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Pragmatic Interventions for Adults and Adolescents with High-Functioning Autism: an Appraisal of the Literature

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Introduction

Autism is a neurodevelopmental disorder that is defined by most psychologists as a collection of traits that arise primarily through an individual's poor or delayed pragmatic development. To date, there have been only three published studies assessing the effectiveness of social skills interventions in adults with autism, while countless others have examined the infant, toddler, and school-age populations (Gantman, Kapp, Laugeson, Orenski, 2012). With relatively little research in the adult and adolescent population compared to younger pediatrics, this will become an issue of great significance as ASD incidence rate continues to increase and diagnosed children mature into adults. The purpose of this literature review is to appraise the current available research on intervention techniques addressing the functional pragmatic skills of adolescents and adults with High Functioning Autism (HFA). In addition, this paper aims to provide a clearer picture of options available to diagnosed adults with HFA, practitioners, clinicians and human services professionals who may assist these individuals.

High-Functioning Autism

Autism Spectrum Disorders (ASD) present on a continuum of severity, which may range from severe to mild (high-functioning) impairment. High Functioning Autism (HFA) is a subset of ASD, distinct from other autism spectrum disorders in that those diagnosed tend to have relatively unaffected—or in some cases, advanced—cognitive and language skills (White, 2011). Asperger's syndrome and Pervasive Developmental Disorder-Not Otherwise Specified are two formerly labeled conditions which will be removed from the next upcoming edition of the Diagnostics and Statistics Manual. They are planned to be consolidated into ASD and considered HFA (Ghaziuddin, 2010).

There are two main clusters of symptoms that are present in individuals with HFA. The first involves impairment in engagement of typical social interactions. These may manifest as difficulties in perceiving and expressing appropriate body language, facial expressions or other nonverbal communication cues. They may also report difficulties in establishing interpersonal relationships and difficulties engaging in naturally flowing and reciprocating conversations (White, 2011). The second cluster of symptoms involves non-communicative traits. These notably include having very narrow, specific subjects of fascination, knowledge or skill. These special interest areas may frequently lead to preoccupation, perseverance in conversation and perhaps stereotypic or repetitive behaviors. Inflexibility to change in routine is also commonly observed. Other secondary symptoms sometimes include motor clumsiness or awkwardness and hypo- or hyper-sensitivity to particular stimuli, especially noise (Bogdashina, 2003).

Is HFA a Disability or a Difference?

Differences in neural functioning and atypical behavior that characterize HFA may result in difficulty forming or maintaining friendships and successful interpersonal relationships (Fombonne, Meng, Strulovitch, Tagalakis, & Tse, 2007). Due to their social difficulties, adults with ASD may also experience barriers in finding and maintaining careers or romantic relationships. These difficulties place individuals with ASD at risk for social isolation, low self-esteem, anxiety, and depression disorders (Feldman, Mitchel, Reaume, & Regehr, 2010; Fombonne et al., 2007). Despite having a label of "high-functioning", adolescents and adults with HFA may face more difficulties than those with lower-functioning versions of autism. Due to their greater cognitive and language skills, they may find a greater degree of social expectations and responsibilities placed upon them by the mainstream population (Fombonne et al., 2007). In addition, they often achieve a higher level of integration into mainstream settings,

correspondingly lower levels of protection offered through a low-functioning label, and heightened self-awareness of their differences and difficulties (Gantman et al., 2012). In addition, prior studies that have found that adults with high-functioning autism and greater cognitive abilities or IQs experience significantly greater degrees of depression, anxiety, peer victimization, social isolation and withdrawal than their lower-functioning or pediatric counterparts (Gantman et al., 2012).

Despite these difficulties that place individuals with HFA at a distinct disadvantage compared to their peers who are not on the spectrum (defined here as "neurotypical") in certain regards, there are arguments to counter this belief. Some prominent researchers, including Simon Baron-Cohen (2000), have expressed opinion that while they may face undeniable difficulties, individuals with HFA often hold unique strengths and abilities seldom found in the neurotypical population, which may partially compensate for any pragmatic shortcomings. For example, Baron-Cohen (2000) wrote the following:

> To call what a person does little of a disability could be seen as unreasonable. It might be a little like saying that the basketball player Michael Jordan has a deficit in fine motor coordination on the grounds that he is not known for spending much (if any) time engaged in needlework. This may be true of him, but to highlight this aspect of his skills, whilst ignoring his obvious assets in hand-eye coordination, physical speed, strength, agility, etc., is to put things back to front, and would be an unfair description of him (p. 774).

Baron-Cohen (2000) highlighted 12 areas of characteristics commonly observed in individuals with HFA that constitute a difference, rather than disability. These include such qualities as special interest areas, strong perceptive skills and notice of detail, methodological

thinking, and being less easily influenced by others. The term "disability" is subjective, and highly dependent upon the cultural and biological environment with which one interacts (Baron-Cohen, 2000). In today's society, where all beings are expected to be social and behave towards each other in a particular manner, individuals diagnosed with HFA are often perceived as incomplete, handicapped, or disabled. It is evident that current cultural attitudes and expectations will in part define what constitutes "normal" and "disabled". Thus, one logical implication is that if cultural expectations, norms, or environmental demands shift, individuals with HFA may no longer viewed as disabled by the current definition.

