Social Skills Training for Youth with Autism Spectrum Disorders: A Follow-Up

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KEYWORDS

• Autism • Social skills • Youth • Interventions • Evidence-based practice

KEY POINTS

- Social communication remains one of the core deficits associated with autism spectrum disorders.
- Several interventions with strong empirical support are available for practitioners to choose from and information on them is readily available.
- Strategies are most successful when they are implemented with fidelity and match the individual's skill deficit.
- Assessment measures have been updated to identify social deficits and to align more closely with DSM-5 diagnostic criteria.

INTRODUCTION

The substantial increase in prevalence rates for autism spectrum disorders (ASD) over the last 10 years has sparked debate regarding cause and critical need for effective services. The most recent reports released by the Centers for Disease Control and Prevention (CDC) estimate that as many as 1 in every 68 children are affected by ASD, a 78% increase from 2002 to 2010.[1] It affects more boys than girls with prevalence estimates being as high as 1 in 42 boys being diagnosed with ASD compared with 1 in 189 girls. The increase in prevalence rates has been referred to as an "epidemic" by some autism organizations and news organizations. However, the

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Abbreviations	
ASD	Autism spectrum disorders
CBI	Cognitive behavioral intervention
CDC	Centers for Disease Control and Prevention
DSM	Diagnostic and Statistical Manual of Mental Disorder
EBP	Evidence-based practices
ESDM	Early Start Denver Model
NAC	National Autism Center
NPDC	National Professional Development Center on Autism Spectrum Disorders
PRT	Pivotal response training
SCD	Social (pragmatic) communication disorder
SRS-2	Social Responsiveness Scale-2
SSIS	Social Skills Improvement System
SSRS	Social Skills Rating System
SST	Social skills training
VSM	Video self-modeling

CDC has pointedly chosen to avoid using the term "epidemic," opting instead to refer to the increase as an "important public health concern." Irrespective of the terms used to describe the increase in prevalence, the demand for effective intervention modalities for youth with ASD has never been greater. Educators, therapists, and physicians have been inundated with an increase in the number of students and patients with ASD in their classrooms and clinics.

Definition of Autism

The definition of autism has changed several times since first described by Leo Kanner[2] in 1943. However, one characteristic has remained consistent: a marked impairment in social relatedness. In fact, "social communication" remains 1 of the 2 core deficits of ASD in the most recent edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-5).[3] According to the manual, characteristic deficits in social communication and social interaction occur across multiple contexts. Specifically, they include the following:

1. Deficits in social emotional reciprocity
2. Deficits in nonverbal communicative behaviors used for social interaction
3. Deficits in developing, maintaining, and understanding relationships.

Historically, the impairment in social relatedness presents itself in several ways, including limited eye contact, limited engagement with others, a tendency to be alone, impaired Theory of Mind, deficits in social reciprocity, and the inability to infer sociocultural constructs of interaction.[4–8]

Asperger Syndrome

The 1994 release of the DSM-IV introduced Asperger syndrome as one of the diagnoses to fall under the umbrella of Autism Spectrum Disorders. Individuals diagnosed with Asperger syndrome have characteristic deficits in social skills and display specific interests or preferences or may have repetitive or stereotypical behaviors. However, they lack impairment in language development and have an IQ ranging from low average to highly gifted. The recent issue of the DSM-5 has removed the diagnosis of Asperger syndrome, offering only a diagnosis of ASD with the notation of mild, moderate, or severe. In addition, a separate diagnosis of Social (Pragmatic)

Communication Disorder (SCD) has been added. Although it is too early to tell how the change to the definition will impact the identification rate of ASD, there remains a growing population of individuals impacted by social communication deficits. Given the common deficits associated with ASD and SCD, this prevalence has tremendous implications for future work as educators and clinicians, primarily because these skills are critical to successful social, emotional, and cognitive outcomes.[9]

