Social Behavior and Interventions for Individuals Diagnosed with Autism Spectrum Disorder

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Today, there is an estimated 1 in 54 children affected by autism in the United States (Maenner et al., 2020) and 1 in 160 children worldwide (Elsabbagh et al., 2012). Autism has been recognized in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) since 1980 (American Psychiatric Association (APA), 1980, 2000, 2013). Now called autism spectrum disorder (ASD), ASD is characterized by deficits in social communication and interaction and repetitive behaviors and is associated with significant social, communication and behavioral challenges (APA, 2013; Centers for Disease Control and Prevention (CDCP), 2019). Despite changes in the name and the diagnostic criteria over the years, deficits in social behavior has remained a consistent defining characteristic of Autism/ASD (APA, 1980, 2000, 2013).

Researchers have demonstrated that individuals diagnosed with ASD can display various social deficits including joint attention (Charman, 1998), self-regulation (Loveland, 2005), social communication (Mundy & Crowson, 1997), and play skills (Wing et al., 1977). Failure to develop these and other pertinent social behaviors could have many serious consequences. Poor social competency could

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lead to adjustment problems such as neuroses, behavioral challenges, and personality disorders (Cowen et al., 1973; Roff et al., 1972), failure to develop friendships (Bauminger & Kasari, 2000), increased feelings of loneliness (Bauminger & Kasari, 2000; Humphrey & Symes, 2010), bullying (Ashburner et al., 2019), failure in school (Ladd et al., 1999), anxiety and depression (Ghaziuddin, 2002; Sterling et al., 2008), suicidal ideation (Mayes et al., 2013), and an overall decrease in quality of life (Schalock, 2004). However, developing a well-established repertoire increases an individual's quality of life in many ways. These gains may include language development (Koegel & Frea, 1993; Mundy & Crowson, 1997), doing better in school (Hartup & Stevens, 1999), and the establishment of social interactions and social relationships (Whitehouse et al., 2001).

The potential negative outcomes associated with a lack of social behavior and the positive outcomes associated with displaying appropriate social behavior justify the importance of comprehensive and effective intervention. To date, the most effective interventions are those based upon the principles of Applied Behavior Analysis (ABA; National Autism Center (NAC), 2015; Wong et al., 2015). ABA is a science and philosophy dedicated to helping others more efficiently access their reinforcers using effective and evidence-based procedures (Wolf, 1978). Numerous studies have been conducted to evaluate the effectiveness of behavioral interventions for increasing social behavior in individuals with ASD, including: discrete trial teaching (DTT; Schrandt et al., 2009), incidental teaching (McGee & Daly, 2007), pivotal response treatment (Koegel et al., 1987), the Teaching Interaction Procedure (TIP; Dotson et al., 2010), video-based instruction (VBI; Cihak et al., 2012); behavioral skills training (BST; Kornacki et al., 2013; Nuernberger et al., 2013); and social skills group instruction (Leaf et al., 2017a).

The purpose of this chapter is to identify the common social deficits observed with individuals with ASD and to provide a review of evidence-based interventions that are effective in increasing social behaviors for individuals diagnosed with ASD.

Deficits Observed

Due to the nature of the disability (i.e., a lack of interest in others and deficits in social communication and interaction), ASD is accompanied by a myriad of social deficits. While the topographies of social deficits vary depending on developmental stages and individual levels of functioning, some degree of social deficit is a universal characteristic for individuals with ASD (Ellingsen et al., 2017). Although not all encapsulating, below are descriptions and research for some common social deficits displayed by individuals diagnosed with ASD.

Joint Attention

Joint attention refers to a cluster of behaviors that coordinate the sharing of attention between an individual, another person, and an object or event in the environment (Charman, 2003; Mundy & Crowson, 1997). There are two main forms of joint attention (i.e., response to joint attention and a bid for joint attention). Response to joint attention is when an individual responds to another's direction to attend to an object or event in the environment (Bruinsma et al., 2004). For example, looking in the direction of someone's point when they say, "What is she doing?" Whereas, a bid of joint attention is when an individual directs another to attend to an object or event in the environment (Bruinsma et al., 2004). For example, a child approaching a parent and saying, "Look what I made" while showing them a drawing. Thus, joint attention allows an individual to convey a message in a nonverbal way such as pointing, eye gaze, or showing (Bruinsma et al., 2004; Charman, 2003).