In addition, automatic classification of all ASDs as disabilities often leads to negative connotations, judgment, assumptions of ability, and labels. Therefore, the word *difference* may be a more appropriate term to use when referring to individuals with high-functioning autism (i.e. no cognitive or language deficits). However, considering HFA to be a difference rather than disability does not eliminate the social difficulties and commonly associated anxiety, depression and social isolation frequently experienced by these individuals. People with HFA may be acutely aware of their difficulties in finding and maintaining personal relationships, and often desire social interactions and friendships (Beversdorf, Cloppert, Fish & Hillier, 2007). Clearly, although being different may not always constitute a disability, it does not guarantee safety from experiencing negative effects of atypicality. To maximize the quality of life of individuals with HFA, access to appropriate services to address social or psycho-emotional difficulties may need to be available. Therefore, in the current medical and legal sense, the term "disability" may need to remain under certain circumstances so that individuals with HFA are eligible for appropriate services.

Considering the rise of autism incidence rates and the beliefs that individuals with HFA may experience more damage to their socio-emotional health than their lower-functioning counterparts, this is an area of increasing importance. Few studies have been conducted to date on social skills interventions for individuals with HFA compared to pediatric or low-functioning populations. A selection of the available published research on HFA intervention techniques in adolescents and adults will be introduced, starting with interventions targeting the most fundamental aspects of pragmatics

Precursory Social Skills: Theory of Mind and Emotion Recognition

Due to their stronger cognitive abilities compared to lower-functioning counterparts, individuals with HFA are often aware of social rules, but do not know how to apply them appropriately to natural contexts, reflecting a discrepancy in social cognition and social functioning. (Beversdorf et al., 2007; Bodfish, Dichter, Penn, Perry, & Turner-Brown, 2008). These social difficulties in individuals with autism are believed to be linked to deficits or neurological differences in three core areas that form the foundation of basic pragmatic skills: Theory of Mind (ToM), emotion recognition, and executive functioning (Gage, Herzog, Randolph, Schultz, Stichter, & Vivovsky, 2010). Because the theory that ToM and emotion recognition are fundamental aspects of pragmatics, a number of researchers believe that interventions for individuals with HFA that target these precursory skills will build a pragmatic foundation upon which more sophisticated social functioning skills may be developed.

Supporting Evidence

Ceder, Gutman, Khan, Raphael, Salvant and Timp (2010) stated that the most effective interventions targeting social skills in individuals with autism begin by promoting a

comprehension of the body language, facial expressions and gestures that reflect particular thoughts or emotions Ceder et al. (2010) theorized that individuals with autism who are unable to comprehend nonverbal communication may have impaired or disrupted motor neuron systems, which leads to difficulty linking motor actions, sensory feedback, cognitive comprehension, emotion and intention. Mirror neurons are a specific type of sensorimotor neuron located in the premotor cortex, named for their phenomenon of discharging both while a person (or animal) executes a particular action and while he or she observes another performing the action (Craighero & Rizzolatti, 2004). The Ceder et al. (2010) study operated under the belief that mirror neurons are partially responsible for the cognitive linkage between motor actions, visual feedback and language. Theoretically, these prerequisite nonverbal language skills build a foundation for greater pragmatic understanding and associated social functioning.

Adhering to this theory, Ceder et al. (2010) examined the effect of a motor-based intervention on two adolescents with HFA that targeted rudimentary social skills such as emotion identification and imitation of nonverbal communication such as facial expressions and body language. In addition, these emotions were rehearsed and identified in structured role-play activities to reinforce understanding and appropriate performance. Upon completion of the seven-week intervention, both boys demonstrated significantly increased use of targeted, functional social skills behaviors that were not taught explicitly. These skills were maintained after a 3-month probe, and also resulted in an improved ability to identify emotions in others. The results of this single-case study suggest that motor-based interventions targeting emotion recognition and basic ToM skills build a foundation for more advanced pragmatic skills and social-cognitive comprehension (Ceder et al., 2010).

Refuting Evidence

Conversely, a study that focused on ToM and basic emotion recognition found no significant functional social skills improvement (Bodfish et al., 2008). Rather than teaching social skills through motor learning, this study concentrated on social cognitive methods of training. Each unit was taught in a highly theoretical fashion without role-play or functional practice of targeted concepts. Eleven adults diagnosed with HFA participated in this study, which consisted of an 18-week intervention. The intervention was carried out in three phases: 1) emotion training, 2) figuring out situations, and 3) integration and application of the first two concepts. The lessons placed an emphasis on encouraging awareness of social cues and determination of relevant (as opposed to irrelevant or incorrect) facts about the interaction or communication situation (Bodfish et al., 2008). A variety of assessments were administered following the intervention, evaluating emotion perception, ToM skills, self-reported social skills, and a role-play assessment of social skills. The authors hypothesized that individuals who received this intervention would show greater improvements in social cognition and social functioning when compared to a control group. Results of Bodfish et al. (2008) found that while the participants' ToM and emotion recognition of the participants improved significantly, self-reported social skills and role play performances did not improve.

A third study concentrated on explicit ToM training (in children and adolescents) found no significant changes in functional social skills (Begeer, Boer, Clifford, Gevers, Hoddenbach, Kat, & Verhoeve, 2010). In this randomized and controlled study, 40 children with HFA attended a semester-long intervention program targeting precursory, elementary, and advanced ToM skills, as well as basic, mixed, and complex emotion recognition. Progress was evaluated through an interview-style ToM test, an emotional awareness scale, self-reported empathy, and

parent-reported changes in their child's social skills. The results of this ToM training intervention found no overall improvements in ToM skills or humor recognition, and no changes in either the participants' reported empathy or parent-reported social skills. However, this intervention did find significant improvements in identification of mixed emotion (e.g. angry but also a bit sad) and complex emotion recognition (e.g. jealous, proud) (Begeer et al., 2010).