Lack of Social Skills in Autism Spectrum Disorders

Some researchers argue that of the core deficits associated with ASD, perhaps the most debilitating, is the lack of social skills.[7] For those youth who fall along the high-functioning end of the spectrum, significant deficits in social skills combined with a level of intelligence that falls within the normal to gifted range minimize the cultural understanding and empathy typically received by those with a more profound and obvious disability. As a result, these children are often targets of bullying and social rejection, which further increase their social isolation and take a tremendous toll on their emotional and cognitive well-being.[10] In fact, Tantam[11(p367)] stated, "It has been said that the 'mildness' of the handicap in Asperger Disorder is what makes its emotional and social impact so severe." For an adolescent, impairments in social communication skills can lead to a variety of negative outcomes, including poor academic achievement,[12] social anxiety,[13] and poor self-esteem and depression.[11] Given the magnitude of difficulty encountered with even mild forms of the disability, it is imperative to consider treatment options for this vulnerable population.

Fortunately, there is an extensive body of research that has been done to address the social skill deficits commonly associated with ASD. In 2008, Bellini and Peters[14] provided an overview of child-specific practices used to build social skills in youth with ASD. Because child-specific approaches continue to be used most often by practitioners in clinical settings, this article focuses on those types of interventions. Child-specific approaches are those that include the following[15(p361)]:

a. General instructional interventions to increase knowledge and social problem-solving (including social stories)
b. High-density reinforcement to "prime" social responding
c. Social skills training
d. Adult-mediated prompting and reinforcement
e. Various generalization promotion techniques (particularly self-monitoring).

In recent years, there has been significant attention to developing and disseminating information regarding social skill interventions that have consistently demonstrated positive outcomes for those with ASD. In the past decade, several empirically supported child-specific social skill interventions have been established through systematic reviews of the literature.[16–18] Reichow and Volkmar[18] examined the empirical evidence of recently studied social skill interventions within the framework of a best evidence synthesis. The findings suggest there is much empirical evidence supporting many different treatments for the social deficits of individuals with ASD. The effectiveness of social skill groups and video modeling has accumulated the evidence necessary for the classifications of established evidence-based practices (EBP) and "promising" EBP, respectively.

Evidence-based Practices for Youth with Autism Spectrum Disorder

Committee work devoted to the identification and dissemination of EBPs for youth with ASD has further elucidated effective practices. The National Professional

Development Center on Autism Spectrum Disorders (NPDC) is a multiuniversity center that functions to review literature, provide professional development and assistance, and further evaluate the use of EBPs in schools across the United States. Using rigorous evaluation criteria, the center has identified 27 EBPs as of their most recent report.[19] Also, in 2005, the National Autism Center (NAC) initiated the National Standards Project in hopes of providing resources to parents and practitioners that allow them to make well-informed decisions regarding the interventions they choose for a child with ASD.[20] After an exhaustive review of the literature, they have categorized interventions based on the level of support they have received in the research. Established interventions are those that have consistently demonstrated positive outcomes and are determined to be effective interventions for youth with ASD. Emerging interventions are those that show promise but have a research base that is either still developing or has inconsistent outcomes. The remaining category lists those interventions that are unestablished, or those interventions for which there is little or no evidence to demonstrate that they are effective.

To follow up the report by Bellini and Peters,[14] research on social skill interventions published from 2008 to the present has been reviewed. In the following sections, an overview of social skills training (SST) is provided as well as the research on social skill interventions by describing the findings of recent meta-analyses that have examined more than one social skills intervention strategy. Then, a descriptive synthesis of child-specific social skills intervention programs that have emerged or have continued to develop as EBP (as considered by the NAC and NPDC on ASD) is provided. Finally, advancements in the assessment of social skills are reviewed.

