

DEVELOPMENT OF THE CONTEXTUAL ASSESSMENT OF SOCIAL SKILLS (CASS):
A ROLE PLAY MEASURE OF SOCIAL FUNCTIONING FOR INDIVIDUALS WITH
AUTISM

Allison Bassett Ratto

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Approved by:

Gary B. Mesibov, Ph.D.

David L. Penn, Ph.D.

Mitchell J. Prinstein, Ph.D.

ABSTRACT

ALLISON B. RATTO: Development of the Contextual Assessment of Social Skills (CASS):
A Role Play Measure of Social Functioning for Individuals with Autism
(under the direction of Gary B. Mesibov)

The aim of this study was to pilot a role play assessment of social functioning for adolescents and young adults with high-functioning autism/Asperger syndrome (HFA/AS). Twenty participants with HFA/AS and twenty typical controls completed the Contextual Assessment of Social Skill (CASS), a role play measure of social functioning. Participants completed two semi-structured role plays with two different confederates, in which social context was manipulated. In the first role play, the confederate demonstrated social interest, while in the second, a different confederate portrayed boredom. Participants' social behavior in each role play context was rated via a behavioral coding system and performance was compared across contexts and groups. An interaction effect was found for several items, whereby control participants showed significant change across context, while participants with HFA/AS showed little or no change. Total change across contexts was associated with relevant constructs and also significantly predicted presence of an autism spectrum diagnosis.

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LIST OF ABBREVIATIONS AND SYMBOLS

ADOS	Autism Diagnostic Observation Schedule
AQ	Autism spectrum Quotient
ASD	Autism spectrum disorder
CASS	Contextual Assessment of Social Skills
CRS	Conversation Rating Scale
HFA/AS	High-functioning autism/Asperger syndrome
ICC	Intraclass correlation coefficient
IQ	Intelligence quotient
SRS	Social Responsiveness Scale
TASIT	The Awareness of Social Inference Test
WASI	Wechsler Abbreviated Scales of Intelligence
α	Cronbach's alpha

CHAPTER 1

INTRODUCTION

Autism spectrum disorders (ASD) are marked by significant deficits in the areas of social functioning and communication, and the presence of repetitive or stereotyped behaviors or interests (DSM-IV-TR; American Psychiatric Association, 2000). Although specific symptomatology varies across the autism spectrum, differences in social functioning are universal across the spectrum and generally persist throughout the life span (Baron-Cohen, 1995; Mesibov, Shea, & Schopler, 2007). Social deficits have also been shown to be the most difficult and complex area of ASD to treat (Mesibov et al., 2007) and are especially problematic for those with high-functioning autism (HFA) or Asperger syndrome (AS) because these individuals are more aware of their social peculiarities, and thus are more negatively impacted by them (Tse, Strulovitch, Tagalakis, Meng, & Fombonne, 2007). Social skills become even more critical in adolescence and young adulthood, as individuals with HFA or AS move toward independent lives, either in higher education or in work settings (Tse et al., 2007). As awareness of the social needs of high-functioning adolescents and young adults on the autism spectrum has increased, research on social skills interventions for this population has increased as well (Solomon, Goodlin-Jones, & Anders, 2004).

The research on social skills assessment and appropriate outcome measures for this population, however, has not advanced at the same pace as research on intervention (Matson & Wilkins, 2007). The most commonly used method for assessing social skills

intervention outcomes in individuals with HFA or AS is still informant report, usually in the form of questionnaires completed by parents or teachers (Matson & Wilkins 2007). While questionnaire methods are quick and cost effective, their results are limited by their dependence on the informant's perspective and biases (Bellack, Brown, & Thomas-Lohrman, 2006; Bierman & Welsh, 2000). Many studies address this limitation by combining third-party questionnaires with laboratory-based measures that target discrete areas of social functioning (e.g. theory of mind, emotion identification), which serve as proxy measures of social behavior (Barnhill, Cook, Tebbenhamp, & Myles, 2002; Ozonoff & Miller, 1995; Solomon et al., 2004; Webb, Miller, Pierce, Strawser, & Jones, 2004). Unfortunately, most studies that use such laboratory-based outcome measures find that improvements on the specific domains tested by proxy measures rarely generalize to overall social functioning (Williams-White, Keonig, & Scahill, 2007). This may be due to the fact that individuals with autism spectrum disorders have particular difficulty generalizing discrete skills to daily settings (Mesibov et al., 2007).

In order to directly target the question of generalization, some studies of social skills interventions have employed observational assessments, particularly in studies of younger children on the autism spectrum (Williams-White et al., 2007). In research with adolescents and young adults, however, direct observational assessment is more complex, as they are less likely than young children to be in easily observable social settings (e.g. recess, "circle time") as part of their regular schedule (Matson & Wilkins, 2007). One observational assessment method that can be readily used with adolescents and adults with and without psychopathology is the role play assessment. Role play assessments have been used quite successfully as a measure of social functioning in adult samples

with similar social deficits, such as schizophrenia and intellectual disabilities (Bellack et al., 2006; Blake & Andrasik, 1986), but have not been similarly utilized in autism (Matson & Wilkins, 2007). Interestingly, role plays are a recommended teaching technique for social skills interventions for individuals with HFA/AS (Krasny, Williams, Provencal, & Ozonoff, 2003), and a few intervention studies have used performance on role plays as an informal outcome measure (Mesibov, 1984; Ozonoff & Miller, 1995; Webb et al., 2004). A systematic role play assessment, however, has not yet been developed for individuals with HFA/AS.

Observational assessments of younger children with ASD generally focus on peer interactions because playing with peers is often a primary focus of treatment (Matson & Wilkins, 2007). In studies of adolescents and young adults with HFA/AS, however, peers have been highly underutilized (Matson & Wilkins, 2007), despite being widely used in social skills research on both typical and socially impaired adolescents and young adults (Blake & Andrasik, 1986; Farmer, Rodkin, Pearl, & Van Acker, 1999; Hagborg, 1994; Larson, Whitton, Hauser, & Allen, 2007; Spence, 2003). Peer interactions are arguably the most informative and representative assessment of social skill because they are sensitive to the changes in social expectations across development and are the primary social context for adolescents and young adults (Englund, Levy, Hyson, & Sraufe, 2000). During adolescence, peer interactions become more complex, as they shift from the activity and play-focused interactions of childhood to the primarily conversation-focused interaction of adulthood (Paul, 2003). Adolescence also marks the beginning of desire for romantic relationships, which for most adolescents denotes an increased interest in interactions with members of the opposite gender, in contrast to the primarily same-

gender interactions of childhood (Connolly, Craig, Goldberg, & Pepler, 2004). Thus, socially competent adolescents and young adults need to be able to engage in casual, mutually enjoyable conversations not only with members of their own gender, but those of the opposite gender as well (Connolly et al., 2004; Paul, 2003).

One important aspect of successful peer interactions is responding appropriately to nonverbal social cues (Turkstra, Ciccio, & Seaton, 2003). This skill is particularly challenging for individuals with HFA/AS (Loveland, Pearson, Tunali-Kotoski, Ortegón, & Cullen Gibbs, 2001), especially in naturalistic settings (Klin, 2000). Adolescents and adults with HFA/AS can often use nonverbal cues to correctly interpret basic emotions such as happiness and sadness, but have difficulty accurately perceiving more complex emotions such as boredom and resentment (Golan, Baron-Cohen, & Hill, 2006). Boredom is a particularly salient emotion for this population, as individuals with HFA/AS often do not realize when they are boring others by talking about their circumscribed interests (Mesibov et al., 2007; Stewart, Carr, & LeBlanc, 2007). Typical individuals, by contrast, are more easily able to discern when a conversational partner is bored with the conversation (Burgoon, Buller, Hale, & de Turck, 1984) and will alter their own behavior to keep the conversation going by asking questions or changing the topic of conversation (Burgoon, Stern, & Dillman, 1995; Brinton, Robinson, & Fujiki, 2004; Kearsley, 1976; McLaughlin & Cody, 1982; Stewart et al., 2007). These behaviors serve to maintain the conversation and moderate the awkwardness of their partner's low involvement. While typical individuals will eventually decrease their involvement in the conversation to match their partner's disinterest, their initial response is to increase their involvement (Burgoon et al., 1995; Burgoon & LePoire, 1999; Patterson, 1982).