Reflections

Although the investigations by Ceder et al (2010), Bodfish et al. (2008), and Begeer et al. (2010) all placed a strong emphasis on developing ToM, emotion recognition and precursory pragmatic skills, individual differences between the methods used make it difficult to evaluate the effectiveness in precursory pragmatic skill intervention. Along with being unique in its motor-based format and focus on developing mirror neuron function, the Ceder et al. (2010) intervention was also the only of the three studies to incorporate role-play and social skill rehearsals in their sessions. It is possible that the role-play and functional nature of the intervention contributed to the relative success of the study compared to those that were explicitly taught without a practical component (Beversdorf et al., 2007; Fombonne et al., 2007). Therefore, further studies will be helpful in comparing the efficacies of motor-based interventions and those that employ role-play and functional components to determine if there are techniques that demonstrate greater success in eliciting appropriate functional social skills behaviors.

It is also interesting to note that the only positive changes found by Bodfish et al. (2008) and Begeer et al. (2010) were non-functional skills that were measured via worksheet activity completion, formal assessments and rating scales. It is possible that inadvertent teaching-to-the-test variables occurred and lead to the observed significant improvements in the explicitly-taught

emotion recognition and aspects of ToM in the two studies. Without a practical, real-life component to the interventions, it may be a jump in logic to assume that individuals who conceptually understand ToM and emotions are automatically able to successfully use those skills in natural social interactions. A useful future direction to take in this area of research would be to evaluate the effectiveness of theoretically-taught ToM and emotion recognition skills, in conjunction with role-play and functional activities to practice those skills and reinforce understanding.

Explicit Teaching of Social Skills

Another theory found in some contemporary research is that individuals with HFA will demonstrate improved quality of social interactions when exposed to intervention techniques that explicitly teach specific social skills. According to Gantman et al. (2012), the utilization of literal, concrete social rules and steps is more appealing and salient for individuals with HFA. This, they explain, is due to the commonly-held belief that individuals with autism have a tendency to think in logical, concrete terms. In addition, they often demonstrate a strong ability to absorb new information, especially when presented in a logical, explicit or systematic way (Gantman et al., 2012).

Supporting Evidence

The 2012 study by Gantman et al. supports this claim. The purpose of their randomized controlled investigation was to evaluate the effectiveness of a caregiver-assisted intervention program called PEERS for Young Adults on 17 individuals aged 18-23 years old with a diagnosis of HFA. The intervention was conducted over 14 weekly 90-minute sessions. Each session consisted of an explicitly taught social skills lesson, followed by role-play

demonstrations, rehearsal activities, feedback, and weekly assignments of functional socialization practice to be conducted outside the session.

Gantman et al. (2012) described the lessons as didactic, concrete, and presented in the form of Socratic Questioning. An example of Socratic questioning would be to tell the participants "the first step for entering a conversation is to listen. What do you suppose we are listening for?" (Gantman et al., 2012). This teaching style, the authors theorize, allows the participants to take control of their own learning, enhance participation, and promote greater understanding of the topics covered in lessons.

In addition to the participants' own social lessons through PEERS-Young Adults, their caregivers were also involved in the intervention process, coached on how to facilitate social interactions, independence, and outgoing behaviors. Caregivers were also involved in the planning and execution of participants' socialization homework. At the end of every session, the investigators collaborated with caregivers and participants to confirm their plan for the socialization homework. This level of assistance was provided with the hope that it would aid the participants in handling executive functioning difficulties (Gantman et al., 2012).

Assessments. The investigation by Gantman et al. (2012) assessed the effectiveness of the intervention through a variety of primary and secondary measures. The first primary outcome measure was the Social Skills Rating System (SSRS), a standardized caregiver questionnaire assessing the frequency of demonstrated social skills and interactions in a variety of natural settings. The SSRS was completed by the caregivers during both the pre- and post-test periods. The second primary outcome measure was the Social Responsiveness Scale (SRS). The SRS is a rating scale assessing the severity of typical ASD symptoms in natural settings. The final primary outcome measure was the Social and Emotional Loneliness Scale for Adults (SELSA).

The SELSA measures self-perception of one's romantic, social, and familial loneliness (Gantman et al., 2012).

Data. The three primary assessments indicated an increase in psycho-social functioning of the treatment group when compared to the delayed treatment group (Gantman et al., 2012). The SSRS revealed an overall increase in the quality and quantity of positive social skills behaviors as reported by caregivers. These improved skills included cooperative behavior, social assertiveness, and self-control (Gantman et al., 2012). In addition, the SRS revealed improved social responsiveness and a nominal decrease in autistic mannerisms. This latter decrease, the authors hypothesized, may be due to the PEERS for Young Adults' emphasis on bidirectional social interaction (Gantman et al., 2012). Lastly, the participant scores on the SELSA indicated a perceptual decrease in loneliness following the PEERS intervention.

The young adults in the intervention demonstrated an overall increase in participation in social activities and friendships, in addition to hosted as well as invited get-togethers. The authors state that the invited get-togethers may in fact be the best indicator of the intervention success, as it signifies social acceptance and reciprocity with peers outside of the context of the intervention (Gantman et al., 2012).

Results and validity concerns. The results of this investigation support the effectiveness of the explicitly taught, caregiver-assisted PEERS *for Young Adults* program in promoting positive social functioning and interpersonal relationships in young adults with ASD. However, the authors identify several possible threats to validity to be noted. One primary concern was the fact that there are few assessment tools available that are designed or standardized for adults with ASD. The SRS was still in the development phase at the time of the investigation. The authors state that there were no blinded behavioral observations, and most observations were conducted

by caregivers, who are potentially biased. Lastly, the SELSA assessment was developed for and standardized on neurotypical college students. It was utilized in this investigation due to a lack of other tools developed or normed for individuals on the spectrum, and used primarily as a pre-and post-test self-report comparative measure.

