

A Review of Social Skills Programs and Approaches for Autistic Youth

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Christine T. Moody, Reina S. Factor,
and Elizabeth A. Laugeson

Abbreviations

		SDARI	SocioDramatic Affective Relational Intervention
BASC	Behavior Assessment System for Children	SENSE	Social Emotional Neuroscience Endocrinology Theater Program
CBT	Cognitive-behavioral therapy	SRS(-2)	Social Responsiveness Scale, 1st or 2nd Edition
CELF	Clinical Evaluation of Language Fundamentals	SSIS/SSRS	Social Skills Improvement System (newer edition of Social Skills Rating System)
CFT	Children's Friendship Training	SSP	Social skills program
CGI	Clinical Global Impression	TAU	Treatment as usual
CNC	Cool Versus Not Cool	VABS	Vineland Adaptive Behavior Scale—Third Edition
DTC	Delayed treatment control		
ERP	Event-Related Potential		
GSSP	Group social skills program		
IQ	Intelligence quotient		
MASSI	Multimodal Anxiety and Social Skills Intervention		
NETT	Nonverbal communication, Emotion recognition, and Theory of mind Training		
P4P	PEERS® for Preschoolers		
PEERS®	Program for the Education and Enrichment of Relational Skills		
PMI	Peer-mediated intervention		
PWP	PEERS® for Adolescents with Peers		
RCT	Randomized control trial		
SAS	Secret Agent Society		

Introduction

Though there is still much to learn, the field of autism research has made great strides in many areas in the years since the first edition of this book. Specific to evidence-based clinical practices for autistic individuals, the number of high-quality intervention studies per year with reported benefits from 2010 to 2017 more than doubled when compared to the previous decade (Hume et al., 2021). In particular, investigation into programs targeting the social communicative differences characteristic of autism has burgeoned in the past decade, with a growing evidence base for various supportive approaches emerging. The importance of this work cannot be understated,

C. T. Moody (✉) · R. S. Factor · E. A. Laugeson
Semel Institute for Neuroscience and Human
Behavior, University of California, Los Angeles,
Los Angeles, CA, USA
e-mail: cmoody@mednet.ucla.edu

given the high rates of social rejection and isolation among autistic individuals and the associated deleterious impacts of social challenges (Maag, 2006; Moore et al., 2017; Wolke & Lereya, 2015). Though our primary focus in this chapter will be to review the literature and summarize the current state of the science with respect to programs to bolster social skills in autistic youth, it is essential to first understand the unique profile of social behavior and social cognition in this population. We will additionally briefly summarize what is known regarding the correlates and sequelae of social challenges for autistic youth both in the short- and long-term.

Social communication differences are fundamental to the diagnostic criteria of autism, with differences observed in three primary areas: non-verbal communication (e.g., differences in use of eye contact, gestures, body language, facial expressions), social-emotional reciprocity (e.g., failure to initiate or respond as expected to social interactions, reduced sharing or turn-taking in conversation), and development/maintenance of relationships (e.g., difficulties making friends, adjusting behavior to social contexts; American Psychiatric Association, 2013). Differences in social communication are often evident in early development (Paul, 2003). Autistic toddlers can be distinguished from both neurotypical toddlers and toddlers with other developmental delays in their social communication, such that those on the autism spectrum show significantly fewer acts of joint attention and three-point gaze shifts, less frequent communication, and less diversity in conventional gestures than both comparison groups (Wetherby et al., 2007). Some theorists posit that this reduced social orientation may contribute to cascading downstream social cognition and communication differences, through a mechanism of fewer learning opportunities within social interactions (Chevallier et al., 2012). Indeed, preschool-age autistic children display challenges in perspective-taking skills, or theory of mind, that have also been linked to less well-developed play skills, especially pretend play (Lin et al., 2017). Further, though meta-analytic results show that school-age autistic children can and do develop friendships, these

friendships tend to be lower in quality and quantity as compared to neurotypical peers (Mendelson et al., 2016). This lack of close reciprocal friendships deprives autistic youth of the protective effects of friendship against depression and anxiety later in life (Wright & Wachs, 2019). As individuals mature, social problems can increase risk for aggressive behaviors, peer rejection, social dissatisfaction, and academic failure, among other problems (Maag, 2006). Autistic teens often become “painfully aware of their social skills deficits” and are significantly more likely to be bullied than neurotypical peers (Lung et al., 2019; Knott et al., 2006).

The negative ramifications of social communication differences extend into adulthood. Longitudinal data from a national database of students who received special education services revealed that autistic young adults were significantly more likely to never see, talk to, or spend time with peers as compared to adults with other disabilities (e.g., intellectual disability, learning disabilities; Orsmond et al., 2013). Indeed, social problems and loneliness have been associated with poor outcomes with respect to anxiety, depression, self-esteem, and life-satisfaction (Mayes et al., 2011; Mazurek, 2014). Further, recent mediational analyses reveal that social loneliness may explain the relationship between characteristics of autism and mental health problems in this at-risk population (Schiltz et al., 2021). Social communication differences and their associated challenges have also been directly associated with poor postsecondary education and employment outcomes for autistic adults (Nasamran et al., 2017).

We aim to discuss the evidence for programs targeting social behavior in autistic children and adolescents. The most common type of program in this category is social skills programming (SSP), in which social skills are broken down and taught didactically, modeled (e.g., role plays), practiced (e.g., behavioral rehearsal), and reinforced through coaching or rewards (Moody & Laugeson, 2020). For autistic youth, reviews of various social skills programs show commonalities in content taught, with foci on emotion recognition, nonverbal behavior and communication,

perspective-taking, hosting playdates or get-togethers, and navigating peer conflict (Moody & Laugeson, 2020). Though SSP has itself been labeled an evidence-based practice for children on the spectrum, the teaching methods and content components of evidence-based SSPs often represent an integration of multiple other evidence-based practices for autistic children, including direct instruction, task analysis, in vivo modeling, video modeling, prompting, reinforcement, cognitive-behavioral strategies, and self-management (Hume et al., 2021). Differences by developmental stage exist, with programs for young children utilizing play as the primary social context, while those for adolescents emphasize conversations. Implementing SSP in a group format, labeled group social skills programs (GSSP), is the predominant approach. However, other approaches have been shown to have positive impacts on social outcomes in autistic youth as well. In the below sections, we will review the literature by detailing evidence for broad categories of therapeutic approaches, including the specific programs within each approach with the most rigorous scientific evidence for their effectiveness. Evidence from randomized control trials since the first edition of this book in 2012 through to 2022 are discussed in the text and summarized in tables.

Group Social Skills Programs

Overall, evidence suggests that for autistic children and adolescents, the approach with the most empirical support is group social skills programs (GSSP), in which SSP approaches are applied within a group format. Teaching social behavior within a group has significant advantages, given the format and desired outcome both involve social interaction. Fellow group members can serve as partners during in-group skills practice, and youth can learn from observing other group members in practice. This is especially important for autistic youth, who may not readily generalize skills across contexts (Jonsson et al., 2016). As the goal of such programs is for skills to be applied within peer interactions, teaching and practicing skills in a group of same-age peers

may help facilitate generalization to other peer contexts. Further, in teaching skills, group leaders can harness the power of group-influence throughout lessons as youth may develop greater insight and buy-in when hearing their peers participate and engage. A final benefit to a group-based approach toward teaching social behavior in autistic samples is the possibility of social interactions within the group setting ameliorating feelings of loneliness, normalizing social challenges, and increasing social connections. Though the primary goal of social skills programming is to teach skills, rather than serve as a source of friends, some evidence indicates that autistic children are more likely than neurotypical children to form friendships with other children with social challenges (Petrina et al., 2014), and thus, GSSP may also serve as a context for friendship formation. Many of these advantages are only present in small groups (e.g., 5–15 individuals) with appropriate adult support and performance feedback.

Two recent meta-analyses indicate consistent significant benefits of GSSP, ranging from small to large effect sizes, on primarily parent-reported standardized measures (Gates et al., 2017; Wolstencroft et al., 2018). One of these meta-analyses examined teacher and self-reported outcome as well, with results suggesting no effects of GSSP on social behaviors by these informants; however, participants did show significant improvements in their self-reported social skills knowledge (Gates et al., 2017). Moderators of program effects show that benefits are greatest when programs include a complementary parent component and are of greater intensity (e.g., time, duration; Wolstencroft et al., 2018). See Table 8.1 for an overview of recent GSSP RCTs since the first edition of this book in 2012.

Program for the Education and Enrichment of Relational Skills (PEERS®)

PEERS® for Adolescents One of the most extensively studied GSSPs is PEERS® for Adolescents (Laugeson & Frankel, 2011), a group program designed for adolescents with

Table 8.1 RCT summary table of Group Social Skills Interventions (GSSIs)

Author/ year	Intervention	Participants	Intensity/duration	Primary outcome measures	Findings
Dekker et al. (2019)	Manualized social skills program based in behavioral principles and social learning theory (SSP) vs. SSP + parent and teacher involvement (SSP + PTI) vs. TAU	<i>N</i> = 122; 9–12 years old	15 weeks, 1.5-hour weekly sessions; three 1.5-hour booster sessions 2–6 months post treatment	VABS-Socialization, questionnaire assessing skills specific to intervention, SSRS	Both SSP groups significantly improved on VABS-Socialization and SSRS-Cooperation, while TAU did not. Some benefits to SSP + PTI over SSP and TAU on SSRS teacher report of Cooperation, Assertion, and Self-Control
Freitag et al. (2016)	SOSTA-FRA vs. TAU	<i>N</i> = 228; average age 12.8 years old	12 weeks, 1.5 hour weekly sessions	SRS, SDQ, CBCL Anxious-Depressed subscale, DIKJ	Significantly greater improvements in SOSTA-FRA on parent-rated SRS total, SRS subscales, and SDQ total score than in TAU. No differences in teacher-reported measures
Idris et al. (2022)	PEERS® for Adolescents vs. Regulation, Organization, and Autonomy Didactics (ROAD)—a psychoeducation curriculum to improve daily functioning and well-being	<i>N</i> = 106; 12–18 years old	14 weeks, 1.5 hour weekly sessions	ADOS-2 CSS, CASS, SSIS, SRS-2	No significant group differences on observational CASS outcome between PEERS® for Adolescents and active control group psychoeducation condition. Significant differences on adolescent-reported SSIS and parent-reported SRS-2, favoring PEERS® for Adolescents
Laugeson et al. (2012)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 28; 12–17 years old	14 weeks, 1.5 hour weekly sessions	SSRS, SRS, QPQ, TASSK-R	PEERS® for Adolescents participants showed greater improvement on SSRS, SRS, QPQ, and TASSK-R than DTC
Laugeson et al. (2014)	PEERS® for Adolescents—School Based vs. Super Skills social skills program	<i>N</i> = 73; 12–14 years old	14 weeks, 30 minute sessions 5 days per week	SRS, SSRS, QPQ, SAS, FQS, PH-2, TASSK	PEERS® for Adolescents participants showed greater improvement on teacher-reported SRS and adolescent-reported QPQ than active control Super Skills

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Table 8.1 (continued)

Author/ year	Intervention	Participants	Intensity/duration	Primary outcome measures	Findings
Lerner and Mikami (2012)	SDARI vs. Skillstreaming (didactic SSP)	<i>N</i> = 13; average age 10.9 and 11.3 years old for treatment groups	4 weeks, 1.5 hour weekly sessions	SIOS, sociometric ratings within group, SSRS, SCQ, SRS	Both groups improved on teacher-reported SSRS; different patterns in social preference within group members for each group treatment approach
Lopata et al. (2018b)	SchoolMAX vs. TAU, clustered randomization at school level	<i>N</i> = 103; 6–12 years old	160–210 minutes per week, 60–90-minute parent training per month, over a ~9-month school year	CAM-C, SRS-2, ASC, SIOS, WJ-III	Significant group differences on CAM-C, SRS-2, and ASC, favoring SchoolMAX. No differences in SIOS and WJ-III
Olsson et al. (2017)	KONTAKT vs. TAU	<i>N</i> = 296; 8–17 years old	12 weeks, 1–1.5 hours weekly sessions	SRS, ABAS, DD-CGAS, OSU Autism CGI-S, PSS	Adolescents in KONTAKT had significant improvements on the SRS relative to adolescents in standard care. Significant group differences across all ages on ABAS, DD-CGAS, OSU Autism CGI-S, and PSS at 3-month follow-up, favoring KONTAKT
Rabin et al. (2018)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 41; 12–17 years old	16 weeks, 1.5 hour weekly sessions	CASS, TASSK, QSQ, LSQ, EQ, SRS-2, SSIS	Significant improvements in PEERS® group over DTC on observed question asking, involvement and rapport in CASS, adolescent- reported TASSK, EQ, LSQ, and QSQ, parent-reported SSIS Social Skills and Problem Behaviors, SRS-2, and QSQ, teacher-reported SSIS Social Skills
Rabin et al. (2021)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 82; 12–17 years old	16 weeks, 1.5 hour weekly sessions	CASS, TASSK, EQ, SRS-2, SSIS	Significant improvements in PEERS® group over DTC on observed CASS conversational total score, adolescent- reported TASSK and EQ, and parent-reported SSIS Social Skills and SRS-2 Total Score

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Table 8.1 (continued)

Author/ year	Intervention	Participants	Intensity/duration	Primary outcome measures	Findings
Schohl et al. (2014)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 58; 11–16 years old	14 weeks, 1.5 hour weekly sessions	TASSK, QSQ, FQS, SIAS, SRS, SSRS	Significant MANOVA results favoring PEERS® over DTC; specific significant results for TASSK, QSQ, SIAS, SRS, and SSRS Problem Behaviors. On Teacher report measures, only a significant group difference in SSRS Problem Behaviors, favoring PEERS®
Shum et al. (2019)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 72; 11–15 years old	14 weeks, 1.5 hour weekly sessions	SRS-2, TASSK, QPQ, ABAS-II, ASBS	Significant group differences favoring PEERS® over DTC, with PEERS® group showing significantly greater improvements on the SRS-2 Total, SCI, and RRB scores, as well as TASSK, which maintained through a 3-month follow-up period
Soorya et al. (2015)	Seaver-NETT vs. facilitated play group	<i>N</i> = 69; 8–11 years old	12 weeks, 1.5 hour weekly sessions	SRS, Griffith Empathy Measure, CCC, DANVA-2, Strange Stories Task, RMET	Significant group differences in social behavior composite (SRS, Griffith Empathy Measure, and CCC), favoring Seaver-NETT, but did not maintain to 3-month follow-up. No group differences in social cognition composite
Thomeer et al. (2012)	SummerMAX vs. DTC group	<i>N</i> = 35; 7–12 years old	5 weeks, 5 days per week, five 70-minute treatment cycles daily	ASC, SRS, BASC-2, SKA, DANVA-2, CASL Idiomatic Language Subtest	Significant group differences favoring SummerMAX on ASC, SRS, BASC-2, SKA, and CASL. High parent, child, and staff satisfaction
Thomeer et al. (2019)	SummerMAX vs. DTC group	<i>N</i> = 57; 7–12 years old	5 weeks, 5 days per week, five 70-minute treatment cycles daily	ASC, SRS, BASC-2, CASL Idiomatic Language Subtest	Significant group differences favoring SummerMAX on ASC, SRS, BASC-2, and CASL. High parent, child, and staff satisfaction