Interestingly, although typical individuals work to increase their partner's engagement through increased numbers of questions and topic changes, other behavioral indicators of interest such as positive affect, use of gestures, and vocal expressiveness often decrease (Burgoon et al., 1995). Additionally, typical individuals generally show increased signs of social anxiety when speaking with a disinterested conversational partner, as indicated by a more tense posture and higher kinesic arousal (Burgoon et al., 1995, Patterson, 1982; Williams & Zadro, 2001). Analyzing the behavioral response of adolescents and young adults with HFA/AS to a bored conversational partner, then, would provide a realistic behavioral measure of social functioning for this population.

The overall goal of this study was to develop a peer-enacted role play measure of social functioning in which confederates displayed either social interest or boredom in two separate role plays. The first aim of the study was to establish reliability of this measure, via evaluation of inter-rater reliability and internal consistency. The second aim was to evaluate participants' ability to adapt their behavior in response to changes in social context. It was hypothesized that typical controls would modify their behavior appropriately to compensate for their conversational partner in the boredom role play, while the HFA/AS group would not show appropriate changes in behavior across the two role plays. Specifically, it was hypothesized that the controls would ask more questions, change the topic of conversation more frequently, increase their overall involvement, and show an increase in anxiety in the boredom role play relative to their behavior in the interested role play. In contrast, the HFA/AS group was expected to show stable levels of these behaviors across both role plays. In addition, it was hypothesized that observers' ratings of conversational rapport would be stable across the two role plays for the

HFA/AS group, but would be decreased for undergraduate controls in the bored relative to the interested role play. Exploratory analyses were also conducted to examine changes in vocal expressiveness, gestures, positive affect, kinesic arousal, and posture across the two role plays for the two groups. The third and final aim was to establish convergent validity through calculating correlations of changes in role play behavior with verbal IQ, theory of mind, and autism severity, and to establish discriminant validity via correlations with performance IQ (Constantino, Pryzbeck, Friesen, & Todd, 2000; Golan et al., 2006; Hughes & Leekam, 2004). It was predicted that change in the CASS primary outcomes (increases in number of questions asked, number of topic changes, overall involvement, and decreases in overall quality of rapport) would be significantly positively correlated with higher verbal IQ and theory of mind, and negatively correlated with autism severity scores, but would be unrelated to performance IQ scores. Predictive validity was also examined in terms of the ability of the CASS to predict autism diagnosis.

CHAPTER 2

METHODS

Participants

A total of 40 adolescents and young adults participated in the present study: 20 participants with high-functioning autism (HFA) or Asperger syndrome (AS), recruited from an intervention study providing Social Cognition Interaction Training for Autism (SCIT-A), and 20 control participants, recruited from an undergraduate population. All participants were required to be between the ages of 16 and 22 years, have a verbal IQ of 85 or higher, and speak English as a primary language to be included in the study.

Additionally, participants in the HFA/AS group were required to have an existing clinical diagnosis and to meet criteria for Autism Spectrum Disorder (ASD) on the Autism Diagnostic Observation Schedule (ADOS), the gold standard assessment for ASD.

Screening measures were used to eliminate any participants from the control group with ASD or another disorder that might impair social functioning.

Measures

Screening measures. All HFA/AS participants were administered a phone screening to gather demographic information and relevant medical and psychological history to determine eligibility. Potential participants with a diagnosis of a disorder that may impair social functioning, other than HFA/AS (e.g. schizophrenia) were excluded from the study. Undergraduates completed a self-report screening form (Appendix A) to

rule out those with diagnosed conditions that may impair social functioning (e.g. social phobia, schizophrenia, autism spectrum disorder).

In addition to the general screening form, undergraduates also completed the Baron-Cohen Autism Spectrum Quotient (AQ; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubbly, 2001). The AQ is a 50-item self-report measure of autism spectrum symptoms normed for adults ages 16 and up. Scores range from 0-50, and the established cut-off of 32 was used to exclude potential participants from the control group (Table 1). No potential control participants were eliminated by these measures.

Cognitive ability measure. All participants were administered the Wechsler Abbreviated Scales of Intelligence by a trained research assistant (WASI; Wechsler, 1999). Participants were required to have a verbal IQ of at least 85 to be eligible for the study. Verbal IQ was also used as a measure of convergent validity, and performance IQ was used as measure of discriminant validity.

Theory of mind. The Awareness of Social Inference Test (TASIT; McDonald, Flanagan, Rollins, & Kinch, 2003) is a three-part test of social perception and theory of mind. Subtest two, *Social Inference-Minimal*, assesses theory of mind skills by asking individuals to interpret the meaning and intentions behind potentially ambiguous remarks made by actors in video vignettes. One point is given for each correct response and then summed to calculate a norm-referenced total score. The TASIT has demonstrated convergent validity with several measures of social functioning and theory of mind and has adequate test-retest reliability (McDonald, Flanagan, Martin, & Saunders, 2004; McDonald et al., 2006). Within the present study, the TASIT demonstrated high internal consistency for both the total score ($\alpha=.71$) and the subscales ($\alpha=.89$).

Parent report of autism severity. The Social Responsiveness Scale (SRS; Constantino et al., 2000) is a 65-item informant (parent or teacher) report that asks the informant to rate the individual's level of reciprocal social behavior and presence of other symptoms of autism. The SRS generates a total score that denotes the individual's degree of social impairment from autism symptoms, where higher scores indicate more severe impairment. The scale has demonstrated high construct and discriminant validity and high test-retest reliability in prior research (Constantino et al., 2000; Constantino & Todd, 2003). Parents completed the SRS for participants in the HFA/AS group. The SRS was not used within the control group.

Target Measure: The Contextual Assessment of Social Skills (CASS)

Overview of Procedure. The Contextual Assessment of Social Skills (CASS) was designed as a behavioral measure of social skills to be used with adolescents and young adults with HFA/AS. In the CASS, participants have two role play conversations with two different confederates, each of which lasts three minutes. Participants speak only to confederates of the opposite gender, as one of the primary social tasks of the adolescent/young adult period is to master opposite gender interactions (Connolly et al., 2004; Paul, 2003). The participant and confederate are seated facing one another, approximately three feet apart. Prior to each conversation, the examiner reads the following prompt to both the participant and the confederate:

“Thank you both so much for coming in. Right now we'd like for each of you to act as if you had recently joined a new club or social group, and now you're sitting next to each other, waiting for the first meeting of this new club or group to start. You will have three minutes to talk to each other, and then I will come back in the room.”

The examiner then exits the room. Participants with HFA/AS are also presented with a typed version of the prompt, as these individuals often demonstrate higher levels of

comprehension in visual processing than in auditory processing (Mesibov et al., 2007). After three minutes, the examiner re-enters the room, escorts the confederate out, and asks the participant to complete a brief questionnaire about the conversation with the confederate (*Conversation Rating Scale*; Appendix B).

