ABSTRACT

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This quasi-experimental study investigated peers attitudes (specifically, behavioral intentions) of 70 middle school students towards engaging in social activities with a student displaying characteristics of autism spectrum disorder (ASD) in a video vignette. Three conditions were investigated with three separate depictions of the student in the video (i.e., moderate to severe ASD, high functioning ASD, and a typically developing student). Results of an analysis of variance indicated that participants reported significantly higher behavioral intentions towards the typically developing student and the student with more severe ASD as compared to the student with high functioning ASD. Participants were also able to differentially rate the behaviors they observed across the three conditions. These findings suggest that peers are capable of observing and distinguishing among different behaviors typically displayed by students with ASD, but peers may be more willing to socially engage with a student with more severe impairment as compared to a student with mild or subtle characteristics. Implications regarding essential elements of interventions for peers based on the target student's level of functioning are discussed.

Peer Perceptions of Students with Autism Spectrum Disorders

by
Whitney Beth Griffin

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APPROVED BY:

_____   _____
Mary Haskett   Susan Osborne

_____
Scott Stage
Chair of Advisory Committee

BIOGRAPHY

Whitney Griffin is a graduate student in the school psychology program at NC State University. Prior to entering the program at NCSU, she worked as a teacher and autism specialist for Orange County Schools. Whitney earned her bachelor's degree in deaf education with a concentration in psychology from the University of North Carolina at Greensboro in 1999, where she was a North Carolina Teaching Fellow and an Ethel Virginia Butler scholarship recipient. She earned her master's degree in special education from East Carolina University in 2010, specializing in low incidence disabilities. Whitney served on the Board of Directors for the Autism Society of North Carolina for two terms.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Peer Perceptions of Students with Autism Spectrum Disorders

Autism spectrum disorders (ASD) are characterized by deficits in communication, language, behavior, and social skills. Autism is referred to as a spectrum disorder because individual characteristics and deficits fall along a continuum. Social skills can range from highly aloof to socially awkward, and communication skills can range from being unable to speak to having a large vocabulary but difficulty with pragmatic language. Behaviors also include engaging in repetitive motor movements such as rocking or hand-flapping, overfocusing on physical objects or on topics of interest, and rigidly adhering to routines. Individuals with ASD may demonstrate unusual sensory seeking behaviors such as repetitively feeling the texture of an object or repeating certain sounds. They may insist upon others acting in a specific way. Individuals with autism may display limited eye contact and may show little shared enjoyment in activities with others. The frequency of engaging with others and initiating joint attention as well as the quality of attempts to initiate interactions may be poor (Heflin & Alaimo, 2007; Lord et al., 2012).

An increased prevalence of ASD has been seen over the past 30 years. In the 1980's, the estimated prevalence of ASD was about 1 in 10,000; the current estimated prevalence of ASD is 1 in 68 (Centers for Disease Control and Prevention [CDC], 2015). This rise in the ASD population is reflected in public schools. For example, based on Child Count data collected by the North Carolina Department of Public Instruction, the number of students, ages 6-21, served under the disability label of ASD in North Carolina in 2004 was 5,408. In 2012, that number had more than doubled to 12,717 (North Carolina Department of Public Instruction [NCDPI], 2013). Regardless of the potential reasons for the increase in diagnosis,

the evidence is clear that more students are in public schools today who meet the criteria for the educational label of autism and require specialized services.

Social Skills Impairment of Individuals with ASD

One of the core areas of deficiency for individuals across the spectrum is their ability to understand and use social skills in order to interact successfully and develop age-appropriate relationships with others (Heflin & Alaimo, 2007). Social skills have been found to be the most prominent challenge for students who were diagnosed with what was once described as Asperger's syndrome (DSM-IV-TR, 2001), a form of high functioning ASD, despite their intellectual strengths (Church, Alisanski, and Amanullah, 2000). Students with impaired social skills are more likely to be rejected by peers and teachers and are at a higher risk for negative life outcomes and poor self-esteem as adults than individuals without these deficits (Crick, 1996; Ialongo, Vaden-Kiernan, & Kellam, 1998; Vitaro, Brendgren, Larose, & Tremblay, 2005).

Students with ASD experience a variety of challenges in social interaction. While the specific difficulties vary from child to child, some of the social problems exhibited by individuals across the spectrum include poor joint attention, difficulty initiating and maintaining interactions with peers, problems interpreting verbal and nonverbal social cues, and failure to develop age-appropriate relationships with peers (Church et al., 2000; Heflin & Alaimo, 2007). Students with ASD have also demonstrated difficulty in suggesting multiple alternative solutions when presented with a social problem (Bauminger, Shulman, & Agam, 2003). In addition to these social challenges, problems with expressive and receptive communication skills, behavioral issues, restricted areas of interest and rigidity, and

difficulties with emotional regulation can also impact the ability of individuals with ASD to interact appropriately with others and develop friendships (Church et al., 2000; Heflin & Alaimo, 2007). For example, if a student with ASD engages in aggressive behaviors, only wants to play one type of game, or becomes easily frustrated and either lashes out or withdraws from other students, these behaviors may isolate that student from peers.

Social Skills Impairment versus Interest

The lack of skills to socially engage with peers is not an indication that students with ASD do not want relationships with peers. Bauminger and Kasari (2000) as well as Bauminger et al. (2003) found that students with ASD had higher levels of reported loneliness. In both studies, researchers concluded that the reports of loneliness provided evidence that students with ASD desire interaction and engagement with others. According to these researchers, students with ASD would like to have more satisfying relationships and interactions with their peers, but they lack the skills to develop these relationships (Church et al., 2000; Bauminger & Kasari, 2000; Bauminger et al., 2003).

Strategies for Improving Social Skills

Finding methods to support the social engagement and interactions of students with ASD has been the focus of numerous research studies. As a result, a variety of strategies have been developed to help improve the social interaction skills of students with ASD. Social skills groups (Contugno, 2009), video modeling (Kroeger, Schultz, & Newsom, 2007), visual cues (Ganz & Flores, 2007) and the use of Social Stories (Soenksen & Alper, 2006) are just some of the strategies that have been used successfully to teach students with ASD the skills to interact appropriately with others. One of the limitations of social skills training

for students with ASD is the difficulty these students have in generalizing the skills to natural settings with their peers (McIntosh & MacKay, 2008; Whitaker, 2004). Another related challenge is the lack of reciprocation by peers when students with ASD begin to learn the skills to initiate and interact. One example that highlights this challenge is a study by Sansoti and Powell-Smith (2008) in which students with ASD were taught how to join in with peers. The researchers and teachers observed that when the students were attempting to utilize their newly learned skills, the peers were not responsive to their initiations. The researchers then altered the conditions and elicited the help of peer confederates who were prompted by their teachers to engage in an activity when the target students with ASD asked them to play. This modification enabled the students with ASD to significantly increase their skills of joining in with peers. This study highlights another important technique that has emerged for improving social interaction skills of students with ASD – the use of peer-mediated social skills strategies.

Peer-mediated strategies. Peers have been incorporated into interventions with students with ASD in a variety of ways. In their review of peer-mediated interventions, DiSalvo and Oswald (2002) noted several approaches to utilizing peers in working with students with ASD. Some approaches involve setting up situations in which peers and students with ASD can play together with structure and supports (such as integrated play groups and peer buddies). Some techniques involve training peers to promote social interaction and use of social skills (such as teaching peers to provide reinforcement to children with ASD), and other approaches entail teaching the students with ASD, and sometimes their peers, to initiate interactions in order to increase social opportunities. A

major feature of all of these interventions is that they are designed to change the expectations of peers in some way in order to promote more opportunities for social interaction with the child with ASD. DiSalvo and Oswald suggest that when peers have more positive expectations of students with ASD and the interactions that they could have with these students, then peers are more likely to make an effort to interact with these students.

Using peers as part of the intervention process to support students with ASD has resulted in improved social skills and behaviors of students with ASD in these studies as well as increased peer-initiated social interactions with the target students with ASD (Harper, Symon, & Frea, 2008; Kamps et al., 2002; Kohler, Greteman, Raschke, & Highnam, 2007; Owen-DeSchryver, Carr, Cale, & Blakeley-Smith, 2008; Roeyers, 1996). For example, incorporating peers has been shown to increase the duration of interactions between students with ASD and typical peers (Kamps et al., 2002; Roeyers, 1996), frequency of initiations and social overtures by children with ASD towards peers (Harper et al., 2008; Roeyers, 1996; Kohler et al., 2007; Whitaker, 2004), and frequency of initiations and social overtures of peers towards students with ASD (Kohler et al., 2007; Owen-DeSchryver et al., 2008). Peer mediated interventions have improved the ability of students with ASD to appropriately gain the attention of a peer (Harper et al., 2008; Laushey & Heflin, 2000), look in the direction of the person who is speaking (Laushey & Heflin, 2000), engage in shared play (Whitaker, 2004), and wait for a turn (Laushey & Heflin, 2000). Interventions involving peers have also increased skills such as functional object play (Wolfberg & Schuler, 1993), reciprocal interaction (Harper et al., 2008; Kamps et al., 2002; McGee, Almeida, Sulzer-Azaroff, and Feldman, 1992), on-topic language (Ganz & Flores, 2008; Kamps et al., 2002), use and

amount of social language (Ganz & Flores, 2008; Wolfberg & Schuler, 1993), and overall responsiveness of students with ASD towards their peers (Roeyers, 1996). In addition, Roeyers (1996) found that self-stimulatory behaviors in students with ASD decreased after an intervention with peers, suggesting that the students with ASD were more available for appropriate play.