Joint attention is critical for the development of language, social behavior, and friendship development (Bruinsma et al., 2004; Charman, 2003; Lawton & Kasari, 2012). However, when compared to typically developing children, children with ASD are significantly less likely to develop joint attention skills (Wetherby et al., 2007). Typically emerging between 9 and 18 months (Mundy et al., 2007), impairments in joint attention are one of the earliest signs of ASD and can be a determining factor in the degree of severity of ASD (Charman, 1998). Joint attention deficits likely develop from low levels of social interest (APA, 2013; Mundy & Crowson, 1997) and a lack joint attention deficits may have several negative consequences, including delays in language cognition (Tomasello & Farrar, 1986), communication skills (Charman, 2003), and the development of quality friendship (Freeman et al., 2015).

Social Language and Communication

Social language and communication deficits occur across all individuals with ASD (Carter et al., 2005; Ozonoff & Miller, 1996; Tager-Flusberg, 1981). Individuals with ASD display difficulties initiating social interaction (Bauminger et al., 2003), attending to context or social nuances, as well as display challenges with nonverbal communication and reciprocity in conversation (APA, 2013). Individuals with ASD engage in inappropriate turn-taking during conversations, use atypical prosody, and display challenges in discriminating between new and old information (Ozonoff & Miller, 1996; Tager-Flusberg, 1981) and interpreting nonliteral language and humor (Emerich et al., 2003; Martin & McDonald, 2004). These deficits do not remit throughout the life of an individual (White et al., 2007) and may lead to further impairment, become more apparent, and lead to peer rejection, bullying, and isolation if left untreated (Laushey & Heflin, 2000; Schopler & Mesibov, 1983; Tantam, 2003), resulting in a lack of friendships and loneliness (Bauminger & Kasari, 2000).

Play Skills

Play is an important foundation for the development of social skills (Ayres et al., 2017; Paiget, 1952) and is a central focus in a child's life. Play provides children with opportunities to practice many skills fundamental to the development of prosocial behavior, such as commenting, turn-taking, cooperation, and problem-solving (Ayres et al., 2017). This allows for positive joint experiences between the child, their siblings, and their peers (Ayres et al., 2017; Volkmar & van der Wyk, 2017). Furthermore, play is essential for positive cognitive development (Paiget, 1952) and increases social interest and motivation (Grosberg & Charlop, 2014). Thus, it facilitates later social success (Freeman et al., 2015; Grosberg & Charlop, 2014). For example, Freeman et al. (2015) examined the influence of play on the quality of friendships 5 years later. At follow up, children who had stronger initial play abilities showed high quality friendships, specifically in the area of helpfulness.

While play skills are critical, children with ASD frequently demonstrate difficulties with play when compared to typically developing children (Wing et al., 1977). For example, children with ASD demonstrate difficulties with symbolic play (Wing et al., 1977), and instead often engage in rigid and stereotyped activities with toys and objects (Ungerer & Sigman, 1981). These differences between children with ASD and typically developing children may be due to a lack of motivation resulting from deficits in attending (Schreibman, 1988), competing stereotypic behavior (Ungerer & Sigman, 1981), and a history of failed opportunities (Clark & Rutter, 1979). These deficits impede on the ability to develop symbolic and functional play skills (Ungerer & Sigman, 1981). Since play skills are a primary form of socialization starting at a young age (Ayres et al., 2017), a lack of development of these skills ultimately hinders the ability of an individual with ASD to develop successful social relationships (APA, 2013). This underscores the importance of play in ASD intervention.

Emotional Recognition and Theory of Mind

Another area of deficit is social-emotional reciprocity (APA, 2013). Social-emotional deficits can manifest in a variety of ways. First, individuals with ASD focus on the mouth region when looking at faces and, as a result, miss emotional information that provides accurate perception and awareness of others (Tanaka et al., 2012; Volkmar & van der Wyk, 2017). This impedes on their ability to respond to others' emotional displays (Volkmar & van der Wyk, 2017). Yet, recognizing and responding to others' emotional expressions is important for successful relationships and facial emotional recognition deficits likely contribute to the social disability (Ekman, 1992; Schultz et al., 2003). Furthermore, individuals with ASD demonstrate high rates of emotional dysregulation (Zablotsky et al., 2013). This emotional dysregulation may cause for misinterpretation between individuals with

ASD and their peers (Zweers et al., 2017). Finally, individuals with ASD often demonstrate limited theory of mind and perspective taking skills (Mendelson et al., 2016), which are important for social-emotional understanding. Theory of mind and perspective taking provides individuals with the ability to infer others' mental states (Jervis & Baker, 2004, p. 49) and recognize another's unique experiences and how those might differ from one's own experiences (Davis, 1983). This deficit in perspective taking results in a lack of emotions such as empathy (Baron-Cohen & Wheelwright, 2004). Empathy is an essential part of normal social functioning, allowing individuals to understand other's intentions, predict behavior, and experience emotion resulting from other's emotions; thus, lack of empathy hinders the individual's ability to develop and maintain successful social relationships (Baron-Cohen & Wheelwright, 2004).