Though the set-up of the two role plays is identical, the behavior of the confederates differs markedly for each, creating two distinct social contexts. In the first role play, the confederate demonstrates social interest and engagement in the conversation by orienting his/her face and body towards the participant, leaning forward slightly, smiling, making consistent eye contact, and using natural gestures and head nodding (Burgoon et al., 1984; Hargie, et al., 1994; Ray & Floyd, 2006). The confederate also asks questions and elaborates on statements in the interested context (Capella, 1983; Coker & Burgoon, 1987; Hargie et al., 1994). In the second role play, the confederate is instructed to use a different set of verbal and nonverbal behaviors to replicate a social boredom context. Confederates in the bored context make minimal eye contact, orient their face and body slightly away from the participant, maintain a relatively flat affect, lean back in their chair, and use minimal gestures and head-nodding (Capella, 1983; Coker & Burgoon, 1987; Patterson, 1982; Ray & Floyd, 2006). The confederate is also instructed to keep conversational initiation (e.g. asking questions, making statements that invite a response) to a minimum and to speak as little as possible (Capella, 1983; Coker & Burgoon, 1987).

Across both role plays, it is important that the confederate not carry the conversational burden, in order to allow for an accurate assessment of the participant's social skill (Lord, Rutter, DiLavore, & Risi, 1999). Consequently, in each role play,

confederates are instructed to speak for no more than 50% of the time. Additionally, confederates in both role plays are instructed to wait 10 seconds after the examiner leaves the room for the participant to initiate the conversation before starting the conversation themselves. This extended waiting period is used because conversational initiation is a particularly difficult skill for individuals with HFA/AS (Bishop, Gagahan, & Lord, 2007; Hauck, Fein, Waterhouse, & Feinstein, 1995).

Standard prompts are provided for initiation and are identical across role plays (Appendix C). If conversational lapses occur, confederates in the interested context are instructed to wait 5 seconds before reinitiating the conversation, while in the bored context, confederates wait 7 seconds. Conversational pauses longer than three seconds are perceived as awkward by typical individuals, and thus are quickly filled (Tree, 2002; McLaughlin & Cody, 1982). The extended wait times described above are used in the present study to allow for the slower social processing time of individuals with ASD (Dawson, Webb, & McPartland, 2005; Rubin & Lennon, 2004), and to keep the conversational burden on the participant. The slightly longer wait time is used in the bored context to maintain the differences between the bored and interested contexts (Tree, 2002; O'Connell, Kowal, & Kaltenbacher, 1990). Confederates were randomly assigned to role plays using the Urn Randomization Program, designed for balanced randomization of groups in small samples.

Confederates were 4 male and 5 female trained undergraduate research assistants. All male confederates were of Caucasian ethnicity. Among the female confederates, two were African American, two were Caucasian, and one was Asian American. Confederates received thorough training before engaging in the role plays. Each completed an hour of

didactic training and rehearsal with the lead author and were then given a week to practice independently. After a week, they returned and spent an additional hour in rehearsal with the author. Confederates also received feedback regarding their performance after each role play. As part of the didactic training and ongoing feedback, confederates watched videos of appropriate confederate behavior in each social context.

Pilot Testing of the CASS. The format for the CASS was based on similar role play measures of social functioning used with adults and adolescents and was pilot tested with undergraduate students ages 18-25. During the pilot testing, magazines were placed on a nearby table to serve as standard objects for manipulation, as some prior research has reported that when individuals are ignored or socially rejected, they are more likely to manipulate objects as a face-saving behavior (Williams & Zadro, 2001). None of the participants utilized the magazines during pilot testing, and so they were not included in the final procedures.

Pilot testing and further literature review also led to the decision to have participants experience the interested context before the bored context, rather than counterbalancing order as initially planned. Expectations about another's behavior guide social interactions and violations of those expectations produce changes in behavior as individuals adapt to the social situation and work to compensate for their partner's deviation from the norm (Burgoon, Stern, & Dillman, 1995; LePoire & Yoshimura, 1999; McLaughlin, Cody, & Rosenstein, 1983). While the confederate's behavior in the interested context represents expected, typical behavior for the situation, the bored context represents a violation of social expectations by minimizing the confederate's involvement in the conversation (Geller, Goodstein, Silver, & Sternberg, 1974; LePoire

& Yoshimura, 1999). Presenting the interested context first allows for rating of the participant's social behavior in a normative interaction (the interested context), and the participant's adaptation to a social change (the bored context). Presenting the bored context first would violate social expectations and lead the participant to expect similar behavior in the second (interested) context, thus leading to an inaccurate representation of the participant's behavior in a normative social interaction (Burgoon & Hale, 1988; LePoire & Yoshimura, 1999; Miller & Turnbull, 1986).

Behavioral Coding. All conversations were videotaped and participants' verbal and nonverbal behaviors were coded in ten categories: Asking Questions, Topic Changes, Vocal Expressiveness, Gestures, Positive Affect, Posture, Kinesic Arousal, Social Anxiety, Overall Involvement in the Conversation, and Overall Quality of Rapport. These items were based on behavior which are indicative of conversational engagement and which are prone to change in response to conversational boredom in previous research (Burgoon et al., 1995). Several of these behaviors also overlap directly with coding items from the ADOS, the gold standard assessment of autism spectrum disorders (Lord et al., 2000).

The four primary outcomes used to evaluate change in social behavior across context were Asking Questions, Topic Changes, Overall Involvement, and Overall Quality of Rapport. Asking Questions was defined as the number of questions asked by the participant to engage the confederate in conversation. Topic Changes was defined as the number of times a participant used a question or comment to attempt to change the topic of conversation. Overall Involvement was a global rating of the degree to which the participant's verbal and nonverbal behaviors indicated interest in the conversation and of

the proportion of the conversational burden carried by the participant. Overall Quality of Rapport was a global rating that described the level of comfort and the balance of conversational burden in the interaction. Among socially skilled individuals, Asking Questions, Topic Changes, and Overall Involvement should increase in the bored relative to the interested context, while Overall Quality of Rapport should decrease (Burgoon et al., 1995; McLaughlin & Cody, 1983; Stewart et al., 2007).

Social anxiety was also examined in this study and was expected to increase in the bored context among the control group, but show no change in the HFA/AS group. The Social Anxiety item was a summary rating of the degree to which the participant's verbal and nonverbal behaviors were indicative of anxiety. Exploratory analyses were also conducted on vocal expressiveness, gestures, positive affect, posture, and kinesic arousal. Vocal Expressiveness described the degree to which the participant varied his/her pitch, tone, and tempo. The rating of Gestures included both the frequency with which the participant used gestures while speaking, as well as the quality of these gestures. The Positive Affect item rated the level of positive emotion directed at the confederate through the participant's facial expression and body language. To rate Posture, raters considered the degree of tension or relaxation in the participant's posture. Kinesic Arousal described the intensity and frequency of body movement by the participant.

Two trained raters coded each set of role plays. The items Asking Questions and Topic Changes were coded as counts of the number of times these behaviors occurred. All other items were rated on a scale of 1-7 (1=low, 7=high; see Appendix D for coding system). Raters were trained using a set of 10 videos from pilot testing. The first video was rated jointly with the author as an initial learning exercise. Raters then coded the nine

remaining videos in sets of three and met with the author following each set for score comparisons and feedback. Reliability analyses were calculated using the last six videos rated, by partitioning the sum of squares for raters scores into error variance and true score variance, where true score variance was defined as the author's scores (Whitehurst, 1984). Both raters achieved agreement with the author within one interval rating of at least .70 in reliability analyses ($SS^2_{\text{true}} = .73, .71$), before proceeding to rating study videos. A third rater also completed the training but was eliminated due to low reliability ($SS^2_{\text{true}} = .52$). Raters were kept blind to study hypotheses and group membership.