Barriers to peer-mediated strategies. Evidence suggests peer mediated interventions can be effective, but there are several limitations to consider. First, generalization is an area of concern that is not always measured in studies of peer-mediated interventions (e.g., Kohler et al., 2007; Whitaker, 2004). Some researchers have specifically explored generalization and have observed that children with ASD do not always generalize their skills to untrained peers (e.g., Ganz & Flores, 2008; Kamps et al., 2008). Another concern is the age of participants in these studies. Most studies appear to target pre-school or elementary age students (e.g., Harper et al., 2008; Kohler et al., 2002; Laushey and Heflin, 2000; Owen-DeSchryver et al., 2008; Whitaker, 2004); very few target middle-school age students, for whom social supports may be even more limited (e.g., Ganz & Flores, 2008). Another issue is training delivery and content. In many of these studies, the researchers provided the initial training to peers as well as ongoing monitoring and support during the intervention (e.g., Ganz & Flores, 2008; Harper et al., 2008; Kamps et al., 2002; Laushey and Heflin, 2000; McGee et al., 1992; Owen-DeSchryver et al., 2008). This level of involvement may not be feasible for many classroom teachers, and they may lack the knowledge and experience to implement similar interventions in their classrooms. In addition, the content of the training provided to peers appears highly variable. It sometimes includes information

about disabilities in general or specifically about ASD (Ganz & Flores, 2008; Owen-
DeSchryver et al., 2008; Whitaker, 2004). Sometimes peers are given specific strategies or

materials to use (Ganz & Flores, 2008; Harper et al., 2008; Kamps et al., 2002; Kohler et al.,

2007; McGee et al., 1992; Owen-DeSchryver et al., 2008) and other times peers are given

more general directions about initiating or responding to the child with ASD (Laushey &

Heflin, 2000; Whitaker, 2004). Thus, the essential elements needed to effectively train peers

are unclear. Finally, the focus of these studies has been the skills of target children with

ASD; whether or not untrained peers will improve in their responsiveness to the child with

ASD has not been explored in these studies. The potential usefulness of peer mediated

strategies highlights an important feature of establishing a more socially inclusive

environment, which is having peers who are available and willing to initiate and respond to

students with ASD. It would be valuable for education professionals to determine factors

that would help better understand the behavioral intentions of peers that lead to social

inclusion of students with ASD. One factor that may have a significant impact on the

successful social integration of students with ASD is the attitude and perceptions of peers

towards students with ASD in their classrooms. Peers attitudes may impact their willingness

to interact with a student with autism in their classroom (Campbell, 2007; DiSalvo &

Oswald, 2000).

Attitudes and Behavioral Intentions

From a behavior-analytic perspective, intention is related to behaviors in which a

person engages. Prior intentions, which may be observed in the verbal behavior of an

individual, may influence that individual's actions (Neuman, 2007). Other researchers,

drawing upon the social psychology literature, discuss intention in the context of attitudes. Researchers investigating attitudes have identified affective, behavioral, and cognitive components (i.e., Campbell, 2006). As related to peers' views toward individuals with disabilities, the affective dimension of attitudes involves peers' feelings towards an individual with a disability. The behavioral component of attitudes is reflected in peers' statements of intention, or reported willingness to interact with an individual with a disability. The cognitive aspect of attitudes involves statements of belief about the individual with a disability. The affective and behavioral elements of attitudes appear to be the most commonly studied in peers' attitudes towards individuals with ASD (e.g., Campbell, 2007; Campbell, Ferguson, Herzinger, Jackson, & Marino, 2004; Swaim & Morgan, 2001). Specifically, individuals' behavioral intentions, or willingness to interact with another person, are of primary interest in the current study.

  Attitudes towards individuals with disabilities. Research on attitudes and interactions involving individuals with disabilities in general seems to indicate overall poorer attitudes of typically developing individuals towards people with disabilities. Maras and Brown (2000) determined that peers view students with disabilities as less able and less likable than students without disabilities. Studies have found sex differences – females have demonstrated more positive views than males towards students with disabilities (Rosenbaum, Armstrong, & King, 1988; Townsend, Wilton, & Vakilirad, 1993). One interesting factor that may impact attitudes is social interaction, or social contact, with individuals with disabilities. Rosenbaum et al. (1988) found that more social contact with people with disabilities was correlated with more positive attitudes. This association implies that

increased opportunities in mainstream settings for students with disabilities may contribute to more positive views by peers.

Attitudes towards individuals with ASD. Research on attitudes and interactions specifically involving students with ASD has revealed similar results with some exceptions and inconsistencies. Peers have shown less positive attitudes towards a student with ASD as compared to a typically developing student (Campbell et al., 2004; Swaim & Morgan, 2001). Peers have also shown lower scores on behavioral intentions toward students with ASD (Campbell et al., 2004). Sex differences have also been found in studies involving students with ASD with females demonstrating more positive attitudes than males towards an individual with ASD in a study of middle school students (Campbell, 2007). However, males demonstrated more positive attitudes towards individuals with ASD compared to females in a study of college students (Matthews, Ly, & Goldberg, 2015). Similar to the findings of Rosenbaum et al. (1988), Gardiner and Iarocci (2014) found that quantity and quality of previous social contact with individuals with ASD predicted college students' behavioral intentions to work with individuals with ASD in a volunteer capacity. Nevill and White (2011) also found that college students who had a first-degree relative on the autism spectrum reported higher levels of openness towards working with an individual with autism. However, contrary to the supposition by many researchers (e.g., Rosenbaum et al., 1988, Gardiner & Iarocci, 2014, and Nevill & White, 2011) that more opportunities to interact may help improve peers' views towards students with disabilities, DiSalvo and Oswald (2000) acknowledge that prior experiences of peers with students with ASD in their classes may stigmatize these students in the eyes of their peers. Negative attitudes and expectations may

cause peers to make less effort to interact with students with ASD in their classroom due to peer social stigmatization.

From Attitudes to Interactions

Peers' attitudes towards students with ASD would seem to translate into their social interactions with these students. Freitag and Dunsmuir (2015) found that peers' behavioral intentions towards a child with ASD in a vignette predicted peers' actual self-report of social interaction with a child with ASD in their class. Students with ASD experience lower acceptance, lower reciprocity, lower companionship, and lower social network centrality than typically developing peers (Chamberlain, Kasari, & Rotheram-Fuller, 2006; Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Symes and Humphrey (2010) compared a group of students with ASD to a group of students with dyslexia and a control group of typically developing children. They found that the group of students with ASD experienced more social rejection and less acceptance than both the group of students with a different special education disability (dyslexia) and typically developing students. In addition, the students with ASD reported higher rates of bullying and lower levels of social support from classmates. Students with ASD tend to have more isolated or peripheral connections to peers (Locke, Ishijima, Kasari, & London, 2010). Students with ASD also experience more social inclusion in earlier grades as compared to later grades. The reason for these observed age differences is not clear but researchers speculate that age differences may be related to social development (Rotheram-Fuller et al., 2010).