Friendship

Friendship is critical to living a meaningful life. Friendship aids in the development of cognitive, linguistic, and social skills (Howes, 2009; Vitaro et al., 2009). Friendship also allows children to practice and develop prosocial behaviors such as empathy, intimacy, and sharing (Bauminger & Shulman, 2003) and is important for emotional and physical wellbeing (Gilmore & Cuskelly, 2014; Greco & Morris, 2005; Hartley & Birgenheir, 2009; Hartup & Stevens, 1999; Lavallee et al., 2005; Parker et al., 1995). Researchers have suggested that lack of friendship may lead to less success in school and work (Hartup & Stevens, 1999), higher rates of aggressive behavior (Lavallee et al., 2005), loneliness (Gilmore & Cuskelly, 2014), depression (Hartley & Birgenheir, 2009), anxiety (Greco & Morris, 2005), and other adjustment problems (Parker et al., 1995). Unfortunately, 60–75% of children with ASD have difficulty forming friendships (Bauminger-Zviely & Kimhi, 2017) and when compared to their typically developing peers, they form fewer and lower quality friendships (Bauminger & Kasari, 2000; Bauminger & Shulman, 2003). This failure to develop friendships is a diagnostic criterion for children with ASD (APA, 2013). One reason for this deficit is that children with ASD lack the social skills necessary to facilitate friendships (Bauminger & Kasari, 2000; Bauminger & Shulman, 2003; Leaf et al., 2009), such as the ability to compromise and resolve conflict as well as engage in perspective taking and emotional regulation (Bauminger & Kasari, 2000, Bauminger & Shulman, 2003). The social-emotional deficits that children with autism display leads to an absence of closeness and intimacy with peers (Bauminger & Shulman, 2003). Furthermore, deficits in theory of mind, as discussed above, produces challenges in reciprocity and empathetic prosocial behaviors (Bauminger & Kasari, 2000, Bauminger & Shulman, 2003). Unfortunately, the failure to develop these skills has several negative consequences, some as severe as depression (Mazurek & Kanne, 2010) and isolation (Bauminger et al., 2003). The good news is that individuals with ASD do often desire friendships (Church et al., 2000), and most adolescents with high-functioning autism report having at least one

friend (Bauminger & Kasari, 2000). This might be because individuals with high-functioning autism have more advanced social-emotional capabilities than those with lower-functioning autism (Bauminger & Shulman, 2003). These friendships may allow individuals with ASD to have a consistent peer model for prosocial behavior, engage in consistent shared play, and learn other's interests, as well as provides further social opportunities for practice of social skills (Bauminger & Shulman, 2003). For this reason, it is important that children with ASD develop the social skills necessary to establish and maintain friendships.

Adolescence and Dating

Social differences begin to develop in children with ASD at a young age and are observed throughout their lifetime. If left untreated, these social challenges become more apparent in adolescence and adulthood (Laushey & Heflin, 2000; White et al., 2007). Social differences may lead to peer rejection, peer victimization, and poor social support, which ultimately may cause social isolation (Bauminger & Kasari, 2000; Humphrey & Symes, 2010). Mehling and Tassé (2015) found that, overall, adults with ASD had fewer friendships when compared to neurotypical adults. This is likely due to their restricted interests and rigid thinking (Winter-Meissiers, 2007). Furthermore, forming these intimate relationships is dependent on identifying and responding to various social nuances and other complex social skills (e.g., cooperation, decision making, problem-solving) that adults with ASD often do not have (Plavnick et al., 2013). Additionally, Stokes and Kaur (2005) demonstrated that individuals with ASD show a slower maturation rate in sexual development when compared to their typically developing peers, also impeding on their ability to form intimate relationships. Despite these challenges, many individuals with ASD desire relationships and are aware of their social limitations (Mazurek & Kanne, 2010). This awareness often leads to higher levels of loneliness (Bauminger et al., 2003), anxiety, and depression (Mazurek & Kanne, 2010). Moreover, many youths with ASD experience victimization and bullying by peers (Church et al., 2000) and these experiences often result in psychiatric disorders and employment challenges in adulthood (Barnhill, 2007).