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Table 8.1 (continued)

Author/ year	Intervention	Participants	Intensity/duration	Primary outcome measures	Findings
White et al. (2013)	MASSI vs. DTC group	<i>N</i> = 30; 12–17 years old	14 weeks, thirteen 60–70-minute individual sessions and 7 group sessions	SRS, CASI-Anxiety Scale, PARS, CGI, DD-CGAS	MASSI participants showed significantly greater improvements on SRS than DTC group. No significant between- group differences on other outcomes though quantitatively favored MASSI
Yamada et al. (2020)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 28; 11–15 years old	14 weeks, 1.5 hour weekly sessions	SRS-2, SCQ, TASSK, QPQ, VABS-2, CBCL, DSRS-C	PEERS® participants showed significantly greater improvements on the TASSK and VABS-2. After all participants received PEERS®, significant effects on SRS, TASSK, VABS-2, QPQ, and CBCL posttreatment. QPQ gains did not maintain to follow-up, but significant improvements emerged on the DSRS-C from pretreatment to follow-up
Yoo et al. (2014)	PEERS® for Adolescents vs. DTC group	<i>N</i> = 47; 12–18 years old	14 weeks, 1.5 hour weekly sessions	ADOS, EHWA-VABS, TASSK-R, QPQ, K-SSRS, SCQ, SRS, ASDS, CDI, STAIC, K-CBCL, STAI	PEERS® participants showed significantly greater improvements on TASSK-R, QPQ, EHWA-VABS, ADOS, CDI, K-CBCL. Reduced parent anxiety on STAI observed after PEERS®

Note. ABAS Adaptive Behavior Assessment System, ADOS Autism Diagnostic Observation Schedule, ADOS-CSS ADOS Calibrated Severity Score, ASBS Adolescent Social Behavior Scale, ASC Adapted Skillstreaming Checklist, ASDS Asperger Syndrome Diagnostic Scale, BASC Behavior Assessment System for Children, CAM-C Cambridge Mindreading Face-Voice Battery for Children, CASI Child and Adolescent Symptom Inventory, CASL Comprehensive Assessment of Spoken Language, CASS Contextual Assessment of Social Skills, CBCL Child Behavior Checklist, CCC Children's Communication Checklist, CDI Children's Depression Inventory, CGI Clinical Global Impressions, DANVA-2 Diagnostic Analysis of Nonverbal Accuracy, 2nd Edition, DD-CGAS Developmental Disabilities modification of Children's Global Assessment Scale, DIKJ Depressions-Inventar für Kinder und Jugendliche, DSRS-C Depression Self-Rating Scale for Children, EQ Empathy Quotient, FQS Friendship Qualities Scale, LSQ Loneliness and Social Dissatisfaction Questionnaire, OSU Autism CGI-S Ohio State University Global Severity Scale for Autism, PARS Pediatric Anxiety Rating Scale, PH-2 Piers Harris 2nd Edition, PPS Perceived Stress Scale (parental stress), QPQ/QSQ Quality of Play/Socialization Questionnaire, RMET Reading the Mind in the Eyes Test, SAS Social Anxiety Scale, SCQ Social Communication Questionnaire, SDQ Strengths and Difficulties Questionnaire, SIAS Social Interaction Anxiety Scale, SIOS Social Interaction Observation System, SKA Skillstreaming Knowledge Assessment, SRS(-2) Social Responsiveness Scale (2nd Edition), SSRS/SSIS Social Skills Rating/Inventor System, STAI State and Trait Anxiety Inventory, STAIC State and Trait Anxiety Inventory for Children, TASSK(-R) Test of Adolescent Social Skills Knowledge (-Revised), VABS Vineland Adaptive Behavior Scales, WJ-III Woodcock Johnson, Third Edition

average intellectual functioning who are experiencing social challenges. PEERS® for Adolescents is a GSSP in which teens and parents participate in separate, but concurrent 90-minute groups for 14–16 weeks. Teens are taught ecologically valid skills related to conversations, peer entry, humor, electronic communication, get-togethers, good sportsmanship, changing one's reputation, and handling peer conflict (e.g., disagreements, responding to bullying). While participating parents learn these same skills, parents are also provided with instruction and individualized feedback on how to social coach their teen outside of sessions. Methods of instruction include didactic lessons, live and/or video modeling, behavioral rehearsals in which teens practice skills with performance feedback, and weekly socialization assignments. Although developed and initially tested in the United States (Laugeson et al., 2009, 2012), PEERS® for Adolescents has been widely disseminated across the globe. It is especially unique in that it has been translated and cross-culturally validated through research conducted in Korea (Yoo et al., 2014), Israel (Rabin et al., 2018), Hong Kong (Shum et al., 2019), Japan (Yamada et al., 2020), and the Netherlands (Idris et al., 2022). Further, PEERS® for Adolescents has been adapted to be delivered within school settings, with autistic adolescents in the school-based PEERS® program showing significantly greater improvements in social responsiveness as compared to an active control group (Laugeson et al., 2014).

A recent meta-analysis identified 12 studies examining PEERS® for Adolescents in autistic populations, with 9 including a delayed treatment control (DTC) group and three utilizing pre-post single group design. Pooled effect sizes showed large effects on adolescent social skills knowledge and medium effects on parent-reported social behavior on the Social Skills Improvement System rating scales (SSIS; Gresham & Elliott, 2008) and autism-related social differences on the Social Responsiveness Scale, Second Edition (SRS-2; Constantino & Gruber, 2012), as well as number of get-togethers, a measure of external

validity (Zheng et al., 2021). A more recent RCT of PEERS® for Adolescents (Rabin et al., 2021) also detected significant improvements on an observational measure of social skills, the Contextual Assessment of Social Skills (CASS; Ratto et al., 2011), in which teens engage in conversations with an unfamiliar confederate, blinded to condition. Use of this behaviorally based measure further increases confidence in PEERS® efficacy, as an additional method of assessment outside of informant reports, which are susceptible to bias. Adolescents who participated in PEERS® have also shown increased reward-related brain activity and a normalization of neural function, as evidenced by a shift from right hemisphere gamma-band EEG asymmetry to left hemisphere asymmetry from pre- to post-PEERS® (Van Hecke et al., 2015; Baker et al., 2020). In these studies, preliminary evidence has supported that neurobiological characteristics predict program outcomes (Baker et al., 2020) and neurobiological changes over the course of PEERS® are associated with positive social behavior outcomes following the program (Van Hecke et al., 2015).

Beyond benefits to social domains, the PEERS® for Adolescents program has reliably produced reductions in adolescents' anxiety, depressive symptoms, and aggression (Schohl et al., 2014; Lordo et al., 2017; McVey et al., 2016; Schiltz et al., 2018). Teens also show increased adaptability, leadership, and independence (Lordo et al., 2017). Family variables are improved, including reduced family chaos and parenting stress, as well improved parental self-efficacy (Karst et al., 2015; Corona et al., 2019). Notably, in a long-term follow-up 1–5 years following the completion of PEERS® for Adolescents, program benefits on the SRS, SSRS Social Skills domain, and SSRS Problem Behaviors domain maintained over time (Mandelberg et al., 2014a). Though not significant, data also suggest some continued growth in the follow-up period in social skills and continued reductions in problem behaviors. As long as participants remain in a similar social context, an effective SSP may theoretically expect con-

tinued gains over time as participants continue to practice newly learned skills, thus becoming increasingly skilled at implementation and receiving natural reinforcement through positive social responses from others. However, the continued improvement over time may also be attributed to parents' extensive involvement and training as social coaches, who were able to continue to support their adolescent's skills use after the PEERS® for Adolescents ended. Indeed, this hypothesis is supported by recent empirical findings that parents who increased their supportive sensitivity following participation in the parent component of PEERS® had adolescents who showed greater social communication gains (Rabin et al., 2021).

PEERS® for Preschoolers While the PEERS® program has extended its highly effective program to autistic young adults (Laugeson et al., 2015), which is out of the scope of this review, more recently PEERS® has also been adapted for young autistic children (Park et al., 2023; Tripathi et al., 2021; Factor et al., 2022). Despite the importance of early intervention (Watkins et al., 2017), few resources for young autistic children explicitly address the development of social skills as a *primary* program target, as indicated in reviews and research (DeRosier et al., 2011; Reichow & Volkmar, 2010; Tripathi et al., 2021; Wolstencroft et al., 2018). The PEERS® program was adapted for young autistic children to fill this need for early social skills programming. PEERS® for Preschoolers (P4P) addresses similar tenets using analogous methods of instruction as other PEERS® programs, but in a developmentally appropriate manner. Social skills explicitly taught include, but are not limited to, listening to and following directions, greeting friends, sharing and giving turns, keeping cool when upset during play, being flexible, asking friends to play, transitioning activities, and maintaining appropriate body boundaries. These skills are taught in a developmentally appropriate approach through a live puppet show and small group games for rehearsing and reinforcing newly learned skills.

Simultaneously, parents engage in a one-hour parent-only group in which they learn specific skills related to helping their children make and keep friends and review previous homework assignments to individualize the successful utilization of skills. As part of the developmental adaptation, the last 30 minutes of each session is devoted to parent-coached play, in which parents provide social coaching to their children during in-group mock playdates, while receive in-vivo performance feedback from the clinical team on their social coaching. An initial P4P pilot study with 19 children (4–6 years; 16 males) indicated improvements in social skills and a reduction in problem behaviors (Park et al., 2023). A second small study ($n = 15$) using a nonconcurrent multiple baseline design also demonstrated gains in some social outcomes (Factor et al., 2022). Further, another paper indicated maintenance of program gains 1–5 years post-P4P (Tripathi et al., 2021). More research is needed to examine P4P, with replication and use of randomized control trials (RCT).

SummerMAX/Adapted Skillstreaming

Skillstreaming is a social skills curriculum designed to teach youth specific skills using a procedure of (1) defining the skill, (2) modeling the skill, (3) establishing trainee skill need, (4–6) role play procedures, (7) performance feedback, and (8) assigning homework (Goldstein & McGinnis, 1997; McGinnis & Goldstein, 1997). Skillstreaming has specific curricula for early childhood, school-aged children, and adolescents, but was not specifically designed for autistic youth. In designing an intensive summer camp program for school-aged autistic children (SummerMAX), Lopata and colleagues critically analyzed the Skillstreaming curriculum to refine the program toward the social communication differences that are characteristic of autism (Lopata et al., 2006). Skills targeted include conversations, peer initiation, complimenting, joining in, managing emotions, interpreting non-literal statements, emotion recognition, coopera-

tion, and interest expansion. During the summer camp, autistic youth ages 9–12 years old participated in approximately 6 hours of direct service, 5 days per week, for 5 weeks. Instruction periods were comprised of group didactic instruction utilizing the Skillstreaming procedure followed by therapeutic collaborative activities to promote skills use with peers. The first two studies examining this approach utilized a RCT design in which participants were assigned to either receive the program with structured, contingent behavioral reinforcement (e.g., response cost, point system) or naturalistic nonspecific feedback (Lopata et al., 2006, 2008). These initial studies showed significant positive effects on parent- and staff-rated social skills and adaptive skills on the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 2004), and social skills on a specific measure designed to assess frequency of social behaviors targeted in the program.

A replication RCT using a waitlist control found significant positive effects favoring the SummerMAX group across a wide range of outcomes, including tests of child knowledge of content, child performance on standardized assessments of pragmatic language and facial emotion recognition, parent- and staff-reported generalized social skills (BASC), and parent-reported autism symptomatology (SRS; Thomeer et al., 2012). In this RCT, maintenance of social skills outcomes was also observed. The efficacy of SummerMAX has since been replicated (Lopata et al., 2016; Thomeer et al., 2019) as well as adapted to be delivered in outpatient (MAXout; Lopata et al., 2017) and school settings (Lopata et al., 2018b). All studies found similar positive effects across multiple outcome measures of social functioning in school-aged autistic children with average cognitive functioning.

Two more recent pre-post group designs of the SummerMAX program, adapted for young autistic children 4–6 years of age (SummerMAX^{yc}), have also demonstrated that following the program, autistic preschoolers show improvements on parent- and staff-reported measures of social skills, autism symptoms, and adaptive skills (Lopata et al., 2018a; Thomeer et al., 2020). One

SummerMAX^{yc} study also utilized a behavioral observation outcome measure (Clinical Global Impression, CGI), with raters naïve to program procedures assessing young children's social behavior in a 20-minute naturalistic play interaction with peers. After SummerMAX^{yc}, 83% (10 of 12) of the participating preschoolers were rated as much improved or very much improved on the CGI (Thomeer et al., 2020).

Children's Friendship Training

Children's Friendship Training (CFT) is a GSSP for school-aged children struggling socially (Frankel & Myatt, 2003). Though originally tested in mixed clinical populations (Frankel et al., 1997; Sim et al., 2006), the manualized curriculum content was developed to teach children and their parents a set of critical social behaviors that are associated with social acceptance. The 12-week child curriculum focuses on skills related to conversations, joining a group at play, good sportsmanship, playdates, and navigating conflict (e.g., responding to teasing). CFT emphasizes parent involvement through several avenues, including attendance at a concurrent parent group, parent facilitation of social network formation (e.g., scheduling playdates, joining play groups), and provision of skills practice and coaching in home and community settings. CFT groups typically include approximately 10 children; though children in elementary grades 2–5 are eligible, groups are separated such that children are no more than one grade apart. Sessions include homework review, didactic lessons, a structured opportunity to rehearse skills, and a coached play time to apply skills in more naturalistic settings. In a RCT with 76 autistic children enrolled into the mixed clinical groups, results indicated that, as compared to a DTC group, autistic children who received CFT showed significantly improved self-control, reduced loneliness, and more frequent play dates with less conflict and higher engagement (Frankel et al., 2010). However, no significant effects were observed in teacher reports, perhaps indicating difficulty with generalization.

A long-term follow-up study of autistic youth who participated in CFT showed that, on average, 1.5 years after program completion 88% of children reported that they had at least one friend they were “pretty close” with; this was corroborated by 83% of parents reporting the same (Mandelberg et al., 2014b). On standardized questionnaires, children who received CFT showed long-term maintenance of social skills improvements and reductions in problem behaviors on the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) and reduction in child self-reported loneliness. The increased number of hosted playdates seen immediately after program delivery significantly declined over the follow-up period, returning to statistically equivalent levels to baseline. Playdate outcomes may be particularly important, given findings that for autistic children, those who have more frequent in-home playdates are more well-received and show more prosocial behaviors during school recess, such as sharing, turn-taking, and talking with peers (Frankel et al., 2011).