Conversation Rating Scale. Following each role play conversation, participants completed the Conversation Rating Scale (CRS), a 5-item questionnaire developed for this study (Appendix B). The CRS asks the participant to rate the confederate's interest in the conversation, using 5 items rated on a 7-point Likert scale. The CRS items are based on items from the Interpersonal Communication Satisfaction Inventory (Hecht, 1978) and the Relational Communication Scale (Burgoon & Hale, 1987), two interpersonal communication rating scales that have been extensively validated and widely utilized in the communication literature (Graham, 1994). The CRS primarily served as a manipulation check, as different CRS ratings should be observed for the undergraduate controls across the two role plays. Due to their deficits in emotion perception (Clark, Winkielman, & McIntosh, 2008), HFA/AS participants would be unlikely to report differences across context. Item scores are summed (with two items reverse scored) to generate a total score of perceived conversational interest for each social context. The total scores range from 5 to 35. Internal consistency for the CRS was high ($\alpha = .92$).

CHAPTER 3

RESULTS

All data analyses were performed using the SAS 9.1x system for Windows, and statistical significance was set at $p < .05$. Prior to any further analyses, the frequency distributions of each of the 10 behavioral items coded in the CASS were examined for the entire sample. The Posture item exhibited extremely low variance across contexts and groups, and thus was excluded from all subsequent analyses.

Data Analytic Plan

Demographic characteristics of the sample were first examined using descriptive statistics. Reliability analyses of the CASS were then conducted to investigate inter-rater reliability and internal consistency. Once these properties had been evaluated, linear regression analyses were conducted to address hypotheses regarding individual CASS items. It was hypothesized that control participants would show an increase in number of questions asked, number of topic changes, and overall involvement, and a decrease in overall quality of rapport in the bored relative to the interested context. An increase in social anxiety in the bored context was also expected for the control group. It was predicted that the HFA/AS group would show no significant changes in any of these domains across context. A simultaneous approach was used for the planned analyses (CASS primary outcomes and social anxiety), in which all independent variables were entered into the model at the same time.

Linear regression analyses were also used for the exploratory analyses regarding change from the interested to the bored context in vocal expressiveness, gestures, positive affect, and kinesic arousal. For the exploratory analyses, a hierarchical linear regression approach was used to determine which variables best predicted item score. Variables were entered hierarchically, beginning with autism diagnosis, then adding social context into the model, and finally adding the interaction term. At each step, squared multiple correlation (R^2) values were calculated, and significance tests were conducted to determine if adding an additional predictor significantly increased the R^2 value.

We also examined the validity properties of the CASS, namely convergent, discriminant, and predictive validity. For the purpose of these analyses, a CASS total score was computed using the primary outcomes of the CASS: Asking Questions, Topic Changes, Overall Involvement, and Overall Quality of Rapport (reverse scored). Predictive and discriminant validity for the CASS would be supported if verbal IQ, social cognition, and autism severity were positively related to change on the CASS and performance IQ was unrelated to it. Pearson correlation coefficients were calculated for these analyses. Predictive validity of the CASS was assessed using a logistic regression to determine whether degree of change on the CASS significantly predicted the probability of an autism diagnosis.

Sample Characteristics

Participants in the control group were matched to participants in the HFA/AS group on gender and ethnicity. The samples were 85% male and 90% Caucasian. There were no significant differences between the two groups on full scale IQ, verbal IQ, or performance IQ (Table 1). The control group was significantly older than the HFA/AS

group ($t = 4.83, p < .0001$). As expected, the control group also received significantly higher scores on the theory of mind measure ($t = 3.81, p < .0005$).

Reliability

Reliability of the CASS was assessed through evaluation of internal consistency and inter-rater reliability. Inter-rater reliability on the CASS was assessed by calculating the intraclass correlation coefficient (ICC) for each of the remaining 9 items separately. Because this study used a fixed number of judges providing single ratings (as opposed to average ratings), ICC (3, 1) for a two-way mixed, random effects model was used (Shrout & Fleiss, 1979). Inter-rater reliability values between .70 and .80 are generally considered acceptable in behavioral research (Fleiss, 1981). The ICC values for all nine CASS items ranged from .50 to .97, with a mean value of .68. On the CASS primary outcomes (Asking Questions, Topic Changes, Overall Involvement and Overall Quality of Rapport), ICC values ranged from .62 to .96, with a mean ICC of .81. While the range of ICCs includes values below .70, the mean ICC values of .68 for all items and .81 for items in the CASS total score were considered acceptable for further analyses. Each rater's scores were averaged to calculate a final score for each participant on each item, and these averaged scores were used for all subsequent analyses.

Internal consistency of the CASS behavioral items was evaluated using Cronbach's alpha. Internal consistency of all 9 items on the CASS was high (standardized alpha = .83). Internal consistency was also analyzed separately for the four primary outcomes and was acceptable (standardized alpha = .75).

Manipulation Check

To verify that the two role play contexts were distinct from one another, the Conversation Rating Scale (CRS) was administered to participants following each role play. We expected a significant interaction effect, whereby the control participants should report significantly lower ratings on the CRS in the bored context (relative to the interested context), and the HFA/AS group should report little or no change.

CRS total scores can range from 5 to 35, with higher scores indicating higher levels of perceived interest. In the present sample, CRS scores ranged from 5 to 32 across groups and contexts. A multiple linear regression analysis was used to evaluate the results of the CRS, representing autism status and context as dummy variables. A significant main effect was found for social context ($t=-8.35$, $p<.0001$), but not for autism status ($t=-0.03$, ns). This indicated that across groups, ratings on the CRS were lower in the bored than in the interested context, but there were no differences overall by autism status. The interaction effect was also statistically significant ($t=2.83$, $p<.006$), indicating that there was a significantly larger decrease in CRS ratings across context for the control group than for the HFA/AS group (See Figure 1). This interaction was further probed using t -tests to check for group differences by context. There was no significant difference between the control and the HFA/AS group for the interested context ($t=0.03$, ns), but for the bored context, the control group's ratings were statistically significantly lower than the HFA/AS group's ($t=-3.67$, $p<.001$).

CASS Group Differences (Primary outcomes)

Group differences in performance on each of the individual CASS items were examined in a multiple linear regression framework. Mean scores by group and context

for all individual CASS items can be found in Table 2. For these analyses, dummy variables representing social context, autism diagnosis, and the interaction of these two factors were entered into a linear regression model to predict score on each of the 9 behavioral items of the CASS. Planned analyses were first undertaken on the primary outcomes: Asking Questions, Topic Changes, Overall Involvement, and Overall Quality of Rapport. Both main effects and interaction effects were examined, but the primary hypothesis was that there would be a significant interaction effect, whereby the control group would show significant increases in Asking Questions, Topic Changes, and Overall Involvement, and significant decreases in Overall Quality of Rapport in the bored relative to the interested context. In contrast, the HFA/AS group was not expected to show significant changes in any of these items across contexts.

For Asking Questions, the full model including context, autism diagnosis, and their interaction significantly predicted number of questions asked ($F=16.12$, $p<.0001$) and accounted for a modest proportion of the variance in this item ($R^2 = .39$). The main effects for context and for autism diagnosis were both statistically significant ($t= 2.97$, $p<.01$, $t= -3.20$, $p< .01$). Across both groups, participants asked significantly more questions in the bored than in the interested context, and the control group asked significantly more questions of the confederate overall than did the HFA/AS group. The interaction effect for the model approached statistical significance ($t = -1.70$, $p<.09$), indicating that the control group showed a larger increase than the HFA/AS group in the number of questions asked in the bored compared to the interested context.

The full linear regression model for Topic Changes also significantly predicted scores on this item ($F=14.38$, $p<.0001$) and accounted for a modest proportion of item

variance ($R^2=.36$). The main effects for both context ($t= 2.48$, $p< .02$) and autism diagnosis ($t= -3.36$, $p<.01$) were statistically significant, indicating that across groups, participants introduced topic changes more frequently in the bored than in the interested context, and that the control group introduced significantly more topic changes than did the HFA/AS group. The interaction of group and context was not statistically significant for this model ($t= -1.30$, *ns*), indicating that the increase in topic changes from the bored to the interested context did not differ significantly between the control group and the HFA/AS group.