ABA-Based Procedures

While individuals with ASD display deficits in the aforementioned social behaviors and a myriad of other social skills deficits, it is clear from research that individuals with ASD have the ability to develop these important skills. However, development of these skills requires careful and effective intervention. Furthermore, it is recommended that evidence-based treatment be utilized in order to avoid wasting valuable time and resources (DiGennaro-Reed et al., 2017). Thus, interventionists should not

implement those procedures with weak empirical support, such as Social Stories/ Social Narratives (DiGennaro-Reed et al., 2017, Reynhout & Carter, 2009; Styles, 2011), or those procedures that are considered pseudoscientific and/or non-evidence based, such as Social Thinking (Leaf et al., 2016b), Floor time (Leaf et al., 2008) or Rapid Prompting Method (Tostanoski et al., 2014). Fortunately, there are several effective and evidence-based interventions, based upon the principles of ABA, which can be utilized to develop social skills (e.g., Ellingsen et al., 2017; Krantz & McClannahan, 1993; Leaf et al., 2012a).

Discrete Trial Teaching (DTT)

DTT allows for highly individualized instruction and rapid acquisition of target skills by breaking a complex skill into smaller components and teaching one skill component at a time through repeated practice within a concentrated amount of time (Smith, 2001). Each teaching unit, or trial, has a discrete beginning and end and consists of three primary components. Each trial begins with an instruction (often referred to as a discriminative stimulus) that signals the availability of reinforcement. The learner is given a limited amount of time to respond (usually a few seconds) to the instruction. Subsequently, the interventionist provides a pertinent consequence (i.e., reinforcement or punishment) for correct and incorrect responses. An optional forth step is the interventionist providing a prompt following the instruction but prior to the learner's behavior. This formal structure allows for repeated practice in a short period of time. Since individuals with ASD often require many opportunities to acquire skills, DTT is especially effective for learners with ASD and can be used to teach a variety of skills, including social skills (Smith, 2001).

DTT has been used to develop critical social skills such as joint attention (Kasari et al., 2006), communication and conversation skills (Garcia-Albea et al., 2014), play skills (Nuzzolo-Gomez et al., 2002), friendship skills, (Marzullo-Kerth et al., 2011), and perspective taking and empathy (LeBlanc et al., 2003; Schrandt et al., 2009). For example, Nuzzolo-Gomez et al. (2002) established play skills in 4 children with ASD by teaching the children to prefer books or toys over stereotypy. DTT procedures were used to pair books and toys with already established reinforcers. Following intervention, play engagement increased across all participants. In another study, LeBlanc et al. (2003) effectively taught 3 children with ASD to engage in perspective-taking skills using video modeling and reinforcement within DTT procedures. In addition, Marzullo-Kerth et al. (2011) examined the effects of multiple exemplar teaching in a DTT format to teach children with autism to share. Following treatment, all 3 children demonstrated an increase in offers to share. Furthermore, the participants demonstrated generalization and maintenance.

Video Based Instruction (VBI)

VBI is another reliably replicated evidence-based procedure for developing social skills in individuals with ASD (Cihak et al., 2012; Grosberg & Charlop, 2014; Gutierrez et al., 2016; LeBlanc et al., 2003; MacDonald et al., 2009; MacManus et al., 2015; Nikopoulos & Kennan, 2004; Plavnick et al., 2013; Travers & Tincani, 2010). VBI allows the interventionist to highlight the many social cues and social nuances that might occur in a social situation (Ayres et al., 2017) and is most helpful for learners that demonstrate strong attending skills as well as generalized imitation (McCoy & Hermarisen, 2007). VBI may be used in instruction through either video modeling or video prompting. Within video modeling, the learner watches a video to completion and then attempts to imitate what they watched. In contrast, video prompting breaks a longer video up into smaller, discrete steps. Each step is then shown as needed in order to prompt the learner through a target response.

Several studies have examined video modeling for teaching social skills. LeBlanc et al. (2003) used video modeling to teach perspective taking skills, whereas Nikopoulos and Kennan (2004) utilized the technology to teach social initiations. Video modeling has also been shown to be effective in increasing prosocial behaviors such as manding (Cihak et al., 2012), novel play statements (MacManus et al., 2015), persistence in peer engagement (Grosberg & Charlop, 2014; Plavnick et al., 2013), engagement in appropriate play (MacDonald et al., 2009), as well as sexuality related skills (Travers & Tincani, 2010). In 2015, Macpherson and colleagues assessed the effect of video modeling to increase compliment behavior in children with ASD. During intervention, the children were shown a video demonstrating appropriate complimenting behavior during an athletic game. Immediately following the viewing of the video, complimenting behavior and response variation significantly increased. Furthermore, some generalization to novel activities occurred.