Attribution Theory in Regard to Disabilities

Campbell et al. (2004) and Corrigan (2000) have discussed the concept of attribution theory as it relates to people's attitudes towards individuals with disabilities. Attribution theory provides an explanation of people's motivation and emotion based on their need to explain the causes of events. When people perceive that an individual does or does not have control over his or her behavior, this perception affects people's attitudes and behavioral responses toward that individual. As applied to individuals with disabilities, this theory leads researchers to predict that peers who believe that a person's behaviors are a part of a disability and thus not under that person's control will have more sympathy and be more willing to provide social support to that person (Campbell et al., 2004; Swaim & Morgan, 2001). The figure below, adapted from the work of Corrigan (2000), demonstrates this concept:

```
                    ┌─────────────────┐      ┌──────────────┐      ┌──────────────────┐
                    │ Symptoms are    │ →    │ Positive     │ →    │ Positive         │
                    │ Uncontrollable  │      │ Affective    │      │ Behavioral       │
                    │ -> Not          │      │ Response     │      │ Reaction         │
                    │ Responsible     │      │ (Sympathy)   │      │ (Helping         │
┌──────────────┐    └─────────────────┘      └──────────────┘      │ Behavior)        │
│ Person with  │ →                                                 └──────────────────┘
│ Disability   │ →  ┌─────────────────┐      ┌──────────────┐      ┌──────────────────┐
└──────────────┘    │ Symptoms are    │ →    │ Negative     │ →    │ Negative         │
                    │ Controllable -> │      │ Affective    │      │ Behavioral       │
                    │ Responsible     │      │ Response     │      │ Reaction         │
                    │                 │      │ (Anger)      │      │ (Punishing       │
                    └─────────────────┘      └──────────────┘      │ Behavior)        │
                                                                   └──────────────────┘
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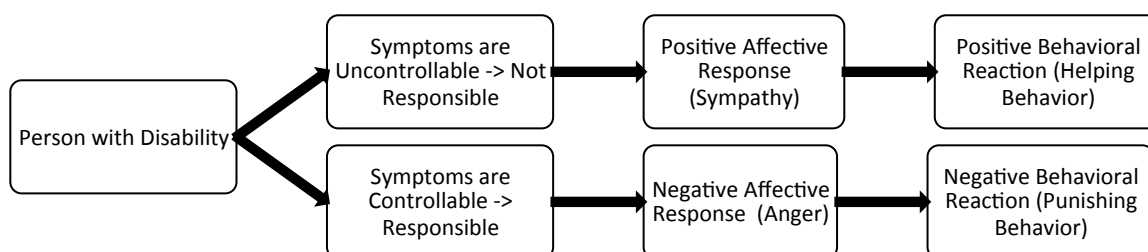
Figure 1. Attribution theory applied to perceptions of individuals with disabilities

Investigating Attitudes and Behavioral Intentions

Investigating peer attitudes towards children with ASD in real-world settings presents various challenges; in particular, the unique aspects of an individual's personality and prior

experience with participants are potentially confounding variables that are difficult to control. This issue has likely led most researchers to utilize written or videotaped vignettes in order to present a realistic but fictional representation of an individual with a particular disability or set of characteristics that can be controlled. It also enables an exploration of whether or not participants can make subtle distinctions between behavioral manifestations of a disorder such as ASD. Several studies have incorporated this design in order to investigate people's attitudes and perceptions of others (e.g., Campbell, 2007; Campbell et al., 2004; Chambres, Auxiette, Vansingle, & Gil, 2008; Jastrowski, Berlith, Sato, and Davies, 2007; Morton & Campbell, 2008).

Addressing the Autism Spectrum in Attitude Research

One issue that does not seem well represented in the current body of research on peers' attitudes toward individuals with ASD is the actual *spectrum* of ASD. Stephen Shore, a well-known adult with ASD who also works professionally in the field, is famously credited as saying "If you have met one person with autism, you have met one person with autism" (Kurtz & Jordan, 2008, p.1). This sentiment epitomizes the diversity of the type and severity of social communication and behavioral characteristics exhibited by individuals diagnosed with ASD. These characteristics occur along a continuum and can lead to very different presentations of symptoms across children. However, the current studies investigating peers attitudes towards a hypothetical individual with ASD do not seem to address this diversity. Most studies only describe a videotape of one child demonstrating some of the stereotypical behavioral characteristics such as hand-flapping, rocking, limited eye contact, and echolalia (e.g., Swaim & Morgan, 2001). It seems feasible that peers may have different perceptions

of students who display more classic characteristics of ASD as compared to students who have less visible symptoms. Many students with forms of high functioning ASD may have characteristics that are less discernible to their peers. As related to attribution theory and controllability, one conclusion may be that students with less visible characteristics of ASD may be perceived as more in control of their behaviors, which may result in more negative attitudes and behavioral intentions by peers.

Peer Ratings of Observed Behaviors

Another related aspect of peer perceptions is whether or not peers possess the observational skills to differentiate characteristics of ASD in students they observe. This area of inquiry does not appear present in the current literature related to peers and students with ASD. Peers' ability to discriminate between a typical student and students demonstrating characteristics of ASD with varying levels of severity may be relevant to their perceptions and views towards students with ASD. Further, peers' ability to differentially rate the observed behaviors of pictured students in a vignette would also lend support to the effectiveness of the vignette in portraying distinct characteristics.

Introduction Summary

Students with ASD struggle with social interaction skills, and effective social skills are important for successful functioning and positive life outcomes (Crick, 1996; Ialongo et al., 1998; Vitaro et al., 2005). One critical aspect of developing effective social interactions is having a responsive partner with whom to engage, but explicit strategies and other important factors related to enhancing appropriate responses from peers are not well understood. Peer attitudes, and specifically one aspect of attitudes – behavioral intentions –

may be one important factor in determining whether or not peers will positively respond to students with ASD (e.g., Freitag & Dunsmuir, 2015). Research suggests that peers demonstrate more negative attitudes towards a student with ASD as compared to a typically developing peer (Campbell et al., 2004; Swaim & Morgan, 2001). However, it is unclear whether or not peers attitudes may vary depending upon the level of functioning of students with ASD, or if peers are even capable of discriminating between varying levels of behavioral characteristics they observe in such students. Attribution theory leads some researchers to predict that when people believe an individual's behavior is due to a disability and not under that individual's control, people may have more positive views towards that individual (Campbell et al., 2004; Swaim & Morgan, 2001). Thus, it may be that milder forms of ASD, with more subtle symptoms, would be associated with more negative perceptions by peers.

Purpose and Hypotheses

The purpose of this study is to examine the attitudes – specifically, behavioral intentions – of peer participants towards a target student with ASD depicted in a video vignette. In particular, this study will investigate if different presentations of characteristics of ASD yield different perceptions by peers. The hypotheses are as follows:

1. Overall, it is predicted that participants will demonstrate less behavioral intention towards social activities with students displaying characteristics of ASD than a typical student

2. It is also predicted that participants will demonstrate different behavioral intention towards social activities with a student depicting a milder form of ASD as compared to the student with more severe characteristics.

3. Finally, it is predicted that participants will be able to discriminate between the behavioral characteristics demonstrated by the actor in the vignette on an adapted standardized measure of ASD, the *Childhood Autism Rating Scale*.

Method

Participants and Sampling Procedures

A total of 71 middle school students were recruited to participate in this study. A sample size of 70 was desired, based on power analysis for a one-way analysis of variance with three groups of students with an alpha set at .05, and power set at .80 (G-power; Faul, Erdfelder, Lang, & Buchner, 2007). Participants were recruited from two middle schools in a small town (with a population of less than 10,000) in a Southeastern state. The principal investigator initially contacted the principal at each school to give a brief overview of the purpose of the study and to obtain permission to initiate recruitment efforts in the school. Approval from the school district was also obtained. Classrooms that included a student currently identified with ASD were excluded from participation. The principal investigator then contacted teachers to establish an appropriate plan to share information about the study and invite students to participate. The study was described to potential participants as an opportunity to learn more about how middle school students make friends and interact with others. Students were given consent forms to take home to their parents and the principal

investigator worked with classroom teachers to make a plan to collect consent forms and remind students who wanted to participate to bring back their forms.

Measures

        Childhood Autism Rating Scale (CARS; modified). A modified version of the Childhood Autism Rating Scale (CARS) was created for peers to rate observed behaviors of the target student on the video. The CARS was developed to assess behavioral characteristics that may be indicative of an autism spectrum disorder and help distinguish between children with mild, moderate, and severe forms of autism. The original measure was designed for parents, caregivers, or professionals to rate autistic behaviors of a student of concern. Fifteen items are rated on a scale of 1 (within normal limits for that age) to 4 (severely abnormal for that age). A total score is then calculated by summing the total ratings, which can range from 15 to 60. In the manual, it is reported that the overall percentage of agreement between the CARS and clinical diagnosis of ASD was 87% using a CARS cutoff of 30. For individual CARS items, mean interrater reliability between two trained raters was .71 (Schopler, Reichler, & Renner, 1988). For the purposes of this study, the measure was slightly modified to contain more student-friendly language appropriate to the age of the participants and to eliminate items that were not characteristics that the participants would be able to evaluate in the videos that they observed (including items related to imitation, fear or nervousness, intellectual response, and a rating of general impressions related to autism). This modified measure was used as a way to support internal validity of the study as well as to establish whether or not students were able to identify and distinguish the presence of various behaviors relevant to ASD. For this modified version, the

total score was compared to the normative scores but prorated given the alterations of the