Overall Involvement was also significantly predicted by the full model ($F=6.29$, $p<.001$), though it accounted for a smaller proportion of item variance ($R^2=.20$). The main effect for autism diagnosis was statistically significant ($t= -3.50$, $p<.001$), indicating that the control group was significantly more involved in the conversation than the HFA/AS group across social context. The main effect for context ($t= -1.14$, *ns*) and the interaction effect ($t= .75$, *ns*) were not statistically significant, indicating that overall involvement did not change significantly across contexts in either group.

The full linear regression model significantly predicted overall quality of rapport ($F=39.92$, $p<.0001$) and accounted for a large proportion of the variance ($R^2= .61$). The main effects for both context ($t= -9.68$, $p<.0001$) and autism diagnosis ($t= -4.32$, $p<.0001$) were statistically significant; across both groups, rapport was significantly lower in the bored relative to the interested context, and rapport was significantly lower in the HFA/AS group than in the control group in both contexts. The interaction effect was also statistically significant ($t= 3.67$, $p< .0001$). Thus, while both groups showed a decrease in

quality of rapport in the bored compared to the interested context, this decrease was significantly larger in the control group than in the HFA/AS group.

The full model for social anxiety was also statistically significant ($F=9.69$, $p<.0001$) and accounted for a modest proportion of the variance ($R^2=.28$). The main effects for both context ($t= -1.99$, $p=.05$) and autism diagnosis ($t= -4.30$, $p<.0001$) were statistically significant. Across groups, social anxiety decreased in the bored relative to the interested context, and the HFA/AS group had significantly lower levels of social anxiety overall than the control group. The interaction effect of context and group was not statistically significant ($t=1.09$, ns), indicating that the decrease in social anxiety across contexts was not significantly different between the two groups.

CASS Group Differences (Exploratory analyses)

Exploratory analyses were also conducted to examine the main and interaction effects of group and context on Vocal Expressiveness, Gestures, Positive Affect, and Kinesic Arousal. Vocal Expressiveness was significantly predicted by autism diagnosis ($F= 22.61$, $p<.0001$), which accounted for a small proportion of the variance ($R^2 =.22$), with the HFA/AS group showing significantly lower vocal expressiveness overall than the control group. Adding context into the model did not have a significant effect on the R^2 value (R^2 increment= .0033, $F^2=.004$), indicating that vocal expressiveness did not change significantly across context for either group, and thus interaction effects were not tested. Gestures were best predicted by the full model ($F=2.56$, $p=.06$), but the model only accounted for a very small proportion of the variance ($R^2=.09$). Although the main effect for group was not statistically significant ($t=-1.26$, ns), the main effect for context was ($t=-2.61$, $p<.01$), indicating that both groups showed a decrease in gestures in the

bored relative to the interested context. The interaction effect for this model was not statistically significant ($t = 1.29$, *ns*).

Both autism diagnosis and context emerged as significant predictors of Positive Affect ($F = 9.24$, $p < .001$), together accounting for a small proportion of the variance ($R^2 = .19$). The results indicated that the HFA/AS group showed significantly less positive affect overall than did the control group, and that across groups, participants showed a significant decrease in positive affect in the bored relative to the interested context. Adding the interaction effect into the model did not significantly increase the R^2 value (R^2 increment = .0041, $F^2 = .005$), so this effect was not interpreted. Kinesic Arousal was not significantly predicted by autism diagnosis ($F = .36$, *ns*) or by the combined model including context ($F = .65$, *ns*), thus the interaction effects were not examined.

Validity Analyses

The convergent and discriminant validity properties of the CASS were examined, as well as its predictive validity. Convergent validity was assessed across groups via correlations of change on the CASS primary outcomes with verbal IQ, theory of mind, and autism severity. Discriminant validity was evaluated using Pearson correlations with performance IQ. Predictive validity was examined via logistic regression analyses, predicting presence of an autism diagnosis.

The primary outcomes on the CASS were number of questions asked, number of topic changes, overall involvement, and overall quality of rapport. These four items were combined to create a CASS total score for the validity analyses. Normative social adaptation was represented by an increase in the number of questions asked, the number of topic changes, and overall involvement, but by a decrease in overall quality of rapport

across social contexts. Thus, overall quality of rapport was reverse scored for these analyses only, so that an increase on all four items would correspond to normative social adaptation. Number of questions asked and topic changes were each coded as counts, while overall involvement and overall quality of rapport were rated on a 1-7 scale (1=low, 7=high). Thus, each of these items were first standardized (converted to z-scores) so that all would be on comparable scales. A total score was then calculated for each social context variable (interested and bored) by summing the standardized scores for Asking Questions, Topic Changes, Overall Involvement, and Overall Quality of Rapport for each role play. A CASS total change score was then calculated by subtracting the total score on the interested context from the total score on the bored context, so that higher change scores were indicative of more normative social adaptation.

CASS total change scores were modestly and significantly correlated with both verbal IQ ($r = .32, p < .04$) and theory of mind ($r = .47, p < .002$) across groups, lending support for convergent validity. Correlations were also conducted with autism severity as measured by the SRS within the HFA/AS group only, as these data were not available for the control group. Contrary to expectations, this correlation was not statistically significant ($r = -.22, ns$). In regard to discriminant validity, the CASS was not significantly associated with performance IQ, as predicted ($r = .006, ns$).

In regard to predictive validity, the CASS total change score, representing ability to adapt social behavior to situational demands, should discriminate between individuals with HFA/AS and those with no social impairments. The mean CASS change score for the control group was .91 (SD= 2.03), while the mean for the HFA/AS group was -.91 (SD= 2.09). A student's t-test indicated that the difference in means was statistically

significant ($t=2.80$, $p<.008$). A logistic regression model was also used to analyze the predictive validity of the CASS, in which total change on the CASS was used to predict probability of an autism diagnosis. This model was statistically significant ($\chi^2=7.63$, $p<.006$), generating an odds ratio of .62. Thus, for every one unit increase in the CASS total change score, the probability of having an autism diagnosis was reduced by a factor of .62.

CHAPTER FOUR

DISCUSSION

This study piloted a novel assessment of social functioning for adolescents and young adults with HFA/AS, the Contextual Assessment of Social Skill (CASS). The first aim of this study was to evaluate the reliability of the CASS via internal consistency and inter-rater reliability. Internal consistency was quite high; inter-rater reliability was not as high, but was still considered acceptable; it was near .70 for all variables and higher when only the primary outcomes were considered. Inter-rater reliability is influenced by a number of factors, including sample size and the number of judges used (Fleiss, 1981). Thus, it is likely that inter-rater reliability will increase in future studies with a larger sample size and a higher number of judges.

The second aim of this pilot study was to evaluate differences between typical controls and individuals with HFA/AS in the ability to adapt to changes in social context. As expected, typical controls accurately perceived changes in social context, rating confederates as significantly less interested in them in the bored relative to the interested context. Individuals with HFA/AS also perceived these changes in social context, though the difference in their ratings between contexts was less robust. Thus, our manipulation check indicates that the confederates were successful in displaying varying levels of interest and boredom across the two role plays.

Consistent with prior research, the control group showed higher levels overall of asking questions, topic changes, involvement, and quality of rapport than the HFA/AS

group. Additionally, across all participants, there was a significant increase in asking questions and topic changes, and a significant decrease in overall quality of rapport in the bored context. These results indicate that on these variables, the CASS does effectively discriminate between these two groups and detects differences in behavior by social context. Moreover, for asking questions, topic changes, and overall quality of rapport, there was an interaction effect whereby the control group generally demonstrated higher levels of change across context than did the HFA/AS group, which showed minimal to no change. It should be noted that this interaction effect was only statistically significant for overall quality of rapport and approached statistical significance for asking questions. Thus, the pattern of the results was generally consistent with the study hypotheses, but subsequent research should be conducted with a larger sample with greater statistical power to discern interaction effects (Note: statistical power was approximately .50 for the linear regression analysis).