Refuting Evidence

Despite the promising results of the Gantman et al. (2012) study, numerous other investigations found explicit social skills training interventions to result in poor or inappropriate generalization to natural situations (Beversdorf et al., 2007; Miller & Ozonoff, 1995). Miller & Ozonoff (1995) conducted a group social skills intervention for 5 adults with ASD and normal IQs, with 4 assigned to the no-treatment control group. The intervention was carried out over 4 ½ months, and included weekly 90-minute lessons targeting theoretical (e.g. as ToM) and applied (e.g. specific conversational skill) components of pragmatics. The theoretical topics were included in hopes of promoting understanding and generalization. Each specific skill targeted in the lesson was broken down into simple, concrete components that could be easily understood (Miller & Ozonoff, 1995). Despite treatment group improvements on several social-cognitive and false belief tasks (such as the M&Ms False Belief Task [1989]), the participants in this study did not demonstrate significant improvements in overall social competence, as reported by caregivers and teachers (Miller & Ozonoff, 1995). The authors speculate that the lack of improved overall pragmatics reveals poor generalization skills to novel situations despite explicit skill instruction. To explain the conundrum of improved social-cognitive assessment scores and unaffected general social skills following intervention, the authors state that possible teaching-to-the task occurred, rather than true skill acquisition.

Reflections

Multiple investigations of autism interventions report that appropriate generalization is a difficult skill for individuals on the spectrum (Beversdorf et al., 2007). A common thought is that although the individuals may understand a particular pragmatic behavior in theory, they may not fully grasp how to employ that skill appropriately. Although the investigations by Miller & Ozonoff (1995) and Gantman et al. (2012) both emphasized explicit teaching of target pragmatic skills and role-play, there were two key differences in their investigations that may explain their contradictory findings. The Gantman (2012) investigation employed functional socialization assignments that provided additional, real-life practice to solidify targeted social skills. Another major component of the Gantman (2012) investigation was the use of caregivers in facilitating the execution of functional social skill endeavors, encouraging social independence and discouraging avoidance behaviors in settings outside of the intervention (Gantman et al., 2012). From the two investigations by Gantman (2012) and Miller & Ozonoff (1995), it appears that interventions containing explicit social skills training have mixed levels of success, depending upon other components of the intervention.

Learning Through Role-Play and Natural Contexts

Functional and naturalistic practice of social skills appear to be a component of many autism interventions in the attempt to increase lesson saliency and competency of the skills targeted (Feldman et al., 2010; Fombonne et al. 2007, Gantman et al., 2012, Miller & Ozonoff, 1995). Functional intervention is a broad concept and these components can range from structured role-play or behavior rehearsals, and unstructured practice during intervention, to socialization assignments conducted outside of the session.

Many investigations embed role-play or other naturalistic components into their intervention in conjunction with other techniques, leading to complex multi-layered intervention programs (Ceder et al., 2010, Feldman et al., 2010; Fombonne et al., 2007; Gantman et al., 2012, Miller & Ozonoff, 1995). These other techniques may include explicit social skills training (Gantman et al., 2010), presence or absence of caregiver involvement (Gantman et al, 2010; Feldman et al., 2010), and group discussion, to name a few.

As stated previously, the Miller & Ozonoff investigation employed role-play in the intervention program, yet parents reported no significant improvements in social competence. However, a number of investigations emphasizing role-play and other naturalistic practice found improvements in overall social functioning. One example is the investigation by Fombonne et al. (2007).

Supporting Evidence

Fombonne et al. (2007) conducted an intervention employing several types of naturalistic and functional components. These included role-play practice, unstructured socialization time, and a game or activity to implicitly encourage appropriate social skills (Fombonne et al., 2007). This investigation evaluated the effectiveness of the intervention on the social competence and executive functioning skills of 46 adolescents with a diagnosis of ASD or HFA. The 12-week, weekly intervention was conducted in a group setting of 7-8 participants each. Each session followed the same schedule consisting of a check-in period, reviewing skills taught the previous week, introducing and discussing a particular social skill, role play with feedback, snack break and socialization, a group activity and closing. (Fombonne et al., 2007). Along with role play, the intervention included other opportunities for functional and naturalistic teaching. One session of the intervention included a trip to a restaurant to practice dining etiquette, and the group chose

to celebrate the final session with an activity they choose. Following the intervention, the participants attend reunion parties two times per year. Throughout these naturalistic contexts in session, the investigators were present to encourage appropriate conversational skills (Fombonne et al., 2007). The immediate feedback provided during such activities was intended to shape appropriate behaviors and strengthen executive functioning skills (Gantman et al., 2012).

Evaluation and results. To evaluate the effectiveness of the treatment program, parents of participants in the Fombonne et al. (2007) investigation were asked to complete and submit 3 questionnaires immediately before and after the intervention. These measures were the *Social Responsiveness Scale* (SRS), *Aberrant Behavior Checklist* (ABC) and the *Nisonger Child Behavior Rating Form* (N-CBRF). These three questionnaires measured aspects of social competence (SRS) and emotional and problem behaviors associated with ASD (ABC, N-CBRF). In addition, the participants and their parents completed an anonymous survey where they rated their satisfaction with the intervention and the impact they felt it had on their social skills.