original scale by dividing the numbers of remaining items by the original number of items

and multiplying the score by that number. Participants' ratings were expected to reflect the

levels of displayed impairment by the target student in the different videotaped conditions,

with higher ratings given by participants viewing the video of the peer with more severe

behaviors. With this modified rating scale, a score of 11-21 would be in the non-ASD range,

greater than 21 up to 26 would be in the mild to moderate ASD range, and from 27 to 44

would be in the severe ASD range. Cronbach's alpha for the modified CARS was .92, which

suggests strong internal consistency. See the modified CARS in the Appendix.

Shared Activities Questionnaire (SAQ). The Shared Activities Questionnaire

(SAQ) was designed to assess the behavioral intentions of individuals; that is, whether or not

an individual is willing to participate in certain activities with the target child. The SAQ

includes 24 items, estimated to be at the second to third grade reading level, that address

three domains: General Social, Academic, and Active Recreational. The items are expressed

as statements about an activity in which one could participate with another person. Raters

indicate their willingness to engage in each activity by selecting a number on a scale from 1

to 3. These numbers correspond with happy, neutral, or frowning faces. This scale was

modified by Campbell (2008) to include ratings of 1 through 5, which read: No, Definitely

Not (1), Probably Not (2), Maybe (3), Probably (4), and Yes, Definitely (5). The additional

ratings were incorporated to increase the variability of responses. This modified scale was

used for the present study. Factorial validity was established with elementary school students

(Morgan et al., 1996). The SAQ has been used to examine the behavioral intentions of

students towards several areas of disability, including autism. Strong internal consistency reliability has been found across groups, with Cronbach's alpha exceeding .80 for total scores as well as factor scores for most samples. Campbell (2008) determined that the SAQ was a reliable and valid measure of middle school students' behavioral intentions toward autism, with Cronbach's alpha of .97 for the total score, .92 for the Social Domain score, .92 for the Academic Domain score, and .94 for the Recreational Domain score. A confirmatory factor analysis of the questionnaire's three-factor model indicates that the three-factor structure is a stronger fit than a simple one-factor model. Factor loadings for each of the items within their established domain range from .72 to .83. Cronbach's alpha for the total SAQ was .96, suggesting that the SAQ had exceptional internal consistency. Cronbach's alpha was .90 for the Social Domain, .89 for the Academic Domain, and .93 for the Recreational Domain, which suggests strong internal consistency for the domains of the measure as well. See a copy of the SAQ in the Appendix on page 26.

Videotaped vignettes. Three videotaped vignettes were created for use in this study. The scripts of these vignettes were adapted and expanded from the script used by Campbell (2007). These vignettes were designed to depict a middle school age student in a brief interaction with an adult. Two main conditions were originally developed for use in Campbell's study – a condition depicting a child with ASD and a condition depicting a typically developing child. The ASD condition included a student presenting with classic signs of autism, including lack of eye contact, repetitive motor movements, and echolalia. A third condition was developed for this study in order to depict a student with a high functioning form of ASD, including odd/atypical quality to speech (more formal speech with

robotic-like quality), perseveration on topics, and difficulty taking the perspective of others.

A second scene was added to the script to include interaction with a peer; the added

interactions provide an opportunity for multiple aspects of ASD symptomology to be

displayed. The same actors and settings were used in all three versions of the videos created

for this study. Both actors were white males who appeared to be middle school age. The

scripts that were used in this study can be found in Appendix A. The completed videos for

this study were shared with two professionals in the field of autism, including a parent of a

child with high functioning ASD and a parent of a child with more classic features of ASD,

to confirm whether or not the vignettes provide an appropriate depiction of the three desired

conditions – a child presenting with typically developing characteristics (TD), a child

presenting with ASD (AU), and a child presenting with high functioning ASD (HFA). See

the draft script for this video in the Appendix on page 29 as well as a chart outlining target

areas from the script and how they related to the modified CARS (page 34).

Know someone with ASD. An additional variable of knowing someone with autism

(rated as "yes" or "no" response by participants) was also collected for analysis based on

previous research suggesting that prior experience with individuals with an individual with

ASD may impact individuals' willingness to interact with other individuals with ASD. The

question, "Do you know someone with autism?" was presented in a written format on a

separate sheet of paper that was provided to participants for them to answer after all other

information had been completed.

Procedure

Each classroom of participants was assigned in sequential order to one of the three conditions – TD, AU, and HFA – as each classroom was scheduled. This order was altered for the last few participating classrooms in order to maintain relatively equal numbers of participants in each condition. The principal investigator met with participants in each classroom during a time requested by the classroom teacher, and the classroom teacher made alternative arrangements for non-participating students. Participants were told to think of the subject in the video as a student who could be coming to their school. The video was then played for participants. An initial voiceover in the video shared brief information about the target child in the video; the information provided was the same in each video.   After the video concluded, students were given a brief demographic questionnaire along with the SAQ and the modified CARS to complete. All directions and items were read aloud to the group. The SAQ was handed out and administered prior to the modified CARS to avoid any bias the adapted CARS might have on participants' expressed behavioral intentions. After completion of all measures, participants were given a sheet of paper with a single question, "do you know someone with autism;" participants answered this question by circling 'yes' or 'no.'

To preserve confidentiality of participants, no participant names were collected. Each questionnaire packet was given an alpha-numeric identifier. The demographic information collected included age, grade, race, and sex.

Research Design

The research design for this study was a quasi-experimental design. As described previously, each classroom was initially assigned in sequential order to one of the three conditions. A count of total participants within each condition was maintained as each classroom was assigned to a condition, and the order of assignment was altered in order to maintain relatively equal numbers of participants in each group. Participants were unaware of the separate conditions.

A chi-square analysis was conducted to determine if any significant differences existed among participants in the three conditions. No significant difference in race or sex across conditions was observed. A significant difference in grade by condition was observed (i.e., not all grades were represented in all conditions); thus, grade was not included in the final analysis, because it was dependent by condition. In order to explore any differences in the three groups of participants – TD, AU, and HFA – in their behavioral intentions toward the target student, a one-way between groups ANOVA was conducted. For this analysis, the dependent variable was SAQ ratings and the independent variable was condition (TD, AU, or HFA). Because sex differences were expected, a follow-up analysis of sex differences overall in behavioral intentions was also conducted using a one-way ANOVA (with SAQ total scores as the dependent variable and sex as the independent variable). An additional analysis was conducted to explore participants' ratings of observed behaviors using the CARS using a one-way between groups ANOVA. The dependent variable was the CARS ratings, and the independent variable was condition. This analysis also served as a support for the internal validity of the study. That is, if participants did not

observe any differences in behaviors across the three conditions, then the videos may have not been effective in capturing distinct portrayals of typical behavior or levels of ASD symptomology by the actor in the video.

Finally, prior experience with someone with ASD was potentially an extraneous variable that may impact participants' ratings of behaviors and willingness to engage in social activities with the pictured student, so information about this variable was collected and incorporated into follow-up analyses. A two-way between groups ANOVA was conducted with condition and knowing someone with ASD as the dependent variables; the modified CARS was the independent variable in one analysis and the SAQ was the independent variable in another analysis.

Results

Seventy-one participants from general education classroom settings participated in this study. Visual inspection of scatterplot data revealed one outlier in the data, which was removed prior to analysis, resulting in a total of 70 participants in the final analysis. Twenty-two participants were in the AU group, 24 in the HFA group, and 24 in the TD group. Table 1 provides additional information about participant characteristics, and Table 2 displays more detailed information about participants across each condition. A total of eight classes participated in the study; however, due to uneven and sometimes small numbers of students in each class, class was not used as a variable. In addition, two grade levels (sixth and eighth) were only represented in two of the three conditions. A chi-square analysis, as expected, revealed significant differences in grade level across condition; thus, grade level was not used as a variable in the analysis. Finally, due to an unequal distribution of sex in

each condition, sex was only analyzed as a main effect (and not within each condition). The skewness of the distribution of scores was conducted on the SAQ ratings and the modified CARS ratings. Both scales showed a relatively normal distribution with no violation of the assumption of normality.

Behavioral Intentions: Analysis of SAQ