Contrary to expectations, no significant differences were observed in overall involvement across context in either group, and a slight decrease was observed in social anxiety. The lack of change in overall involvement may be accounted for by the brief time period of the role plays. Prior research on social adaptation has typically utilized longer interactions of 10-15 minutes, as opposed to the 3 minutes used in the present study, and found that overall involvement decreased slowly over the course of the interaction (Burgoon et al., 1995; LePoire & Yoshimura, 1999). The shortened interaction time may not have allowed for the gradual changes in the global variable of involvement observed in prior research. Similarly, the slight decrease in social anxiety across contexts may also be explained by the brief time period used in this role play

measure, compared to the longer time spans used in prior research (Coker & Burgoon, 1987; Williams & Zadro, 2001). Social anxiety is often initially high and decreases over time, particularly if participants are aware they are being videotaped, as in the present study (Coker et al., 1995; Williams & Zadro, 2001). It is possible, then, that the decrease in social anxiety observed in the present study was due primarily to participants' adaptation to being videotaped, and is not reflective of change in response to the social demands of the context.

In addition to the primary outcomes of the CASS, exploratory analyses were also conducted to examine changes in vocal expressiveness, gestures, positive affect, and kinesic arousal. While group differences were observed in vocal expressiveness, gestures, and positive affect, and differences across context were found for gestures and positive affect, no significant interaction effects emerged. These findings indicate that these variables are likely not sensitive to the context demands of the CASS.

The final aim of the study was to examine the construct validity of the CASS, specifically, criterion-related and predictive validity. In general, there was support for criterion-related validity of the CASS, as the total change score of the CASS was associated with both verbal IQ and social cognition, but was uncorrelated with performance IQ. The CASS total change score also significantly predicted the presence of autism, indicating that predictive validity for the CASS is likely strong as well. Thus, the psychometric properties of the CASS are promising and indicate that the CASS has the potential to serve as a valid and reliable measure of social impairment in individuals with HFA/AS.

While the purpose of this study was to investigate the psychometric properties and utility of this measure, the results may also have implications for our understanding of HFA/AS. Individuals with HFA/AS perceived differences in social context in this study, although the degree of change was attenuated compared to typical controls. While other studies have found that basic socioemotional perception is largely intact among those with HFA/AS, this is the first study to our knowledge to demonstrate relatively intact social perception in vivo. Despite their relative accuracy in social perception, individuals with HFA/AS did not show normative changes in behavior in response to changes in social context, indicating that this relative perceptual competence did not translate to behavioral competence. This finding may indicate that social skills interventions for this population may need to focus treatment on the ability to adapt behavior to a social context, rather than targeting general socioemotional perception.

This study had a number of limitations. First, although our sample size is comparable to previous research that has examined social skills in HFA/AS, it is likely under-powered and a larger sample is needed to extend the results found in the present study (Krasny et al., 2003; Rao, Beidel, & Murray, 2008). Second, little is known about the stability of performance on the CASS over time or its sensitivity to treatment effects. Most social skills intervention studies for individuals with HFA/AS fail to find significant changes on measures of social functioning, though many note changes in discrete social behaviors anecdotally. The CASS may be more sensitive to these types of changes, but this can only be evaluated using a longitudinal design. Third, the CASS requires extensive training and the use of several research assistants to administer properly, which may present an obstacle in implementing it in routine clinical practice. However, as the

CASS is still early in its development, it is possible that administration and scoring of the CASS will become simpler over time. Finally, although the control sample was matched with the HFA/AS sample in ethnicity and IQ it was a convenience control sample of undergraduate students. Thus, these findings need to be replicated with a control sample drawn from the community at large.

In summary, this initial investigation of the CASS found that it has relatively sound psychometric properties and was able to distinguish the social functioning of individuals with HFA/AS from healthy controls. For some key social behaviors (asking questions, topic changes, and rapport), healthy controls showed a pattern of adaptation to social context that was not observed in the HFA/AS group. Thus, the CASS has the potential to fulfill the need for a generalizable measure of social skill through its direct assessment of social functioning in an externally valid social context. The current study underscores the promise of the CASS for studying social functioning in HFA/AS, and the need to conduct future research on this instrument.

Table 1

Demographic Variables by Group.

	Control	HFA/AS
<i>N</i>	20	20
Gender	85% Male (n=17)	85% Male (n=17)
Ethnicity	White: 90% (n=18) Latino: 5% (n=1) Asian: 5% (n=1)	Caucasian: 90% (n=18) Latino: 5% (n=1) Asian: 5% (n=1)
Age	19.9 years (1.2)	17.9 years (1.4)**
Full Scale IQ	113.6 (8.3)	108.1 (14.8)
Verbal IQ	115.8 (9.8)	109.1 (16.3)
Performance IQ	108.3 (8.8)	105.7 (14.4)
Theory of Mind	52.6 (4.0)	46.0 (6.7)*
Autism Quotient	12.9 (3.0)	--

Note. Entries in the table are means and standard deviations. Dashes indicate that data was not collected.

HFA/AS = High-functioning autism/Asperger syndrome.

IQ scores reported as standard scores. Theory of Mind = raw score on The Awareness of Social Inference Test (TASIT). Autism Quotient = raw score on the Baron-Cohen Autism Spectrum Quotient (AQ).

* $p < .0005$

** $p < .0001$

Table 2

Performance on the CASS by Group.

	Control (n=20)		HFA/AS (n=20)	
	<u>Interested</u>	<u>Bored</u>	<u>Interested</u>	<u>Bored</u>
Asking Questions	10.65 (4.07)	15.13 (5.01)	5.83 (4.83)	6.60 (5.09)
Topic Changes	4.98 (2.20)	6.60 (2.30)	2.78 (1.82)	3.20 (1.93)
Overall Involvement	6.08 (.44)	5.70 (.57)	4.93 (1.48)	4.90 (1.27)
Overall Quality of Rapport	6.13 (.53)	3.33 (.80)	4.88 (1.27)	3.58 (.91)
Social Anxiety	5.58 (1.17)	4.80 (.92)	3.90 (1.45)	3.73 (1.32)
Kinesic Arousal	4.28 (.87)	4.05 (.69)	4.13 (1.00)	3.95 (1.12)
Vocal Expressiveness	5.80 (.57)	5.45 (.51)	4.55 (1.34)	4.65 (1.17)
Gestures	4.75 (1.24)	3.25 (1.58)	4.03 (2.14)	3.58 (2.14)
Positive Affect	5.75 (.53)	5.03 (.47)	4.50 (1.81)	4.13 (1.60)
<i>Posture</i>	5.88 (.22)	5.83 (.29)	5.75 (.85)	5.65 (.75)