Video prompting may be more appropriate for longer or more complex skills or for learners who have weaker attending skills, because it breaks a video up into smaller steps (Ayres et al., 2017). For example, Gutierrez et al. (2016) compared the effects of video prompting with and without voice narration to increase play skills in 2 children with ASD. During intervention the children were required to build a Lego set. The Lego pieces were placed in front of the children and a video clip displaying the first step was shown. The children were provided with 10 s to complete each step. Praise was delivered for each step completed correctly. If the child was incorrect or did not complete a step within 10 s the interventionist put the Lego pieces together out of the child's view and then placed the pieces back in front of the child and advanced to the next video clip demonstrating the subsequent steps. Results displayed an increase in play skills for both children.

Script-Fading

Another technology commonly used to enhance social competence in individuals with ASD is script-fading (Garcia-Albea et al., 2014; Krantz & McClannahan, 1993; MacDuff et al., 2007; Murdock & Hobbs, 2011; Sarokoff et al., 2001). Script fading is used to promote language development in individuals with ASD by providing prompts or cues for an individual to emit targeted verbal behavior in specific contexts (Akers et al., 2016). Scripts may include text (Krantz & McClannahan, 1993), pictures (Murdock & Hobbs, 2011), or audio (MacDuff et al., 2007). Scripts are then systematically and gradually faded with a goal of increasing scripted and novel verbal behavior (Akers et al., 2016).

Script fading has effectively established prosocial behaviors such as bids for joint attention (MacDuff et al., 2007), peer initiations and interactions (Garcia-Albea et al., 2014), conversational skills (Sarokoff et al., 2001), and play skills (Murdock & Hobbs, 2011). In the first demonstration of using script-fading to enhance social skills, Krantz and McClannahan (1993) taught 4 children with ASD to initiate to peers. The children were provided with scripts displaying 10 different initiation statements or questions (e.g., "Hey [Name], would you like some candy or chips?"). The teacher stood behind the child and guided him or her to pick up a pencil, point to a script, and move the pencil below the text. Once the child read the script out loud the teacher prompted the child to place a check mark next to the script. Peer initiations increased immediately after scripts were introduced. Script prompts were then gradually faded, and peer initiations generalized to different settings, individuals, and activities. Furthermore, participant initiations occurred within the same range as typically developing peers even after the scripts were fully faded.

In 2008, Argott and colleagues evaluated the ability of script fading to increase empathy skills in adolescents with ASD. In order to evoke empathetic responses (e.g., "are you okay?") from participants, the experimenter presented a non-verbal affective stimulus (e.g., grimacing and rubbing the back of their neck). Following the affective stimulus, the participant was provided with a script to prompt an appropriate response. Scripts were gradually faded following correct responding by removing parts of the text, starting with the last word. Both scripted and unscripted empathetic responses increased throughout treatment. Furthermore, empathetic responses generalized to novel stimuli and in a 6 week follow up participants maintained appropriate empathetic responding.

Peer Mediation Intervention (PMI)

Most early social skills interventions entail adult mediation (Rogers, 2000). Rogers (2000) asserted that adult mediated approaches ignored the natural environment and often did not generalize to peers. PMIs are also effective in establishing pro-social

behavior in individuals with ASD. PMIs are evidence-based practices (Wang et al., 2012) that aim to teach typically developing peers to model appropriate social behavior for their peers with ASD and then reinforce their peers when they demonstrate this behavior in natural social contexts (DiSalvo & Oswald, 2002; Rogers, 2000). PMIs can teach the individuals with ASD the ability to successfully carry out appropriate social skills and form relationships (Guralnick, 1990). There are three basic approaches for using PMI (DiSalvo & Oswald, 2002). The first approach, manipulation of the environment to promote peer effort and interaction, includes play groups (Wolfberg & Schuler, 1993), peer tutoring (Laushey & Heflin, 2000), and group contingencies (Lefebvre & Strain, 1989). Chung and Douglas (2015) evaluated the impact of an intervention package using changes in proximity, a speech generating device (SGD), enhanced peer prompting, and paraprofessional training to increase reciprocal interactions and initiations between typical peers and adolescents with ASD. The environment was rearranged in order to sit participants next to typically developing peers. The SGD was embedded with appropriate peer interaction and social related messages and the paraprofessionals helped peers talk to the participants. Paraprofessionals received 35–50 min training sessions that outlined (a) the purpose of the treatment, (b) a review of facilitative strategies, (c) how to identify opportunities for peer and participant engagement, and (d) how to complete a self-monitoring data sheet. Results demonstrated an increase in initiations and interactions between participants and peers.