Unlike other GSSPs, CFT has a published manual, making it one of the few evidence-based social skills programs that are widely disseminated to providers. One pre-post group design replicated CFT’s benefits with respect to social skills, loneliness, and increased positive engagement in playdates in a Malaysian sample of 40 autistic children ages 7–12 (Goh et al., 2020). However, outside of this study and the original RCT and follow-up study, which were conducted by the developers of CFT, relatively few independent investigations and replications of CFT’s effectiveness with autistic children have been published.

Other GSSPs

Other GSSP approaches exist, though they have not been as extensively or rigorously tested and replicated as those outlined above. We will discuss additional GSSPs below, many of which draw upon similar foundational teaching methods and content (Moody & Laugeson, 202). Notable differences in program characteristics

and studies with particular methodological strengths will be highlighted.

The Superheroes Social Skills Program (Jenson et al., 2011) is a manualized program that incorporates didactic training and behavioral rehearsal, as well as performance feedback, like many other GSSPs. Superheroes Social Skills was designed as a school-based program, rather than the traditional outpatient clinic model. The program also systematically incorporates video modeling, neurotypical peer inclusion, and child interests (e.g., animated superheroes) to increase efficacy and engagement. In single-subject designs, results have suggested that this program significantly increases social skill accuracy and social engagement in autistic preschoolers (Radley et al., 2015, 2016) and school-aged children (Block et al., 2015; Radley et al., 2017). However, to our knowledge, no RCTs have been conducted as of 2022.

Although social skills and mental health are often intertwined, few programs concurrently target both areas of functioning. It is these characteristics that are unique to the Multimodal Anxiety and Social Skills Intervention (MASSI; White et al., 2010). MASSI includes individual therapy, small group sessions, and parent education components, using modules that cover concrete social skills topics (e.g., peer initiation, conversations, handling rejection) and cognitive-behavioral strategies (e.g., cognitive triangle, exposures, problem-solving). In an RCT of autistic adolescents ($N = 30$), those in MASSI showed significantly greater improvements in social responsiveness (SRS-2) and on a blind clinician-rated measure of global functioning than participants in the waitlist condition. Unfortunately, no significant group differences emerged on the measure of anxiety, though the effect size appeared to be moderate (White et al., 2013).

SocioDramatic Affective Relational Intervention (SDARI) is also a GSSP, for late elementary through high school students. Unlike other GSSPs, SDARI relies less on didactic instruction and more on experiential games designed to both engage youth and target social skills. In this way, SDARI relies on implicit learning of skills rather than explicit instruction.

In a review of the approach and qualitative description of its results, SDARI was reported to have produced positive benefits across many domains and reporters, including depression, confidence, social-seeking behavior, nonverbal communication, and collaboration (Lerner & Levine, 2007). Two pre-post studies revealed improved theory of mind skills following SDARI, with inconsistent effects in other areas (Marro et al., 2019). In the initial nonrandomized control pilot study, SDARI produced few significant gains across several areas assessed, with improvements seen in the SDARI group on only one subscale, assertion, of a parent-reported social skills measure, and on one subscale, adult voices, of a nonverbal cue reading assessment (Lerner et al., 2011). Though high levels of child and parent satisfaction and clinical progress are reported qualitatively following SDARI, additional empirical support is needed.

In another study, SDARI was directly compared to generic Skillstreaming program, in a RCT implemented in an afterschool setting over four 90-minute sessions (Lerner & Mikami, 2012). Although this RCT was limited by its small sample and short program duration, results suggested that school-aged youth in both groups showed significant social skills improvement as rated by research staff and positive growth in reciprocated friendship nominations within the group contexts (Lerner & Mikami, 2012). However, these outcome measures may be biased (i.e., staff expectancy effects, reciprocated friendship nominations using sociometric ratings on the first session would not be expected in a group of children who do not know each other), and parent-reported change in social skills at home was nonsignificant for both groups.

One essential methodological step in advancing GSSP research is to conduct RCTs with larger sample sizes, as most of the existing studies include samples less than 50 participants. Given heterogeneity in autism, larger samples can increase confidence that programs are likely to be effective across the full phenotypic autism spectrum and enable more nuanced analyses of moderators. In our review of the literature, two RCTs stood apart with respect to recruiting a

large sample size (KONTAKT: $N = 296$, Olsson et al., 2017; SOSTA-FRA: $N = 209$, Freitag et al., 2016). Both KONTAKT and SOSTA-FRA are similar to SDARI in that a wide range of ages were included (8–19 years old), with specific curriculum materials for younger and older participants. However, unlike SDARI, both approaches utilized a more traditional knowledge-based social skills explicit teaching curriculum (Moody & Laugeson, 2020). For KONTAKT, no differences emerged between the KONTAKT and standard care groups on the SRS when examining the full sample. In contrast, results indicated added benefits of SOSTA-FRA over treatment as usual (TAU) with respect to parent-reported social responsiveness, including evidence of maintenance and neurobiological markers of positive response (Freitag et al., 2016; Luckhardt et al., 2018). Emergent moderators in these studies differed, with age moderating program effects for KONTAKT (with adolescents showing significant improvements over children; Olsson et al., 2017), but not for SOSTA-FRA (Freitag et al., 2016). Further, females showed significantly greater improvements in the KONTAKT condition relative to standard care (Olsson et al., 2017), while cognitive abilities and autism symptom severity were both positively correlated with response to the SOSTA-FRA program (Freitag et al., 2016).

In another large sample GSSP study of school-aged children on the spectrum ($N = 122$), three conditions were compared: TAU (control), social skills program (SSP), and social skills program + parent and teacher involvement/education (SSP + PTI; Dekker et al., 2019). There were mixed findings, such that the TAU group showed improvements similar to the SSP groups on several outcomes. However, the two SSP groups showed significant gains and maintenance on parent-reported socialization on the VABS and cooperation on the SSRS. There were slight observed advantages to the SSP + PTI condition in teacher report for several SSRS subscales. This could suggest enhanced generalization through parent- and teacher involvement but may also be an artifact of bias given teachers' additional investment in and directed attention toward social

skills of target youth due to their involvement in the study (Dekker et al., 2019). A third relatively large RCT included 69 school-aged autistic children and compared the Seaver-NETT (Nonverbal communication, Emotion recognition, and Theory of mind Training) program ($n = 35$) to an active control condition ($n = 34$) of facilitated play (Soorya et al., 2015). Results indicated significant improvements on a social behavior composite outcome as compared to the active control group of facilitated play, while no differences emerged on a social cognition composite (Soorya et al., 2015). Although only half of participants returned for a 3-month follow-up, results did not suggest significant group differences were maintained. Similar to findings from Freitag and colleagues' (2016), moderator analyses suggested that children with higher verbal intelligence quotients (IQs) benefitted more from the NETT program (Soorya et al., 2015).

Peer-Mediated Programs (PMP)

Peer-mediated social skills programs for autistic youth utilize peers as the agent of change in promoting social functioning, rather than using an adult clinician. Peers are frequently selected and provided training based on their own social communication savvy and social capital, though sometimes peers also volunteer to be involved. Theoretically, as compared to traditional clinician-led approaches, peer-mediated approaches may be advantageous in that they more closely approximate the social context in which the skills will be generalized. Several reviews of single-subject design studies using PMI approaches have concluded that they are effective in improving social, behavioral, and academic behavior in autistic youth across a wide range of ages, with evidence for generalization of skills (Watkins et al., 2015; Chan et al., 2009). Notably, one review summarized peer-mediated approaches for minimally verbal autistic children, an oft-neglected population in autism intervention research (O'Donoghue et al., 2021). Though primarily single-subject experimental designs, the effects were positive with increased

interaction and communication among autistic participants (O'Donoghue et al., 2021). However, fewer studies with group or randomized control trial designs have been conducted examining PMPs for children on the spectrum, with one review identifying only 5 such studies with social outcomes (Chang & Locke, 2016). See Table 8.2 for an overview of recent RCTs of peer-mediated social skills programs since the first edition of this book in 2012, through 2022.

Before reviewing specific peer-mediated approaches, we note that some previously discussed evidence-based social skills programs have been adapted to be peer-mediated or to include peer-mediated components. One RCT study tested a modified PEERS® for Adolescents program, with peer-mediated components, in autistic teens (13–17 years old; Matthews et al., 2018). Specifically, peer mentors comprised half of the PEERS® for Adolescent groups and served as positive social examples by participating in group discussions, modeling appropriate social skills in behavioral rehearsals, and interacting with autistic teens during homework socialization assignments. Peer mentors were treated equally and not distinguished from autistic teens by group leaders. In a comparison between a DTC group, traditional PEERS® for Adolescents, and PEERS® for Adolescents with Peers (PWP), both PEERS® conditions improved on social skills knowledge and loneliness relative to the DTC group, while only PWP improved on parent report of generalized social skills and problem behaviors on the SSIS. On the other hand, autistic teens in the standard PEERS® for Adolescents program had significantly more get-togethers than the participants DTC group, an effect not observed in PWP (Matthews et al., 2018). Other group differences that did not rise to significance may suggest a slight advantage to PWP, though more research is needed.

Peer-Mediated PEER Program

In a school-based trial, 60 autistic elementary schoolers were randomly assigned to participate in individual SSP, the peer-mediated PEER

Table 8.2 RCT summary table of peer-mediated interventions (PMI)

Author/year	Intervention	Participant ages	Intensity/duration	Primary outcome measures	Findings
Matthews et al. (2018)	PEERS [®] for Adolescents peer-mediated (PWP) vs. DTC group vs. traditional PEERS [®] for Adolescents	<i>N</i> = 34; 13–17 years	14 weeks, 1.5 hour weekly sessions	SRS-2, SSIS, QSQ-P, QSQ-A, TASSK, SIAS, R-UCLA, Social Distance Scale, AKQ	Both treatment conditions improved on social skills knowledge and loneliness relative to DTC group, only PWP improved on parent report of generalized social skills and problem behaviors on SSIS, autistic teens in standard PEERS [®] program had significantly more get-togethers than DTC group, no effect in PWP
Kasari et al. (2012)	SSP vs. PEER intervention vs. combined SSP + PEER vs. no-treatment control group	<i>N</i> = 60; 6–11 years	6 weeks total, twelve 20-minute training sessions, twice per week	Social Networking Survey (SNS), playground observation	Improvements in social network, number of friendship nominations, teacher report of social skills in classroom, and decreased isolation on the playground for children who received PEER interventions, changes at the end of the treatment maintained at the 3-month follow-up
Corbett et al. (2016, 2019)	Social Emotional NeuroScience Endocrinology (SENSE) Theater vs. waitlist control	<i>N</i> = 30; 8–17 years	2 weeks, 3 hour daily classes	SRS, PSI, ABAS, Companionship Scale, salivary cortisol	Autistic youth in the SENSE Theater condition showed significant improvements in theory of mind and social memory tasks, enhanced Event-Related Potential (ERP) markers to familiar faces, and more cooperative play and verbal interactions, as well as some evidence of reduced anxiety and physiological arousal

Note. ABAS Adaptive Behavior Assessment System, AKQ Autism Knowledge Questionnaire, PSI Parenting Stress Index, QPQ/QSQ Quality of Play/Socialization Questionnaire, R-UCLA Revised UCLA Loneliness Scale, SIAS Social Interaction Anxiety Scale, SRS(-2) Social Responsiveness Scale (2nd Edition), SSRS/SSIS Social Skills Rating/Inventory System, TASSK(-R) Test of Adolescent Social Skills Knowledge (-Revised)

program, combined SSP + PEER, or a no-treatment control group in a RCT design (Kasari et al., 2012). The peer-mediated PEER program involved training neurotypical students in the same classroom as the participant autistic child on strategies to both identify and engage socially isolated children (without identifying the target child). Neurotypical peers were selected by the classroom teacher and research staff based on social network salience (e.g., positive social connections within classroom) and appropriateness

for training. In twelve 20-minute training sessions, neurotypical peers were taught specific social skills support strategies, such as direct instruction, modeling, role playing, and rehearsal, for skills related to social initiation, positive interaction, game play, and conflict resolution. On the primary outcome of social network salience, which measured classroom-wide nominations to a peer group, participants in the groups with peer-mediated components had significantly more nominations than those in the individual

SSP or control groups, with some evidence that SSP + PEER performed best (Kasari et al., 2012). Teachers rated children on the spectrum who received PEER as having significantly improved social skills after program delivery as well. At follow-up, those who received PEER also showed significant decreases in solitary engagement and increases in joint engagement in coded play-ground interactions. These findings suggest ongoing improvements after formal training sessions ended, which may be due to continued support of trained peers resulting in enhanced social integration of the autistic child.

SENSE Theater

In recent years, a growing emphasis on music, arts, and performance-based approaches has emerged in the autism field, though not all such programs aim to specifically improve social behavior (Edwards et al., 2020; Simpson & Keen, 2011). It is difficult to synthesize the evidence for this approach at large given the wide variability in program techniques and inconsistent efficacy results. A specific performance-based approach that has accumulated research support is Social Emotional Neuroscience Endocrinology (SENSE) Theater (Corbett et al., 2014b). SENSE Theater was informed by translational research methods, integrating behavioral intervention techniques and peer models that together target specific social and emotional challenges commonly seen in autism. Participants are embedded within a musical theater production and assigned an acting role. Through theater games, rehearsal, and peer modeling, participants' social attention, emotional expression, emotional recognition, flexibility, and theory of mind (e.g., understanding the character) skills are theorized to be promoted. SENSE Theater considers itself a peer-mediated program in that the peer models are considered the primary agent of change. Peer models receive training about autism, behavioral interventions, and the SENSE Theater approach. Each autistic youth is paired with one neurotypical peer model that learns and models the acting via video modeling. SENSE Theater has been

delivered as an intensive summer camp program (i.e., 4 hours a day of direct service for 2 weeks) and as a 10-week program (i.e., 4 hours on consecutive Saturdays) for autistic youth 8–18 years old culminating in a final performance.

SENSE Theater has been tested in multiple pre-post group designs (Corbett et al., 2011, 2014a) and randomized control trials (Corbett et al., 2016, 2019). Per parent report, results demonstrated improved social responsiveness on the SRS and improved adaptive skills (Corbett et al., 2014a, 2016), as well as some evidence of reduced anxiety and physiological arousal via salivary cortisol (Corbett et al., 2011, 2014a, 2017). Across the two recent RCTs (Corbett et al., 2016, 2019), researchers assigned a total of 132 autistic youth to either SENSE Theater or a waitlist control group. At the end of the study, autistic youth in the SENSE Theater condition showed significant improvements in theory of mind and social memory tasks, enhanced Event-Related Potential (ERP) brain activation markers to familiar faces, and more cooperative play and verbal interactions in an observational measure with same-aged peers. These outcomes are strengthened by the more objective nature of the measures, each unlikely to exhibit biases commonly present in informant reports. Future studies of SENSE Theater would benefit from paired inclusion of informant reports alongside observational and physiological measures, as well as long-term assessments of external validity (e.g., sociometric status, number of friends or get-togethers).