OVERVIEW OF SOCIAL SKILLS TRAINING

SST procedures involve the application of techniques to enhance the social behaviors of individuals who experience social deficits. Specifically, SST "refers to instruction that facilitates the acquisition or performance of social skills."[14(p858)] The NPDC on ASD defines SST as:

Group or individual instruction designed to teach learners with autism spectrum disorders (ASD) ways to appropriately interact with peers, adults, and other individuals. Most social skill meetings include instruction on basic concepts, role-playing or practice, and feedback to help learners with ASD acquire and practice communication, play, or social skills to promote positive interactions with peers.[19(p21)]

SST is considered an EBP by the NPDC on ASD. The NAC has this categorized as a Social Skills Package and has it ranked as an emerging practice. This discrepancy is not unexpected. First, the NAC standards were published in 2009, whereas the NPDC report was released early this year, allowing for more research to be included in the NPDC report. In addition, although there are several strategies that have shown success in increasing social skills for youth having ASD, given the variation among the delivery of SST programs and small sample sizes, the assessment of quality of an intervention is difficult to determine.[17,21]

Typically, social skills are taught in small group settings with 5 to 8 participants with a teacher or adult facilitator.[22] Within social skills groups, a variety of evidence-based techniques can be used to teach several social interaction skills, including, but not limited to, emotional regulation, basic conversation skills, nonverbal communication skills, perspective taking, initiating, responding, and maintaining a social interaction. Given the evidence, as long as interventions used in combination are administered with fidelity, they can be used in a group or with individual children and can yield positive results.

META-ANALYTIC REVIEWS OF SOCIAL SKILLS INTERVENTIONS

Since 2008, meta-analytic reviews have been conducted to examine the collective outcomes of SST and to establish the efficacy of various social intervention strategies. Wang and Spillane[23] reviewed the literature on social skills interventions published between 1997 and 2008. They identified 5 categories of social skill interventions including social stories, peer-mediated interventions, video modeling, cognitive behavioral training, and other. Using a percentage of nonoverlapping data scores, the authors concluded that of the 5 categories, only video modeling met the criteria for being evidence-based and demonstrating high-effectiveness as an intervention strategy. The remaining strategies showed promise, but had moderate effectiveness. The authors concluded that more research is needed to establish these strategies as evidence-based. These findings are consistent with those of previous meta-analyses, which found low to questionable effectiveness and generalization of social skills interventions.[9]

In addition, de Bruin and colleagues[24] evaluated 4 categories of interventions for youth with ASD implemented in a public-school setting. Dependent variables for the studies included academic, functional, and social skills. Antecedent interventions were those strategies that were implemented before the targeting behavior or setting and included social stories, chaining, modeling, task sequencing, strategy training, prompting, and time delay. Consequence interventions were those that were generally applied after the targeted skill or behavior occurred and included praise, contingency mapping, error correction, differential reinforcement, and embedded instruction. Self-management interventions were those that required youth to observe, record, and evaluate their own behavior. These strategies included self-monitoring, self-reinforcement, self-recording, and self-management. Finally, video interventions used some sort of video component with feedback and included video modeling, video scheduling, and video prompting. Based on the number of quality investigations for each category, the authors determined that antecedent, consequence, and video interventions were considered evidence-based. Using percentage of all non-overlapping data, the authors determined that video interventions demonstrated the most consistently favorable outcomes. Consequence and antecedent interventions resulted in moderate outcomes. Self-management procedures also had positive outcomes, but there were not enough studies to establish a meaningful average effect size.

In another meta-analysis, the authors used hierarchical linear modeling to evaluate the effectiveness of social skill interventions examined via a single case design.[25] They found that, in general, social skill interventions are effective at improving the social functioning of youth with ASD. However, their findings differ from other previous analyses[26] in that intervention length, gender and age of participants, and the quality of the research methods did not significantly impact the efficacy of the interventions. The only variable that significantly affected the intervention effectiveness was the single-case design chosen, with multiple-baseline and reversal methods demonstrating the most dramatic outcomes.

SOCIAL SKILLS INTERVENTION STRATEGIES

Eight strategies have been identified, including cognitive behavioral intervention (CBI), modeling, naturalistic intervention, pivotal response training (PRT), self-management, social narratives, technology-aided instruction, and video-modeling. Four strategies that appeared in the article by Bellini and Peters (2008)[14] will not be described. Social problem-solving has not met sufficient criteria to be evidence-based on its own; however, it may still be used within other EBPs such as cognitive-behavioral intervention.