A second approach involves direct peer instruction to promote initiation and social interaction responses (DiSalvo & Oswald, 2002), such as peer networks (Kamps et al., 1997) pivotal response training (Pierce & Schreibman, 1995), and peer initiation training (Odom & Strain, 1986). Kamps et al. (1997) implemented a multiple probe design to assess the effects of peer networks and reinforcement on social interaction for three children with ASD. Learners were placed in a group of 2–5 peers as a support network during activities. The activities were structured to promote social interactions (e.g., learners were sat in dyads or quads and were asked to take turns tutoring each other). Social scripts, peer prompting, and reinforcement and corrective feedback were implemented to establish successful interactions. Following intervention all participants engaged in increased interaction time and two participants generalized interactions to novel settings.

A final approach described by DiSalvo and Oswald (2002) is specific instruction of the target child. This approach utilizes target child initiation training (Gunter et al., 1988) and initiation training for the target child and peers (Gonzalez-Lopez & Kamps, 1997). Gunter et al. (1988) utilized a teacher prompt and praise procedure to teach two children with ASD to initiate with peers. Results demonstrated an increase in social interactions between the participants and their peers. One participant engaged in generalized spontaneous initiations.

The Teaching Interaction Procedure (TIP)

The TIP (Phillips, 1968) is an effective methodology for teaching social skills to individuals with ASD (Dotson et al., 2010; Ferguson et al., 2013; Kassardjian et al., 2013; Leaf et al., 2009, 2010). The TIP is implemented in 6 distinct steps, which may be modified and rearranged as necessary. The TIP begins with the interventionist describing the target skill (e.g., "Today we will practice complimenting our friends."). The second step is providing a meaningful rationale to the learner (e.g., "Providing a compliment will make them feel good and they will want to spend time with you"). The interventionist then breaks the skill into smaller components (e.g., provides the steps that they will need to display for complimenting). Next, the interventionist models the behavior both accurately and inaccurately so the learner can observe both a correct and incorrect demonstration of the skill. Following this model, the learner then practices the target skill in a simulation of the natural context and immediate feedback in the form of reinforcement or corrective feedback is provided for correct and incorrect responding.

The TIP has been demonstrated as an effective methodology for teaching language and social skills such as receptive labeling, giving compliments, making empathetic statements (Leaf et al., 2010), game play and play flexibility (Leaf et al., 2009), as well as conversational skills (Dotson et al., 2010). Furthermore, the TIP is an effective procedure for teaching social skills to adolescents and adults with ASD (Ferguson et al., 2013) and can be effectively implemented in the group setting (Leaf et al., 2010). In 2012 Leaf, Oppenheim-Leaf, and colleagues compared the effects of the TIP to Social Stories™ in teaching social skills to individuals with ASD. Within the study the participants were taught 18 social skills using the teaching interaction procedure and 18 social skills using Social Stories™. While Social Stories™ were only effective in establishing 4 of the 18 social skills across the participants, the TIP effectively taught all 18 social skills across all participants. Moreover, skills taught using the TIP showed greater generalization and maintenance.

Behavioral Skills Training (BST)

BST (Sarokoff & Sturmey, 2004) is similar to the TIP. The major difference between BST and TIP is in BST the interventionist does not provide the learner with a rationale for why they should engage in the skill and the interventionist provides a correct demonstration only. Therefore, the steps of BST are as follows; instruction, model, role-play, and feedback. The effectiveness of BST in establishing social skills in individuals with ASD is well documented in the literature (Kornacki et al., 2013; Nuernberger et al., 2013; Stannis et al., 2019). Researchers have shown BST to be effective in teaching communication (Nuernberger et al., 2013), conversation skills (Kornacki et al., 2013), negotiating (Peters & Thompson, 2015), providing

help (Hanley et al., 2007) and giving compliments (Hanley et al., 2007; Leaf et al., 2009), and responding to bullying (Stannis et al., 2019). Stannis et al. (2019) evaluated the effects of BST and in situ training (IST) to teach four adults with intellectual disabilities to respond appropriately to bullying. The adult participants were taught to restrain from retaliating and instead state disapproval, walk away, and tell a staff member. BST trials were implemented in a simulation of the natural context. IST assessments were conducted in the natural setting following BST trials. All four adults responded appropriately to bullying following treatment.