Peer Network Programs

In peer network programs, a child on the spectrum is identified to participate in small group activities with neurotypical peers. These approaches are most often implemented in school settings, during unstructured times, such as lunch or recess. An adult facilitator is present to support the group through providing instruction, generating discussion, leading activities, and providing feedback, with faded support as the group interacts more naturally. In a block RCT design,

where kindergarten and first grade classes were randomized to receive the peer network program or TAU within each child's individualized education plan for 2 school years (Kamps et al., 2015), autistic children in the peer network groups showed significantly greater gains on standardized measures of language on the Clinical Evaluation of Language Fundamentals (CELF; Semel et al., 2003), adaptive communication skills on the Vineland Adaptive Behavior Scales—Third Edition (VABS-2; Sparrow et al., 2005), and social communication as rated by teachers. The peer network group also made significantly greater growth in spontaneous communication initiations within the peer network groups and during multiple social probes testing generalization of skills. Though statistically significant, it is unclear whether the effect was clinically meaningful, with differences in average initiations per probe across groups maxing out at 1. Given that the program was 2 years in length, this difference may not be substantial. Yet, peer network programs in school-age children have been successfully implemented by school personnel, supporting their readiness for broad dissemination (Mason et al., 2014; McFadden et al., 2014).

One example of a peer network program for preschoolers includes “Integrated Play Groups” (see Wolfberg et al., 2012 for detailed description). In a pre-post design including 48 autistic preschoolers, results revealed significant and generalized improvements in symbolic and interactive play with unfamiliar peers following 3 months of facilitated play groups with neurotypical peers (Wolfberg et al., 2015). In one RCT using this approach, autistic preschoolers received three sessions per week, one in which the adult facilitator taught a skill, and two where the participants played in a consistent peer group of neurotypical preschoolers (Bauminger-Zviely et al., 2020). There were three randomly assigned peer network program conditions of integrated play groups, where facilitators focused on different components of social communication (i.e., play, conversation, and social interaction), as well as a waitlist control group. After 6 months, participating children in the peer network groups

generally showed significant improvements in play skills, observed and informant-rated conversational skills, and adaptive skills. In contrast, the waitlist control group generally did not demonstrate significant gains, or on some measures even worsened, over the same time period. There was some evidence of specificity of effects, with specific conditions showing greater gains in their targeted area (e.g., play; Bauminger-Zviely et al., 2020).

The peer network program model has also been adapted for use with high school students with disabilities (Carter et al., 2013). A large RCT compared a peer network program condition ($n = 47$) to TAU ($n = 48$) for adolescents with disabilities. This sample included 45 autistic teens, with a range of cognitive/adaptive functioning capacities, who qualified for special education services from an autism classification (Asmus et al., 2017). In this study, peer network groups, consisting of one focal teen with a disability and 3–6 neurotypical peers, met at least once per week with an adult facilitator. As compared to the TAU participants, those in the peer network groups had increased social contacts (e.g., social interactions of 15 minutes or more) with peers at school and a greater number of friends, as rated by teachers. Follow-up assessments suggested that 20% and 40% of the neurotypical peers continued to have extended social contact and remained friends with the student with a disability (Asmus et al., 2017). To our knowledge, this approach has not been tested in a group design exclusively with autistic teens, though several single-subject designs indicate it has promise (Gardner et al., 2014; Hochman et al., 2015; Sreckovic et al., 2017). Outcomes across these studies show preliminary evidence for positive benefits with respect to joint engagement, social interaction, and reduced victimization.

Technology-Mediated Programs

In the past decade, there has been an emerging literature base examining technology and computer-assisted programs to teach social skills

(Hanna et al., 2021; Grossard et al., 2017; McCoy et al., 2016). This growth has been bolstered by positive results from initial studies and hypotheses that autistic youth may be more comfortable first developing skills using technology, rather than with peers (Shic & Goodwin, 2015; Mintz et al., 2012). Further, adjunctive mobile technologies may reduce the costs associated with in-person services, which may make evidence-based psychotherapies more accessible to families. Video modeling, role play, computer-based programs, and virtual reality have all been implemented in teaching social skills with some success (McCoy et al., 2016). While caregivers and clinicians alike have expressed satisfaction

with some tools (Draper Rodríguez et al., 2014), it is important to consider individual differences and preferences. See Table 8.3 for an overview of recent RCTs examining technology-mediated approaches to social skills since the first edition of this book in 2012.

Secret Agent Society

Through espionage-themed computer games, virtual reality missions, and a “cadet workbook,” the Secret Agent Society (SAS) program helps autistic youth learn and apply social-emotional skills, such as emotion recognition in self and others,

Table 8.3 RCT summary table of technology-mediated interventions

Author/year	Intervention	Participant ages	Intensity/duration	Primary outcome measures	Findings
Beaumont and Sofronoff (2015)	Secret Agent Society (SAS), computer-based activity structured training vs. Secret Agent Society (SAS), computer-based activity no training	$N = 49$; 7–12 years	Ten 90-minute (or twenty 45-minute) group sessions over 10 weeks	SSQ-P/T, ERSSQ-P/T, SCAS-P, Vignettes, CAPESDD-P and CAPES-DD-T	Both programs led to improvements in emotion regulation abilities, social skills, and behavior at school and home, and were maintained at 6-week follow-up. However, generally the structured group led to superior treatment outcomes.
Beaumont et al. (2021)	Self-directed SAS vs. active control espionage-themed computer games focusing on cognitive skills (e.g., memory games, spotting visual differences).	$N = 70$; 7–12 years	Began with 150 minute parent-training webinar, daily up to 30-minute sessions over 10 weeks (in both conditions)	SSQ-P/T, ERSSQ-P/T, SCAS-P, ECBI	Children in the SAS condition showed significantly greater gains on social skills, as reported by both parents and teachers, parent-reported problem behavior intensity also declined in the SAS treatment group.
So et al. (2018)	Robot gestural intervention vs. WLC	$N = 30$; 4–6 years (and 15 age-matched neurotypical children)	Four 30-minute robot-based gestural training sessions	Coding gestures	Increased accurate use of gestures following robot gestural story telling intervention, compared to WLC

Note. *SSQ-P/T* Social Skills Questionnaire—Parent or Teacher, *ERSSQ-P/T* Emotion Regulation and Social Skills Questionnaire—Parent or Teacher, *SCAS-P* Spence Children’s Anxiety Scale—Parent, *CAPESDD-P* Child Adjustment and Parent Efficacy Scale—Developmental Disability—Parent, *CAPES-DD-T* Child Adjustment and Parent Efficacy Scale—Developmental Disability—Teacher, *ECBI* Eyberg Child Behavior Inventory

interpreting nonverbal cues, relaxation skills, playing collaboratively with peers, starting/entering conversations, and managing bullying (Sofronoff et al., 2017). An example of a computer-based activity in SAS is “*Secret Message Transmission Device*” where children detect how others feel based on their tone of voice (Beaumont, 2015). In the initial pilot implementation, 49 school-aged autistic children were randomized to either SAS ($n = 26$) or wait-list control ($n = 23$; Beaumont & Sofronoff, 2008). This initial implementation was within a small group format over 7 weeks, where children met weekly for 2 hours to play the computer games for the first portion of the session and then applied skills in real-life interactions within the group, with a complementary parent component. Children in the SAS condition showed significant gains in social skills on a standardized parent-reported questionnaire, vignette responses to challenging social situations, and a measure designed to test learning of program content (Beaumont & Sofronoff, 2008). SAS has been adapted and tested in several novel contexts, with most of the adaptations adjusting the curriculum to ten 90-minute weekly sessions. In a school-based adaptation of SAS with limited parent involvement, use of the SAS program resulted in significant improvements in parent- and teacher report of both social skills and mental health symptoms (Beaumont et al., 2015). A subsequent nonrandomized trial, with a control condition who received (TAU) special education services for autistic children, found significant relative benefits of the SAS program on parent-reported and child-completed measures of social skills (Einfeld et al., 2018).

SAS has also been tested as an individual, self-directed program, where children use the computer program at home and apply the skills through “home missions” with the support of parents, who have access to weekly clinical support regarding program delivery (Sofronoff et al., 2017). In a pre-post design with 41 autistic children (7–12 years old), the self-directed program led to significant and positive social emotional outcomes that maintained over a 6-week follow-up period (Sofronoff et al., 2017). This mode of

implementation is advantageous as it reduces barriers to access for families living in remote or rural communities, or for whom travel to a clinic is otherwise not feasible. In the first randomized control trial of SAS (Beaumont et al., 2021), results continued to support its efficacy. This RCT compared the self-directed, parent-supported version of SAS, where children complete the computer games and missions at home, to an active control condition of engaging espionage-themed computer games focusing on cognitive skills (e.g., memory games, spotting visual differences). Parents were involved in implementation of both conditions. Children in the SAS condition showed significantly greater gains on social skills, measured by the Social Skills Questionnaire (Spence, 1995), as reported by both parents and teachers, when compared to the active control condition (Beaumont et al., 2021). Parent-reported problem behavior intensity on the Eyberg Child Behavior Inventory (Eyberg & Pincus, 1999) also declined in the SAS group.

Robot-Assisted Programs

Advancements in technology have increased interest in the use of robots within therapy contexts for children on the autism spectrum, across a variety of outcomes. There has been a significant rise in the number of published studies investigating robot-mediated or robot-assisted programs with social behavior targets, such as imitation, initiation, turn-taking, social skills, and joint attention. The justification for use of robots in therapy for autistic youth has been bolstered by findings that autistic children direct more attention toward robots than people, are more likely to imitate robots, and engage in less restricted, repetitive behaviors in the presence of robots than with people (Warren et al., 2015; Costa et al., 2018). Further, one study of performance on a joint attention task in the presence of a robot or human (who both also modeled joint attention) found that autistic children in the robot condition displayed joint attention on more trials, an effect that carried over to later joint attention task trials with a

human interaction partner (Kumazaki et al., 2018b). Additionally, adolescents were found to engage in more self-disclosure and longer interactions with robotic agents as compared to human interviewers, despite use of the same script (Kumazaki et al., 2018a).

Reviews of robot-assisted programs approaches reveal significant limitations, including small sample sizes (mostly single-subject designs) and low methodological rigor, though they have generally suggested positive benefits (DiPietro et al., 2019; Saleh et al., 2021). Notably, several studies have found no positive effects to programs including robots (Huskens et al., 2015; Saleh et al., 2021). Other studies have found no difference between robot-mediated approaches and typical human-implemented supportive services and programs (Huskens et al., 2013; Yun et al., 2017); however, the latter finding may be of utility if robot-mediated approaches ultimately become more cost effective than clinician-mediated approaches. Some studies do suggest that robots may be effective service delivery agents for autistic youth, potentially over and above clinician-mediated modalities. One study of 30 preschoolers on the spectrum found increased accurate use of gestures following a robot-mediated story telling program, as compared to a waitlist control group (So et al., 2018). Notably, the preschoolers showed transfer of skills to novel stories, and comparable levels of gesture use as neurotypical control participants ($n = 15$). More research is needed to conclusively determine the benefits of robot-assisted and robot-mediated approaches, with more detailed analyses examining child characteristics, robot characteristics, and involvement of robot as possible moderators of response (Kumazaki et al., 2020).

Emotion Recognition Training

In a meta-analysis of computer-based social-emotional programming for youth with autism, programs targeting the social cognitive skills of facial processing and emotion recognition (e.g., FaceSay; Rice et al., 2015) were by far the most common (Tang et al., 2019). Meta-analytic

results show medium effect sizes of such programs on outcomes closely related to the original context and skills directly taught (e.g., computer-based images, audio, or videos of social stimuli). In contrast, on measures assessing transfer of skills to broader social contexts (e.g., parent- or teacher report of social skills, observations of social interactions), the pooled effect was diminished, only reaching marginal significance (Tang et al., 2019). Similar findings were seen in a meta-analysis of facial emotion recognition programs only, such that these programs tended to have narrow effects, with little generalization or maintenance (Zhang et al., 2021). Importantly, some studies have found evidence that some effects of emotion recognition training are diminished in autistic youth with below average cognitive functioning (Hopkins et al., 2011). See Table 8.4 for an overview of recent emotion recognition training RCTs since the first edition of this book in 2012 through 2022.

MindReading

MindReading is one of the more widely known and studied examples of computer-based emotion recognition training. It is an interactive computer software program designed to help autistic individuals learn and recognize 412 simple and complex emotions through exemplars of pictures of real faces, video clips, and audio recordings. The content used emotions of varying intensity, gender, and ethnicity, while also providing information on patterns within emotionally salient information (Baron-Cohen et al., 2004). MindReading was originally tested in autistic adults, with results showing increased affect recognition abilities, empathy, and long-term positive effects on friendship formation (Golan & Baron-Cohen, 2007). In applications with youth on the spectrum, MindReading is usually limited to fewer emotions (e.g., 98 instead of 412), includes games to reinforce emotion recognition lessons, and incorporates rewards (e.g., motivating videos) for completion of tasks and quizzes (Thomeer et al., 2015). A pre-post design pilot

Table 8.4 RCT summary table of emotion recognition training interventions

Author/year	Intervention	Participant ages	Intensity/duration	Primary outcome measures	Findings
Lopata et al. (2016)	SummerMAX vs. SummerMAX + Mindreading	$N = 36$; 7–12 years old	6 hours per day, 5 days per week over 5 weeks	CAM-C, ERDS, SEE, ASC, BASC, SRS	SummerMAX + Mindreading group made greater gains on CAM-C; Significant main effects of SummerMAX (regardless of MindReading component) on the ERDS, SEE, ASC, BASC parent report, and SRS
Thomeer et al. (2015)	Mindreading intervention vs. WLC	$N = 43$; 7–12 years	24 sessions—two 90-minute sessions per week over 12 weeks	CAM-C, ERDS, SRS, BASC-2	Significantly better posttest performance for the treatment group on facial and vocal expressions, were maintained at 5-week follow-up. Analyses of secondary measures indicated treatment group demonstrated fewer autism symptoms posttest and follow-up
Young and Posselt (2012)	Intervention group (watched DVD designed to teach emotion recognition skills; the Transporters) vs. control group (watched DVD of Thomas the Tank Engine)	$N = 25$; 4–8 years	Participants in both conditions asked to watch at least three episodes per day for 3 consecutive weeks	NEPSY-II affect recognition, Pictures of Facial Affect	Intervention group showed significant improvements in emotion recognition; however, both groups demonstrated increased social interest in peers and appropriate eye contact
Williams et al. (2012)	Intervention group (watched DVD designed to teach emotion recognition skills; the Transporters) vs. control group (watched DVD of Thomas the Tank Engine)	$N = 55$; 4–7 years	Watched the DVD for 15 minutes per day over 3 weeks	Pictures of Facial Affect, NEPSY-II affect recognition subtest and NEPSY-II theory of mind subtest, mindreading tasks	Improved emotion recognition, with few improvements maintained at 3-month follow-up, no generalization to social skills or more complex theory of mind skills in either group

(continued)

Table 8.4 (continued)

Author/year	Intervention	Participant ages	Intensity/duration	Primary outcome measures	Findings
Gev et al. (2017) (Hebrew adaptation)	Intervention group (watched DVD designed to teach emotion recognition skills; the Transporters) with parent support vs. Intervention group (watched DVD designed to teach emotion recognition skills; the Transporters) without parent support vs. control group (watched DVD of Thomas the Tank Engine) with parent support vs. control group (watched DVD of Thomas the Tank Engine) without parent support	$N = 77$; 4–7 years (4–7 matched TD children, randomized to same groups)	Watched the DVD for minimum of 10 minutes per day over 8 weeks	Emotion recognition test: (1) Familiar close generalization (2) Unfamiliar close generalization, (3) Distant generalization, Emotion vocabulary tasks	Treatment groups showed improved emotion recognition skills and maintained skills. Parent support bolstered this improvement of skills and improved generalization and maintenance of emotion recognition skills. All groups improved on emotion vocabulary; autism severity negatively correlated with emotion recognition improvement

Note. ASC Adapted Skillstreaming Checklist, BASC Behavior Assessment System for Children, CAM-C Cambridge Mindreading Face-Voice Battery for Children, ERDS Emotion Recognition and Display Survey, NEPSY-II A Developmental NEuroPSYchological Assessment, 2nd Edition, SEE Social Emotional Evaluation, SRS(-2) Social Responsiveness Scale (2nd Edition)

study and subsequent randomized control trial using MindReading in school-age children both indicated improved emotion recognition skills and reductions in autism-related social communication differences on the SRS.