Prompting, priming, and scripting have also been excluded from this synthesis because recent research has typically evaluated these strategies as components of "treatment packages" and not as the primary intervention strategy for social skills. For more information regarding these interventions, please refer to the NPDC Evidence Based Practices Report[19] and the findings of the NAC's National Standards Project.[20]

Cognitive Behavioral Intervention

CBI, or cognitive behavioral therapy, is a therapeutic method that focuses on targeting positive and negative thought processes to change behavior. It is used primarily with those who experience anxiety or difficulty controlling expressions of anger and aggressive behavior. Individuals using CBI are taught to identify their feelings and the thoughts associated with those feelings and then use strategies to express their behavior in a more appropriate manner. According to the literature, it is effective with youth from elementary school age to high school.[27] Although CBI has been used to address living skills, anger and anxiety management, and communication skills, it has also been used to address social skill deficits for youth with ASD. Social problem-solving may also be targeted in some CBI, as participants are required to assess a social situation and decide on an appropriate plan of action. Some researchers have posited that social skill deficits occur as a function of avoidance due to increased social anxiety.[13] Therefore, by addressing the thoughts and feelings associated with social anxiety, one may learn to function in a more socially appropriate manner.

Research shows that CBI is typically administered in a group setting and in combination with other social skill intervention strategies. In a review of the literature on SST groups, Cappadocia and Weiss[28] found that groups that used some form of CBI demonstrated gains in skills using premeasures and postmeasures, more so than those that used traditional training (instruction and feedback only) and those with a parent component. However, on closer review of the techniques used in the different types of groups, the authors noted that the primary difference among the group of CBI social skill groups was the amount of intervention hours provided, and not the CBI techniques. CBI features such as identifying feelings and self-evaluation were used in some form even in the traditional groups and the parent groups. However, the CBI groups offered between 50 and 180 hours of intervention, whereas the traditional and parent groups offered no more than 18 and 30 hours of intervention, respectively. Therefore, longer or more intense interventions may result in greater outcomes.

Cotugno[29] created 4 social skill groups. Using a combination of group therapy, CBI, and skills instruction techniques within a developmental framework, participants met weekly with a lead facilitator for 1 hour for 30 weeks. Each session was structured to address a developmental stage through targeted activities. For example, in a group session, participants may choose from activities focused on group cohesion and then have an evaluative discussion following the activity to address skills learned and problem solved. Using pretest and posttest measures, teacher and parent ratings demonstrated a significant improvement in skills in the areas of anxiety management, joint attention, and flexibility/transitions. White and colleagues[30] described the development of a program that used CBI to alleviate anxiety experienced by youth with ASD and increase social competence. They completed an initial study to test the feasibility of the program and found it to be promising in that it is acceptable to their participants and can be implemented with fidelity. Research to determine treatment outcomes are currently underway. Other studies reported that the use of CBI in group settings was effective in increasing executive functioning skills, facial recognition, problem-solving,

Theory of Mind, reading nonverbal cues, and accurately describing how to respond in a social situation.[31,32]

Modeling

Modeling involves the demonstration of a skill in order for a learner to imitate the skill. Typically, when modeling is used as an intervention strategy, it occurs within an intervention package and not in isolation. When used in conjunction with repetition, praise, and reinforcement, skill acquisition can take place. In the first randomized control trial study of a social intervention for 2-year-olds with ASD, Landa and colleagues[33] found that intervention groups that used modeling procedures among other strategies benefitted participants. Participants made gains in socially engaged imitation, expressive language, and cognitive and social functioning abilities. Similarly, modeling, prompting, and reinforcement were used to teach empathy responses to 4 children with ASD. Researchers used dolls and puppets to express affect, such as sadness, pain, or fear, and participants were taught to respond empathetically. In addition, generalization of the empathy responses was observed, but decreased as time passed.[34] When compared with a video-modeling intervention, the most recent research has shown that video-modeling and in vivo modeling have similar effectiveness in terms of gains in social skills; however, the participants were more visually attentive to video models, and practitioners found the video-modeling condition to be slightly more preferred than in vivo modeling.[35]

Naturalistic Intervention

Naturalistic intervention is a behavior therapy technique that uses manipulations of the natural environment, and interaction strategies to develop social communication skills in youth with ASD. The primary difference between naturalistic intervention and more formalized behavioral therapy is that naturalistic interventions typically occur in the child's natural environment and is embedded within the child's routines that may be naturally reinforcing. For example, a practitioner may layout the child's favorite toys and elicit requests from the child based on the toys they most prefer. By using already established reinforcement routines, teachers, parents, and other practitioners can build more skills that are appropriate to the context.