In support of the hypothesis that the group intervention would result in overall gains in pragmatic competence, the participant SRS and N-CBRF (Positive Social subtest) scores were significantly higher following treatment (Fombonne et al., 2007). All problem behaviors associated with ASD were also significantly lower in the post-test assessments, except the hyperactivity subscale. The greatest behavioral improvements were in the "Irritability" and "Overly Sensitive" subscales. Of the 13 participants who completed the feedback survey, 10 reported liking the group. The most improved targeted skill the group reported was conversation. Other areas they reported improvement included understanding body language, meeting new people, handling teasing, and improved self-confidence. The majority of parent feedback surveys reported 'a little' improvement in their social competence of their son or daughter.

Due to the great emphasis on role-play and naturalistic socialization practice in the Fombonne et al. (2007) investigation, this overall successful intervention appears to indicate that these functional methods are effective in eliciting appropriate social skills behavior and generalization outside the context of structured sessions. Investigations by Gantman et al. (2012) and Feldman et al. (2010) which also contain role-play components support this theory. Despite the promising results of the Fombonne et al. (2007) investigation, the authors list several potential threats to validity in their investigation. The most significant of these is the lack of a control group in the study; without one the authors can only speculate whether the social skills improvements are due to spontaneous improvement in skills, the extra socialization time or the investigation design itself (Fombonne et al., 2007). In addition, the only quantitative measures taken in this investigation were reports completed by the parents. Teachers, blinded examiners or even the participants themselves are potential reporting sources who may have different perceptions of behavioral changes and social competence of the participants (Fombonne et al., 2007).

Reflections

Attributable to the complexity and unique nature of published interventions targeting HFA social skills, it can be difficult to glean apart and isolate the effects of role-play and other strategies employed in the particular social skills intervention. To understand the true impact of naturalistic interventions, future investigations should be conducted to tease apart the effects of role-play and social practice in naturalistic settings from other intervention strategies. Until then, we can only speculate the effect of these intervention techniques on pragmatic development and their interactivity when utilized in conjunction with other techniques. Although structured role

play and guided practice in natural settings is one common strategy used to facilitate appropriate pragmatic skills, studies have attested to the efficacy of less structured group interventions

The Benefits of Low-Structured Group Interventions

There is evidence that adults and adolescents with HFA may experience increased quality of social interactions as well as benefits of gaining friendships and sharing experiences through group interventions (Beversdorf et al., 2007; Gantman et al., 2012). The rationale behind these discussion-style interventions is that they provide additional opportunities to practice social skills in a natural, non-contrived setting as well as find friendships. In addition, groups designed specifically for individuals with an ASD would entail lower social demands than a neurotypical group, leading to less anxiety and a greater sense of security (Beversdorf et al., 2007).

Supporting Evidence

The Beversdorf et al. (2007) investigation reviewed and evaluated Aspirations, which is an 8-week pragmatic intervention program with a unique emphasis on vocational and employment skills (Beversdorf et al., 2007). Thirteen participants (2 women and 11 men, age 18-23 years) with HFA were recruited to the study. The program consisted of 8 weekly 1-hour meetings with 6-7 participants each, and was designed to address pragmatic and vocational skills, enhance awareness, and provide opportunities for participants to socialize with peers and improve their own interpersonal skills (Beversdorf et al., 2007).

Each meeting was centered around a particular topic, introduced by the investigator. The meeting was primarily lead by the participants, similarly to group counseling or support groups. The investigators guided the discussion as needed to keep the participants on topic. This is in contrast to explicitly taught or investigator-lead methods (Beversdorf et al., 2007). Topics addressed included employment, friendships, interpersonal problem-solving, social events,

general problem-solving, social communication/ToM, and a final review. During the discussions, participants were encouraged to share and listen to personal experiences, give advice, and develop problem-solving strategies with peers. Monthly reunions were offered to aid in the solidification and generalization of skills acquired. In addition, parents of participants were encouraged to attend a weekly support group (Beversdorf et al, 109).

Evaluation and results. Self-report measures, behavioral observations, and qualitative reviews were used to evaluate the effectiveness of the Aspirations program. Three self-report measures were utilized pre- and post-intervention: the Index of Peer Relations (IPR), Autism Spectrum Quotient (AQ), and the Empathy Quotient (EQ). After combining and analyzing the data, the authors found that responses to 17 out of the 25 items on the IPR were higher after Aspirations, indicating improved attitudes towards peers. However, the changes were not significant. Likewise, responses on the AQ were non-significantly higher. Two items on the EQ were significantly different, indicating increased empathy skills. To measure behavioral changes throughout the course of the program, observers recorded the quantity and type of contributions each participant made to the group. Findings revealed that participants contributed more to the group discussions towards the end of the Aspirations program than at the beginning (Beversdorf et al., 2007).

Lastly, the investigators examined their qualitative observations of the participants' overall social competence, behaviors and attitudes. They noted that over time, the participants demonstrated increased self-disclosure and a positive attitude towards the program. Participant feedback was gathered during the final session. They reported developing friendships with others in the group, maintaining contact and initiating get-togethers outside of the group. The participants also reported an improved attitude and better understanding towards gaining

employment. When asked about their opinion of the program, participants stated that the opportunity to meet and interact with others on the autism spectrum was beneficial. They reported that they appreciated the opportunity to discuss mutual difficulties and challenges in an environment in which they felt accepted (Beversdorf et al., 2007).

Validity concerns. The authors list a few areas that could benefit this investigation. One improvement would be to include more detailed behavioral observations. More comprehensive pre- and post-evaluations from parents would also be beneficial, as parents may be more aware of changes and abilities than the participants themselves (Beversdorf et al., 2007). Additionally, this study did not have a control population by which to further evaluate the effectiveness of the program.