      Ratings across conditions. A one-way independent analysis of variance (ANOVA) was conducted to determine if there were differences among the three groups of participants (TD, AU, and HFA) in their ratings on the SAQ. Results indicated that there was a significant main effect of condition on students' ratings on the SAQ, $F(2,67) = 8.81$, $p < .001$, $\eta^2 = 21$ (See Table 4). On average, participants in the AU condition showed the highest SAQ ratings ($M = 80.27$, $SD = 18.1$), participants in the TD condition showed the next highest SAQ ratings ($M = 73.67$, $SD = 22.03$), and participants in the HFA condition showed the lowest SAQ ratings ($M = 58.08$, $SD = 14.64$). See Table 3 for a list of means and standard deviations for ratings across conditions and Figure 2 for a depiction of average SAQ ratings across condition. Post hoc analysis indicated that the AU ($p < .01$) and TD ($p < .001$) conditions were significantly different from the HFA condition, with higher ratings on the SAQ in the TD and AU conditions than the HFA condition; the AU and TD conditions were not different from each other. The average rating on the SAQ for participants was 3.34 (between "maybe" and "probably" willing to engage in interactive activities on average) in the AU condition, 3.07 ("maybe" willing to engage in interactive activities) in the TD condition, and 2.42 (between "probably not" and "maybe" willing to engage in interactive activities) in the HFA condition.

A follow-up analysis using a multivariate analysis of variance (MANOVA) was conducted to explore any differences across the conditions within the three domains of the SAQ. Results revealed a significant main effect for condition, $F(3,132) = 3.99$, $p = .001$, $\eta^2 = .15$. Univariate ANOVA's showed significant differences in condition on ratings of activities in the Social domain ($p < .001$), the Recreational domain ($p < .001$), and Academic domain ($p = .01$). Levene's test of equality of variance was significant at the .027 level for the Recreational Domain, so post hoc analysis was conducted using Games-Howell for this domain. Again, post-hoc analysis revealed a similar pattern of ratings overall, with significantly higher ratings in the AU and TD condition as compared to the HFA condition in both the Social and Academic Domains ($p < .01$). However, only the AU condition was significantly higher than the HFA condition in the Recreational Domain ($p < .001$); the TD condition was not significantly greater than the HFA condition ($p > .05$). See Table 3 for means and standard deviations of each domain across the three conditions.

Sex differences overall. An additional one-way ANOVA was conducted to explore any sex differences in behavioral intentions. This variable was explored separately due to too few participants in each condition. A main effect of sex was observed by the participants' SAQ ratings, $F(1,68) = 5.64$, $p = .02$, $\eta^2 = .07$ (See Table 4). Males reported significantly higher ratings ($M = 77.73$, $SD = 20.39$) than females ($M = 66.07$, $SD = 19.52$). The average rating of males was 3.24 (between "maybe" and "probably" willing to engage in each activity), whereas for females it was 2.75 (between "probably not" and "maybe" willing).

To further explore these sex differences, a MANOVA was conducted to explore sex differences within the three domains of the SAQ – Social, Academic, and Recreational. Results revealed a significant main effect for sex, $F(3,66) = 4.35$, $p = .007$, $\eta^2 = .17$. Follow-up univariate ANOVA's revealed significant sex differences on ratings of activities in the Recreational domain ($p < .01$); the Social domain approached significance ($p = .055$), but the Academic domain did not ($p > .05$). The Recreational domain contains items such as asking the target individual to go to an amusement park, go out to dinner, or go shopping at a store. The Social domain includes items such as asking the target individual to come over to one's house, sharing games or books with the target individual, eating lunch with the individual, or walking in the hall at school with that individual. Items in the Academic domain address academic activities, such as working in the school library with the target individual, working on a science project with that individual, or studying for a test with that individual at school.

Observed Behaviors of the Target Child in the Video: Analysis of Modified CARS

Ratings across conditions. A one-way independent ANOVA was also conducted to determine if there were differences among the three groups of participants (TD, AU, and HFA) in their ratings of observed behaviors of the target child in the video using the modified CARS. Results indicate a significant effect of condition on participants' ratings, $F(2,67) = 88.82$, $p < .001$, $\eta^2 = .73$ (See Table 4). On average, participants in the AU condition indicated the highest ratings on the modified CARS ($M = 28.18$, $SD = 4.57$), participants in the HFA condition indicated the next highest ratings ($M = 24.67$, $SD = 5.11$), and participants in the TD condition indicated the lowest ratings ($M = 12.83$, $SD = 2.10$). See Figure 3 for average ratings across condition and Table 3 for means and standard deviations

across condition and other variables. Levene's test of equality of variance was significant at the .004 level, so post hoc analysis using Games-Howell was conducted. Results indicate that all three conditions (AU, HFA, and TD) were significantly different from one another (AU compared to HFA, $p < .05$; AU compared to TD, $p < .001$; HFA compared to TD, $p < .001$). Participants' ratings indicated they observed the most unusual behaviors in the target student displaying characteristics of ASD in the video, some unusual behaviors in the target student displaying characteristics of high functioning ASD, and the fewest unusual behaviors in the target student who was portraying a typically developing individual. Based on the prorated score ranges for the modified CARS, the average rating for the AU condition fell within the *severe* range of autism, the average rating for the HFA condition fell within the *mild to moderate* range, and the average rating for the TD condition fell within the *typical* range.

   Sex differences. A one-way ANOVA was also conducted to explore any sex differences in participants' ratings on the modified CARS. No main effect of sex was observed, $F(1,68) = 0.66$, $p = .419$, $\eta^2 = .01$ (See Table 4). On average, ratings indicated both males and females observed similar levels of behaviors indicative of ASD in the video.

Knowledge of Autism

   Most of the students (77%) indicated that they did know someone with autism. A two-way ANOVA was conducted using both knowledge of someone with ASD and condition as the independent variables and the SAQ as the dependent measure. Only a main effect of condition was observed, $F(2,64) = 4.65$, $p = .013$, $\eta^2 = .13$ (See Table 4 for all univariate

results). The main effect of knowing someone with ASD and the interaction between

knowing someone and condition was not statistically significant.

A two-way ANOVA was also conducted using both knowledge of someone with

ASD and condition as independent variables and modified CARS ratings as the dependent

measure. Again, only a main effect of condition was observed, F (2, 64) = 62.47, $p < .001$,

$\eta^2 = .66$. The main effect of knowing someone with ASD and the interaction between

knowing someone with ASD did not significantly differentiate ratings on the modified CARS

(See Table 4 for all univariate results).

Discussion

The results of this study provide some interesting information about middle school

students' observations of and willingness to interact with a peer displaying varying

behavioral characteristics indicative of high functioning or more severe ASD. Analysis of

the modified CARS provides two insights. First, results suggest that the video successfully

differentiated across the three versions with the same individual displaying three different

constellations of behaviors. Second, the ratings of participants in the three conditions

suggest that middle school students are capable of observing other children, discriminating

between the behaviors they observe, and reasonably reporting about those observed

behaviors. Not only were participants in this study able to distinguish between the more

overt characteristics of the child demonstrating more severe characteristics of ASD and the

typically developing child, but they were also able to note the more subtle behaviors of the

child displaying characteristics of high functioning ASD and differentially rate those

behaviors at a level between the more severe and typically developing presentations.

Participants were able to make these observations after a relatively brief observation of less than four minutes, suggesting that middle school students may have keen insights into behaviors of others and how unusual another student may be from the norm. Further, knowing someone with ASD did not appear to impact participants' ability to observe and rate these behaviors.

Perhaps even more interesting is that participants' ratings did not directly translate into their behavioral intentions as measured by the SAQ. That is, just because students aptly rated the more unusual behaviors of the child demonstrating more severe characteristics of ASD, they did not report less willingness to interact with this child. In fact, participants were just as willing to interact with the student in the AU condition as the student in the TD condition (on average, reporting that they were "maybe" to "probably" willing to interact with this student). This is contrary to what Swaim and Morgan (2001) observed with both third and sixth grade participants in their study. These researchers found that peers demonstrated significantly less willingness to interact with a student displaying more moderate to severe signs of ASD as compared to a typically developing student. Further, in the present study, whether or not peers reported knowing someone with autism did not appear to impact their ratings. These results suggest that despite being aware of a peer who displays unusual behaviors, middle school students may be more willing to socially engage with that peer than we might expect in some circumstances.

Where participants did express divergent behavioral intentions is towards the student displaying characteristics of high functioning ASD. Peers' behavioral intentions were significantly lower towards the student in the HFA condition. These results could be

explained by attribution theory and controllability (e.g., Campbell et al., 2004; Corrigan, 2000); that is, it may be that peers viewed the student more negatively when they observed somewhat unusual behaviors but behaviors that may not have met a threshold for an observed disability. Participants may have concluded that the student should be better able to control his behaviors, leading to a more negative view towards the student overall and subsequent poorer ratings of behavioral intentions towards that student.

