A PILOT STUDY OF SOCIAL COGNITION TRAINING FOR ADULTS WITH HIGH-FUNCTIONING AUTISM

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ABSTRACT

TIMOTHY D. PERRY: A Pilot Study of Social Cognition Training for Adults with
High-Functioning Autism
(Under the direction of David Penn, Ph.D. and Gary Mesibov, Ph.D.)

Background**:** Difficulty with social interaction is universal in autism spectrum

disorders and often constitutes the most debilitating feature of these conditions. Impaired

social cognition (i.e., perceiving the emotions and intentions of others) makes it difficult

to establish friendships and form positive social relationships, and is particularly

incapacitating for adults with autism who must navigate the world unaided by parents.

Objectives**:** The goal of this study was to examine the feasibility of a group-based

cognitive behavioral intervention to improve social-cognitive functioning in adults with

high-functioning autism (HFA). Methods**:** We modified the treatment manual of a

previously validated form of group-based intervention, Social Cognition and Interaction

Training (SCIT), for optimal use with HFA adults. We then conducted a pilot study to

compare SCIT for autism (N=6) to treatment as usual (TAU) (N=4). Results**:**   High

levels of attendance and overwhelmingly positive satisfaction reports supported the

feasibility of SCIT with this population   Participants in SCIT showed larger

improvements in theory of mind skills and emotion identification skills when compared

with individuals in the TAU condition. <u>Conclusions</u>**:** Findings indicate SCIT is an

intervention program with promise for use with adults who have HFA. More research is

needed to clarify the role of SCIT in improving social functioning for individuals with

HFA beyond research settings.

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CHAPTER 1

INTRODUCTION

Impaired social functioning is one of the defining features of autism spectrum disorders. Interventions addressing social impairments have traditionally focused on underlying constructs less relevant to the high-functioning adult population (e.g. joint attention) and have produced mixed results (e.g., Adams, Green, Gilchrist, & Cox, 2002). Interventions that address processes underlying social deficits, a key feature of autism, need to be explored. One such process is social cognition. Social cognition refers to the ability to read and understand verbal and non-verbal social cues, the ability to recognize and distinguish between central and peripheral social stimuli, and the ability to understand ones own mental state and the mental states of others (Crick & Dodge, 1994).

Below, I will discuss the importance of ameliorating social functioning deficits in individuals with autism. I will also discuss the unique challenges faced by adults with high-functioning autism. The term high-functioning autism (HFA) will be used throughout the text and refers to individuals with Asperger's Syndrome as well as those with Autistic Disorder and Pervasive Developmental Disorder-NOS whose intellectual functioning falls in the average or above average range and who lack significant language difficulties (See Appendix A for complete diagnostic criteria). Next, I will discuss the nature of social cognitive deficits in autism with an emphasis on the high-functioning subgroup and discuss

the similarities and differences between the impairments seen in autism and those seen in schizophrenia, another clinical group characterized by impairments in social cognition and social functioning. I will then briefly review interventions which have been used to remediate social cognitive deficits in individuals with schizophrenia. As part of this discussion, I will highlight the protocol of Social Cognition and Interaction Training (SCIT) for schizophrenia. Next, I will present the rationale for adapting this intervention for use with individuals with high-functioning autism and discuss the implications this intervention might have on these individuals' social cognitive abilities and social functioning as well as subjective feelings of distress. Finally, I will describe the design of a pilot, matched groups, randomized controlled pilot trial of SCIT for high-functioning autism. Study hypotheses and planned data analyses for this thesis will then be discussed.

Background

The social deficits in autism spectrum disorders are arguably the most handicapping characteristics of these conditions. These features were first noted by Kanner (1943) when he described children with pronounced impairments in the areas of reciprocal social interaction, and difficulties with emotional expression and recognition. The specific social abnormalities common among individuals with autism have been linked to social isolation and peer rejection (Orsmond, Krauss, & Seltzer, 2004), limitations in independent living (Tantam, 1991), and psychiatric dysfunction (Green, Gilchrist, Burton, & Cox, 2000). Given this association with negative outcomes, improvement in social-adaptive functioning is one of the main goals in the treatment of autism.

A variety of social interventions have been designed and published in the autism literature (Rogers, 2000). Several researchers have reported success in improving social

functioning through use of educational and remedial strategies (Harris & Handleman, 2000; Howlin, 1997; Mesibov, Schopler, & Hearsey, 1994; Venter, Lord, & Schopler, 1992). Interventions have used techniques as diverse as video-modeling (Charlop & Milstein, 1989), social skills groups (Ozonoff & Miller, 1995), and peer tutors (Blew, Schwartz, & Luce, 1985). In addition to varying teaching strategies, these interventions have targeted samples across a wide range of ages and functioning levels. For the most part, however, these studies have focused on the acquisition of specific social skills rather than addressing processes that might underlie social problems. This approach may impact generalization of training to the natural environment. Apple, Billingsly, and Schwartz (2005), for example, used video-modeling instruction to investigate social reciprocity (compliment-giving) in children with HFA. They found that this technique was effective in teaching children to give compliments in response to praise but did not impact compliment initiation in the absence of reinforcement. In other words, the social gains witnessed in these children in the experimental condition did not generalize to other conditions. This study, and others like it, suggests that teaching social behaviors may not lead to generalized changes in social functioning because they do not address underlying social deficits which may account for social behavior.

Generalization of social gains achieved in research settings has been an important focal area in autism research (Chandler, Lubeck, & Fowler, 1992; Odum & McConnell, 1992). Williams, Carnerero, and Perez-Gonzalez (2006) investigated the ability of children with autism to verbally label objects and events in the presence and absence of cues from another person. Results suggested that this labeling behavior occurred for all children when cues were employed but only for about half of their sample without cues. Another study

evaluated the efficacy of outpatient social groups targeting discrete social skills in producing social skill improvement across settings (Barry, Klinger, Lee, Palardy, Gilmore, & Bodin, 2003). This study assessed generalization via observation of peer interaction and parent report. Observers indicated that generalized gains were accomplished in the areas of greeting and play skills but not in conversation skills. Parent report, however, suggested improvement only in greeting skills and not in the other two areas. In light of the mixed and negative results found in studies investigating the generalization of specific social skill training, it is reasonable to hypothesize that skills training focusing on common underlying social processes might produce results more apt to generalize across settings.