In a study demonstrating the effectiveness of this type of intervention on the neural activity of participants, the investigators implemented the Early Start Denver Model (ESDM) with children ranging in ages from 18 to 30 months old for 2 years.[36] The ESDM is a naturalistic teaching strategy that uses a variety of agents (ie, teachers, parents, clinicians) to encourage children to engage socially within their own preferred tasks. Applied behavioral analysis strategies, such as reinforcement and prompting, are used systematically throughout the session to encourage communication, joint attention, and socialization. For comparison, the investigators had a neurotypical comparison group and another control group of children with ASD who received therapies typically offered in the community.

After 2 years of using this intervention, samples from the 3 groups of children participated in an EEG while images of faces and images of objects were flashed in front of them. Children who received the ESDM intervention showed a shorter latency in the attention-related event-related potential and increased cortical activation when faces were shown and opposite when objects were shown. This pattern is the same as was observed in neurotypical children. However, children with ASD who solely received community interventions had the reverse pattern. They had more cortical activation and shorter event-related potential latency in response to objects than in response to faces. Another study compared a naturalistic intervention

strategy with a developmental social pragmatic intervention in which adults increased their responsiveness to the child. Remaining consistent with previous findings, the authors found that the naturalistic intervention condition and a combined condition resulted in greater gains in social communication skills for 4 young children with ASD.[37]

Pivotal Response Training

PRT is a naturalistic intervention strategy based on the principles of applied behavior analysis. Similar to naturalistic interventions, it uses the child's existing interests, settings, and routines to target desired skill acquisition.[38] Specifically, PRT allows the child to choose the activity and provides the child with systematic reinforcement for every correct response and appropriate attempt to respond that the child makes.[39] What makes this approach unique is that it is designed to enhance specific learning variables, or pivotal skills, that are thought to underlie other more complex skills. These pivotal skills are motivation, responding to multiple cues, self-management, and self-initiation.[38] More recently, PRT has been found to be extremely effective in teaching symbolic, manipulative, and sociodramatic play skills to youth with ASD. The newly acquired skills have also been generalized to new toys and new adults.[39]

Developed as an alternative to interventions focused on single target behaviors,[40] PRT has a long history of success and has been considered an evidence-based practice by both the NPDC and an established practice by the NAC. Most published PRT intervention studies are implemented with individuals, as opposed to a group, yet the implementers have ranged from researchers/clinicians to parents, primary care takers, peers, and teachers. An analysis of many studies targeting social skills functioning through the use of PRT was conducted, and the results indicate that having different intervention implementers aided with the generalizability of the skills being taught.[41]

Many PRT interventions emphasize a focus on parent involvement to support the goal of producing naturalized behavioral improvements.[42,43] As there is an ever-increasing demand for access to effective interventions for families who have children with ASD, more evidence-based resources are being developed for this purpose. Nefdt and colleagues[44] created a self-directed learning program using an interactive DVD to provide parents of children with ASD with introductory PRT. The findings indicate that most parents who completed the program demonstrated learning of specified procedures, higher confidence levels during parent-child interactions, high satisfaction ratings, and an increase in the functional verbal sounds made by their children with ASD. Minjarez and colleagues[43] found that, in addition to individual training, a group training model for parents is also beneficial in targeting specific language-based and communication-based deficits in youth with ASD. In an effort to further extend knowledge on PRT implementation, Robinson[45] examined a modeling and video-based feedback training package to enable paraprofessionals to implement PRT in the school environment. Because children spend most of their days in school settings, schools are another key naturalistic location for them to receive intervention. The paraprofessionals who were taught using this technique demonstrated maintenance of the PRT implementation several weeks afterward, and each of the youth who participated in the study demonstrated positive improvements in each of their social communication target behaviors.