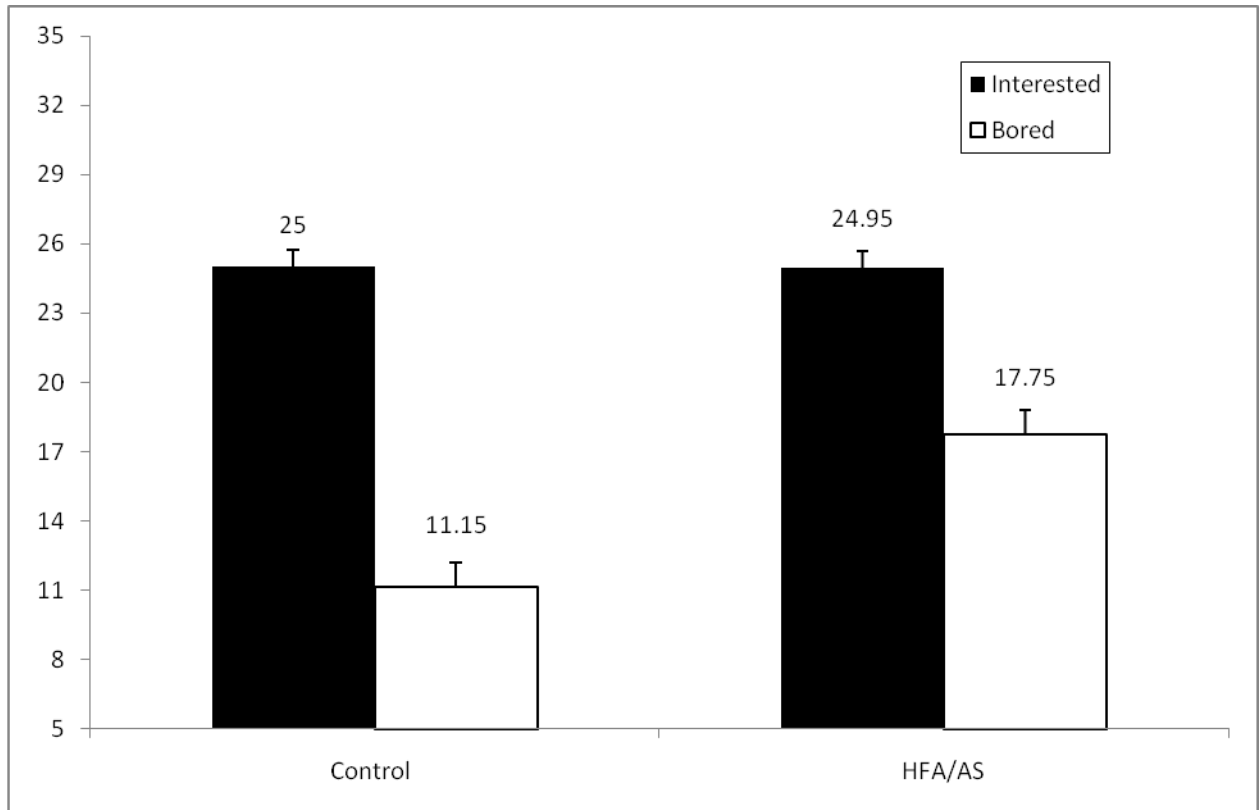
Note. Scores reported as means and standard deviations. HFA/AS= High-functioning autism/Asperger syndrome. Asking Questions and Topic Changes scored as behavior counts.

All other variables scored on 1-7 scale, 1=low, 7=high.

Posture not included in later analyses due to low variance.

Figure 1

Social Perception by Group using CRS Ratings.



Note. CRS = Conversation Rating Scale, range=5-35. HFA/AS = High-functioning autism/Asperger syndrome.

Appendix A

Demographic Screening Form

Please respond to each item on this form. If you have a question about any of the items, please ask a staff member.

Age: _____ Date of Birth: _____

Gender (circle one): Male Female Transgender

Ethnicity (check one):

- ☐ White/Caucasian
- ☐ Black/African-American
- ☐ Latino/Hispanic-American
- ☐ Asian-American/Pacific Islander/Native Hawaiian
- ☐ West Asian-American/Middle Easterner
- ☐ Native American/American Indian
- ☐ Biracial – *please specify*: _____
- ☐ Other – *please specify*: _____
- ☐ Prefer not to answer

Education (check only the highest level of education you have attained):

- ☐ Middle school/8th grade
- ☐ Some high school (check here if currently enrolled in high school)
- ☐ High school diploma
- ☐ Vocational or Technical degree
- ☐ Some college/university (check here if currently enrolled in college)
- ☐ Bachelor's degree
- ☐ Some graduate education (check here if currently enrolled in graduate program)
- ☐ Master's degree/Doctoral degree/Other graduate education

Have you ever been diagnosed with an autism spectrum disorder, such as autism, Asperger syndrome, Rett's disorder, Childhood Disintegrative Disorder, pervasive developmental disorder, etc.? (Circle one)

YES NO

If yes, please specify: _____

Have you ever been diagnosed with a psychological disorder, such as an anxiety disorder, psychotic disorder, schizophrenic disorder, etc.? (Circle one)

YES NO

If yes, please specify: _____

Do you currently receive any psychological or therapeutic services, such as psychotherapy or speech therapy or social skills training? (Circle one)

YES

NO

If yes, please specify: _____

Do you currently receive any special educational services, such as additional test-taking time, pull-out services, an educational aide, etc.? (Circle one)

YES

NO

If yes, please specify: _____

Appendix B

Conversation Rating Scale

The purpose of this questionnaire is to find out more about the conversation you just had. For each item, please circle a number, 1 through 7, to indicate to what extent you agree or disagree with the statement. Please complete all items.

1. The other person was interested in what I had to say.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neutral/ Unsure	Agree Somewhat	Agree	Strongly Agree

2. This person was warm and friendly.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neutral/ Unsure	Agree Somewhat	Agree	Strongly Agree

3. The conversation flowed smoothly.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neutral/ Unsure	Agree Somewhat	Agree	Strongly Agree

4. The other person acted bored by our conversation.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neutral/ Unsure	Agree Somewhat	Agree	Strongly Agree

5. The other person created a sense of distance between us.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neutral/ Unsure	Agree Somewhat	Agree	Strongly Agree

Appendix C

Script for the Contextual Assessment of Social Skills (CASS)

Investigator: As we talked about in the consent/assent form, we are interested in learning more about how people [with high-functioning autism/ Asperger syndrome] get to know new people. We have asked someone else to come in today, so that you two can get to know one another. I'm going to go get that person, and then I'll tell you both a little more about what we'll be doing today.

Investigator will escort the confederate into the room and ask him/her to take a seat next to the participant.

Investigator: Thank you both so much for coming in. Right now, we would like for both of you to act as if you had recently joined a new club or social group and now you are sitting next to each other, waiting for the first meeting to start. You will have three minutes to talk to each other, and then I will come back in the room.

Investigator will then leave the room and close the door.

Role Play A

General Confederate Behavior: Appear warm, friendly, and interested in the conversation. Be sure to:

- *Keep your face and body turned toward the participant*
- *Maintain natural eye contact*
- *Smile*
- *Lean forward slightly*
- *Use natural gestures and head nodding*

After the examiner leaves, WAIT 10 SECONDS before speaking (only for the initiation of the conversation), while making sure to use the nonverbal behaviors above to show that you are interested in talking to the participant. If the participant does not start the conversation, begin by saying:

“Hi, I’m (insert name). What’s your name?”

First prompt to use if conversation does not start after previous prompt:

“I just joined this group. Are you a new member, too?”

Other prompts to use in order to move conversation forward:

- What do you like to do in your free time?
- Where did you grow up?
- What kind of work do you do?
- What is your favorite TV show/book/movie?
- What is your favorite sports team?
- What kind of music do you listen to?

Use the prompts and questions listed above to help keep the conversation going. After your initial wait time for the conversation to begin (10 seconds), from here forward, WAIT 5 SECONDS after speaking for the participant respond. Elaborate on your answers, but do not speak for more than 50% of the time. Your goal is to be responsive and interested, without carrying too much of the conversation for the participant.

The examiner will enter the room after a maximum of 3 minutes.

Role Play B

General Confederate Behavior: Appear bored and uninterested in talking to the participant. Do not be directly rude, and make sure to give some type of response to every overture the participant makes. Also be sure to:

- *Keep your face and body turned slightly away from the participant*
- *Minimize your amount of eye contact*
- *Lean back in your chair*
- *Do not use much facial expression*
- *Keep head-nodding and gestures to a minimum*
- *Keep all responses to no more than 2 sentences*

After the examiner leaves, WAIT 10 SECONDS before speaking (for conversation initiation only), while making sure to use the nonverbal behaviors above to show that you are low interest in talking to the participant. If the participant does not start the conversation, begin by saying: “Hi, I’m (insert name). What’s your name?”