Another weakness of the extant literature on social interventions in autism involves the heterogeneity of this diagnostic category. At first glance, the socially isolated, non-verbal, low-functioning children described by Kanner (1943) seem to bear little resemblance to the hyper-verbal children with pedantic styles of discourse and intense special interests described by Asperger and Frith (1991). Though the resemblance is ultimately great enough to assign similar diagnoses, the diversity of this population renders research findings difficult to generalize beyond the specific characteristics of the sample used in a given study (Tsatsanis, 2004). Consequently, one focus of autism research has been the identification of relatively homogeneous subgroups. Particular research attention has focused on discerning the unique social development of individuals with HFA (Norberg & Gillis, 1998). A discussion of some of those characteristics is included below.

One important characteristic that distinguishes individuals with HFA from others with autism is their desire for social contact. Whereas autism is generally perceived to entail social indifference and desire for isolation, it appears that social initiation and social-

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emotional understanding is the major problem experienced by individuals with HFA (Bacon, Fein, Morris, Waterhouse, & Allen, 1998; Sigman & Ruskin, 1999). This desire, however, does not mean that these individuals are any less handicapped in their daily functioning than those with classic autism. Rather, a desire for social interaction creates a unique dilemma for these individuals. It appears that they use their relatively high cognitive abilities to learn social heuristics, thus compensating for their innate social deficits to some extent. This compensation is often accomplished in a rote fashion and is generally insufficient to produce smooth social interactions in naturalistic settings (Hermelin & O'Connor, 1985; Kasari, Chamberlin, & Bauminger, 2001; Sigman & Ruskin, 1999). This discrepancy between social need and social skill creates what Bauminger (2002) called a "vicious circle of social isolation" for individuals with HFA. On the one hand, they wish to be socially included with their peers and express loneliness and depression in the absence of such relationships. However, they tend to have poor friendships and have difficulty interacting appropriately with peers due to limited social emotional understanding (Bauminger & Kasari, 2000; Hobson, 1993; Wing, 1992).

Due to the documented difficulties experienced by individuals with HFA and the identified problems surrounding social interventions for this group, the central task has been to identify underlying mechanisms that contribute to social deficits seen in HFA in order to better tailor treatments to these issues (Aldred, Green, & Adams, 2004). Research on the core deficits of autism over the past two decades has focused largely on joint attention (Mundy, Sigman, Ungerer, & Sherman, 1986) and executive dysfunction (Pennington, et al., 1997; Russell, 1997). Joint attention describes a cluster of behaviors with the common goal of sharing attention to communicate with another person about a third entity using non-verbal

cues (Mundy, 1995). Because communication deficits tend to be less pronounced in

individuals with HFA (and absent in AS), this topic has received less research attention with

regard to this group. The executive dysfunction theory suggests that autism involves frontal

lobe pathology leading to perseveration and difficulty with cognitive shifting (Ozonoff et al.,

1991). Studies attempting to identify and define executive dysfunction, however, have

produced equivocal results and have been plagued by measurement issues (Joseph & Tager-

Flusberg, 2004). More recently, the concept of social cognition has arisen as a key

underlying construct in explaining the social deficits of autism. Findings with regards to the

role of social cognition are reviewed in the next section.

Autism and Social Cognition

Empirical evidence demonstrates that individuals with HFA are characterized by

deficits in several domains of social cognition. Social cognition refers to a broad set of

abilities that allow us to understand our own attitudes and beliefs about social situations, to

attribute similar attitudes to others, and to use this information to explain and predict

behavior (Garfield, Peterson, & Perry, 2001). Below I will discuss deficits related to autism

in the following domains: a) emotion recognition, b) the ability to construct social meaning

from relevant social details, c) social attribution, and d) theory of mind.

Research has consistently demonstrated that individuals with autism have difficulties

identifying emotions in others and in themselves. Emotional recognition is defined as the

ability to discern different affective states through other's facial expressions, gestures and

verbal displays (Buitelaar, Van der Wees, Swab-Barneveld, & Van der Gaar, 1999).

Studies have shown that high-functioning children with autism have more difficulty

identifying simple human emotions (happiness, sadness, anger, fear), more complex

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emotions (embarrassment, loneliness, surprise, pride) and discriminating between different emotions than their neuro-typical peers (i.e., healthy control subjects) (Borman-Kischkel, Vilsmeier, & Baude, 1995; Capps, Yirmiya, & Sigman, 1992; Jaedicke, Storoschuk, & Lord, 1994; Kasari, Chamberlain, Paparella, & Bauminger, 1999). These abnormalities in emotional recognition cannot be explained as reflecting cognitive deficits. For example, in studies with children with autism and children with mental retardation matched on intellectual ability, children with mental retardation perform better on tasks of emotional recognition (Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). Children with mental retardation showed distress when in the presence of a distressed researcher (as evidenced by facial expression and gestures) whereas children with autism did not appear to recognize or react to the enacted distress of the researcher (Corona, Dissanyake, Arbelle, Wellington, & Sigman, 1998). Thus, lack of emotional recognition may lead to social impairment by causing individuals to miss social cues and prevent empathic response.

Individuals with autism also have problems understanding and processing their own emotions. Autobiographies of people with HFA and AS have revealed unusually detached reporting of feelings in conjunction with very detailed descriptions of bodily sensations (e.g., Grandin, 1995). Sifneos (1973) described the cluster of cognitive and affective features in terms of an alexithymia construct. Included in this construct are: difficulties identifying and describing feelings, difficulties distinguishing feelings from the bodily sensations of emotional arousal accompanying them, impaired symbolization (as evidenced by a paucity of fantasies and other imaginative activity) and concrete thought (tendency to focus on external events rather than inner experiences). A number of recent narratives written by people with

HFA describe an inability to understand and relate to others due to a failure to understand and describe their own emotions (Grandin, 1995).