Self-Management

Self-management refers to strategies that are used to teach children how to identify, record, assess, and manage their behavior. According to Rafferty,[46] there are 5 types

of self-management interventions that are frequently used to help foster self-regulated performance:

1. Self-monitoring
2. Goal setting
3. Self-evaluation
4. Self-instruction
5. Strategy instruction.

Self-monitoring is a strategy commonly used to develop self-regulation skills and involves the observation and recording of one's own behavior. Typically, children are taught to record their behavior following a specific prompt, such as a tone from an interval timer. Goals are set based on the occurrence or nonoccurrence of the target behavior, and children may evaluate their performance in relation to their goals. It has been shown to be effective with a wide range of individuals from preschoolers to adults with and without disabilities on both academic and behavioral skills.[47,48] In addition, self-monitoring contributes to the development of self-management, which is a pivotal skill[40] that, when mastered, provides a catalyst to the mastery of several other related skills. This strategy is effective for youth with ASD because they commonly lack self-awareness and self-regulation skills.

Although research supports the utilization of this method as an EBP, "self-management" intervention packages in general vary widely in terms of the specific implementation strategies, making it difficult to determine the true effectiveness of this intervention.[49] In the most recent review of the literature on the use of self-management procedures to address core deficits of ASD, Southall and Gast[50] found that most studies using a self-management package use self-monitoring, self-recording, and self-reinforcement. Also, studies often used additional technologies such as tokens, videos, and pictures to make the intervention more attainable for those with more severe forms of ASD. Deitchman and colleagues[51] used self-management training during a video feedback session to increase the use of social initiations for 3 children with ASD. The children were video-taped entering the general education setting and interacting with their peers. Then, in daily feedback sessions, they reviewed the footage with the interventionist and were asked to observe and record their social initiations. The researchers found that the rate of social initiations increased for all participants. In addition, 2 of the participants increased their use of social initiations to novel settings and the behavior was maintained following the intervention.

Social Narratives

Social narratives encompass a variety of interventions that function to introduce and teach appropriate behavior via written story form, such as Social Stories, Power Cards, and other written story-based prompts. They may also include illustrations, pictures, and songs.[52] The most common of these are Social Stories, developed by Carol Gray. According to The Gray Center Web site, "A Social Story describes a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses in a specifically defined style and format."[53] To be considered a Social Story, the written passage must contain the following statements[54]:

a. Descriptive: objective statements that describes the situation and the people in it
b. Perspective: statements that describe the reactions, feelings, and responses of others
c. Directive: statements that describe the appropriate action
d. Cooperative: statements that describe what others will do to help

e. Affirmative: statements that validate the common values of a given culture
f. Control: statements written or developed by the child that provide strategies for using the appropriate behaviors.

In general, Social Stories are read to the child before they enter the difficult situation being described in the story.

Power Cards are another intervention strategy that uses short written prompts to elicit desired behavior. The primary differentiation between Social Stories and Power Cards is that Power Cards incorporate the child's special interest area.[55] Special interests are common for youth with ASD and can be highly motivating in eliciting desired behaviors.[56] By using special interests, such as a favorite hero or character as the "person" describing the behavior to be changed, the child may be more inclined to attend to the Power Card and perform the desired skills.

A recent meta-analysis on the effectiveness of Social Stories[52] found that they resulted in low to questionable effects. This low to questionable effect is surprising given the strong attention that Social Stories have received in the past few years. However, on further examination of the scores, the authors found that the most of the studies reviewed either resulted in a high degree of effectiveness or were not effective at all, suggesting that not all youth may benefit equally from this intervention. Intervention effects were greater when the child was their own agent of the intervention, as opposed to having the story read by a parent, teacher, or researcher, and when it was read just before the situation described. In addition, simple stories presented within a brief time frame resulted in better outcomes for the child. Power Cards have demonstrated effectiveness in developing social behaviors, such as increasing the percentage of time that adolescents engaged in conversation outside of their preferred topic[57] and increasing pro-social playground behaviors of a 5-year-old boy with ASD.[56]

