazan, S. J., Adery, L. H., Denluck, E. M., & Laugeson, E. A. (2022). Efficacy of peers® for adolescents via telehealth delivery. *Journal of Autism and Developmental Disorders, 52*(12), 5232–5242. https://doi.org/10.1007/s10803-022-05580-5

Ferdinand, R. F. (2008). Validity of the CBCL/YSR DSM-IV scales anxiety problems and affective problems. *Journal of Anxiety Disorders, 22*(1), 126–134. https://doi.org/10.1016/j.janxdis.2007.01.008

Gale, B. M., Greenberg, S., & Ireland, K. (2021). Adapting an in-person transdiagnostic social skills program to online delivery: Technology to the rescue. *International Electronic Journal of Elementary Education, 13*(3), 391–406.

Gardner, D. M., Gerdes, A. C., & Weinberger, K. (2019). Examination of a parent-assisted, friendship-building program for adolescents with ADHD. *Journal of Attention Disorders, 23*(4), 363–373.

Gioia, G.A., Isquith, P.K., Guy, S.C., & Kenworthy, L. (2015). Behavior rating inventory of executive function®, Second Edition (BRIEF®2). Lutz, FL: PAR Inc.

Hendrickson, N. K., & McCrimmon, A. W. (2019). Test review: behavior rating of executive function, Second edition (BRIEF-2) by Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. *Canadian Journal of School Psychology, 34*(1), 73–78. ⟨https://doi-org.ezp2.lib.umn.edu/10.1177/0829573518797762⟩.

Hua, Y., Zhao, Q., Shen, J., Liu, Y., Zheng, L., & Zhang, M. (2022). Program for education and enrichment of relational skills (peers) training for social skills and depressed mood intervention in young adult with depression: Study protocol for a randomized controlled trial. *Frontiers in Psychiatry, 13*. https://doi.org/10.3389/fpsyt.2022.993124

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

La Greca, A. M., & Stone, W. L. (1993). Social anxiety scale for children-revised: Factor structure and concurrent validity. *Journal of Clinical Child Psychology, 22*(1), 17–27. https://doi.org/10.1207/s15374424jccp2201_2

Laugeson, E. A., & Frankel, F. (2010). *Social skills training for teenagers with developmental and autism spectrum disorders: The peers treatment manual.* Routledge,.

Laugeson, E. A., Frankel, F., Mogil, C., & Dillon, A. R. (2009). Parent-assisted social skills training to improve friendships in teens with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39*(4), 596–606.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 22*(*140*), 55.

Lord C., Rutter M., DiLavore P.C., Risi S., Gotham K., Bishop S. (2012). *Autism diagnostic observation schedule*, second edition. Torrance, CA: Western Psychological Services.

MacEvilly, D., & Brosnan, G. (2020). Adapting an emotional regulation and social communication skills group programme to teletherapy, in response to the COVID-19 pandemic. *Irish Journal of Psychological Medicine*, 1–6.

Mandelberg, J., Laugeson, E. A., Cunningham, T. D., Ellingsen, R., Bates, S., & Frankel, F. (2014). Long-term treatment outcomes for parent-assisted social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of Mental Health Research in Intellectual Disabilities, 7*(1), 45–73.

Matthews, N. L., Orr, B. C., Warriner, K., DeCarlo, M., Sorensen, M., Laflin, J., & Smith, C. J. (2018). Exploring the effectiveness of a peer-mediated model of the peers curriculum: A pilot randomized control trial. *Journal of Autism and Developmental Disorders, 48*(7), 2458–2475. https://doi.org/10.1007/s10803-018-3504-2

Moody, C. T., & Laugeson, E. A. (2020). Social skills training in autism spectrum disorder across the lifespan. *Child and Adolescent Psychiatric Clinics, 29*(2), 359–371.

Mootz, C. A., Lemelman, A., Giordano, J., et al. (2022). Brief report: feasibility of delivering the secret agent society group social skills program via telehealth during COVID-19: A pilot exploration. *Journal of Autism and Developmental Disorder, 52*, 5274–5279. ⟨https://doiorg.ezp3.lib.umn.edu/10.1007/s10803-022-05591-2⟩.

Morelli, M., Cattelino, E., Baiocco, R., Trumello, C., Babore, A., Candelori, C., & Chirumbolo, A. (2020). Parents and children during the COVID-19 lockdown: The influence of parenting distress and parenting self-efficacy on children's emotional well-being. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.584645

Rutter, L. A., & Brown, T. A. (2017). Psychometric properties of the generalized anxiety disorder scale-7 (GAD-7) in outpatients with anxiety and mood disorders. *Journal of Psychopathology and Behavioral Assessment, 39*(1), 140–146. https://doi.org/10.1007/s10862-016-9571-9

Simacek, J., Elmquist, M., Dimian, A. F., & Reichle, J. (2021). Current trends in telehealth applications to deliver social communication interventions for young children with or at risk for autism spectrum disorder. *Current Developmental Disorders Reports, 8*(1), 15–23. https://doi.org/10.1007/s40474-020-00214-w

Soares, E. E., Bausback, K., Beard, C. L., Higinbotham, M., Bunge, E. L., & Gengoux, G. W. (2021). Social skills training for autism spectrum disorder: A meta-analysis of in-person and technological interventions. *Journal of Technology in Behavioral Science, 6*(1), 166–180. https://doi.org/10.1007/s41347-020-00177-0

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine, 166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Sutherland, R., Trembath, D., & Robert, J. (2018). Telehealth and autism: A systematic research and review of the literature. *International Journal of Speech-Language Pathology, 20*(3), 321–336. https://doi.org/10.1080/17549507.2018.1465123

Titov, N., Dear, B. F., McMillan, D., Anderson, T., Zou, J., & Sunderland, M. (2011). Psychometric comparison of the PHQ-9 and BDI-II for measuring response during treatment of depression. *Cognitive Behaviour Therapy, 40*(2), 126–136.

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology, 33*(4), 448–457. https://doi.org/10.1037/h0027806

Wolstencroft, J., Kerry, E., Denyer, H., Watkins, A., Mandy, W., & Skuse, D. (2021). New approaches to social skills training: Blended group interventions for girls with social communication difficulties. *Autism Research, 14*(5), 1061–1072.

Yuan, E. (2011). Zoom (5.8.3) [Computer software]. Zoom Video Communications.

Zheng, S., Kim, H., Salzman, E., Ankenman, K., & Bent, S. (2021). Improving social knowledge and skills among adolescents with autism: Systematic review and meta-analysis of UCLA PEERS® for adolescents. *Journal of Autism and Developmental Disorders*. https://doi.org.ezp3.lib.umn.edu/10.1007/s10803-021-04885-1.