Difficulties in emotional recognition have been linked to the tendency in autism to focus on peripheral rather than central social information, and failure to integrate information to form a meaningful whole. Focusing on parts of the face not particularly relevant to emotional expression and failing to integrate other information, such as voice tone and gestures, likely hinders individuals with autism from accurately perceiving key emotions (Ruffman, Garnham, & Rideout, 2001). Although studies have shown that individuals with HFA are more adept at integrating social information than their lower-functioning counterparts, this group exhibits more difficulties on these tasks relative to non-disabled controls (Berger et al, 2003; Capps et al, 1992). For example, Bauminger and Shulman (2001) found that high-functioning adolescents and pre-adolescents with autism tended focus on physical details of a picture depicting children sharing secrets (e.g., color of clothing) rather than recognizing social indices of friendship present in the picture.

Central coherence is the term used to describe the innate drive to integrate information into a larger context. Weak central coherence has been posited as a core cognitive deficit among individuals with autism (Frith & Happe, 1999). Because effective social functioning is contingent upon the integration of information and the application of meaning to social stimuli, the central coherence theory provides a reasonable explanation for the piecemeal perceptual style leading to poor emotional recognition. This focus may cause individuals to misinterpret social cues such as facial expressions and gestures or to miss them entirely in the manner described above.

Theory of mind (ToM), the ability to attribute mental states (e.g., beliefs, intentions, desires, and emotions) to others and to predict behavior based on these states, is another domain in which individuals with autism show deficits. The ToM model proposes that normative social development depends on the understanding that others possess mental states independent of ones own and that these mental states inform decision making (Klin, 2000). To assess ToM skills, researchers often use simple false belief tasks in which the participant is asked to predict the action of a character possessing incorrect information. These false-belief tasks can be divided, based on complexity, into first order false beliefs (e.g. Sally thinks it's x, when it's really y.) and second order false beliefs (Sally thinks Mary thinks x, but they are both wrong) (Baron-Cohen, O'Riordan, Stone, Jones & Plaisted, 1999). To answer correctly, participants must understand that others may hold beliefs which are contrary to what the participant knows to be true and that mental states determine people's actions (Wimmer & Perner, 1983). Studies have consistently demonstrated that people with autism are less able than control subjects to understand that other people can have beliefs that different from their own (Baron-Cohen, 1989a; Baron-Cohen, 1989b; Baron-Cohen, 1991; Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Leslie, & Frith, 1986). The majority of studies involving ToM in individuals with autism, though, have been conducted with those with cognitive impairments (Serra, Minderaa, van Geert, & Jackson, 1999). Several studies with individuals with HFA show that they are as capable as controls of correctly attributing mental states on simple false belief tests (Happe, 1994; Ozonoff et al., 1991). Consequently, more advanced measures have been developed in recent years to detect subtle ToM deficits of high-functioning individuals. For example, Happe's Strange Stories Test (1994) and Kaland's Stories from Everyday Life Test (2002) require individuals to explain character's

non-literal statements. Results from these studies suggest that individuals at the high end of the autism spectrum also display difficulties attributing mental states to others (Beaumont & Newcombe, 2006).

Attributional or explanatory style involves the causes people typically provide for events in their lives (Barnhill, 2001). This style is typically measured by providing a participant with a hypothetical event and then asking that participant to determine what caused this event (Lysaker, Lancaster, Nees, & Davis, 2004). A tendency toward attribution bias represents another social cognitive characteristic of individuals with autism, although attribution processes have not been widely studied in individuals with autism. Due to their limited ability to appreciate and understand multiple perspectives, individuals with HFA may use faulty social information to arrive at suspicious or hostile explanations for events in their environments (Frith, 2004). This group has been presumed to have global social-cognitive deficits and social insensitivity such that social attributions are not made (Meyer, Mundy, Van Hecke, & Durocher, 2006). Rather than preventing attribution, however, these social cognitive impairments may lead individuals with HFA to misinterpret social situations and miss social cues needed to form accurate causal attributions. Additionally, the quality and nature of these interpretations may have implications for psychological adjustment. Barnhill (2001) suggested that attributions about the self and others are closely linked to comorbidity with conditions like depression and anxiety. Blackshaw et al., (2001) reported that individuals with AS scored lower on theory of mind tests and higher on tests of paranoid attributions than control participants. Interestingly, Blackwhaw et al. also reported that the paranoia was of an unusual quality. Rather than viewing the actions of others as hostile toward them, misattributions stemmed from confusion about social situations and involved

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heightened self-consciousness and social anxiety. Thus, evidence clearly exists to support the idea that individuals with HFA attribute social meaning to situations in a biased manner.

Despite these well documented social cognitive deficits in HFA, little research attention has been focused on remediating these impairments in this clinical population (Diggle, McConachie, & Randle, 2003; Wolery & Garfinkle, 2002). The available research on interventions targeting social cognition in autism has shown positive, but often limited, effects (Gevers, Clifford, Mager, & Boer, 2006; Hadwin, Baron-Cohen, Howlin, & Hill, 1996; Ozonoff & Miller, 1995). The participants in these studies have typically been children or adolescents, and results have indicated improvements in specific areas, with little generalization of skills to outside the therapy setting. More research directly targeting social cognition and social functioning in adults with HFA is needed (Howlin et al., 2004). The discrepancy between cognitive and social skills in this group creates unique challenges. Adults with HFA often excel academically and have the intellectual capacity needed for independent living, but struggle due to impairments in social skills (Howlin et al., 2004; Klin et al., 2006). Therefore, it is important to develop effective therapies for adults with HFA as these therapies could have wide-ranging impact for these individuals, their families and their communities.

In developing these interventions, it is useful to identify programs that have been effective in ameliorating social cognitive deficits in other clinical disorders. One such clinical disorder is schizophrenia. The specific social cognitive deficits seen in schizophrenia are, arguably, similar to those describe above in relation to autism. Like individuals with autism, individuals with schizophrenia are impaired in emotion perception (Penn et al., in press). Additionally, a growing body of research has shown that individuals with

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schizophrenia and those with autism have comparable theory of mind deficits (Bolte, Rudolf, & Poustka, 2002; Couture, Piven, Hurley, Losh, & Penn, 2005). Recently, Pinkham, et al. (submitted) found that individuals with HFA and those with paranoid schizophrenia showed similar patterns of neural activation while rating the "trustworthiness" of faces. Finally, these social cognitive deficits are consistently related to social functioning and real-world outcomes among individuals with schizophrenia (Couture et al., in press). Thus, schizophrenia may represent a good clinical model for evaluating interventions that aim to improve social cognition.