This finding has potential implications for interventions involving students with ASD and their peers. Students with high functioning ASD may be particularly vulnerable in their ability to develop positive interactions with peers because peers may have poor perceptions of those students and be less willing to interact with them. Interventions that focus on building positive associations with individuals with ASD may help peers be more receptive to interactions with these students. While behavioral interventions that target improvement of specific behaviors and social skills of the student with ASD are still likely to be beneficial, another consideration might be an intervention package that pairs behavioral interventions for the student with ASD with components that are aimed at enhancing peers' attitudes and willingness to interact with these students. These findings also highlight the importance of considering the spectrum of autism in developing interventions involving peers. In particular, the essential components of peer training might differ depending on whether or not the student with ASD is high functioning or has more moderate to severe characteristics. Intervention components that are designed to change peers' attitudes and willingness to interact with students with ASD may be more effective and necessary for peers of students with high functioning ASD specifically.

Significant differences in peers' willingness to interact with the pictured student were observed across a variety of activities in both social and academic domains. For example, peers reported more willingness to engage in activities such as going to a birthday party and walking in the hall at school with the student with moderate to severe ASD and the typically developing student than with the student with high functioning ASD. These results suggest that students with high functioning ASD may experience difficulties with peers in both academic and social contexts. Thus, interventions that target increasing engagement in multiple activities and settings may be beneficial. Interestingly, peers were not significantly more willing to engage with the student in the TD condition than the HFA condition in activities within the recreational domain overall, though they were more willing to engage with the student in the AU condition in this domain. This lack of significant difference may have been impacted by differences observed between females' and males' reported willingness to engage in activities within this domain, but limitations in the sample prevented further analysis of both sex and condition in this area.

One unexpected result in this study is that, overall, females reported significantly less willingness to interact with the target student than males. Several previous articles have reported more positive attitudes for females than for males towards individuals with disabilities (i.e., Campbell, 2007; Rosenbaum, Armstrong, & King, 1988; Townsend, Wilton, & Vakilirad, 1993). Unfortunately, differences in ratings within each condition could not be further analyzed due to small and uneven numbers of participants of each sex within each condition. However, ratings within each of the domains of the SAQ were further analyzed and revealed some interesting differences. Females were only less willing to engage in

activities in the social and recreational domains, but they were just as willing as males to engage with the target peer in activities in the academic domain. It may be that a female expressing willingness to engage in social and recreational activities with a male carries a different social meaning at the middle school age. Those types of activities could potentially have different implications for students at this age who are entering adolescence. That is, asking a female student if she is interested in going out to dinner or to a movie with the unknown male student pictured in the video may suggest interest in a less platonic relationship. Thus, female participants may have been less likely to express willingness to engage in these kinds of activities. A potential consideration related to these results may be in selection of peers for social interventions for students with ASD. For students with high functioning ASD, educators may want to consider the gender of students selected for peer-mediated intervention and to be cautious in making peer selections. However, more information about how peers' reported willingness to interact might impact their participation in an intervention would be valuable in aiding these decisions.

Limitations

One limitation of this study is that it only examines participants' reported willingness to engage with the pictured student, but not their actual engagement. It is possible that, due to the tendency many people have to provide socially desirable answers, participants may have expressed a willingness to interact with the child even though they would not actually be willing to engage in each of those activities with the child. However, even if participants felt pressure to respond in a more socially desirable way, it is still interesting that they reported more willingness to engage with the student in AU and TD conditions than in the

HFA condition. This still suggests that, for some reason, participants did not feel the same social pressure to report that they would interact with this child at a level commensurate with the participants in the other conditions. Again, this lends credence to the attribution theory and idea of controllability (e.g., Campbell et al., 2004; Corrigan, 2000) – it is possible that participants viewed this student as being in more control of his behaviors and therefore felt less social pressure to say they would engage with him.

Another limitation of this study is the way participants were grouped. Random assignment to conditions would possibly have yielded a more even distribution of participants across more variables and enabled further investigation into characteristics. However, this would have likely made scheduling the study at times that would not interfere with regular classroom instruction much more challenging (which was a major reason this method was not selected). Grouping participants by classroom led to a much more uneven division of participants across several variables. Too few to no participants in each condition prevented a more in depth analysis of responses. Investigating variables such as sex, grade, and even classroom may have provided additional insights into peers' perceptions of the target child in each condition. In addition, a larger sample size overall would assist in controlling for other variables that may impact peers' ratings.

A final limitation is imposed by the subject matter of the study – ASD – and the diverse nature of this disorder. The autism spectrum, by definition, involves individuals who demonstrate a wide spectrum of potential characteristics in their behavior and social communication. The videos created for this study depict two children with characteristics common to many individuals with ASD. However, these are just two children who cannot

fully represent all individuals with ASD. Further, there may have been specific aspects of the characteristics and/or situations selected for the vignettes that may have had more of an impact on participants' ratings than others. This diversity makes it more challenging to generalize the results to all individuals with ASD. There may be certain behaviors that are less appealing or more aversive to peers and other behaviors that are less problematic.

Future Directions

This study is the first to examine differences in peer perceptions of students with ASD across two different presentations of ASD as well as peers' ability to accurately rate observed behaviors related to ASD. Results suggest that peers may have different attitudes (as expressed through their behavioral intentions) towards students with ASD depending on the severity of symptoms. Limitations in the current study prevented further analysis of peer characteristics; thus, future studies may be useful in identifying any peer characteristics that may impact behavioral intentions. More specific details about prior experience with ASD may also be useful to explore, as the category of *knowing someone with autism* used in this study was quite broad. For example, having a family member with ASD may lead to different experiences and perceptions than a classmate, a friend, or an acquaintance; prior positive versus negative interactions may also play a role in perceptions and attitudes. In addition, investigation of details such as classroom or school variables may provide additional insight into other factors that might influence peer perceptions.

Another future direction based on these results would be to investigate interventions that might assist in improving peer perceptions of students with ASD. If peers have poorer perceptions of students with ASD whose characteristics are subtler, one question may be

whether or not a better understanding of ASD may help change peers' perceptions, and thus, their willingness to interact with these students. In addition, these results may be useful in identifying important elements of training and education related to other peer-based interventions for students with ASD. Training for peers who will be interacting with students with more moderate to severe ASD as compared to training for peers who will be interacting with students with high functioning ASD may not necessarily include the same essential features. Training for peers who will be working with students with high functioning ASD may be enhanced by including education and activities that target peers' attitudes or understanding of ASD in addition to any strategies for interacting or engaging with the student with ASD.

While attribution theory and controllability (e.g., Campbell et al., 2004; Corrigan, 2000) may help to explain differences in peer ratings, this may not be the only explanation or the only tool to guide how interventions might improve peers' responsiveness to students with ASD. Improving peers' understanding of ASD and its impact on behaviors and functioning of students with this disorder may be valuable, but other strategies may also be considered to improve peers' willingness to interact with these students. Peers may need to learn techniques to assist them to initiate and maintain interactions with students with ASD, to engage students with ASD in multiple activities and contexts, and to respond to the various unique behaviors of students with ASD. Future research that explores specific strategies to improve peers' willingness to interact with students with ASD is critical to assist educators in supporting students with ASD and creating more inclusive climates.

References

Baker, J. (2005). *Preparing for life: The complete guide for transitioning to adulthood for those with Autism and Asperger's Syndrome.* Arlington, TX: Future Horizons.

Bauminger, N. & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development, 71*(2), 447-456.

Bauminger, N., Shulman, C., & Agam, G. (2003). Peer interaction and loneliness in high-functioning children with autism. *Journal of Autism and Developmental Disorders, 33*(5), 489-507.

Campbell, J. M. (2006). Changing children's attitudes toward Autism: A process of persuasive communication. *Journal of Developmental and Physical Disabilities, 18*(3), 251-272.

Campbell, J. M. (2007). Middle school students' response to the self-introduction of a student with ASD: Effects of perceived similarity, prior awareness, and educational message, *Remedial and Special Education, 28*(3), 163-173.

Campbell, J. M. (2008). Brief report: Reliability and validity of the Shared Activities Questionnaire as a measure of middle school students' attitudes toward autism. *Journal of Autism and Developmental Disorders, 38*, 1598-1604.

Campbell, J. M. & Barger, B. D. (2011). Middle school students' knowledge of autism. *Journal of Autism and Developmental Disorders, 41*(6), 732-740.