Although the modified self-report measures revealed few significant differences in social functioning apart from empathy, qualitative data and participant feedback suggest that the unstructured, group discussion-style Aspirations intervention had a positive impact on the group members as a whole. The most valuable aspects of the program such as interacting with peers on the autism spectrum and benefitting from sharing personal experiences are difficult to quantify (Beversdorf et al., 2007). Other investigations have encountered similar challenges where post-intervention anecdotal results are not supported by quantitative data from assessments (Miller & Ozonoff, 1995).

Reflections

The study by Beversdorf et al. (2007) is unique in intervention style and age group, with few others to compare. However, it brings up several topics of interest for future investigations. Less-structured group interventions provide an opportunity for individuals with HFA to both offer and receive advice and share personal stories. The benefits of this group counseling-type of

intervention have anecdotally included increased self-esteem, interest in social interactions, and friendships. However, the results were not enough to significantly increase standardized assessment performance. If combined with elements of more explicit social skills teaching, group discussion may help solidify these topics and provide an opportunity to develop these skills in a less contrived environment.

Virtual Interventions

Several researchers believe that exposing an individual with ASD to the social demands of a group intervention will prove to be overwhelming and may lead to anxiety and withdrawal. For individuals with HFA and greater awareness of their deficit, this anxiety may be amplified (Bell, Boteler, Olsen, Trepagnier, 2011). In addition, group interventions may be conducted at a pace that is not ideal for each participant (Baron-Cohen & Golan, 2006). One category of intervention that addresses these caveats is those of the virtual or computer-based modality. Baron-Cohen & Golan (2006) argue the benefits of virtual interventions. First, virtual interventions appeal to the temperament of many individuals with ASD in that they are predictable, logical, consistent, and free from anxiety-evoking social demands. This may allow the individual to step out of his or her comfort zone and explore social behaviors. In addition, many virtual interventions can be conducted at the preferred pace of the learner, and repeated until the concept is mastered (Baron-Cohen & Golan, 2006). Two recent investigations have examined the efficacy of virtual interventions: Baron-Cohen & Golan (2006) and Bell et al. (2011). The former intervention targeted emotion recognition, while the latter dealt with appropriate conversational skills. Neither intervention included real-life social interactions.

Supporting Evidence

Baron-Cohen & Golan. The investigation by Baron-Cohen and Golan (2006) evaluated the effectiveness of *Mind Reading* (Baron-Cohen, Golan, Wheelright, & Hill, 2004), an interactive software program that teaches recognition of complex emotion and mental states. This investigation consisted of two separate experiments. The first experiment assessed the effectiveness of *Mind Reading* intervention in a population of adults with HFA compared to a matched control group with HFA and a neurotypical control group. The second experiment was a continuation of the first: the treatment group consisted of individuals with HFA who used the *Mind Reading* software along with a weekly tutoring session, and control groups consisted of individuals with HFA who underwent social skills training as well as a neurotypical control.

The software. The *Mind Reading* software consisted of a database of 412 emotions and mental states, which are sub-divided into 24 emotion groups. Each emotion group had examples from 6 different age groups, ranging from age 4-adult. To appeal to the logical, pattern-finding method of thinking and learning present in many individuals with ASD, the emotions were systematically organized. Each lesson was introduced by a video clip demonstrating the emotion, followed by 6 silent films depicting faces, 6 voice recordings in the target emotion, and 6 written examples of scenarios depicting the target mental state. These examples were presented in isolated form to encourage a more concrete understanding of modalities of the targeted mental state. With 412 emotions or mental states and 18 voice, video, and textual demonstrations of each, *Mind Reading* software contained an impressive bank of 7,146 examples of different mental states (Baron-Cohen & Golan, 2006). To further facilitate full understanding and generalization, male and female actors from a range of genders and ethnicities were used in the software. The emotion database was accessed in three ways: (a) an "emotion library*"* allowed

users to browse through and play examples, take notes and compare emotions, (b) a structured "learning center" allowed the users to take lessons and quizzes to earn awards, (c) lastly, the "game center" was comprised of 5 different educational games, designed for both children and adults of various levels of functioning (Baron-Cohen & Golan, 2006).

The intervention. The first experiment in the Baron-Cohen and Golan (2006) investigation consisted of 19 individuals aged 17-51 with ASD diagnoses who used the *Mind Reading* software at home 2 hours per week for 10-15 weeks. The second experiment consisted of 13 individuals with ASD diagnoses, who completed the same software requirements along with attending a weekly group session led by a tutor to review and discuss the materials covered (Baron-Cohen & Golan, 2006). Following the intervention in both experiments, the participants facial and vocal expression recognition skills were assessed at three levels of generalization. These three levels included close generalization, feature-based distant generalization, and holistic distant generalization. The first included faces and voices used in the software tasks, but represented in different software and with more difficult answer choices. Feature-based distant generalization involved using novel faces and voices that were not used in the software, testing the generalization of skills to the recognition of discreet facial expressions and vocal tone. Lastly, holistic distant generalization consisted of recognizing the emotional state of actors in movie clips, requiring an analysis and integration of the facial expressions, vocal tone, body language, and context of the scene (Baron-Cohen & Golan, 2006).

Results and validity. Following the post-intervention assessments, the treatment group in both experiments improved significantly on close generalization tasks. However, there was no significant improvement on feature-based distant or holistic distant tasks, which may reflect poor generalization. The treatment group in experiment 2 that used tutoring lessons in addition to the

software demonstrated improvements in emotional recognition. However, these improvements were not significantly greater than in participants who used the software exclusively.