Interventions for improving Social Cognition in Schizophrenia

A variety of interventions have attempted to improve social cognition in schizophrenia. These interventions have either focused on a specific social cognitive ability, such as emotion perception (i.e., targeted interventions) or on more comprehensive deficits, such as neuro-cognition, social cognition, and social skills (reviewed in Couture et al., 2006). However, none of these interventions has focused on the three primary domains impaired in schizophrenia, emotion perception, ToM, and attributions. This has led to the development of a new intervention, Social Cognition and Interaction Training (SCIT) (Roberts, Penn, & Combs, 2004).

SCIT is a manual-based intervention which is conducted over an 18-20 week period divided into three phases. Phase one is "Emotion Training" and focuses on improving emotion recognition by linking emotions to facial expressions. During this phase, the group uses the Emotion Trainer, which is a computer program that has been shown to improve emotion perception in individuals with schizophrenia and autism (Silver, Goodman, Knoll, & Isakov, 2004; Silver & Oakes, 2001). Phase two is entitled "Figuring Out Situations." This

phase is designed to strengthen ToM skills and attributional styles. Participants are taught strategies for avoiding pitfalls of "jumping to conclusions," a concept illustrated via videotaped interactions between actors who draw conclusions from events without gathering adequate information. Participants are also encouraged to become better social detectives and not "convict" based on initial evidence. To achieve this goal, participants are taught the differences between facts and guesses using photographs and videotapes. Links between guesses and feelings are also emphasized. This phase concludes with strategies to help participants make more conservative guesses and to have a higher tolerance for ambiguity.

Phase three is entitled "Integration: Checking it Out." This final phase is intended to consolidate the skills learned in earlier phases of SCIT and to encourage the application of these skills to participants' lives. The group brainstorms solutions to problems from each participant's life and develops strategies for "checking out" problems with other people based on the concepts learned in SCIT.

Despite their similarities, however, individuals with autism and schizophrenia do differ in important ways. These differences make modifications to the SCIT protocol necessary when adapting it for use with individuals with HFA. In phase one, rather than focusing on the emotion of suspiciousness, attention needs to be paid to the emotions of boredom and interest. These emotions are emphasized in order to help participants detect cues that others are or are not interested in interacting with them. As in the original SCIT protocol, video clips of every-day situations are used to demonstrate appropriate and problematic social interaction. Additional videos were created to reflect situations likely to be encountered by individuals with HFA. For example, one video presented a man interrupting a work meeting. He does not notice the social cues of the individuals in the

meeting indicating that his behavior is disruptive. The task for participants is to identify the

emotions and social cues that signal that the man's behavior was disruptive to others. Other

aspects of phase one such as the recognition of facial expressions and use of the Emotion

Trainer will be retained.

Phase two was adapted to focus on problems decoding social situations specific to

individuals with HFA. Whereas individuals with schizophrenia tend to jump to conclusions

without sufficient evidence, individuals with HFA struggle with social situations because

they miss socially relevant information (e.g., women are looking at and talking to one

another) and attend to irrelevant details (e.g., their notebooks are blue). Therefore, rather

than jumping to conclusions, they rarely make initial guesses about situations as they

scrutinize the details in an overly thorough manner. This observation fits with the theory of

weak central coherence, discussed earlier, as a feature of autism that contributes to social

impairment (Happe, 1999; Klin & Jones, 2006). As a result, the modified protocol teaches

the difference between socially relevant versus socially irrelevant details. It also encourages

participants to make guesses more quickly in contrast to the more cautious guessing

encouraged in the original protocol.

Phase three focused on consolidation and application of skills just as in the original

SCIT protocol. However, due to the emphasis on different emotions and attending to

relevant social information, the skills practiced are different than those for participants with

schizophrenia. Because this is a pilot study, more modifications may be warranted once

results are known. This process should inform further adaptation of the SCIT manual for

individuals with autism.

Psychological Distress in HFA

The prevailing perception of individuals with autism has been that of socio-insensitive individuals with a preference for isolation. More recent descriptions depict HFA as a disorder defined not by lack of social interest, but by an inability to sustain social relationships (Bauminger, 2002; Solomon, Goodlin-Jones, & Anders, 2004). This inability to sustain social relationships might be one reason why depression is the most common psychiatric illness among people with ASD (Gillberg, 1984; Hill, Berthoz & Frith, 2004; Tantum, 1988; Wing, 1981). In studies with autistic samples, depression rates of 32% (Martin, Scahill, Klin & Volkmar, 1998) and even 37% (Ghaziuddin, Weider-Mikhail, Ghaziuddin, 1998) have been reported. These findings are especially noteworthy since the majority of the individuals in these studies (approximately 80%) are male (Rutter & Schopler, 1988; Volkmar, Szatmari & Sparrow, 1993), in contrast to under-representation of depressed males in the general population (APA, 1994). Additionally, Lainhart and Folstein (1994) concluded that depression was probably under-diagnosed in individuals with ASD due to their difficulties expressing feeling states. These findings suggest that depression is a common condition in individuals with autism   If one considers that poor social skills and lack of social attachments have been shown to be associated with the development of depressive illness (Gable & Shean, 2000; Joiner, Lewisohn, & Seeley, 2002), then an intervention aimed at improving social functioning by remediating social cognition might also have the indirect effect of reducing levels of psychological distress experienced by individuals with HFA.

Overview of Current Study and Hypotheses

Social Cognition and Interaction Training for High Functioning Autism (SCIT-A) is based on the original SCIT protocol developed by Roberts, Penn and Combs (2004) with the population specific modifications described above. One goal of this thesis is to examine the feasibility of the modified version of SCIT based on data from a recently completed small, pilot, quasi-experimental study comparing SCIT to treatment as usual (TAU) for individuals with HFA. Individuals in the TAU condition will continue to receive therapeutic and support services offered by the UNC Autism Center, but will not be exposed to the SCIT intervention The primary outcome of interest is social cognition, while social functioning and psychological distress are secondary outcomes.

The hypotheses for the study (and thesis) are as follows:

(a) The primary hypothesis is that individuals who receive SCIT-A will show greater improvement in the three targeted domains of social cognition (emotion recognition, ToM, and attributional style) relative to individuals who receive TAU.