Cool Versus Not Cool

The Cool versus Not Cool Procedure (Leaf et al., 2012b) is an empirically validated social discrimination procedure used to teach social skills to individuals with ASD. As with the TIP, the Cool versus Not Cool Procedure begins with the interventionist labeling the skill and then modeling a socially appropriate (i.e., "cool") or socially inappropriate (i.e., "not cool") form of the skill for the learner. Each demonstration is followed by the interventionist asking the learner to state if the modeled behavior was "cool" or "not cool" and to provide a rationale as to why the behavior was "cool" or "not cool". The interventionist then provides the learner with feedback and an opportunity to practice the skill. Further feedback is provided contingent on correct (i.e., specific praise) and incorrect (i.e., corrective feedback) responding.

Several studies successfully utilized the Cool versus Not Cool Procedure to develop social skills in individuals with ASD, such as losing graciously and empathy skills (Leaf et al., 2016d), interrupting and greeting others and changing the activity or conversation (Leaf et al., 2012b), and social game play (Leaf et al., 2016a). Leaf et al. (2012b) provided the first empirical investigation on the effectiveness of the Cool versus Not Cool Procedure to teach social skills to children and adolescents with ASD. Results indicated an increase in social skill performance across all participants. Leaf et al. (2016a) implemented the Cool versus Not Cool Procedure to teach 8 children diagnosed with ASD how to play three different social games. The games taught to the participants were Fruit Salad, Mouse Trap, and the Sleeping Game. The results indicated that 7 of the 8 participants learned how to appropriately engage in all 3 games following the implementation of the Cool versus Not Cool Procedure.

Social Skills Groups

DTT, VBI, Script Fading, PMI, the TIP, BST and the Cool vs. Not Cool procedure can all be implemented in the group setting to effectively teach social skills to individuals with ASD (Akers et al., 2018; Garfinkle & Schwartz, 2002; Leaf et al.,

2010, 2016a; Kassardjian et al., 2013; Macpherson et al., 2015; Palmen et al., 2008; Wolfberg & Schuler, 1993). Group instruction is an intervention that utilizes evidence-based procedures in a format in which the interventions are implemented with multiple children at a time, rather than in a 1:1 setting (Akers et al., 2018; Leaf et al., 2010; Macpherson et al., 2015). In group instruction, the learner is provided with an opportunity to learn from and practice social skills with peers (Ellingsen et al., 2017). Groups most commonly consist of 2 or more children and group treatment priorities are focused based on the population of the particular group (Ellingsen et al., 2017; Kransny et al., 2003). For example, a preschool aged social group may focus on play skills whereas a group with teenagers might focus on developing social skills necessary for dating or employment. An effective social skills group utilizes learner strengths while treating deficits by breaking down complex skills into more simple skills and providing numerous learning opportunities (Kransny et al., 2003). Group instruction has many advantages. Group instruction allows for learning to occur in an environment that more closely resembles the natural setting, thus increasing chances of generalization. Furthermore, group instruction provides the leaner with peers to socialize with and allows for more than one child to learn at a time. For these reasons, group instruction provides promising social skills outcomes for individuals with ASD. Group instruction has been implemented to develop social skills such as, showing appreciation, giving compliments, making empathetic statements, and play flexibility (Kassardjian et al., 2013; Leaf et al., 2009, 2012a), conversational skills (Dotson et al., 2010), job related skills (Kelly et al., 1980), sportsmanship (Ferguson et al., 2013), and social perception (Stauch et al., 2018).

Leaf et al. (2017a) evaluated the effects the effectiveness of a social skills group using a randomized control trial. In this study the 15 participants were randomly divided into a treatment group or a waitlist control group. The treatment group received 64 h of intervention and then the waitlist control group received 64 h of intervention. The researchers implemented a progressive approach to behavioral intervention, in which the therapist used in-the-moment decision making about what skills to teach and what procedures to implement. The results showed that the implementation of the social skills group showed significant improvements and that these improvements maintained over time.