One adaptation of MindReading for preschool children grafted images of real faces displaying 15 basic emotions onto transportation vehicles with predictable movement (e.g., trains; Golan et al., 2010). In a randomized control study of autistic preschoolers, participants in the Transporters MindReading group watched at least three 5-minute “episodes” focusing on a particular emotion or mental state per day for 4 weeks via DVD technology. At posttest, autistic preschoolers in the Transporters MindReading group made significant improvements in emotion recognition and performed comparably to a neurotypical control group (Golan et al., 2010). A second control group of autistic preschoolers who did not receive the MindReading program did not show comparable gains. Replication studies with an active control of “Thomas the Tank

Engine” found that the Transporters MindReading group showed significantly greater improvements in emotion recognition when compared to the active control (Young & Posselt, 2012). However, both groups demonstrated increased social interest in peers and appropriate eye contact, reducing confidence that those benefits were program-specific (Young & Posselt, 2012). A third RCT again found improved emotion recognition but no broad generalization to social skills or more complex theory of mind skills following the Transporters MindReading program (Williams et al., 2012). Of note, the Transporters MindReading program has been culturally adapted and implemented within Israel, participating autistic children ages 4–7 showed improved emotion recognition, which was bolstered when paired with parent support; however, broader social functioning outcomes were not assessed (Gev et al., 2017).

In sum, consistent with the larger field of computer-based social skills programming, studies of the MindReading program in autistic chil-

dren reliably produce positive benefits on narrow outcome measures of emotion recognition and understanding, with little evidence to support external validity and generalization to daily social interactions (Berggren et al., 2018). Additionally, though MindReading appears to produce significant gains when compared to waitlist controls or computer-based active controls, it did not provide meaningful added benefits when combined with a more comprehensive GSSP (Lopata et al., 2016). Taken together, this evidence suggests that GSSPs would continue to be the preferred choice given the more robust effects across domains in GSSPs.

Other Approaches to Address Social Behavior

Although the above broad categories of social behavior programs, supports, and services (e.g., GSSP, PMP, and Technology-Assisted) are the most common, other approaches are available. Clinically, the teaching methods of GSSPs can be adapted to be delivered in an individual format when indicated (e.g., limitations of service delivery systems, child behavioral or cognitive differences indicate individual format would be preferable). Alternatively, social skills programming can take different forms. Below we will review other alternative social skills programs that do not fit into one of the above discussed broader categories.

LEGO Therapy

LEGO therapy for autistic children has been examined as a method of more naturalistically supporting social communication in this population. LEGO therapy is conducted in small groups of multiple children on the spectrum, who are assigned roles of being a “builder,” “supplier,” or “engineer,” with the shared goal of creating a LEGO set. Small group meetings are facilitated by an adult. A recent review classified LEGO therapy as “possibly effective” (Lindsay et al., 2017). Although one RCT design has demon-

strated positive effects (Owens et al., 2008), some smaller studies found no significant effects, inconsistent benefits across measures, or smaller effect sizes. The synthesis of the literature is also impeded by wide variability in the program components and delivery (e.g., duration, intensity, facilitator, setting, group size).

Social Stories

Social stories are brief narratives that are constructed to illustrate and provide information to an individual about a situation (e.g., facts, perspectives of others, cultural values) and the relevant socially appropriate response (Kokina & Kern, 2010). For autistic children, social stories have been commonly used to address problem behaviors as well as teach social skills. Though widely used, likely due to its concrete and directive approach, the evidence base for social stories in teaching social skills is limited. Most studies have utilized single-subject designs, reducing external validity. Further, within meta-analyses of single-subject case studies of social stories, mixed results emerge, with inconsistent demonstration of effectiveness (Kokina & Kern, 2010; McGill et al., 2015; Qi et al., 2018; Bozkurt & Vuran, 2014). Some results of these meta-analyses have indicated that there is insufficient evidence to support social stories being an evidence-based practice for autistic children. Of relevance to this review, moderators in these syntheses suggest that social stories may be more effective in addressing problem behavior than promoting social skills.

To our knowledge, there have only been five RCTs regarding social stories published, and many are administered over only 1 day, targeting one specific behavior (Marshall et al., 2016; Wright et al., 2016). Some of the skills targeted in these RCTs included social skills required for playing a game and learning to identify and handle emotions. One recent RCT found that a group of autistic children ($n = 9$) who received a social story once a day for 2 weeks did show significant improvements in outcomes when compared to a control group who were read a

poem (Hanrahan et al., 2020). Both social stories and poems were digitally delivered, to provide equal amounts of screen time for both groups. Though behavior targets were individualized for each participant (e.g., taking turns, personal space with friends), results indicated digitally delivered social stories were indeed effective in producing large effects for behavior change and this change was sustained at the 6-week follow-up in the social story group. Ultimately, there is a clear need for more rigorous science to determine the true effectiveness of the social stories approach.

Cool Versus Not Cool

One limitation of social stories is that it presents only the expected or desired normative behavior, provides the context and rationale for such behavior directly, and does not provide opportunity for skills practice. Though children are asked questions to ensure understanding of when and why a target social behavior is used, they are often not given the opportunity to critically evaluate social situations on their own, with support as needed. In one single-subject case design, researchers compared a social stories procedure to that of the “Cool Versus Not Cool” (CNC) procedure, a one-on-one supportive approach for autistic children. In CNC, the clinicians act out social situations, elicits the child’s evaluation of the behavior as “cool” or “not cool,” and then provides a naturalistic opportunity for the child to practice (Leaf et al., 2016). Leaf and colleagues compared the learning of 6 specific target social skills, with three skills taught using each procedure, in a 7-year-old boy on the autism spectrum. This participant successfully learned all three skills taught using the CNC procedure with 100% accuracy, while only showing minimal improvement in the skills taught via social stories (Leaf et al., 2016). The CNC procedure has been delivered in small group formats (Au et al., 2016; Milne et al., 2017) and has been implemented as part of eclectic program using behavioral teaching principles (Leaf et al., 2017). Though CNC has several additional single-subject case designs to support

its efficacy in preschoolers and school-age children with autism (e.g., Leaf et al., 2015; Cihon et al., 2021), it has yet to be specifically tested in a randomized control trial.

Remaking Recess

While all of the above studies utilize a format in which the child is the participant, researchers have also tested a novel approach in which school staff are trained in strategies to promote social engagement during unstructured times at school, recess and lunch (Kretzmann et al., 2015; Shih et al., 2019). School personnel received 10 Remaking Recess training sessions that included didactic information, modeling of strategies, and active coaching, as well as supplemental flexible coaching session to troubleshoot and refine strategies as needed. Specifically, school personnel were trained to identify children struggling to engage socially, scaffold that child’s joint engagement with peers, and learn how to fade scaffolding. In two RCTs, results showed that autistic children who had school staff receiving the Remaking Recess training showed significantly increased social engagement with peers during recess and/or lunch, though this engagement was not always high quality (Kretzmann et al., 2015; Shih et al., 2019). These studies replicate and extend other multiple baseline design studies that supported school personnel as effective agents of social skills change for autistic youth (Koegel et al., 2014; Feldman & Matos, 2013). A pilot study of four autistic children also suggests Remaking Recess can be feasibly and successfully applied with current school staff in well-resourced and under-resourced urban schools (Locke et al., 2019), which could enhance timely dissemination efforts given previous findings of significant barriers to implementation of evidence-based practices in school settings (Silveira-Zaldivar & Curtis, 2019). However, school personnel’s use of these program strategies was not maintained, suggesting ongoing supports to staff may be needed (Kretzmann et al., 2015).

Conclusions

In sum, research into programs and services targeting social awareness and social skills in autistic youth has burgeoned over the past decade since the first edition of this book. It is clear from the literature that the field of autism research has been successful in developing effective tools to promote clinically meaningful change in the social lives of neurodivergent children, which may serve as potent protective factors as individuals transition into adulthood and beyond. Indeed, participation in evidence-based SSP produces reductions in depression, suicidality, and anxiety in teens (Laugeson et al., 2012; Schiltz et al., 2018).

By far, the most well-supported approach in this domain for autistic youth is GSSP. GSSP approaches consistently produced significant gains across multiple measures of social functioning, ranging from parent-reported, self-reported, observational assessments, and neurobiological measures (e.g., EEG activity, cortisol). Some GSSPs also reported improvements in secondary domains, such as adaptive functioning and mental health symptoms. Peer-mediated approaches also appear to have positive benefits for autistic youth, though the methodological rigor and replications are weaker. Further, effects appear to be smaller and/or less consistent across measures. Although an emerging field, technology-driven approaches seem to show promise in improving social functioning, but more literature is needed to understand the benefits of technology to augment SSIs. Finally, though emotion recognition training has been well studied, the evidence for robot-assisted models or technology-assisted emotion recognition programs is mixed. Emotion recognition training programs consistently show limitations in generalization to social skills and social interactions, while the effectiveness of robot-assisted approaches is inconclusive.

Despite the expansion and innovation seen in social skills programming in the last decade, the strength of the evidence is not equal across all demographic groups or approaches (Safer-Lichtenstein et al., 2019). The most research

exists for school-age children, with fewer studies examining preschool and adolescent populations. Many are familiar with the neurodevelopmental salience of early intervention on later trajectories, but there is also evidence that adolescence represents a critical period of brain development and maturation, especially in social cognitive neural networks (Tseng et al., 2020), making it a time ripe for supportive services as well. Adolescence also prompts a normative reorientation away from family and toward peers, for which social skills are necessary. These shifts neurobiologically and contextually during adolescence are theorized to stimulate increased impairment for autistic individuals (Picci & Scherf, 2015), further urging ongoing investigation for social skills programming during this developmental stage.

Beyond age, samples were almost exclusively representative of autistic youth with average cognitive functioning and who were verbally fluent, with many studies specifying this in their eligibility criteria. Estimates vary, but approximately 30% of autistic individuals are minimally verbal, with an equal amount or more also meeting diagnostic criteria for co-occurring intellectual disability (Tager-Flusberg & Kasari, 2013; Lecavalier et al., 2011). For some of these individuals, communication targets may need to be prioritized, but social interaction and behavior goals also have the potential to be profoundly meaningful toward enhancing quality of life. Researchers and clinicians have a duty to adapt existing evidence-based social skills programs or develop new methods to meet the needs of autistic youth with higher support needs.

Participants also tend to be predominantly White, from North America, middle class income or higher, and male (Safer-Lichtenstein et al., 2019). Although males are overrepresented in autism as compared to the general population, exploring gender differences in social skills program outcomes is essential given gender differences observed in the autistic phenotype (Antezana et al., 2019; Hull et al., 2020b). Of particular relevance to this chapter, several of the phenotypic gender differences are related to social communication or functioning. As compared to autistic boys, autistic girls appear to be

better able and/or more likely to engage in camouflaging (e.g., using compensatory strategies to mask autistic traits or “pass” as neurotypical; Wood-Downie et al., 2021) and tend to have higher social motivation (Sedgewick et al., 2016; Hull et al., 2020b), and more advanced social communication skills (Wood-Downie et al., 2020). Similar to neurotypical females, autistic females are at higher risk for internalizing problems and compulsive/insistence on sameness RRBs than autistic boys (Hull et al., 2020b; Antezana et al., 2019). Such differences in presentation, strengths, and challenges, may also contribute to differences in engagement in and response to social skills program approaches. Future studies may consider over-sampling autistic females to more closely investigate this question. Growing attention to gender diversity in autism also warrants targeted attention to young people with intersectional identities that may impact their social world.

In examining SSP, it is also our duty to consider views of the autism community and expressed concerns that these approaches may perpetuate a cycle of autistic individuals trying to emulate predefined social norms rather than promoting acceptance of neurodiversity within society. Concerted efforts to “camouflage” one’s autism characteristics have been associated with increased mental health symptomatology in autistic adults (Cage et al., 2018; Cassidy et al., 2018; Hull et al., 2020a). However, research has also confirmed that autistic youth strongly desire friendship and social connection, while also feeling deeply impacted by social challenges (Cresswell et al., 2019). The authors of this chapter recommend that social skills programming be implemented with youth who *want* to learn such skills, rather than having such skills forced upon them by others. Such an approach enables access to the information, tools, and supportive services that autistic youth benefit from as they seek to decode social situations and form meaningful relationships, a frequent goal of autistic people. Another recommendation would be to involve autistic advocates continuously and intentionally in all stages of the development and implementation of social skills programming. More broadly,

ongoing psychoeducation and intervention efforts can also be aimed at promoting acceptance of neurodiversity and enhancing neuroinclusion in schools, workplaces, and society.

Finally, now that a foundation for effective social skills programming has been established through increased scientific attention, systemization and refinement of therapeutic techniques and processes is warranted. Randomized control trials comparing multiple social skills programs can provide information about which approach is superior and for whom. Dismantling studies in which program components are systematically included/removed or altered can help identify the essential active ingredients, with the potential to enhance efficiency and accessibility without sacrificing results. For example, Lopata and colleagues (2017) demonstrated through a direct comparative trial that children participating in the SummerMAX program showed similar gains with two different levels of child-adult ratios. Moderators of SSP response beyond demographic variables must be explored. Isolated studies that have tested for presence of such process variables have found significant results, elucidating the significance of therapeutic alliance with the group leader in GSSPs (Kang et al., 2021) and quality of student-teacher relationships in school-based interventions (Kasari et al., 2016). Kasari and colleagues (2021) suggest sequential randomization designs that can help inform service planning and adaptive ongoing decision-making based on a child’s progress. In particular, testing of components to promote implementation of skills knowledge into real world interactions and naturalistic generalization is another area where current social skills programs have room to grow (Jonsson et al., 2016), especially given meta-analytic findings of a discrepancy between social performance and social knowledge (Gates et al., 2018).