One threat to validity in this study was that participants in experiment 2 had significantly lower IQ levels. This may have made comprehension of the tasks and generalization more difficult despite tutoring. Moreover, the authors found that verbal IQ levels had a significant impact on test performance in experiment 2. To address this potential threat to testing validity, the authors suggested that non-verbal assessments should be included in future experiments. Furthermore, in Baron-Cohen and Golan's (2006) view, a reduced generalization is an indication of the strong drive of people with ASD to compartmentalize and systemize what they learn, rather than a deficit (Baron-Cohen & Golan, 2006). One other recent study evaluating the effectiveness of a virtual intervention was conducted by Bell et al. (2011).

Bell and colleagues Whereas Baron-Cohen and Golan (2006) used virtual intervention to target emotion recognition, Bell et al. (2011) used computer software to teach appropriate conversation skills to 16 adults and adolescents with HFA. The purpose of this pilot study was to evaluate the feasibility of a prototype conversation simulation. The simulation task is to meet and sustain a comfortable conversation with the virtual conversation partner *Sam Martin*, a young man in his early 20s portrayed by an actor and presented by a mutual friend at a party. The justification for this method of intervention was similar to the argument presented by Baron-Cohen and Golan (2006); virtual interventions allow the participant to avoid anxiety-evoking situations, practice in a low-stress environment, and repeat lessons and scenarios until skills are mastered (Bell et al., 2011). The software was created using algorithms originally developed to teach occupationally valuable social and culturally appropriate communication skills.

The software. The algorithm in the Bell et al. (2011) study analyzes the conversation history after each exchange to play the most appropriate and realistic response from Sam. For example, Sam displays positive and negative emotions where appropriate, but no severe displeasure or rudeness to prevent the program from eliciting anxiety (Bell et al., 2011). The potential conversations come from a bank of 300 video clips and 125 statement choices for the participants. The software can support 10-12 novel conversations of approximately 10 minutes each. The multiple-choice responses could either be clicked or spoken aloud using speech recognition technology (Bell et al., 2011).

The primary feedback provided during the virtual training was Sam's responses. However, other methods employed to provide feedback included a scoring system where points were provided for the number and appropriateness of social responses provided by the participants. A female coach was present in the bottom corner of the screen, who provided emotional feedback such as applauding, and also provided feedback and explanations of Sam's behavior. Lastly, an instructional screen was available that explained conversational rules and guidelines in clear, explicit language (Bell et al., 2011).

The intervention. The participants in the study attended two sessions, two weeks apart. During the first session, they were introduced to the game and asked to play two games independently to ensure they understood the features. The participants were then provided a DVD containing the game and asked to play it twice per week before returning to the next session. At the second and last meeting, the participants played two more games, and were asked to rate various statements about the software on a 17-item Likert scale (Bell et al., 2011).

Results. Overall, the participants in the Bell et al. (2011) investigation agreed with all 10 positive statements about the realism of the conversation and their experience. They also agreed

with all but one of the statements about the auxiliary instructional features and feedback methods. Of the participants who remained in the study, only 1 of the 10 did not complete the requested number of games, and 6 played extra (Bell et al., 2011). They indicated an interest in seeing a larger-scale simulation in the future. When asked to provide feedback, a number of the participants reported that they liked the conversation, it had felt real, and it had allowed them to step outside of their comfort zone since they normally shy away from social situations. Others also reported that the virtual conversation had increased their interest in talking with other people (Bell et al., 2011). When comparing participant conversation quality at the first and last session, the scores improved, but not statistically significantly so (Bell et al., 2011).

Despite the non-significant improvements in conversational quality, the fact that a number of participants reported benefitting from this style of intervention is promising. The authors state that a larger-scale, randomized controlled trial is needed to better gauge the feasibility of virtual conversation training. They additionally hope that the software can be expanded to include multiple communication partners and longer, more varied conversation (Bell et al., 2011).

Reflections

For individuals who are self-conscious or experience significant anxiety in social situations, their own anxiety may hinder the efforts of traditional social skills interventions. A virtual environment may be less socially challenging and may be more comfortable for the individual to explore, take risks they normally would not have taken, as well practice and learn various aspects of social awareness and interaction. Positive experiences with virtual interventions may result in increased self-confidence in and awareness of social situations, thereby increasing the efficacy of more traditional interventions involving face-to-face contact.

Further research is needed to assess the potential of virtual interventions to be an alternative to or additional intervention strategy for adults with HFA.

Conclusion and Future Directions

The prevalence rates of autism have been steadily increasing in recent years, and as of 2009 had risen to 1 in 110 (White, 2011). Little research has been conducted to date on adults with HFA compared to the pediatric and adolescent populations, in particular those using randomized controlled trials on a large scale. Additionally, relatively few evidence-based social skills or pragmatic interventions exist for this population as well (Gantman et al., 2012). However, a synthesis of the literature revealed a handful of contemporary investigations evaluating the efficacy of different social skills interventions in adults with HFA. Deficits and needs in ASD are complex and often open to interpretation, reflected by the variety of interventions that target different pragmatic subsets. It was apparent that pragmatic interventions often focused on one or two broad areas of pragmatics. The first area frequently addressed consisted of ToM and emotion recognition, the foundations of pragmatics. The second broad area was related to basic conversational skills or rules and expectations of social interactions, targeted because they most noticeably impact daily functioning.

These two broad areas of social functioning were targeted through a variety of means, including explicit teaching of the target skill, role play, unstructured practice in a naturalistic setting, group discussions with peers, and caregiver involvement. Because most studies applied several intervention techniques, it is difficult to determine isolated cause and effect. However, some trends are suggested by the results.