(b) Secondary hypotheses are that individuals receiving SCIT-A will show greater improvement on measures of social functioning, and greater reduction in psychological distress (depression and anxiety) relative to individuals in the TAU group.

CHAPTER TWO

METHODS

Participants: 13 individuals (11 males, 2 females) were recruited from area social skills groups and from individuals receiving services at the UNC Autism Center. Flyers were given to service providers of adults with HFA to disseminate to their clients. Interested individuals were informed that about half of selected participants would be selected to receive group psychotherapy to help them improve their social skills at no charge. Additionally, they were informed that all participants would receive compensation totaling $50 for completion of pre- and post-testing. In order to be eligible for participation, participants had to have a diagnosis or Autistic Disorder, Asperger's Disorder, or Pervasive Developmental Disorder NOS. Participants also had to be above the age of 18, needed to actively be receiving services from the UNC Autism Center, and meet criteria for designation as high-functioning (IQ score > 80).

Screening Measures

Wechsler Abbreviated Scale of Intelligence (WASI: Psychological Corporation, 1999) was administered to each participant individually to determine verbal IQ (VIQ), performance IQ (PIQ), and full scale IQ (FSIQ). The WASI consists of two subtests measuring verbal abilities (Vocabulary and Similarities) and two tests measuring perceptual and spatial abilities (Block Design and Matrix Reasoning).

Autism Diagnostic Observation System (ADOS; Lord, et al., 2000) is a standardized interview and observation measure that assesses social and communication behaviors which are diagnostic criteria for autism spectrum disorders. The ADOS was administered by a trained rater and algorithim scores corresponding to DSM-IV criteria were obtained. The ADOS demonstrates good reliability and validity when used by trained examiners and differentiates between individuals with autism and those with other developmental disabilities as well as from neuro-typical individuals.

Stakeholder Feedback

At post-test, we administered a short questionnaire to clients to obtain feedback on SCIT-A. The questionnaire consisted of 5 statements about SCIT-A (e.g. "I found SCIT-A helpful") that the respondent rates on three-point scales (e.g. "disagree," "agree," and "strongly agree"), as well as three open-ended questions (e.g. "what suggestions would you make to improve SCIT-A?")

Social Cognition Measures

Emotion Perception was assessed using the Facial Emotion Identification Task (FEIT) and the Facial Emotion Discrimination Task (FEDT; Kerr & Neale, 1993). The FEIT is comprised of 19 photographs of individuals expressing one of six basic emotions (happy, sad, angry, afraid, surprised, and ashamed). The participant's task is to identify the emotion being expressed in each photograph. The FEDT is comprised of 30 pairs of faces and requires the participant to determine if the two faces in each pair are displaying the same or different emotions. Performance on both tasks is indexed as the number of correct responses.

Theory of Mind was assessed using the Hinting Task (Corcoran, 2001). This test contains ten short stories involving interactions between two people. Each story concludes

with one of the characters uttering at statement with implied rather than explicit meaning (a hint). The participant's task is to determine the meaning of the hint. If not guessed correctly on the first trial, participants are given a second more direct hint about the meaning of the statement. Two points are awarded if the participant correctly deciphers the hint on the first trial. One point is awarded if the participant answers correctly after the second hint. No points are awarded if the participant is unable to determine the meaning of the hint after two trials. Performance is indexed as the total number of points.

Social Attribution was measured using the Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs, Penn, Wicher, & Waldheter, 2007). The AIHQ consists of 15 short stories that depict negative events that vary in intentionality (i.e., accidental, ambiguous and clearly intentional). Participants are asked to read each story, to imagine the scenario happening to her or him (e.g., "You walk past a bunch of teenagers at a mall and you hear them start to laugh"), and to write down the reason why the other person (or persons) acted that way toward them. This reason is later coded by two independent raters to compute a "hostility index". Each participant then rates, on Likert scales, whether the other person (or persons) performed the action on purpose (anchored by [1], *definitely no*, and [6], *definitely yes*), how angry it would make them feel (anchored by [1], *not at all angry*, and [5], *very angry*), and how much they would blame the other person (or persons) (anchored by [1], *not at all*, and [5], *very much*). Finally, the participant is asked to write down how she or he would respond to the situation which is later coded to compute an "aggression index."

Social Functioning Measures

Perceived Social Competence was assessed using the Social Skills and Communication Questionnaire (SSCQ; McGann, 1997). The SSCQ is a self-report measure

developed for use with individuals with traumatic brain injury. It was selected for this study due to its emphasis on communication as central to social competence. It is comprised of 27 statements describing social communicative ability. Each statement is rated based on how well they describe the participant on a 5 point scale from "Always "to "Never" true. Scores are obtained by summing the numbers corresponding to each rating resulting in an overall rating of perceived social competence.

Social behavior was also assessed with the Social Skills Performance Assessment (SSPA; Patterson et al., 2001). The SSPA is a verbal role-play assessment in which the subject participates in one practice conversation for one minute and two conversations for three minutes on pre-determined topics (e.g. your landlord has not fixed a leak that you told him about last week, and now you are calling him on the phone to follow-up.). The SSPA has good face validity as a social skill measure, and has shown excellent inter-rater and test-retest reliability, as well as good convergent validity with a measure of activities of daily living among individuals with schizophrenia (Patterson et al., 2001).

The SSPA was scored by coders trained to reliability (alpha =.70) and blind to pre/post and group status. Coders rated participants' performance in the audio-taped role-plays in the following domains: interest/disinterest, fluency, clarity, focus, affect, social appropriateness, submissive/persistent, negotiation ability, and overall conversational effectiveness. Each domain was rated on a 5-point Likert-type scale with higher scores signifying greater social skill. Due to the small sample size, performance on this measure will be indexed as the average social skill (across all domains and both role plays).

Psychological Distress Measures

Depression was assessed using the Beck Depression Inventory (BDI-II; Beck, 1996). The BDI-II is a 21-item self report measure of depressive symptoms on which participants are asked to rate how true each item has been about them during the preceding two weeks. A score of 0-13 indicates normal mood, 14-20 indicates mild depression, 21-30 indicates moderate depression and scores over 31 indicate severe depression. The BDI-II has demonstrated good internal consistency, test-retest reliability, and validity (Whisman, Perez, & Randall, 2000).