Campbell, J. M., Ferguson, J. E., Herzinger, C. V., Jackson, J. N., & Marino, C. A. (2004). Combined descriptive and explanatory information improves peers' perceptions of autism. *Research in Developmental Disabilities, 25*, 321-339.

Centers for Disease Control and Prevention. (2015). Autism Spectrum Disorders: Data and

Statistics. Retrieved May 1, 2015 from http://www.cdc.gov/ncbddd/ASD/ data.html

Church, C., Alisanski, S., & Amanullah, S. (2000) The social, behavioral, and academic

experiences of children with Asperger Syndrome. *Focus on Autism and Other*

Developmental Disabilities, 15(1), 12-20.

Contugno, A. J. (2009). Social competence and social skills training and intervention for

children with ASD spectrum disorders. *Journal of Autism and Developmental*

Disorders, 39, 1268-1277.

Corrigan, P. W. (2000). Mental health stigma as social attribution: Implications for research

methods and attitude change. *Clinical Psychology: Science and Practice, 7*(1), 48-67.

Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial

behavior in the prediction of children's future adjustment. *Child Development, 67*,

2317-2327.

DiSalvo, C. A. & Oswald, D. P. (2002). Peer-mediated interventions to increase the social

interaction of children with autism: Consideration of peer expectancies. *Focus on*

Autism and Other Developmental Disabiltiies, 17(4), 198-207.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical

power analysis program for the social, behavioral, and biomedical sciences. *Behavior*

Research Methods, 39(2), 175-191.

Freitag, S. & Dunsmuir, S. (2015). The inclusion of children with ASD: Using the Theory of

Planned Behavior as a theoretical framework to explore peer attitudes. *International*

Journal of Disability, Development, and Education, 62(4), 405-421.

Ganz & Flores, M. M. (2008). Effect of the use of visual strategies in play groups for

children with autism spectrum disorders and their peers. *Journal of Autism and*

Developmental Disorders, 38, 926-940.

Gardiner, E. & Iarocci, G. (2014). Students with autism spectrum disorder in the university

context: peer acceptance predicts intention to volunteer. *Journal of Autism and*

Developmental Disorders, (44), 1008-1017.

Gray, C. (2002) *The sixth sense II.* Arlington, TX: Future Horizons.

Harper, C. B., Symon, J., & Frea, W. (2008). Recess is time-in: Using peers to improve

social skills of children with autism. *Journal of Autism and Developmental Disorders,*

38, 815-826.

Heflin, L. J. & Alaimo, D. F. (2007). *Students with autism spectrum disorders.* Upper Saddle

River, NJ: Pearson Education.

Ialongo, N. S., Vaden-Kiernan, N., & Kellam, S. (1998) Early peer rejection and aggression:

longitudinal relations with adolescent behavior. *Journal of Developmental and*

Physical Disabilities, 10(2), 199-213.

Jacobs, S., Decker, D. M., & Hartshorne, T. S. (2011). *Ethics and law for school*

psychologists. Hoboken, NJ: John Wiley & Sons, Inc.

Kamps, D., Royer, J., Dugan, E., Kravits, T., Gonzalez-Lopez, A., Garcia, J., … Kane, L. G.

(2002). Peer training to facilitate social interaction for elementary students with

autism and their peers. *Exceptional Children, 68*(2), 173-187.

Kohler, F. W., Greteman, C., Raschke, D., & Highnam, C. (2007). Using a buddy skills

package to increase the social interactions between a preschooler with autism and her

peers. *Topics in Early Childhood Special Education, 27*(3), 155-163.

Kroeger, K. A., Schultz, J. R., & Newsom, C. (2007). A comparison of two group-delivered

social skills programs for young children with autism. *Journal of Autism and

Developmental Disorders, 37,* 808-817.

Kurtz, A. & Jordan, M. (2008). Supporting individuals with Autism Spectrum Disorders:

Quality employment practices. *The Institute Brief, 25*, 1-12.

Laushey, K. M. & Heflin, L. J. (2000). Enhancing social skills of kindergarten children with

autism through the training of multiple peers as tutors. *Journal of Autism and

Developmental Disorders, 30*(3), 183-193.

Lord, C., Rutter, M., DiLavore, P. C., Risi, S., Gotham, K. & Bishop, S. L. (2012). *Autism

diagnostic observation schedule, second edition (ADOS-2) manual (Part 1): Modules

1-4.* Torrence, CA: Western Psychological Services.

Matthews, N. L., Ly, A. R., & Goldberg, W. A. (2015). College students' perceptions of

peers with autism spectrum disorder. *Journal of Autism and Developmental

Disorders, 45*, 90-99.

McGee, G. G., Almeida, M C., Sulzer-Azaroff, B., & Feldman, R. S. (1992). Promoting

reciprocal interactions via peer incidental teaching. *Journal of Applied Behavior

Analysis, 25*(1), 117-126.

McIntosh, K. & MacKay, L. (2008). Enhancing generalization of social skills: Making social

skills curricula effective after the lesson. *Beyond Behavior, 18*(1), 18-24.

Morton, J. F., & Campbell, J. M. (2008). Information source affects peers' initial attitudes

toward autism. *Research in Developmental Disabilities, 29*, 189-201.

Morgan, S. B., Walker, M., Bieberich, A., & Bell, S. (1996). *The Shared Activities Questionnaire*. Unpublished manuscript. University of Memphis, Memphis, TN.

Neuman, P. (2007). On terms: Comments on the distinction between intention and intentionality. *Behavior Analyst, 30*(2)*,* 211-216.

Nevill, R. E. & White, S. W. (2011). College students' openness toward autism spectrum disorders: Improving peer acceptance. *Journal of Autism and Developmental Disorders,* (41), 1619-1628.

North Carolina Department of Public Instruction. 2013. Child Count Reports December 1. Retrieved September 15, 2013 from http://ec.ncpublicschools.gov/reports-data/child-count/reports/december-1

Owen-DeSchryver, J. S., Carr, E. G., Cale, S. I. & Blakeley-Smith, A. (2008). Promoting social interactions between students with autism spectrum disorders and their peers in inclusive school settings. *Focus on Autism and Other Developmental Disabilities, 23*(1), 15-28.

Roeyers, H. (1996). The influence of nonhandicapped peers on the social interactions of children with a pervasive developmental disorder. *Journal of Autism and Developmental Disorders, 26*(3), 303-320.

Rotheram-Fuller, E., Kasari, C., Chamberlain, B., & Locke, J. (2010). Social involvement of children with autism spectrum disorders in elementary school classrooms. *Journal of Child Psychology and Psychiatry, 51*(11), 1227-1234.

Rosenbaum, P. I., Armstrong, R. W., & King, S. M. (1988). Determinants of children's

attitudes toward disability: A review of evidence. *Children's Health Care, 17*(1), 32-39.

Sansosti, F. J. & Powell-Smith, K. A. (2008). Using computer-presented social stories and video models to increase the social communication skills of children with high-functioning autism spectrum disorders. *Journal of Positive Behavior Interventions, 10*(3), 162- 178.

Schopler, E., Reichler, R.J., and Renner, B.R. (1988). *The Childhood Autism Rating Scale (CARS)*. Los Angeles, CA: Western Psychological Services.

Soenkson, D. & Alper, S. (2006). Teaching a young child to appropriately gain attention of peers using a Social Story intervention. *Focus on Autism and Other Developmental Disorders, 21*(1), 36-44.

Swaim, K. F. & Morgan, S. B. (2001). Children's attitudes and behavioral intentions toward a peer with autistic behaviors: Does a brief educational intervention have an effect? *Journal of Autism and Developmental Disorders, 31*(2), 195-205.

Symes, W. & Humprey, N. (2010). Peer-group indicators of social inclusion among pupils with autistic spectrum disorders (ASD) in mainstream secondary schools: A comparative study. *School Psychology International, 31*(5), 478-494.

Townsend, M. A. R., Wilton, K. M., & Vakilirad, T. (1993). Children's attitudes toward peers with intellectual disability. *Journal of Intellectual Disability Research, 37*(4), 405-411.

Vitaro, F., Brendgren, M., Larose, S., & Tremblay, R. E. (2005). Kindergarten disruptive

behaviors, protective factors, and educational achievement by early adulthood.

Journal of Educational Psychology, 97(4), 617-629.

Whitaker, P. (2004). Fostering communication and shared play between mainstream peers

and children with autism: approaches, outcomes, and experiences. *British Journal of*

Special Education, 31(4), 215-222.

Wolfberg, P. J. & Schuler, A. L. (1993). Integrated play groups: A model for promoting the

social and cognitive dimensions of play in children with autism. *Journal of Autism*

and Developmental Disorders, 23(3), 467-489.

Table 1

Participant characteristics

	Number	Percentage
Total Participants	70	100%
Grade		
Sixth Grade	21	30%
Seventh Grade	35	50%
Eighth Grade	14	20%
Sex		
Female	44	63%
Male	26	37%
Race		
White/Caucasian	41	59%
African American/Black	10	14%
Hispanic	8	11%
Asian	1	1%
Mixed	3	4%
Did not identify	6	8%

Table 2

Participant characteristics across conditions

Condition	AU		HFA		TD		Total	
	n	%	n	%	n	%	N	%
Total Participants	22	31.4%	24	34.3%	24	34.3%	70	100%
Grade								
6th	15a	68.2%	6b	25%	0c	0%	21	30%
7th	7a	31.8%	7a	29.9%	21b	87.5%	35	50%
8th	0a	0%	11b	45.8%	3a	12.5%	14	20%
Age								
11 yrs	13a	59.1%	4b	17.4%	0c	0%	17	24%
12 yrs	9a	40.9%	8a	34.8%	17b	70.8%	34	48.6%
13 yrs	0a	0%	8b	34.8%	7b	29.2%	15	21%
14 yrs	0a	0%	3a	13%	0a	0%	3	4%
Sex								
Male	10a	45.5%	5a	20.8%	11a	45.8%	26	37%
Female	12a	54.5%	19a	79.2%	13a	54.2%	44	63%
Knowing Autism								
No	5a	22.7%	5a	20.8%	6a	25%	16	23%
Yes	17a	77.3%	19a	79.2%	18a	75%	54	77%

Note: Each subscript letter denotes a subset of condition categories in which column proportions are not significantly different ($p > .05$). However, columns with different letter subscripts are statistically different at $p < .05$

Table 3.

Means and Standard Deviations of SAQ Ratings and CARS ratings across condition, sex, and knowing someone with autism

Condition	AU		HFA		TD		**Total**	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SAQ-Total	80.27	18.1	58.08	14.64	73.67	22.03	70.4	20.51
Male	83.20	18.11	64.5	23.92	82.64	19.56	77.73	20.39
Female	77.83	18.52	58.63	15.29	66.08	21.81	66.07	19.53
Know Autism	81.76	17.55	56.32	15.4	70.39	20.2	69.02	20.37
Don't Know Autism	75.2	21.12	64.8	9.71	83.5	26.3	75.06	20.93
SAQ-Academic	26.82	6.23	21.50	6.4	26.67	7.31	24.94	7.04
Male	28	6.57	21.6	7.83	27.18	6.21	26.42	6.83
Female	25.83	6.06	21.47	6.22	26.23	8.35	24.07	7.09
SAQ-Social	27.55	6.91	19.54	5.72	25.54	7.58	24.11	7.5
Male	27.90	6.4	18	5.05	28.73	6.5	26.35	7.29
Female	27.25	7.57	19.95	5.94	22.85	7.6	22.8	7.39
SAQ-Recreation	25.91	6.96	17.04	4.95	21.46	8.56	21.34	7.77
Male	27.30	7.18	16.4	1.52	26.73	7.66	24.96	7.76
Female	24.75	6.86	17.21	5.53	17	6.67	19.2	7.01
CARS-Total	28.18	4.57	24.67	5.11	12.83	2.1	21.71	7.77
Male	28.1	5.24	24	6.75	12.55	1.7	20.73	8.46
Female	28.25	4.18	24.84	4.8	13.08	2.43	22.30	7.73
Know Autism	28.41	4.94	25.68	5.05	12.89	2.22	22.28	7.98
Don't Know Autism	27.4	3.36	20.8	3.42	12.67	1.86	19.81	6.87

Table 4

*Univariate effects of condition, gender, and knowing someone with ASD on participants'
behavioral intentions (measured by SAQ) and ratings of behaviors observed in video
vignettes (measured by modified CARS)*

|	F	df	p	η^2
SAQ Total Score				
1-way ANOVA				
Main Effect – Condition	8.81	2	<.001	.21
Main Effect – Sex	5.64	1	.02	.07
2-way ANOVA				
Main Effect – Condition	4.65	2	.013	.13
Main Effect – Knowing ASD	.91	1	.345	.01
Interaction – Condition and Knowing	1.26	2	.29	.04
SAQ: Social Domain				
1-way ANOVA				
Main Effect – Condition	8.82	2	<.001	.21