First prompt to use if conversation does not start after previous prompt:

“I just joined this group. Are you a new member, too?”

Other prompts to use in order to move conversation forward:

- *What do you like to do in your free time?*
- *Where did you grow up?*
- *What kind of work do you do?*
- *What is your favorite TV show/book/movie?*
- *What is your favorite sports team?*
- *What kind of music do you listen to?*

In general, you should not be speaking a lot in this conversation. Keep your answers brief, and try to make use of yes/no responses, and “uh-huh,” “yeah,” and similar phrases in place of longer answers when possible. To keep some degree of conversation going, you may use the prompts listed above as many times as necessary. After your initial wait time (10 seconds) for the conversation to begin, from here forward WAIT 7 SECONDS after speaking for the participant to respond, and that you should be speaking no more than 50% of the time.

The examiner will enter the room after a maximum of 3 minutes.

Appendix D

Coding System for the Contextual Assessment of Social Skills (CASS)

1. Asks Questions: Asking questions to express interest in the confederate's ideas, knowledge, experiences, or reactions or to engage the confederate in conversation. Questions do *not* necessarily have to lead to sustained conversation.

Number of questions asked by *participant*: _____

2. Topic Changes: The frequency with which the *participant* (NOT the confederate) changed the topic of conversation (i.e. introduces a new topic, idea, or theme for discussion following discussion of another topic) during the role play

Number of topic changes by *participant*: _____

3. Vocal Expressiveness: The degree to which the participant varies the tempo, pitch, tone, volume and/or rhythm of his/her speech

Rating: _____

- 1: Flat or monotone voice throughout the role play
- 2: Mostly flat or monotone voice, with minimal or rare variation
- 3: Some vocal expressiveness, but seems odd, stereotyped, or exaggerated
- 4: Several instances of appropriate vocal expressiveness, but not consistent, or seems more flat than expressive
- 5: Somewhat appropriate vocal expressiveness, but mostly a polite tone, not warm and engaging
- 6: Good use of vocal expressiveness, but not overly engaging or enthusiastic
- 7: Very warm, friendly, and enthusiastic use of vocal expressiveness, that clearly attempts to engage the confederate in conversation

4. Gestures: The frequency and skill with which the participant uses gestures to describe, explain, or emphasize something that he/she is saying

Rating: _____

- 1: Does not gesture during interaction
- 2: Only gestures once or twice during interaction (may be appropriate or inappropriate)
- 3: Uses some gestures, but these seem odd, stereotyped, or exaggerated or are poorly integrated with speech
- 4: Uses only descriptive/conventional gestures without use of any emphatic/emotional gestures
- 5: Uses several appropriate gestures, but not frequently or consistently

- 6: Uses appropriate gestures frequently throughout the conversation
- 7: Consistently (almost always) gestures while speaking

5. Positive Affect: The degree to which the participant demonstrates positive affect through facial and physical cues

Rating: _____

- 1: No smiling, seems openly angry, negative, or bored; clearly turns face or body away from confederate at more than one point in conversation
- 2: A mostly flat or bored facial expression; may turn face or body away
- 3: Occasional appropriate or positive affect but seems uncomfortable, forced or false; may only turn face or body away infrequently, without clear intent to show lack of interest or disengagement
- 4: Appropriate and polite affect, but not clearly positive; may not turn away
- 5: Positive, though not enthusiastic, affect and consistently facing confederate
- 6: Clearly positive, warm affect, but not overly animated or enthusiastic
- 7: Smiling and positive affect throughout interaction to the point that the participant seems animated and enthusiastic about the conversation

6. Posture: Degree of relaxation or tenseness in the participant's posture

Rating: _____

- 1: Very tense – sitting straight in chair, limbs tight and close to body
- 2: Very tense as described for a “1,” but not throughout entire interaction
- 3: Somewhat tense, but not intensely so
- 4: Neither overly tense or relaxed; seems somewhat comfortable
- 5: Mostly relaxed posture for most of the interaction
- 6: Relaxed posture throughout – sitting comfortably in chair, limbs loose and relaxed, not kept tightly to the body
- 7: Overly relaxed – slouching in chair, limbs overly spread out

7. Kinesic Arousal: The degree to which the participant shows signs of physical arousal, such as fidgeting, moving about in the chair, or tapping or repetitively moving body parts (fingers, feet, etc.)

Rating: _____

- 1: High arousal throughout the interaction that has at least some impact on the smoothness of the conversation (shifting in chair, fidgeting, tapping, swinging or bouncing foot, leg, arm, or hand, etc.)
- 2: High arousal as described for a “1,” but limited impact on conversation
- 3: Some clear kinesic arousal for most of the conversation, but not high arousal and has limited impact on conversation
- 4: Some clear kinesic arousal (e.g. consistent fidgeting or body movements), but without impact on the conversation

- 5: Very little kinesic arousal that has no impact on conversation
- 6: Brief moments of kinesic arousal at only one point in the conversation
- 7: No observed kinesic arousal

8. Social Anxiety: Amount of anxiety displayed by individual through physical and behavioral signs (includes vocal tremors, fidgeting, sweating, shaking, avoidance of eye contact, etc.)

Rating: _____

- 1: Clear signs of extreme anxiety throughout interaction that have a definite impact on the smoothness of conversation
- 2: High social anxiety throughout most of conversation, with clear, but not overwhelming, impact
- 3: Clear, but not high, anxiety with only limited impact on conversation (e.g. occasional silences or strained conversation due to anxiety)
- 4: Some anxiety evident, but not always clear and not overly distracting
- 5: Minimal or brief anxiety evident, but with minimal or no impact on conversation
- 6: No clear behavioral indicators of anxiety, but does not seem completely relaxed
- 7: Seems completely relaxed throughout the conversation

9. Overall involvement/interest in the conversation: The extent to which the participant indicates through verbal and/or nonverbal means that he/she is interested and involved in the conversation and in what the *confederate* is saying (not simply in his/her own side of the conversation)

Rating: _____

- 1: Withdrawn or unengaged – speaks infrequently, turns face and/or body away from confederate, leans back in chair, shows poor eye contact
- 2: Shows low engagement in the conversation but does not actively avoid conversation; may show occasional nods and respond verbally or nonverbally to confederate's questions and/or statements
- 3: Demonstrates some engagement, but seems uninterested overall, may look away often
- 4: Seems mostly engaged in conversation but interaction is odd, stilted, awkward, and/or uncomfortable; may ask some questions or elaborate on answers for confederate's benefit
- 5: Appropriately engaged throughout and generally works to keep the conversation going; does not look or turn away often
- 6: Demonstrates consistent engagement in the conversation, and takes the lead in the conversation more than once, by asking questions and/or building on what the confederate has said
- 7: Highly engaged in the conversation and leads most of the conversation; clearly seems to enjoy the interaction

10. Overall Quality of Rapport: Summary rating of the rapport and give-and-take in the role play – especially consider the degree to which one person had to initiate and maintain conversation

Rating: _____

- 1: Highly uncomfortable for entire interaction, partners show little regard or interest in one another
- 2: Largely uncomfortable interaction with brief comfortable moments
- 3: One sided or unusual interaction that is sustained by one person and that would have failed had that person not given clear additional effort
- 4: Slightly awkward or uncomfortable interaction at times, but largely appropriate and somewhat comfortable
- 5: Conversation is polite and appropriate, but not clearly comfortable
- 6: Comfortable, appropriate interaction, with no clearly long or awkward silences
- 7: Consistently comfortable, warm interaction that is enjoyable for both

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