The 21-item Beck Anxiety Inventory (BAI) was used to assess symptoms of anxiety (Beck, Epstein, Brown, & Steer, 1988). Participants indicate on a 4-point scale (0= "not at all", 3= "I could barely stand it.") how much each symptom of anxiety distressed them during the preceding week. The total score can range from 0-63. The BAI has been widely used in research and has demonstrated good reliability and validity (Cimarolli, 2006).

Procedure

SCIT for HFA (SCIT-A) was developed by the author in collaboration with several autism researchers and clinicians. Additionally, this process involved input from the developers of the original SCIT protocol for schizophrenia. The aim of manual development was to preserve essential aspects of the original SCIT protocol while making it more appropriate for individuals with HFA. Necessary alterations to SCIT included a de-emphasis of attribution errors and stronger focus on the role of social insight in producing generalization of gains (See Table 2 for summary of similarities and differences between SCIT for Schizophrenia and SCIT for HFA). The intervention was delivered by two post-

doctoral clinical psychologists and was supervised by one of the developers of SCIT (DP) who attended all group sessions.

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Insert Table 1 here

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Potential participants received a verbal and written description of the present study and informed consent was obtained. Diagnostic measures and measures of cognitive functioning were administered first to ensure that each participant met eligibility requirements. Once eligibility was established, baseline measures were administered, and individuals were then randomly assigned to SCIT or the TAU group, stratified by gender and IQ. The SCIT-A group received the 18-week modified SCIT intervention as outlined above. The TAU group was not exposed to the SCIT-A intervention but continued to participate in existing support programs (i.e. individual therapy, supported employment, social skills groups).

CHAPTER THREE

RESULTS

Overview

Given the small sample size of this study, formal inferential statistics were not appropriate. Rather, we calculated within-group effect sizes for continuous outcome variables in order to evaluate the magnitude of pre-post change in our key clinical domains, including social cognition (FEIT, FEDT, Hinting Task, AIHQ), social functioning (SSCQ, SSPA), and psychological distress (BDI-II, BAI). Within-group effect sizes report the magnitude of change due to an intervention and are estimated as follows:

$$d = (M_2 - M_1) / SD$$

where M_1 is the pre-test mean, M_2 is the post-test mean, and *SD* is the pool standard deviation (Cohen, 1988). Effect sizes will be evaluated according to the standards recommended by Cohen (1988): small (*d* = .20), medium (*d*=.50), and large (*d*=.80). Between-group effect sizes were calculated on pre-test means to examine baseline group equality. Between-group effect sizes report the distance between the means of two groups while controlling for the variance within the groups and are estimated as described above. M1 is the control group mean, M2 is the experimental group mean, and SD is the pooled standard deviation.

Following random assignment, one participant dropped out of SCIT-A after the initial session and another participant did not attend any of the group meetings. Both early drop-outs stated that they could not attend SCIT-A due to schedule conflicts. Two members of the TAU group also dropped out of the study and did not complete post-test measures. Data from these two individuals was not used in our analyses.

Our approach to data analysis was to compare means of only those participants who received an optimal dose of the intervention with those who did not receive the intervention at all. For the purposes of the current study, "optimal dosage" was defined as attendance at a minimum of 9 of 18 intervention sessions (50 %). This approach has been called "efficacy subset analysis," because it provides a test of the efficacy of an intervention among the subset of participants who receive the intervention as it is intended to be delivered. (Lee, Ellenberg, Hirtz, & Nelson, 1991).

Feasibility

Group attendance levels were excellent (92% overall attendance; range = 69 -100%). Ratings of satisfaction were also high; 5/6 SCIT-A participants rated the group as "useful" or "very useful," in the brief survey administered at the end of treatment. The first open-ended question asked participants what they liked about the group. Answers included the size of the group (e.g., 6 people), the topics covered, the flexibility of group leaders, and the opportunity to meet other adults with high functioning autism. The second open-ended question asked what members did not like about the group. Respondents indicated that they wished that sessions had lasted longer to allow more time for discussion and practice. One participant noted that he did not have enough social opportunity outside of the group to practice what he had learned. Two participants noted that they wished this type of group had

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been available to them when they were younger. The one participant who stated that he did not find the group helpful stated that he prefers one-on-one interaction to group interaction.

Analyses of Baseline Measures

Between group effect sizes were calculated for all variables at time 1 (baseline). A large effect size was found for age (d = 1.54); individuals in the SCIT-A condition were older than those in the TAU condition. A moderate effect size was detected for autistic symptoms (d = .68); individuals in the SCIT-A condition had lower autistic symptoms than those in the TAU condition. There was no other large or medium between group effect sizes on remaining demographic or clinical variables (see Table 3 for means and standard deviations).

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Insert Table 2 here

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Large between group effect sizes were detected for the primary outcome variables measuring emotion identification (FEIT, d = -.90) and emotion discrimination (FEDT, d = -.85). Individuals in the SCIT-A group scored higher on these measures than individuals in the TAU group at time 1. All other primary outcome measures produced only small effect sizes (Hinting Task, d = .34; AIHQ hostility bias for ambiguous situations, d = .37 and intentional situations d = .05) with the exception of hostility bias for accidental situations which produced a moderate effect size (.78). Individuals in the SCIT-A tended to rate these situations as reflective of less hostility than did individuals who received TAU (see Table 4 for means and standard deviations for the primary outcome variables).

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Insert Table 3 here

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A moderate between group effect size was found for the secondary outcome variable of perceived social competence (d = .72); individuals in the SCIT-A group perceived themselves to be less socially competent than did members of the TAU group. Small effect sizes were detected for measures of objective social skill (SSPA, d = -.40) and depression (BDI, d = .12). Finally, a large between group effect size was found for our measure of anxiety (BAI, d = 1.55). Individuals in the SCIT-A group rated themselves as less anxious than did members of the TAU group (see Table 5 for means and standard deviations of the secondary outcome measures).