Future efforts might also be directed at dissemination and implementation efforts. Almost all of the social skills programs reviewed have been studied primarily by the developer of the intervention and their research lab, with few independent replications, cross-cultural adaptations, or community translation trials. One nota-

ble exception to this is the PEERS® for Adolescents program, which has been widely disseminated worldwide, with strong empirical support. Some of the characteristics that may differentiate PEERS® for Adolescents in this area include published commercially availability program delivery manuals, regular certified provider trainings in the model, and research collaborations with other universities across the globe.

In conclusion, while autism researchers have successfully developed effective programs to promote improved social outcomes among neurodiverse youth over the last decade, new challenges have emerged which warrant increased attention in the decades to come.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.
- Antezana, L., Factor, R. S., Condry, E. E., Strege, M. V., Scarpa, A., & Richey, J. A. (2019). Gender differences in restricted and repetitive behaviors and interests in youth with autism. *Autism Research*, 12(2), 274–283.
- Asmus, J. M., Carter, E. W., Moss, C. K., Biggs, E. E., Bolt, D. M., Born, T. L., et al. (2017). Efficacy and social validity of peer network interventions for high school students with severe disabilities. *American Journal on Intellectual and Developmental Disabilities*, 122(2), 118–137.
- Au, A., Mountjoy, T., Leaf, J. B., Leaf, R., Taubman, M., McEachin, J., & Tsuji, K. (2016). Teaching social behaviour to individuals diagnosed with autism spectrum disorder using the cool versus not cool procedure in a small group instructional format. *Journal of Intellectual and Developmental Disability*, 41(2), 115–124.
- Baker, E., Veytsman, E., Martin, A. M., Blacher, J., & Stavropoulos, K. K. (2020). Increased neural reward responsivity in adolescents with ASD after social skills intervention. *Brain Sciences*, 10(6), 402.
- Baron-Cohen, S., Golan, O., Wheelwright, S., & Hill, J. J. (2004). *Mindreading: The interactive guide to emotions*. London: Jessica Kingsley Limited.
- Bauminger-Zviely, N., Eytan, D., Hoshmand, S., & Ben-Shlomo, O. R. (2020). Preschool Peer Social Intervention (PPSI) to enhance social play, interaction, and conversation: Study outcomes. *Journal of Autism and Developmental Disorders*, 50(3), 844–863.
- Beaumont, R. (2015). The Secret Agent Society social-emotional skills training program for children with autism spectrum disorders. *The Australian Clinical Psychologist*, 1, 27–29.
- Beaumont, R., & Sofronoff, K. (2008). A multi-component social skills intervention for children with Asperger syndrome: The Junior Detective Training Program. *Journal of Child Psychology and Psychiatry*, 49(7), 743–753.
- Beaumont, R., Rotolone, C., & Sofronoff, K. (2015). The secret agent society social skills program for children with high-functioning autism spectrum disorders: A comparison of two school variants. *Psychology in the Schools*, 52(4), 390–402.
- Beaumont, R., Walker, H., Weiss, J., & Sofronoff, K. (2021). Randomized controlled trial of a video gaming-based social skills program for children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 1–14.
- Berggren, S., Fletcher-Watson, S., Milenkovic, N., Marschik, P. B., Bölte, S., & Jonsson, U. (2018). Emotion recognition training in autism spectrum disorder: A systematic review of challenges related to generalizability. *Developmental Neurorehabilitation*, 21(3), 141–154.
- Block, H. M., Radley, K. C., Jenson, W. R., Clark, E., & O'Neill, R. E. (2015). Effects of a multimedia social skills program in increasing social responses and initiations of children with autism spectrum disorder. *International Journal of School & Educational Psychology*, 3(1), 16–24.
- Bozkurt, S., & Vuran, S. (2014). An Analysis of the use of social stories in teaching social skills to children with autism spectrum disorders. *Educational Sciences: Theory and Practice*, 14(5), 1875–1892.
- Cage, E., Di Monaco, J., & Newell, V. (2018). Experiences of autism acceptance and mental health in autistic adults. *Journal of Autism and Developmental Disorders*, 48(2), 473–484.
- Carter, E. W., Asmus, J., Moss, C. K., Cooney, M., Weir, K., Vincent, L., et al. (2013). Peer network strategies to foster social connections among adolescents with and without severe disabilities. *Teaching Exceptional Children*, 46(2), 51–59.
- Cassidy, S., Bradley, L., Shaw, R., & Baron-Cohen, S. (2018). Risk markers for suicidality in autistic adults. *Molecular Autism*, 9(1), 1–14.
- Chan, J. M., Lang, R., Rispoli, M., O'Reilly, M., Sigafoos, J., & Cole, H. (2009). Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, 3(4), 876–889.
- Chang, Y. C., & Locke, J. (2016). A systematic review of peer-mediated interventions for children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 27, 1–10.
- Chevallier, C., Kohls, G., Troiani, V., Brodtkin, E. S., & Schultz, R. T. (2012). The social motivation theory of autism. *Trends in Cognitive Sciences*, 16(4), 231–239.
- Cihon, J. H., Ferguson, J. L., Lee, M., Leaf, J. B., Leaf, R., & McEachin, J. (2021). Evaluating the cool versus not cool procedure via telehealth. *Behavior Analysis in Practice*, 1–9.

- Constantino, J. N., & Gruber, C. P. (2012). *Social responsiveness scale: SRS-2*. Western Psychological Services.
- Corbett, B. A., Gunther, J. R., Comins, D., Price, J., Ryan, N., Simon, D., et al. (2011). Brief report: Theatre as therapy for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 41(4), 505–511.
- Corbett, B. A., Swain, D. M., Coke, C., Simon, D., Newsom, C., Houchins-Juarez, N., et al. (2014a). Improvement in social deficits in autism spectrum disorders using a theatre-based, peer-mediated intervention. *Autism Research*, 7(1), 4–16.
- Corbett, B. A., Qualls, L. R., Valencia, B., Fecteau, S. M., & Swain, D. M. (2014b). Peer-mediated theatrical engagement for improving reciprocal social interaction in autism spectrum disorder. *Frontiers in Pediatrics*, 2, 110.
- Corbett, B. A., Key, A. P., Qualls, L., Fecteau, S., Newsom, C., Coke, C., & Yoder, P. (2016). Improvement in social competence using a randomized trial of a theatre intervention for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(2), 658–672.
- Corbett, B. A., Blain, S. D., Ioannou, S., & Balser, M. (2017). Changes in anxiety following a randomized control trial of a theatre-based intervention for youth with autism spectrum disorder. *Autism*, 21(3), 333–343.
- Corbett, B. A., Ioannou, S., Key, A. P., Coke, C., Muscatello, R., Vandekar, S., & Muse, I. (2019). Treatment effects in social cognition and behavior following a theater-based intervention for youth with autism. *Developmental Neuropsychology*, 44(7), 481–494.
- Corona, L. L., Janicki, C., Milgramm, A., & Christodulu, K. V. (2019). Brief report: Reductions in parenting stress in the context of PEERS—A social skills intervention for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 49(12), 5073–5077.
- Costa, A. P., Charpiot, L., Lera, F. R., Ziafati, P., Nazarikhorram, A., van der Torre, L., & Steffgen, G. (2018). A comparison between a person and a robot in the attention, imitation, and repetitive and stereotypical behaviors of children with autism spectrum disorder. In *Proceedings workshop on social human-robot interaction of human-care service robots at HRI2018* (pp. 1–4).
- Cresswell, L., Hinch, R., & Cage, E. (2019). The experiences of peer relationships amongst autistic adolescents: A systematic review of the qualitative evidence. *Research in Autism Spectrum Disorders*, 61, 45–60.
- Dekker, V., Nauta, M. H., Timmerman, M. E., Mulder, E. J., van der Veen-Mulders, L., van den Hoofdakker, B. J., et al. (2019). Social skills group training in children with autism spectrum disorder: A randomized controlled trial. *European Child & Adolescent Psychiatry*, 28(3), 415–424.
- DeRosier, M. E., Swick, D. C., Davis, N. O., McMillen, J. S., & Matthews, R. (2011). The efficacy of a social skills group intervention for improving social behaviors in children with high functioning autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 41, 1033–1043.
- DiPietro, J., Kelemen, A., Liang, Y., & Sik-Lanyi, C. (2019). Computer-and robot-assisted therapies to aid social and intellectual functioning of children with autism spectrum disorder. *Medicina*, 55(8), 440.
- Draper Rodríguez, C., Strnadová, I., & Cumming, T. (2014). Using iPads with students with disabilities: Lessons learned from students, teachers, and parents. *Intervention in School and Clinic*, 49, 244–250.
- Edwards, B. M., Smart, E., King, G., Curran, C. J., & Kingsnorth, S. (2020). Performance and visual arts-based programs for children with disabilities: A scoping review focusing on psychosocial outcomes. *Disability and Rehabilitation*, 42(4), 574–585.
- Einfeld, S. L., Beaumont, R., Clark, T., Clarke, K. S., Costley, D., Gray, K. M., et al. (2018). School-based social skills training for young people with autism spectrum disorders. *Journal of Intellectual & Developmental Disability*, 43(1), 29–39.
- Eyberg, S. M., & Pincus, D. (1999). *Eyberg child behavior inventory and sutter-eyberg student behavior inventory-revised: Professional manual*. Psychological Assessment Resources.
- Factor, R. S., Rea, H. M., Laugeson, E. A., & Scarpa, A. (2022). Examining feasibility and outcomes of the PEERS® for preschoolers program. *Journal of Autism and Developmental Disorders*, 1–13.
- Feldman, E. K., & Matos, R. (2013). Training paraprofessionals to facilitate social interactions between children with autism and their typically developing peers. *Journal of Positive Behavior Interventions*, 15(3), 169–179.
- Frankel, F., & Myatt, R. (2003). *Children's friendship training*. Brunner-Routledge.
- Frankel, F., Myatt, R., Cantwell, D. P., & Feinberg, D. T. (1997). Parent-assisted transfer of children's social skills training: Effects on children with and without attention-deficit hyperactivity disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(8), 1056–1064.
- Frankel, F., Myatt, R., Sugar, C., Whitham, C., Gorospe, C. M., & Laugeson, E. (2010). A randomized controlled study of parent-assisted children's friendship training with children having autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 40(7), 827–842.
- Frankel, F. D., Gorospe, C. M., Chang, Y. C., & Sugar, C. A. (2011). Mothers' reports of play dates and observation of school playground behavior of children having high-functioning autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 52(5), 571–579.
- Freitag, C. M., Jensen, K., Elsuni, L., Sachse, M., Herpertz-Dahlmann, B., Schulte-Rüther, M., et al. (2016). Group-based cognitive behavioural psycho-

- therapy for children and adolescents with ASD: The randomized, multicentre, controlled SOSTA-net trial. *Journal of Child Psychology and Psychiatry*, 57(5), 596–605.
- Gardner, K. F., Carter, E. W., Gustafson, J. R., Hochman, J. M., Harvey, M. N., Mullins, T. S., & Fan, H. (2014). Effects of peer networks on the social interactions of high school students with autism spectrum disorders. *Research and Practice for Persons with Severe Disabilities*, 39(2), 100–118.
- Gates, J. A., Kang, E., & Lerner, M. D. (2017). Efficacy of group social skills interventions for youth with autism spectrum disorder: A systematic review and meta-analysis. *Clinical Psychology Review*, 52, 164–181.
- Gev, T., Rosenan, R., & Golan, O. (2017). Unique effects of the transporters animated series and of parental support on emotion recognition skills of children with ASD: Results of a randomized controlled trial. *Autism Research*, 10(5), 993–1003.
- Goh, H. S. E., Roslan, S., Baguri, E. M., Ong, S. Y., & Li, S. Y. (2020). The effects of children's friendship training on social skills and quality of play among children with autism spectrum disorder. *International Journal of Learning, Teaching and Educational Research*, 19, 225–245.
- Golan, O., & Baron-Cohen, S. (2007). Teaching adults with autism spectrum conditions to recognize emotions: Systematic training for empathizing difficulties. In E. McGregor, N. Nunez, K. Cebula, & J. C. Gomez (Eds.), *Autism: An integrated view* (pp. 236–259). Blackwell Publishing.
- Golan, O., Ashwin, E., Granader, Y., McClintock, S., Day, K., Leggett, V., & Baron-Cohen, S. (2010). Enhancing emotion recognition in children with autism spectrum conditions: An intervention using animated vehicles with real emotional faces. *Journal of Autism and Developmental Disorders*, 40(3), 269–279.
- Goldstein, A. P., & McGinnis, E. (1997). *Skillstreaming the adolescent: New strategies and perspectives for teaching prosocial skills*. Research Press.
- Gresham, F. M., & Elliott, S. N. (1990). *Social skills rating system: Manual*. American Guidance Service.
- Gresham, F. M., & Elliott, S. N. (2008). *Social skills improvement system rating scales manual*. NCS Pearson.
- Grossard, C., Grynspan, O., Serret, S., Jouen, A. L., Bailly, K., & Cohen, D. (2017). Serious games to teach social interactions and emotions to individuals with autism spectrum disorders (ASD). *Computers and Education*, 113, 195–211.
- Hanna, N., Lydon, H., Holloway, J., Barry, L., & Walsh, E. (2021). Apps to teach social skills to individuals with autism spectrum disorder: A review of the embedded behaviour change procedures. *Review Journal of Autism and Developmental Disorders*, 1–17.
- Hanrahan, R., Smith, E., Johnson, H., Constantin, A., & Brosnan, M. (2020). A pilot randomised control trial of digitally-mediated social stories for children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 50(12), 4243–4257.
- Hochman, J. M., Carter, E. W., Bottema-Beutel, K., Harvey, M. N., & Gustafson, J. R. (2015). Efficacy of peer networks to increase social connections among high school students with and without autism spectrum disorder. *Exceptional Children*, 82(1), 96–116.
- Hopkins, I. M., Gower, M. W., Perez, T. A., Smith, D. S., Amthor, F. R., Wimsatt, F. C., & Biasini, F. J. (2011). Avatar assistant: Improving social skills in students with an ASD through a computer-based intervention. *Journal of Autism and Developmental Disorders*, 41(11), 1543–1555.
- Hull, L., Lai, M. C., Baron-Cohen, S., Allison, C., Smith, P., Petrides, K. V., & Mandy, W. (2020a). Gender differences in self-reported camouflaging in autistic and non-autistic adults. *Autism*, 24(2), 352–363.
- Hull, L., Petrides, K. V., & Mandy, W. (2020b). The female autism phenotype and camouflaging: A narrative review. *Review Journal of Autism and Developmental Disorders*, 1–12.
- Hume, K., Steinbrenner, J. R., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., et al. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. *Journal of Autism and Developmental Disorders*, 1–20.
- Huskens, B., Verschuur, R., Gillesen, J., Didden, R., & Barakova, E. (2013). Promoting question-asking in school-aged children with autism spectrum disorders: Effectiveness of a robot intervention compared to a human-trainer intervention. *Developmental Neurorehabilitation*, 16(5), 345–356.
- Huskens, B., Palmen, A., Van der Werff, M., Lourens, T., & Barakova, E. (2015). Improving collaborative play between children with autism spectrum disorders and their siblings: The effectiveness of a robot-mediated intervention based on Lego® therapy. *Journal of Autism and Developmental Disorders*, 45(11), 3746–3755.
- Idris, S., van Pelt, B. J., Jagersma, G., Duvekot, J., Maras, A., van der Ende, J., et al. (2022). A randomized controlled trial to examine the effectiveness of the Dutch version of the Program for the Education and Enrichment of Relational Skills (PEERS®). *BMC Psychiatry*, 22(1), 1–16.
- Jenson, W. R., Bowen, J., Clark, E., Block, H., Gabrielsen, T., Hood, J., et al. (2011). *Superheroes social skills*. Pacific Northwest.
- Jonsson, U., Choque Olsson, N., & Bölte, S. (2016). Can findings from randomized controlled trials of social skills training in autism spectrum disorder be generalized? The neglected dimension of external validity. *Autism*, 20(3), 295–305.
- Kamps, D., Thiemann-Bourque, K., Heitzman-Powell, L., Schwartz, I., Rosenberg, N., Mason, R., & Cox, S. (2015). A comprehensive peer network intervention to improve social communication of children with autism spectrum disorders: A randomized trial in kindergarten and first grade. *Journal of Autism and Developmental Disorders*, 45(6), 1809–1824.