Technology-aided Instruction

Technology-aided instruction refers to any intervention in which technology (such as a computer, DVD/video, timer, or virtual environment) is used as the principal component of the intervention.[58] It is used to address a variety of behaviors including academic, social, and problem behaviors. Given the availability of technology to practitioners and families of those with disabilities, it may come as no surprise that technology-assisted interventions have become a popular and effective practice. In addition, many youth with ASD are more prone to interact with technology and, therefore, interventions using technology may be reinforcing in their design, further increasing their potential efficacy. Although the technology-aided interventions of video-modeling and self-monitoring (when a timer is used) are EBP on their own, there are other ways of using technology to address the unique characteristics of individuals with ASD.

DiGennaro Reed and colleagues[59] reviewed the literature on technology-aided interventions to teach social skills to youth with ASD. They found that the most interventions used video or DVDs and that most of the studies were aimed at initiation of conversations. Other types of technology commonly used were computer programs, tactile prompts (such as a vibrating timer or MotivAider), or audio scripts. Ramdoss and colleagues[60] reviewed computer-assisted interventions and found that these interventions were generally effective in producing positive outcomes in social skills, but there was great variability among the outcomes of the studies. However, those interventions in which the technology interventions and measurement tool was developed by the researcher showed the most positive outcomes.

Video Modeling

Video modeling and video self-modeling (VSM) are 2 of the most consistently successful methods of providing SST to youth with ASD. Video modeling refers to an individual watching a video that demonstrates a target behavior and then reproducing the same modeled behavior. VSM is a form of video modeling that enables the individual to perform specific, targeted behavior by watching himself or herself perform a positive behavior effectively.[14,61] Research suggests that VSM can generalize across multiple settings and that the learned skills throughout this process are sustained for months after the intervention.[62] The success of VSM has been demonstrated in a variety of areas when teaching youth with ASD.[35,63,64] Some of these areas include language, play, self-help, and social skills[65] and are particularly significant for youth with ASD, who have difficulty applying skills to multiple settings.[14] The VSM technique has shown to be especially effective for those with high-functioning ASD.

Wang and colleagues[66] conducted a meta-analysis to determine the effectiveness of peer-mediated and video-modeling techniques. Both peer-mediated interventions and video modeling were effective in improving the children's social behavior. However, it seems that age functioned as a significant moderator between the effectiveness of the 2 types of intervention. Specifically, the results indicate that younger children may benefit more from both interventions than older children. This study provides valuable evidence indicating that when children are younger, they receive the most positive outcomes from video-modeling interventions.

One study aimed at teaching vocational skills to adolescents with ASD in social settings.[67] In this study, using direct instruction and a multiple baseline design, 4 adolescents with ASD were taught how to dress as a mascot and entertain customers in a retail setting via VSM. The participants learned how to interact with customers in socially appropriate ways that both the managers and the customers appreciated. Kleeberger and Mirenda[68] also extended the application of VSM by measuring the effectiveness of interventions designed to address the generalized imitation deficit that is commonly seen in young youth with ASD. The results indicated that imitative behaviors could be significantly improved by providing video-modeling instructional techniques. Despite all of the evidence of the effectiveness of VSM, there was one study that did not find VSM to be effective for making gains in the frequency of social initiations.[69] As such, continued research is still needed in this area to determine best practices for the use of this technique across youth of different ages and setting.

ASSESSMENT OF SOCIAL FUNCTIONING

Since 2008, the development of social skill assessments has continued to grow. Revisions have been made to old assessments and new assessments continue to be developed to measure social functioning in individuals with ASD. As reviewed by Bellini and Peters,[14] there are 3 different methods of measuring social functioning according to Gresham and colleagues[26]: type I, type II, and type III.