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Insert Table 4 here

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Primary Outcome Analyses

A moderate within-group treatment effect size was observed on the emotion identification measure for individuals in the SCIT-A group (d = .60), while a large negative effect size was observed for individuals in the TAU group (d = -.98); individuals in the SCIT-A group improved on this task while those in the TAU group declined in performance. A moderate negative within-group treatment effect size was observed on the measure of emotional discrimination for individuals in the SCIT-A group (d = -.65) whereas a small negative within-group effect size was observed for the TAU group (d = -.35). Thus, both groups declined in performance on this task.

For ToM, a large within-group treatment effect size was observed for individuals in the SCIT-A group (Hinting Task, $d = .86$) while a small negative treatment effect was found for individuals in the TAU group ($-.11$). Small within group effect sizes were observed for the measure of hostile attribution bias in ambiguous and intentional situations for both groups (Ambiguous: SCIT-A, $d = .27$, TAU, $d = .20$; Intentional SCIT-A, $d = -.47$, TAU, $d = .03$). The SCIT-A group also showed a small within-group effect size for hostile attribution bias in accidental situations ($d = -.10$) while the TAU group showed a large negative effect size ($d = -.80$).

Secondary Outcome Analyses

Individuals attending the SCIT-A group showed a small positive within-group treatment effect size on our measure of perceived social competence ($d = .20$) while individuals in the TAU group had a moderate negative within-group effect size ($d = -.56$); individuals in the SCIT-A rated themselves as more competent at post-treatment, while those in the TAU group rated themselves as less socially competent. Small within-group effect sizes were found for both groups on the SSPA (SCIT- $d = -.07$, TAU- $d = .32$); both groups social skills were rated as lower at time 2 compared to time 1.

On the BDI-II, Individuals in the TAU group showed a moderate positive within-group effect size ($d = .67$) while individuals in the SCIT-A group did not ($d = .06$); individuals in the TAU condition had a moderate increase in self-reported depressive symptoms whereas those in the SCIT-A group showed no increase. On the measure of anxiety, small within-group effect sizes where found for both groups (SCIT-A- $d = .07$, TAU- $d = -.37$).

Supplemental Analyses

Due to the non-significant findings from our objective measure of social functioning (i.e., the SSPA), supplemental analyses were conducted to assess the validity of this measure with individuals with high functioning autism. Significant correlations were found between severity of autistic symptoms as measured by the ADOS and scores on the two role plays on the SSPA (r= -.75 and r=-.81 respectively). Individuals rated as having more severe autistic symptoms on the ADOS performed significantly more poorly on each of the SSPA role plays. These findings lend preliminary support to the validity of the SSPA for use with individuals with autism.

CHAPTER FOUR

DISCUSSION

This preliminary study of SCIT-A for adults with high-functioning autism sought to examine the feasibility of this group intervention and explore its possible clinical benefits. Adults with HFA represent a growing population but have received relatively little research attention (Fombonne, 2005). This initial study demonstrated that SCIT-A is feasible and that it might hold promise in improving emotion recognition and theory of mind. These findings are discussed in more detail below.

Feasibility data indicated that attendance was high and that most participants reported that the group was helpful. High attendance rates were especially promising given the independence level of our sample (i.e., all lived at least semi-independently and most were responsible for their own transportation to and from group), and the minimal effort made to remind participants of group sessions. Thus, SCIT-A appeared to be well-tolerated and accepted by participants. Future research may elucidate participant characteristics predictive of SCIT-A satisfaction

There was some support for the hypothesis that SCIT-A would improve social cognition. Individuals in the SCIT-A group showed larger improvements on measures of theory of mind and emotion recognition than individuals in the TAU group. Deficits in

social cognitive skills are thought to underlie many of the challenges individuals with autism face in social situations, such as understanding vague language, reading nonverbal cues, and knowing when to approach potential social partners (Tager-Flusberg, 1999). This finding is therefore promising because improvements in social thinking may ultimately lead to improvements in social behavior.

We were unable to find support for hypothesized improvements in emotion discrimination and tendency toward attributional bias. The lack of improvements in emotion discrimination may have been due to ceiling effects. Both the SCIT-A group and the TAU group correctly identified a large number of items on the face discrimination task at baseline (25 and 23 respectively out of a possible 30). Neither group demonstrated change over time on this measure. On the attributions task, neither group showed any change with regard to a hostile attribution bias. This is likely due to floor effects. In general, both groups showed a low hostility bias at baseline, suggesting that this is not an area of social cognitive impairment for this clinical group. In addition, the modified SCIT protocol for autism de-emphasized the focus on jumping to conclusions included in SCIT for schizophrenia, which is related to a tendency to make hostile attributional errors. Thus, future research on SCIT for HFA may not want to include measures of attributional style in the protocol.

In terms of social functioning, the findings were mixed. We found a small increase in perceived social functioning for individuals in the SCIT-A group and a moderate decline in perceived social functioning for those in the TAU group. Two possible explanations may be put forth to explain this pattern of findings. The SCIT-A intervention may have served some protective function against negative self-perceptions (which might accrue as a result of limited or poor social interactions in the TAU group). Viewed in this light, this finding is

significant because improved perceived social skills may lead to greater confidence during social exchanges which may in turn lead to more successful social interactions. Since the TAU group scored more highly on this measure at baseline, however, this finding may be simply an artifact of a regression toward the mean.

SCIT-A was not associated with improved social skills as measured by the SSPA. A variety of issues might account for this non-significant finding: 1) the SSPA is not sensitive to change in this clinical population; 2) SCIT-A did not improve social skill; and 3) situations in the SSPA are not relevant to individuals with HFA. Therefore, future research that examines SCIT in HFA might consider using multiple measures of social skill, including tasks that are more naturalistic (e.g., informant ratings) and/or that involve situations that are more personally relevant to individuals with HFA.

Finally, individuals in the SCIT-A group did not show a decrease in reported levels of psychological distress, while those in the TAU group showed a moderate increase in level of depressive symptoms. Again, SCIT-A (or the weekly exposure to other people with HFA) might have been somewhat protective against an increase in distress over time. Thus, SCIT-A might have reduced feelings of loneliness in participants. Additionally, having individuals with HFA rate their own emotions might be problematic, as they typically suffer from an inability to appreciate their own emotions, or 'alexithymia' (Hill, Berthoz, & Frith, 2004). Autobiographies of people with autism have revealed unusually detached reporting of own feelings in conjunction with very detailed descriptions of bodily sensations (e.g. Grandin, 1995). These difficulties with emotional understanding have been implicated as possible confounds on self-report measures used to understand emotional constructs like depression and anxiety. The Beck Depression Inventory, for example, includes an item about

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experiencing "excessive guilt" (Beck, Steer, & Brown, 1996). In order to experience guilt, however, a person must understand that he or she has hurt someone else and that that person feels badly. In future studies, measures of psychological distress that rely less on capacity for emotional understanding might illuminate the relationship between social functioning and distress more clearly. .