- Kang, E., Gioia, A., Pugliese, C. E., Islam, N. Y., Martinez-Pedraza, F. D. L., Girard, R. M., et al. (2021). Alliance-outcome associations in a community-based social skills intervention for youth with autism spectrum disorder. *Behavior Therapy*, 52(2), 324–337.
- Karst, J. S., Van Hecke, A. V., Carson, A. M., Stevens, S., Schohl, K., & Dolan, B. (2015). Parent and family outcomes of PEERS: A social skills intervention for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 45(3), 752–765.
- Kasari, C., Rotheram-Fuller, E., Locke, J., & Gulsrud, A. (2012). Making the connection: Randomized controlled trial of social skills at school for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 53(4), 431–439.
- Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., et al. (2016). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology and Psychiatry*, 57(2), 171–179.
- Kasari, C., Shire, S., Shih, W., & Almirall, D. (2021). Getting SMART about social skills interventions for students with ASD in inclusive classrooms. *Exceptional Children*, 00144029211007148.
- Knott, F., Dunlop, A. W., & Mackay, T. (2006). Living with ASD: How do children and their parents assess their difficulties with social interaction and understanding? *Autism*, 10(6), 609–617.
- Koegel, R. L., Kim, S., & Koegel, L. K. (2014). Training paraprofessionals to improve socialization in students with ASD. *Journal of Autism and Developmental Disorders*, 44(9), 2197–2208.
- Kokina, A., & Kern, L. (2010). Social Story™ interventions for students with autism spectrum disorders: A meta-analysis. *Journal of Autism and Developmental Disorders*, 40(7), 812–826.
- Kretzmann, M., Shih, W., & Kasari, C. (2015). Improving peer engagement of children with autism on the school playground: A randomized controlled trial. *Behavior Therapy*, 46(1), 20–28.
- Kumazaki, H., Warren, Z., Swanson, A., Yoshikawa, Y., Matsumoto, Y., Takahashi, H., et al. (2018a). Can robotic systems promote self-disclosure in adolescents with autism spectrum disorder? A pilot study. *Frontiers in Psychiatry*, 9, 36.
- Kumazaki, H., Yoshikawa, Y., Yoshimura, Y., Ikeda, T., Hasegawa, C., Saito, D. N., et al. (2018b). The impact of robotic intervention on joint attention in children with autism spectrum disorders. *Molecular Autism*, 9(1), 1–10.
- Kumazaki, H., Muramatsu, T., Yoshikawa, Y., Matsumoto, Y., Ishiguro, H., Kikuchi, M., et al. (2020). Optimal robot for intervention for individuals with autism spectrum disorders. *Psychiatry and Clinical Neurosciences*, 74(11), 581–586.
- Laugeson, E. A., & Frankel, F. (2011). *Social skills 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.
- Laugeson, E. A., Frankel, F., Gantman, A., Dillon, A. R., & Mogil, C. (2012). Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of Autism and Developmental Disorders*, 42(6), 1025–1036.
- Laugeson, E. A., Ellingsen, R., Sanderson, J., Tucci, L., & Bates, S. (2014). The ABC's of teaching social skills to adolescents with autism spectrum disorder in the classroom: The UCLA PEERS® program. *Journal of Autism and Developmental Disorders*, 44(9), 2244–2256.
- Laugeson, E. A., Gantman, A., Kapp, S. K., Orenski, K., & Ellingsen, R. (2015). A randomized controlled trial to improve social skills in young adults with autism spectrum disorder: The UCLA PEERS® program. *Journal of Autism and Developmental Disorders*, 45(12), 3978–3989.
- Leaf, J. B., Taubman, M., Leaf, J., Dale, S., Tsuji, K., Kassardjian, A., et al. (2015). Teaching social interaction skills using cool versus not cool. *Child & Family Behavior Therapy*, 37(4), 321–334.
- Leaf, J. B., Mitchell, E., Townley-Cochran, D., McEachin, J., Taubman, M., & Leaf, R. (2016). Comparing social stories™ to cool versus not cool. *Education and Treatment of Children*, 39(2), 173–185.
- Leaf, J. B., Leaf, J. A., Milne, C., Taubman, M., Oppenheim-Leaf, M., Torres, N., et al. (2017). An evaluation of a behaviorally based social skills group for individuals diagnosed with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 47(2), 243–259.
- Lecavalier, L., Snow, A. V., & Norris, M. (2011). Autism spectrum disorders and intellectual disability. In *International handbook of autism and pervasive developmental disorders* (pp. 37–51). Springer Science & Business Media.
- Lerner, M. D., & Levine, K. (2007). The Spotlight Program: An integrative approach to teaching social pragmatics using dramatic principles and techniques. *The Journal of Developmental Processes*, 2(2), 91–102.
- Lerner, M. D., & Mikami, A. Y. (2012). A preliminary randomized controlled trial of two social skills interventions for youth with high-functioning autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 27(3), 147–157.
- Lerner, M. D., Mikami, A. Y., & Levine, K. (2011). Socio-dramatic affective-relational intervention for adolescents with Asperger syndrome & high functioning autism: Pilot study. *Autism*, 15(1), 21–42.
- Lin, S. K., Tsai, C. H., Li, H. J., Huang, C. Y., & Chen, K. L. (2017). Theory of mind predominantly associated with the quality, not quantity, of pretend play in children with autism spectrum disorder. *European Child & Adolescent Psychiatry*, 26(10), 1187–1196.

- Lindsay, S., Hounsell, K. G., & Cassiani, C. (2017). A scoping review of the role of LEGO® therapy for improving inclusion and social skills among children and youth with autism. *Disability and Health Journal*, 10(2), 173–182.
- Locke, J., Kang-Yi, C., Pellecchia, M., & Mandell, D. S. (2019). It's messy but real: A pilot study of the implementation of a social engagement intervention for children with autism in schools. *Journal of Research in Special Educational Needs*, 19(2), 135–144.
- Lopata, C., Thomeer, M. L., Volker, M. A., & Nida, R. E. (2006). Effectiveness of a cognitive-behavioral treatment on the social behaviors of children with Asperger disorder. *Focus on Autism and Other Developmental Disabilities*, 21(4), 237–244.
- Lopata, C., Thomeer, M. L., Volker, M. A., Nida, R. E., & Lee, G. K. (2008). Effectiveness of a manualized summer social treatment program for high-functioning children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 38(5), 890–904.
- Lopata, C., Thomeer, M. L., Rodgers, J. D., Donnelly, J. P., & McDonald, C. A. (2016). RCT of mind reading as a component of a psychosocial treatment for high-functioning children with ASD. *Research in Autism Spectrum Disorders*, 21, 25–36.
- Lopata, C., Lipinski, A. M., Thomeer, M. L., Rodgers, J. D., Donnelly, J. P., McDonald, C. A., & Volker, M. A. (2017). Open-trial pilot study of a comprehensive outpatient psychosocial treatment for children with high-functioning autism spectrum disorder. *Autism*, 21(1), 108–116.
- Lopata, C., McDonald, C. A., Thomeer, M. L., Donnelly, J. P., Jordan, A. K., & Rodgers, J. D. (2018a). Pilot trial of a comprehensive summer psychosocial treatment for high-functioning young children with ASD. *Journal of Developmental and Physical Disabilities*, 30(4), 439–454.
- Lopata, C., Thomeer, M. L., Rodgers, J. D., Donnelly, J. P., McDonald, C. A., Volker, M. A., et al. (2018b). Cluster randomized trial of a school intervention for children with autism spectrum disorder. *Journal of Clinical Child & Adolescent Psychology*, 48, 922–933.
- Lordo, D. N., Bertolin, M., Sudikoff, E. L., Keith, C., Braddock, B., & Kaufman, D. A. (2017). Parents perceive improvements in socio-emotional functioning in adolescents with ASD following social skills treatment. *Journal of Autism and Developmental Disorders*, 47(1), 203–214.
- Luckhardt, C., Kröger, A., Elsuni, L., Cholemkery, H., Bender, S., & Freitag, C. M. (2018). Facilitation of biological motion processing by group-based autism specific social skills training. *Autism Research*, 11(10), 1376–1387.
- Lung, F. W., Shu, B. C., Chiang, T. L., & Lin, S. J. (2019). Prevalence of bullying and perceived happiness in adolescents with learning disability, intellectual disability, ADHD, and autism spectrum disorder: In the Taiwan Birth Cohort Pilot Study. *Medicine*, 98(6), e14483.
- Maag, J. W. (2006). Social skills training for students with emotional and behavioral disorders: A review of reviews. *Behavioral Disorders*, 4–17.
- Mandelberg, J., Laugeson, E. A., Cunningham, T. D., Ellingsen, R., Bates, S., & Frankel, F. (2014a). 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.
- Mandelberg, J., Frankel, F., Cunningham, T., Gorospe, C., & Laugeson, E. A. (2014b). Long-term outcomes of parent-assisted social skills intervention for high-functioning children with autism spectrum disorders. *Autism*, 18(3), 255–263.
- Marro, B. M., Kang, E., Hauschild, K. M., Normansell, K. M., Abu-Ramadan, T. M., & Lerner, M. D. (2019). Social performance-based interventions promote gains in social knowledge in the absence of explicit training for youth with autism spectrum disorder. *Bulletin of the Menninger Clinic*, 83(3), 301–325.
- Marshall, D., Wright, B., Allgar, V., Adamson, J., Williams, C., Ainsworth, H., et al. (2016). Social Stories in mainstream schools for children with autism spectrum disorder: A feasibility randomised controlled trial. *BMJ Open*, 6(8), e011748.
- Mason, R., Kamps, D., Turcotte, A., Cox, S., Feldmiller, S., & Miller, T. (2014). Peer mediation to increase communication and interaction at recess for students with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 8(3), 334–344.
- Matthews, N. L., Orr, B. C., Warriner, K., DeCarlo, M., Sorensen, M., Laffin, 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.
- Mayes, S. D., Calhoun, S. L., Murray, M. J., & Zahid, J. (2011). Variables associated with anxiety and depression in children with autism. *Journal of Developmental and Physical Disabilities*, 23(4), 325–337.
- Mazurek, M. O. (2014). Loneliness, friendship, and well-being in adults with autism spectrum disorders. *Autism*, 18(3), 223–232.
- McCoy, A., Holloway, J., Healy, O., Rispoli, M., & Neely, L. (2016). A systematic review and evaluation of video modeling, role-play and computer-based instruction as social skills interventions for children and adolescents with high-functioning autism. *Review Journal of Autism and Developmental Disorders*, 3(1), 48–67.
- McFadden, B., Kamps, D., & Heitzman-Powell, L. (2014). Social communication effects of peer-mediated recess intervention for children with autism. *Research in Autism Spectrum Disorders*, 8(12), 1699–1712.
- McGill, R. J., Baker, D., & Busse, R. T. (2015). Social Story™ interventions for decreasing challenging behaviours: A single-case meta-analysis 1995–2012. *Educational Psychology in Practice*, 31(1), 21–42.