Conclusion

Social skills provide the ability to relate to others and adapt to different social contexts (Schopler & Mesibov, 1983). Social skills impairment is a hallmark feature of ASD (APA, 2013, Scheeren et al., 2012) and a common characteristic shared by all individuals with ASD (Carter et al., 2005). Common social skills deficits observed in individuals with ASD include challenges with joint attention, social language and communication, play skills, emotional regulation and theory of mind, friendship development, and dating skills. Social skills are essential for living a healthy and

meaningful life (Kennedy & Shukla, 1995; Pollard, 1998; Scott et al., 2000). These deficits occur throughout the lifespan of individuals with ASD and become more evident if left untreated (Laushey & Heflin, 2000; White et al., 2007). Moreover, social skills deficits have substantial life consequences. Insufficient social skills may result in increases in challenging behavior (Frea, 1995) and poor-quality friendships and peer rejection, which may result in isolation and loneliness (Bauminger & Kasari, 2000; Humphrey & Symes, 2010) as well as anxiety and depression (Ghaziuddin, 2002; Sterling et al., 2008). Social skills deficits often result from missing necessary prerequisite skills that would allow the individual to acquire appropriate social skills and apply them to different contexts (Schopler & Mesibov, 1983). Despite these challenges, individuals with ASD often desire social relationships (Scott et al., 2000). Due to the pervasiveness of social skills deficits in those diagnosed with ASD and the negative consequences of not acquiring appropriate pro-social behaviors, effective and evidence-based interventions are needed to address the development of these critical skills. Evidence-based interventions allow individuals diagnosed with ASD to interact successfully with others and develop relationships and, thus, meet their best potential and live the most meaningful life possible. Several empirically supported methods for developing social skills have been identified throughout this chapter. The literature summarized in this chapter suggests that evidence-based practices can be implemented in a variety of settings with parents, teachers, and peers to teach a range of social skills across individuals of all different ages and abilities. Research clearly suggests that social skills can be successfully taught to individuals with ASD, improving their overall quality of life. However, there are several areas of need in social skills research.

First, researchers should further evaluate the effect of social skills intervention on the overall quality of life for individuals with ASD. While social skills research has resulted in more effective interventions and socially meaningful clinical outcomes, more research is required. For example, most social skills research focuses on early intervention. There is a need for additional research on social skills interventions for adolescents and adults living with ASD (Chang & Locke, 2016; Reichow & Volkmar, 2010). Currently, most research involving adolescents and adults diagnosed with ASD evaluates interventions in the clinical setting and in the group setting with peers with ASD, rather than with typically developing peers (Schohl et al., 2014; White et al., 2010).

Another limitation is the inadequate research assessing the effects of social skills interventions in developing social skills in those more impacted by ASD (Reichow & Volkmar, 2010). Future research should evaluate the effectiveness of social skills procedures in developing social skills in individuals with more severe impairments and across a variety of social skills levels. Additionally, it is important that interventionists implement procedures that are not only effective but also efficient (Baer et al., 1968; Wolf, 1978). In order to determine the most efficient approaches, research might further compare the efficacy of different social skills interventions for teaching social skills, as well as the implementation of treatment packages that combine several of these procedures. Generality is another socially significant outcome (Baer et al., 1968; Wolf, 1978). Future research should further assess the

generality of social skills interventions. Dingfelder and Mandell (2011) recommended addressing the research-to-practice gap in autism intervention, noting that many interventions are difficult to implement in the applied setting, such as school. The effectiveness of social skills interventions in applied settings with caregiver implementation should be further examined.

Another recommendation for future research is to evaluate the maintenance of social skills interventions in improving social skills in individuals diagnosed with ASD. An intervention is not socially important if it does not produce long-standing results (Baer et al., 1968; Wolf, 1978). Much of the social skills research contains inconsistencies in the maintenance conditions (Leaf et al., 2016b) or lacks maintenance conditions all together (Koegel & Frea, 1993; Nikopoulos & Kennan, 2004). Furthermore, few studies evaluate maintenance 1 month or more after intervention, making it difficult to determine the long-term effects of these interventions (Leaf et al., 2017b). Along with assessing socially important outcomes such as generality, efficacy, and maintenance, future research should assess the overall social validity of social skills interventions for individuals with ASD. While social validity is perhaps the most important measure of effectiveness (Wolf, 1978), there is an overall deficiency of social validity measures in ABA literature (Carr et al., 1999). It is recommended that social validity measures be included in further social intervention research. Finally, Leaf et al. (2016c) urge for a movement towards a more progressive model of ABA, encompassing flexible protocols and in-the-moment decision making. Researchers should further assess the effectiveness of the progressive model in establishing social skills.

Social skills are important for living a meaningful life, yet individuals with ASD are greatly impacted by social skills deficits. Fortunately, researchers have provided a myriad of procedures for improving social skills with ASD. This research is encouraging and may help pave the path for more meaningful outcomes in autism treatment. Yet, further evaluation of social skills intervention is required in order to achieve the most socially significant results. Further research will yield more effective treatment and, thus, more meaningful outcomes for individuals living with ASD.

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