Type I Measures

Type I measures include rating scales and checklists administered to parents, teachers, and the child in the form of self-report measures. Some of the commonly used type I measures used in clinical and research settings have recently been updated to reflect information needed in effective intervention planning, such as the recent update to the Social Skills Rating System (SSRS).[70] Type I measures among the most common measures currently used to assess social functioning and include behavior rating scales and interviews that measure social competence or perception of social

performance from key stakeholders such as teachers and parents. There are many advantages to type I measures. Type I measures are efficient and make it easy to obtain information regarding social behaviors in multiple settings and from a variety of sources. However, a disadvantage of type I measures is that they often provide general information about the development of social behaviors over time, but are not as helpful in tracking improvement during intervention when data must be collected frequently.[71]

There are several standardized social skills assessments that rely heavily on type I measures, such as rating scales completed by parents and teachers, that are used most commonly to assess social functioning of individuals with ASD. One of the most commonly used, and most researched, social skills assessments is the SSRS.[70] However, in 2008, an updated version of the assessment was released, called the Social Skills Improvement System (SSIS).[72] The SSIS is a rating scale for youth ages 3 to 18 that produces subscale scores on 3 dimensions:

1. Social skills
2. Problem behaviors
3. Academic competence.

The scales are used to screen for social difficulties and to assist in intervention planning, but are not specifically designed for individuals with ASD.[71]

Another social skills assessment that has been recently updated is the Social Responsiveness Scale. The Social Responsiveness Scale-2 (SRS-2)[73] includes self, parent, and teacher report scales that have been normed for use with youth between the ages of three and 18 years of age. Although the SSIS is not designed specifically for ASD, the SRS-2 is designed to measure social deficits in individuals with ASD from that age of 2 and one-half into adulthood. The SRS-2 produces an overall score to reflect the level of social functioning as well as scores on 5 treatment subscales: social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behavior. These new subscales were designed to align closely with the new DSM-5 criteria for ASD.

Type II Measures

Although type I measures assess the judgments and perspective of parents and teachers, type II measures include direct assessments of the individual's social functioning and behaviors. Type II measures are ideally suited for progress monitoring. Teachers and clinicians may wish to use type II measures when they would like to measure change in behavior after the implementation of an intervention. For example, observing a child in the classroom and collecting data on their behavior may be an example of a type II measure. Type II measures are effective in assessing current levels of functioning in a child's natural environment. These measures continue to be used extensively in applied research studies using a single-subject methodology to investigate the effectiveness of social skills interventions.

Type III Measures

The last of Gresham's 3 categories of social skills assessment are type III measures. Type III measures are assessments that use role-play scenarios and address questions regarding social cognition. Type III measures are highly useful in the measurement of social cognitive skills. For example, clinicians working in social skills groups can teach perspective-taking skills by creating scenarios in which the child is asked to infer the feelings and thoughts of others. A common example of a type III measure is the Sally-Anne false belief task[74] in which a child must predict the search behavior of a child that does not know his or her toy has been moved. Type II measures address

social cognition and are not intended to be used to predict behavior in a natural setting. Type III measures are considered the least psychometrically sound of the 3 types of social skills assessment. In addition, research has not established a clear relationship between performance on type III measures and type I (ie, rating scales) or type II (ie, direct observation) measures.

Looking to the future, some researchers suggest that the number of social skills measures may, in fact, be overwhelming. Therefore, similar measures that have been shown to be reliable and valid should be combined.[75] Social skills measurement would benefit from comprehensive scales that are evidence-based that can be supplemented by more specific assessments that target precise social behaviors that are of interest to a particular case. In addition, future research should seek to develop more psychometrically sound social cognitive assessment measures.

SUMMARY

Social communication remains one of the core deficits associated with ASD. Given the increase in prevalence in recent years as well as the negative outcomes associated with limited social skills, it is important for practitioners to be knowledgeable of the EBPs that can be used to address these deficits. Fortunately, since 2008, the identification and dissemination of resources regarding the use of EBPs have been on the forefront of research efforts, allowing researchers and practitioners to make confident decisions regarding practices that may be efficacious. Not only are there several interventions for practitioners to choose from that have strong empirical support, information on them is readily available. In addition, assessment measures have been updated to identify social deficits and to align more closely with DSM-5 diagnostic criteria. Further research may focus on establishing best practices for SST interventions as well as developing comprehensive assessment tools.

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