- McGinnis, E., & Goldstein, A. P. (1997). *Skillstreaming the elementary school child: New strategies and perspectives for teaching prosocial skills*. Research Press.
- McVey, A. J., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., Casnar, C. L., et al. (2016). A replication and extension of the PEERS® for young adults social skills intervention: Examining effects on social skills and social anxiety in young adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(12), 3739–3754.
- Mendelson, J. L., Gates, J. A., & Lerner, M. D. (2016). Friendship in school-age boys with autism spectrum disorders: A meta-analytic summary and developmental, process-based model. *Psychological Bulletin*, 142(6), 601.
- Milne, C., Leaf, J. A., Leaf, J. B., Cihon, J. H., Torres, N., Townley-Cochran, D., et al. (2017). Teaching joint attention and peer to peer communication using the cool versus not cool procedure in a large group setting. *Journal of Developmental and Physical Disabilities*, 29(5), 777–796.
- Mintz, J., Branch, C., March, C., & Lerman, S. (2012). Key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with autistic spectrum disorders. *Computers and Education*, 58, 53–62.
- 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.
- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry*, 7(1), 60.
- Nasamran, A., Witmer, S. E., & Los, J. E. (2017). Exploring predictors of postsecondary outcomes for students with autism spectrum disorder. *Education and Training in Autism and Developmental Disabilities*, 52(4), 343–356.
- O'Donoghue, M., O'Dea, A., O'Leary, N., Kennedy, N., Forbes, J., & Murphy, C. A. (2021). Systematic review of peer-mediated intervention for children with autism who are minimally verbal. *Review Journal of Autism and Developmental Disorders*, 8(1), 51–66.
- Olsson, N. C., Flygare, O., Coco, C., Görling, A., Råde, A., Chen, Q., et al. (2017). Social skills training for children and adolescents with autism spectrum disorder: A randomized controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, 56(7), 585–592.
- Orsmond, G. I., Shattuck, P. T., Cooper, B. P., Sterzing, P. R., & Anderson, K. A. (2013). Social participation among young adults with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43(11), 2710–2719.
- Owens, G., Granader, Y., Humphrey, A., & Baron-Cohen, S. (2008). LEGO® therapy and the social use of language programme: An evaluation of two social skills interventions for children with high functioning autism and Asperger syndrome. *Journal of Autism and Developmental Disorders*, 38(10), 1944–1957.
- Park, M. N., Moulton, E. E., & Laugeson, E. A. (2023). Parent-assisted social skills training for children with autism spectrum disorder: PEERS for preschoolers. *Focus on Autism and Other Developmental Disabilities*, 38(2), 80–89.
- Paul, R. (2003). Promoting social communication in high functioning individuals with autistic spectrum disorders. *Child and Adolescent Psychiatric Clinics of North America*, 12(1), 87–106.
- Petrina, N., Carter, M., & Stephenson, J. (2014). The nature of friendship in children with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, 8(2), 111–126.
- Picci, G., & Scherf, K. S. (2015). A two-hit model of autism: Adolescence as the second hit. *Clinical Psychological Science*, 3(3), 349–371.
- Qi, C. H., Barton, E. E., Collier, M., Lin, Y. L., & Montoya, C. (2018). A systematic review of effects of social stories interventions for individuals with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, 33(1), 25–34.
- Rabin, S. J., Israel-Yaacov, S., Laugeson, E. A., Mor-Snir, I., & Golan, O. (2018). A randomized controlled trial evaluating the Hebrew adaptation of the PEERS® intervention: Behavioral and questionnaire-based outcomes. *Autism Research*, 11(8), 1187–1200.
- Rabin, S. J., Laugeson, E. A., Mor-Snir, I., & Golan, O. (2021). An Israeli RCT of PEERS®: Intervention effectiveness and the predictive value of parental sensitivity. *Journal of Clinical Child & Adolescent Psychology*, 50(6), 933–949.
- Radley, K. C., Ford, W. B., McHugh, M. B., et al. (2015). Brief report: Use of superheroes social skills to promote accurate social skill use in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 45, 3048–3054.
- Radley, K. C., Hanglein, J., & Arak, M. (2016). School-based social skills training for preschool-age children with autism spectrum disorder. *Autism*, 20(8), 938–951.
- Radley, K. C., McHugh, M. B., Taber, T., Battaglia, A. A., & Ford, W. B. (2017). School-based social skills training for children with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, 32(4), 256–268.
- Ratto, A. B., Turner-Brown, L., Rupp, B. M., Mesibov, G. B., & Penn, D. L. (2011). Development of the contextual assessment of social skills (CASS): A role play measure of social skill for individuals with high-functioning autism. *Journal of Autism and Developmental Disorders*, 41(9), 1277–1286.
- Reichow, B., & Volkmar, F. R. (2010). Social skills interventions for individuals with autism: Evaluation for evidence-based practices within a best evidence synthesis framework. *Journal of Autism and Developmental Disorders*, 40(2), 149–166.

- Reynolds, C. R., & Kamphaus, R. W. (2004). *Behavior assessment system for children* (2nd ed.). Pearson Assessments.
- Rice, L. M., Wall, C. A., Fogel, A., & Shic, F. (2015). Computer-assisted face processing instruction improves emotion recognition, mentalizing, and social skills in students with ASD. *Journal of Autism and Developmental Disorders*, 45(7), 2176–2186.
- Safer-Lichtenstein, J., Hamilton, J. C., & McIntyre, L. L. (2019). Examining demographics in randomized controlled trials of group-based social skills interventions for individuals with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 49(8), 3453–3461.
- Saleh, M. A., Hanapiah, F. A., & Hashim, H. (2021). Robot applications for autism: A comprehensive review. *Disability and Rehabilitation: Assistive Technology*, 16(6), 580–602.
- Schiltz, H. K., McVey, A. J., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., et al. (2018). Changes in depressive symptoms among adolescents with ASD completing the PEERS® social skills intervention. *Journal of Autism and Developmental Disorders*, 48(3), 834–843.
- Schiltz, H. K., McVey, A. J., Dolan Wozniak, B., Haendel, A. D., Stanley, R., Arias, A., et al. (2021). The role of loneliness as a mediator between autism features and mental health among autistic young adults. *Autism*, 25(2), 545–555.
- Schohl, K. A., Van Hecke, A. V., Carson, A. M., Dolan, B., Karst, J., & Stevens, S. (2014). A replication and extension of the PEERS intervention: Examining effects on social skills and social anxiety in adolescents with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 44(3), 532–545.
- Sedgewick, F., Hill, V., Yates, R., Pickering, L., & Pellicano, E. (2016). Gender differences in the social motivation and friendship experiences of autistic and non-autistic adolescents. *Journal of Autism and Developmental Disorders*, 46(4), 1297–1306.
- Semel, E., Wiig, E. H., & Secord, W. A. (2003). *Clinical evaluation of language fundamentals, fourth edition (CELF-4)*. The Psychological Corporation/A Harcourt Assessment Company.
- Shic, F., & Goodwin, M. (2015). Introduction to technologies in the daily lives of individuals with autism. *Journal of Autism and Developmental Disorders*, 45, 3773–3776.
- Shih, W., Dean, M., Kretzmann, M., Locke, J., Senturk, D., Mandell, D. S., ... & Kasari, C. (2019). Remaking recess intervention for improving peer interactions at school for children with autism spectrum disorder: Multisite randomized trial. *School Psychology Review*, 48(2), 133–144.
- Shum, K. K. M., Cho, W. K., Lam, L. M. O., Laugeson, E. A., Wong, W. S., & Law, L. S. (2019). Learning how to make friends for Chinese adolescents with autism spectrum disorder: A randomized controlled trial of the Hong Kong Chinese version of the PEERS® intervention. *Journal of Autism and Developmental Disorders*, 49(2), 527–541.
- Silveira-Zaldivar, T., & Curtis, H. (2019). “I’m not trained for this!” and other barriers to evidence-based social skills interventions for elementary students with high functioning autism in inclusion. *International Electronic Journal of Elementary Education*, 12(1), 53–66.
- Sim, L., Whiteside, S. P., Dittner, C. A., & Mellon, M. (2006). Effectiveness of a social skills training program with school age children: Transition to the clinical setting. *Journal of Child and Family Studies*, 15, 408–417.
- Simpson, K., & Keen, D. (2011). Music interventions for children with autism: Narrative review of the literature. *Journal of Autism and Developmental Disorders*, 41(11), 1507–1514.
- So, W. C., Wong, M. K. Y., Lam, W. Y., Cheng, C. H., Yang, J. H., Huang, Y., et al. (2018). Robot-based intervention may reduce delay in the production of intransitive gestures in Chinese-speaking preschoolers with autism spectrum disorder. *Molecular Autism*, 9(1), 1–16.
- Sofronoff, K., Silva, J., & Beaumont, R. (2017). The secret agent society social-emotional skills program for children with a high-functioning autism spectrum disorder: A parent-directed trial. *Focus on Autism and Other Developmental Disabilities*, 32(1), 55–70.
- Soorya, L. V., Siper, P. M., Beck, T., Soffes, S., Halpern, D., Gorenstein, M., et al. (2015). Randomized comparative trial of a social cognitive skills group for children with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(3), 208–216.
- Sparrow, S. S., Cicchetti, D. V., Balla, D. A., & Doll, E. A. (2005). *Vineland adaptive behavior scales: Survey forms manual*. American Guidance Service.
- Spence, S. H. (1995). *Social skills questionnaire. Social skills training: Enhancing social competence with children and adolescents: Photocopiable resource book*. NFER-Nelson.
- Sreckovic, M. A., Hume, K., & Able, H. (2017). Examining the efficacy of peer network interventions on the social interactions of high school students with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 47(8), 2556–2574.
- Tager-Flusberg, H., & Kasari, C. (2013). Minimally verbal school-aged children with autism spectrum disorder: The neglected end of the spectrum. *Autism Research*, 6(6), 468–478.
- Tang, J. S., Chen, N. T., Falkmer, M., Bölte, S., & Girdler, S. (2019). A systematic review and meta-analysis of social emotional computer based interventions for autistic individuals using the serious game framework. *Research in Autism Spectrum Disorders*, 66, 101412.
- Thomeer, M. L., Lopata, C., Volker, M. A., Toomey, J. A., Lee, G. K., Smerbeck, A. M., et al. (2012). Randomized clinical trial replication of a psychosocial treatment for children with high-functioning autism spectrum disorders. *Psychology in the Schools*, 49(10), 942–954.

- Thomeer, M. L., Smith, R. A., Lopata, C., Volker, M. A., Lipinski, A. M., Rodgers, J. D., et al. (2015). Randomized controlled trial of mind reading and in vivo rehearsal for high-functioning children with ASD. *Journal of Autism and Developmental Disorders*, 45(7), 2115–2127.
- Thomeer, M. L., Lopata, C., Donnelly, J. P., Booth, A., Shanahan, A., Federiconi, V., et al. (2019). Community effectiveness RCT of a comprehensive psychosocial treatment for high-functioning children with ASD. *Journal of Clinical Child & Adolescent Psychology*, 48(sup1), S119–S130.
- Thomeer, M. L., Lopata, C., Rodgers, J. D., Donnelly, J. P., Jordan, A. K., Booth, A. J., & McDonald, C. A. (2020). Feasibility and initial efficacy of a cognitive-behavioral summer treatment for young children with ASD. *Journal of Developmental and Physical Disabilities*, 1–20.
- Tripathi, I., Estabillo, J. A., Moody, C. T., & Laugeson, E. A. (2021). Long-term treatment outcomes of PEERS® for preschoolers: A parent-mediated social skills training program for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 1–17.
- Tseng, A., Biagianti, B., Francis, S. M., Conelea, C. A., & Jacob, S. (2020). Social cognitive interventions for adolescents with autism spectrum disorders: A systematic review. *Journal of Affective Disorders*, 274, 199–204.
- Van Hecke, A. V., Stevens, S., Carson, A. M., Karst, J. S., Dolan, B., Schohl, K., McKindles, R. J., Rummel, R., & Brockman, S. (2015). Measuring the plasticity of social approach: A randomized controlled trial of the effects of the PEERS intervention on EEG asymmetry in adolescents with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 45(2), 316–335.
- Warren, Z., Zheng, Z., Das, S., Young, E. M., Swanson, A., Weitlauf, A., & Sarkar, N. (2015). Brief report: Development of a robotic intervention platform for young children with ASD. *Journal of Autism and Developmental Disorders*, 45(12), 3870–3876.
- Watkins, L., O'Reilly, M., Kuhn, M., Gevarter, C., Lancioni, G. E., Sigafoos, J., & Lang, R. (2015). A review of peer-mediated social interaction interventions for students with autism in inclusive settings. *Journal of Autism and Developmental Disorders*, 45, 1070–1083.
- Watkins, L., Kuhn, M., Ledbetter-Cho, K., Gevarter, C., & O'Reilly, M. (2017). Evidence-based social communication interventions for children with autism spectrum disorder. *The Indian Journal of Pediatrics*, 84(1), 68–75.
- Wetherby, A. M., Watt, N., Morgan, L., & Shumway, S. (2007). Social communication profiles of children with autism spectrum disorders late in the second year of life. *Journal of Autism and Developmental Disorders*, 37(5), 960–975.
- White, S. W., Albano, A. M., Johnson, C. R., Kasari, C., Ollendick, T., Klin, A., et al. (2010). Development of a cognitive-behavioral intervention program to treat anxiety and social deficits in teens with high-functioning autism. *Clinical Child and Family Psychology Review*, 13(1), 77–90.
- White, S. W., Ollendick, T., Albano, A. M., Oswald, D., Johnson, C., Southam-Gerow, M. A., et al. (2013). Randomized controlled trial: Multimodal anxiety and social skill intervention for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43(2), 382–394.
- Williams, B. T., Gray, K. M., & Tonge, B. J. (2012). Teaching emotion recognition skills to young children with autism: A randomised controlled trial of an emotion training programme. *Journal of Child Psychology and Psychiatry*, 53(12), 1268–1276.
- Wolke, D., & Lereya, S. T. (2015). Long-term effects of bullying. *Archives of Disease in Childhood*, 100(9), 879–885.
- Wolfberg, P., Bottema-Beutel, K., & DeWitt, M. (2012). Including children with autism in social and imaginary play with typical peers: Integrated play groups model. *American Journal of Play*, 5(1), 55–80.
- Wolfberg, P., DeWitt, M., Young, G. S., & Nguyen, T. (2015). Integrated play groups: Promoting symbolic play and social engagement with typical peers in children with ASD across settings. *Journal of Autism and Developmental Disorders*, 45(3), 830–845.
- Wolstencroft, J., Robinson, L., Srinivasan, R., Kerry, E., Mandy, W., & Skuse, D. (2018). A systematic review of group social skills interventions, and meta-analysis of outcomes, for children with high functioning ASD. *Journal of Autism and Developmental Disorders*, 48(7), 2293–2307.
- Wood-Downie, H., Wong, B., Kovshoff, H., Cortese, S., & Hadwin, J. A. (2020). Research review: A systematic review and meta-analysis of sex/gender differences in social interaction and communication in autistic and nonautistic children and adolescents. *Journal of Child Psychology and Psychiatry*, 62, 922–936.
- Wood-Downie, H., Wong, B., Kovshoff, H., Mandy, W., Hull, L., & Hadwin, J. A. (2021). Sex/gender differences in camouflaging in children and adolescents with autism. *Journal of Autism and Developmental Disorders*, 51(4), 1353–1364.
- Wright, M. F., & Wachs, S. (2019). Does PEER rejection moderate the associations among cyberbullying victimization, depression, and anxiety among adolescents with autism spectrum disorder? *Children*, 6(3), 41.
- Wright, B., Marshall, D., Adamson, J., Ainsworth, H., Ali, S., Allgar, V., et al. (2016). Social Stories™ to alleviate challenging behaviour and social difficulties exhibited by children with autism spectrum disorder in mainstream schools: Design of a manualised training toolkit and feasibility study for a cluster randomised controlled trial with nested qualitative and cost-effectiveness components. *Health Technology Assessment*, 20(6), 1–258.
- Yamada, T., Miura, Y., Oi, M., Akatsuka, N., Tanaka, K., Tsukidate, N., et al. (2020). Examining the treatment efficacy of PEERS in Japan: Improving social skills among

- adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 50(3), 976–997.
- Yoo, H. J., Bahn, G., Cho, I. H., Kim, E. K., Kim, J. H., Min, J. W., et al. (2014). A randomized controlled trial of the Korean version of the PEERS® parent-assisted social skills training program for teens with ASD. *Autism Research*, 7(1), 145–161.
- Young, R. L., & Posselt, M. (2012). Using the transporters DVD as a learning tool for children with autism spectrum disorders (ASD). *Journal of Autism and Developmental Disorders*, 42(6), 984–991.
- Yun, S. S., Choi, J., Park, S. K., Bong, G. Y., & Yoo, H. (2017). Social skills training for children with autism spectrum disorder using a robotic behavioral intervention system. *Autism Research*, 10(7), 1306–1323.
- Zhang, Q., Wu, R., Zhu, S., Le, J., Chen, Y., Lan, C., et al. (2021). Facial emotion training as an intervention in autism spectrum disorder: A meta-analysis of randomized controlled trials. *Autism Research*, 14, 2169–2182.
- 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*, 1–16.