Future directions in the development of SCIT-A for individuals with high-functioning autism include addressing social insight as a target of the intervention. During the SCIT-A sessions, participants were observed to become more adept at understanding social situations and how to improve their interactions with others in session. However, these improvements did not always translate to improved insight, a natural precursor to changes in behavior. For example, one participant was able to identify when a person in a video missed a cue that his social partner was in a hurry, but did not pick up on these cues when talking to one of the co-therapists after group ended.

The primary limitation of the current study is the very small sample size. A randomized controlled design with larger samples would be optimal to test the efficacy of SCIT-A. However, at this initial stage of treatment development, we were interested in treatment feasibility, tolerability, and the determination whether the intervention holds promise for improving the social cognitive abilities of individuals with autism. In this regard, we felt that SCIT-A achieved those goals and that it might be a promising approach for continued development and evaluation. However, these results are <u>clearly preliminary</u> and should therefore be <u>interpreted with great caution</u>. Future SCIT-A research should also follow accepted guidelines for treatment research in autism to further develop this

intervention and to examine SCIT-A for use with individuals with HFA of different age ranges and abilities.

Table 1. Phases of SCIT Program (Roberts et al., 2004)

Sessions	Phase	Content	Autism Modifications
1 to 6	I - Introduction & Emotions	Introduce SCIT and social cognition, establish group alliance, review the role of emotions in social situations, conduct emotion training.	Focus on emotions of boredom and interest; reduce focus on emotion of paranoia.
7 to 13	II – Understanding Situations	Address jumping to conclusions, attributional biases, tolerating ambiguity, distinguishing facts from guesses, and gathering data to make better guesses.	Focus on distinguishing relevant social facts from irrelevant social facts.
14 to 18	III - Integration: Checking It Out	Consolidate skills and generalize to everyday problems.	Focus on individuals' social insight to assist with generalization.

Table 2: Demographic characteristics of sample

	SCIT (n = 6)	TAU(n = 4)
Chronological age (months) Mean (s.d.)	42.54 (12.30)	29.10 (1.0)
IQ* Mean (s.d.)	113.33 (19.98)	110.75(16.36)
Male/Female (ratio)	5/1	4/0
Caucasian/African American (ratio)	6/0	1/3

* Scores derived from the Wechsler Abbreviated Scales of Intelligence, Full Scale IQ - 2.

Table 3: Means and standard deviations for measures of social cognition

	SCIT (n = 6)		TAU (n = 4)	
	Pre	Post	Pre	Post
Emotion Recognition (FEIT)	13.20	14.17	11.75	10.5
	(1.5)	(1.7)	(1.7)	(.60)
Emotion Discrimination (FEDT)	25.17	24.13	23.25	22.00
	(.75)	(1.63)	(3.10)	(3.74)
Theory of Mind	14.50	16.83	15.25	15.00
(Hinting Task)	(2.6)	(2.6)	(1.7)	(.82)
Hostile Attribution Bias				
(AIHQ-ambiguous)	9.00	9.75	10.25	11.00
	(3.85)	(3.61)	(2.78)	(2.74)
(AIHQ-accidental)	6.13	6.00	7.63	6.13
	(1.31)	(1.22)	(2.40)	(1.11)
(AIHQ-intentional)	13.00	13.10	13.13	11.75
	(2.12)	(2.11)	(2.84)	(2.96)

Table 4: Means and standard deviations for measures of social functioning and psychological distress

	SCIT (n = 6)		TAU (n = 4)	
	Pre	Post	Pre	Post
Perceived Social Competence (SSCQ)	55.5 (20.4)	60.00 (23.78)	67.00 (9.10)	61.00 (12.14)
Social Skill Performance (SSPA)	55.92 (13.51)	54.92 (15.29)	51.88 (4.57)	53.25 (3.97)
Depression (BDI)	17.33 (11.00)	18.00 (11.20)	18.50 (8.90)	25.75 (12.37)
Anxiety (BAI)	12.50 (7.40)	13.17 (10.68)	25.75 (9.03)	20.75 (14.67)

Appendix A
DSM-IV Diagnostic Criteria for Autistic Spectrum Disorders

A diagnosis of **autistic disorder** is made when the following criteria from A, B, and C are all met.

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):
1. *qualitative impairment in social interaction, as manifested by at least two of the following:*
   a. marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
   b. failure to develop peer relationships appropriate to developmental level
   c. a lack of spontaneous seeking to share enjoyment, interests, or achievements with others (e.g., by a lack of showing, bringing, or pointing out objects of interest)
   d. lack of social or emotional reciprocity
2. *Qualitative impairments in communication as manifested by at least one of the following:*
   a. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   b. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
   c. stereotyped and repetitive use of language or idiosyncratic language
   d. lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
3. *restricted, repetitive, and stereotyped patterns of behavior, interest, and activities, as manifested by at least one of the following:*
   a. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
   b. apparently inflexible adherence to specific, nonfunctional routines or rituals
   c. stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
   d. persistent preoccupation with parts of objects
B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.
C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

A diagnosis of **Asperger Syndrome** is made based on the following characteristics and requirements:

A) Severe and sustained impairment in social interaction
B) The development of restricted repetitive patterns of behavior, interests and activities.
C) The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.
D) There is no clinically significant impairment in general delay in language.
E) There is no clinically significant delay in cognitive development or in the development of age appropriate self-help skills, adaptive behaviors.
F) Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.

Pervasive Developmental Disorder-Not Otherwise Specified: PDD-NOS: Criteria for PDD-NOS (including atypical autism), this category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction or verbal and nonverbal communication skills, or when stereotyped behavior, interests, and activities are present, but the critera are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder or Avoidant Personality Disorder.

(APA, 1994)

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