One method commonly employed was to explicitly teach target social skills, in clear and concrete language more easily understood by individuals with ASD. Results of investigations

employing this result are varied. The only investigation addressed in this literature to use explicit teaching exclusively with no other methods was that by Bodfish et al. (2008). In this case, explicit teaching with no other intervention components resulted in improved emotional recognition but no changes to functional social skills. All other studies utilized explicit teaching in conjunction with other methods, with mixed results.

Role play was another intervention method commonly utilized, often in conjunction with other strategies, as in Ceder et al. (2010), Fombonne et al. (2007), Gantman et al. (2012), and Miller & Ozonoff (1995). The justification for this strategy is that it allows the participants to practice and master a targeted skill in a structured, low-anxiety environment with immediate feedback and instruction available. Except for Miller & Ozonoff (1995), all of these investigations resulted in improved social skills, indicated through observation, self-report, or pragmatic assessment.

A third strategy used in some interventions was a practical or naturalistic component. Individuals with ASD often demonstrate difficulty generalizing skills learned in interventions to natural situations (Beversdorf et al., 2007). A goal of naturalistic interventions is to foster a greater understanding of skills targeted and to provide ample opportunities to practice these skills in a functional setting. Beversdorf et al. (2007), Fombonne et al. (2007), and Gantman et al. (2012) included discussion or unstructured and naturalistic components to their interventions. All three of these studies found caregiver or participant self-reported social skills improved after intervention.

Of all studies reviewed, the Gantman et al. (2012) investigation demonstrated the most optimistic results, through caregiver report, self-assessment and standardized assessment. It also employed the greatest number of intervention strategies, including explicit teaching, role-play,

functional practice, "socialization homework" with other peers outside of sessions, caregiver involvement and discussion. Results included an overall improvement in social skills, increased quality and quantity of pro-social behaviors, a decrease in autism-associated mannerisms, decreased loneliness, and increased friendships (Gantman et al., 2012). Even more indicative of the success of this multi-faceted intervention was the increased acceptance by neurotypical peers. Following intervention, the number of hosted get-togethers with peers increased, as did the number of invitations to get-togethers.

A final intervention strategy to address pragmatic deficits is virtual training. Bell et al. (2011) and Baron-Cohen and Golan (2006) investigated interventions that targeted rudimentary pragmatic knowledge and conversational skills through computer software. The rationale behind this method is that virtual training lessens the social pressure for those who are anxious and not yet ready to venture into the social realm to practice new social skills. In addition, virtual lessons may appeal to those with HFA in that they can be explicitly or systematically taught and repeated at the desired pace until the concepts are mastered (Baron-Cohen & Golan, 2006). Both of these virtual interventions resulted in increased confidence and interest in social interactions. These investigations support the notion that virtual methods may be employed in conjunction with other intervention strategies to optimize motivation, confidence, functional practice and skill acquisition.

Future Directions

It appears from the studies thus far that naturalistic practice, caregiver involvement, group discussions with peers and explicitly or systematically-taught components are potential intervention elements necessary to improve functional social communication skills. With this vast array of diverse intervention strategies, a pressing topic for future research is to understand

the true impact of each overlapping component. Large-scale randomized investigations should ideally be conducted. To tease apart the effects of each intervention strategy, interventions with and without the different embedded components should be contrasted to determine if there is an optimal combination of strategies.

A different perspective.

Finally, returning to the "Is Asperger's Syndrome/High Functioning Autism Necessarily a Disability?" article by Baron-Cohen (2000), new directions could be taken to explore peer acceptance and socio-emotional functioning. According to Baron-Cohen (2000), it is the values of society that determine what is norm. In a world where social behavior and focus towards people rather than objects is expected, individuals with different focuses and behaviors are seen as disabled and cannot fit in to societal expectations. Individuals with ASD often experience anxiety, poor self-esteem, depression and other psychological disorders (Eaves & Ho, 2008). These numbers are even higher in individuals with HFA (Fombonne et al., 2007), possibly due to a heightened self-awareness of their differences, greater societal expectation and subsequently higher peer rejection. Anecdotal evidence has indicated that individuals with AS and HFA feel much more comfortable and outgoing when interacting with peers on the spectrum compared to neurotypical peers (Bell et al., 2011; Beversdorf et al., 2007), suggesting that peers' responses and interactional style are a contributing factor in the anxiety and withdrawal seen in individuals with HFA. If this is true, could neurotypical peers be trained as well? This is clearly a concept that would entail work on a massive scale, but is an interesting theory nevertheless. If society determines what is normal as Baron-Cohen (2000) suggests, would training or re-training neurotypical individuals to use a different interactional style or perception towards peers with

HFA change anything? This idea could be tested on a small scale within classrooms, workplaces or schools.

In order to optimize the quality of life and acceptance of individuals with HFA, change may be necessary from the mainstream population as well as those with HFA. If mainstream society can learn to challenge preexisting expectations and see the world through a new lens, the acceptance and quality of life for individuals with HFA may improve. Meanwhile, caregivers, teachers, therapists and other professionals should continue the provision of support needed to enhance necessary social functioning in individuals with HFA.

As evident in the investigations outlined in this literature review, there is no single ideal methodology to improve social functioning in adolescents and adults with HFA. However, the most successful interventions appear to employ a multi-faceted approach. Explicit teaching, guided role-play of skills, discussion, opportunities to practice skills in a natural setting, and caregiver involvement are all potential strategies that may be used to enhance pragmatic skills. For those with significant anxiety associated with social interactions, exposure to treatment groups consisting of peers with HFA and virtual modalities may be used to increase confidence and interest in social interaction. Supported by mainstream awareness, improved social functioning skills could increase acceptance and self-esteem, as well as improve quality of life for individuals with HFA.

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