SAQ: Academic Domain				
1-way ANOVA				
Main Effect – Condition	4.86	2	.011	.13
SAQ: Recreational Domain				
1-way ANOVA				
Main Effect – Condition	9.27	2	<.001	.22
Modified CARS Total Score				
1-way ANOVA				
Main Effect – Condition	88.82	2	<.001	.73
Main Effect – Sex	0.66	1	.419	.01
2-way ANOVA				
Main Effect - Condition	62.47	2	<.001	.66
Main Effect – Knowing ASD	3.14	1	.08	.05
Interaction – Condition and Knowing	1.56	2	.217	.05
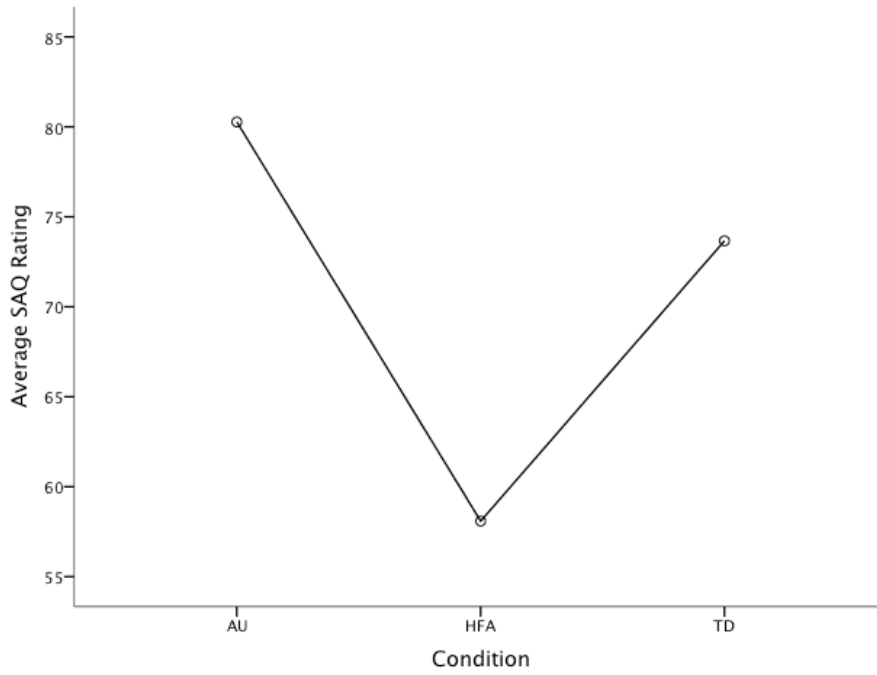
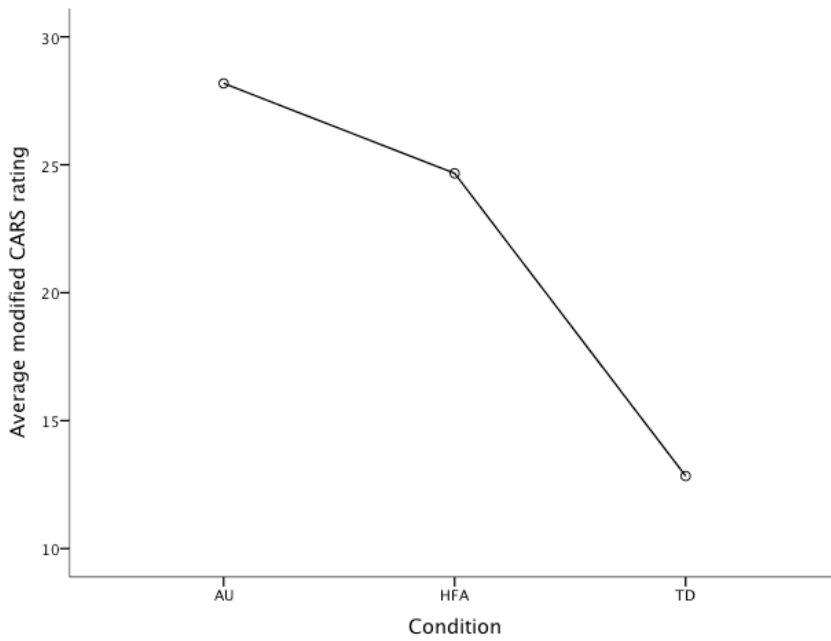*Figure 2.* Average total SAQ scores across condition

Figure 3. Average total modified CARS score across condition

APPENDICES

Appendix A. Modified CARS

I.   GETTING ALONG WITH PEOPLE
1. No problems getting along with people; about the same as other kids that age
2. May occasionally have trouble looking people in the eye, be especially shy, might not respond to others as much as someone normally would
3. Sometimes doesn't seem aware of others; it's hard for others to get this child's attention, doesn't try to interact with others very often
4. Almost always seems not aware or not interested in what others are doing. Almost never responds or tries to interact with others, really hard to get this child's attention

II.   SHOWING FEELINGS AND EMOTIONS
1. No problems showing feelings and handling feelings like most other kids
2. Occasionally has difficulty showing feelings and emotions - might occasionally have too big or small of a reaction/feeling; might occasionally show feelings that don't seem related to things going on around the child
3. Seems to have difficulty showing feelings and emotions several times - might have too big or small of a reaction/feelings several times, might seem to have feelings and reactions that don't seem related to what's going on around the child several times
4. Almost never seems to show appropriate feelings or handle feelings appropriately; if the child gets in a certain mood, it might be really hard to change that mood, or the child's mood might change a lot even though it doesn't seem like there's anything going on that is related

III.   ABILITY TO MOVE AND HANDLE BODY MOVEMENTS
1. No problems moving around and being coordinated like most other kids
2. Might have just a few problems moving around/being coordinated like others; might be a little clumsy; might have just a few odd body movements that seem unusual
3. Might have several strange or unusual body movements or might do these movements sometimes (like strange finger movements, rocking, spinning around, walking on toes)
4. Has a lot of unusual body movements or does these movements a lot; even if others try to get the child to stop these movements might continue

IV.   USING TOYS AND OTHER OBJECTS
1. Seems to have a normal interest in toys and other objects like other kids that age
2. Just a few problems with using toys and other objects like normal; might be interested in toys or objects in a way that seems a little unusual or childish (like banging the toy or sucking on it)
3. Several problems with toys and other objects – either doesn't seem very interested in toys like others that age, or might be interested in the toy in an unusual way – for example, focusing on a part of the toy that doesn't seem very important, being interested in the way light reflects off the object, moving the object around the same way over and over, or only playing with one toy or object all of the time

4. A lot of problem with toys and other objects (even more often or in a more intense way than described above); it's really difficult to distract the child when playing with the toy or object of interest

V. HANDLING CHANGE

1. No problems handling change – not too stressed over change
2. When an adult tries to change the activity the child might continue the same activity or use the same materials
3. The child has more problems with changes in the routine; might try to continue the same activity, might be difficult to distract, might become angry or unhappy when the routine changes
4. Has a lot of problems with change – might have a severe reaction when there is a change; if the change is forced, the child might become really angry or won't listen and follow directions, might have a tantrum

VI. LOOKING AT THINGS

1. No problems with looking at things/using sense of sight
2. Occasionally needs reminders to look at objects; just occasionally may stare off into space or may avoid looking others in the eye
3. Frequently must be reminded to look at what he or she is doing; may frequently stare into space, avoid looking people in the eye; may frequently look at objects from an unusual angle or hold objects very close to eyes while looking
4. Consistently avoids looking at other people or certain objects; may always avoid eye contact or show extremely unusual ways of looking at objects (looking at things from unusual angle or up really close)

VII. LISTENING TO THINGS

1. No problems with listening to things/using sense of hearing
2. Occasionally has some lack of response to sounds or mild overreaction to some sounds; may not respond right away (some delay before responding); may be distracted by sounds
3. Response to sound varies; often ignores a sound the first few times; may be startled or cover ears when hearing everyday sounds
4. Extreme overreaction and/or under-reaction to sounds, regardless of type of sound

VIII. TASTE, SMELL, AND TOUCH RESPONSE AND USE

1. Explores new objects like other kids the same age (usually just feeling and looking; tasting or smelling when appropriate)
2. Puts objects in mouth, tastes or smells when not really appropriate
3. May be somewhat unusually interested in touching, smelling, or tasting objects or people
4. Seems to be very unusually interested in touching, smelling, or tasting objects – more for the sensation

IX.   TALKING/COMMUNICATING

1. Talks to other people like other kids the same age
2. Some talking seems a little slower than normal; may occasionally repeat what others say; occasionally uses odd words or has slightly unusual way of saying things
3. May not talk very much; talking may include frequently copying what someone else says; may ask questions excessively or just talk about one topic over and over
4. Does not seem to talk/use regular speech; may make sounds or squeals; may make noises that sound like talking but aren't real words, or might use some words or phrases in an unusual way that is hard to understand

X.   BODY LANGUAGE/FACIAL EXPRESSIONS

1. Uses body language and facial expressions like other kids the same age
2. May not use as much body language or facial expressions as others – may not use pointing and gesturing to specifically show what wants
3. Has difficulty asking for and showing needs using body language and facial expressions and has trouble understanding body language and facial expressions of others
4. Only uses odd gestures that don't seem to have meaning and doesn't seem to understand gestures or facial expressions of others

XI.   ACTIVITY LEVEL

1. Seems as active as other kids the same age
2. Seems mildly over or under-active – may be restless or slow moving at times
3. May be frequently over-active, have lots of energy, and be difficult to calm down; on the other hand, may seem slow and tired and might need lots of prompting to get moving and do things
4. Shows extremes of activity or inactivity and may switch from one extreme to the other

Appendix B. Shared Activities Questionnaire

SAQ
Here is a list of things that you might do with Robby. Circle the answer that shows how you feel about doing each of these things with Robby.

1. Ask Robby to come to my house to watch TV.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

2. Sit next to Robby in class.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

3. Work in the school library with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

4. Share my games or books with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

5. Work on a science project at school with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

6. Be in the same reading group with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

7. Study for a test with Robby at school.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

8. Invite Robby to my birthday party.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

9. Ask Robby to go to an amusement park with me, like Six Flags.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

10. Go out to dinner with Robby and his/her family.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

11. Eat lunch next to Robby at school.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

12. Walk together with Robby in the hall at school.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

13. Do art with Robby in class.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

14. Go shopping at a store with Robby.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

15. Work math problems in class with Robby.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

16. Write a story or report for school with Robby.

No,   **Probably Not**   **Maybe**   **Probably**   **Yes,**
Definitely Not   **Definitely**

17. Ask Robby to join my group of friends.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

18. Do homework with Robby at home after school.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

19. Go to the movies with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

20. Play with Robby outside at school.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

21. Pick Robby as my partner in a game with other kids.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

22. Be good friends with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

23. Go to a ball game with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

24. Go to McDonald's with Robby.

No, Definitely Not	**Probably Not**	**Maybe**	**Probably**	**Yes, Definitely**

Appendix C: Video Script

Part A: All conditions
Voiceover: "This is Robby. Robby's family lives in a town called Woodmont. Woodmont is a medium sized town that has schools, churches, shopping malls, movie theaters, libraries, and most of the other things towns have. During the summer, Robby and his family sometimes go to an amusement park or a lake to enjoy being outdoors."

Part B-Typical Youth (TD): [after voiceover ends]
Scene 1: In family/play room in a house
Adult female: [walks into view, towards Robby] "Hi Robby, what are you doing, playing a videogame?"
Robby: [pauses the videogame] "Yeah. It's one I got at the mall. It's got 15 different racing games and it shakes when you wreck."
Adult female: "I haven't seen that game before."
Robby: "Here – let me show you the demo"
Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?"
Robby: "Sure! That sounds like fun!"
Adult female: "Nice job, Robby."
Robby: "Thanks."
Adult female: [walks out of view]
Robby: [activates videogame and continues playing for 10 seconds, stands up, and then walks out of view]

Scene 2: Small driveway with basketball hoop
Friend: "Hey – What's up, Robby?"
Robby: "Hey! What's up?!"
Friend: ""I don't have a lot of time – just stopped by to see if you wanted to shoot some baskets. Hey - wanna play Pig?" [tosses ball to Robby]
Robby: "Yeah – sure. How do you play again?"
Friend: "Every time you miss, you get a letter of the word Pig. The first to spell Pig loses – P-I-G."
Robby: "Got it!"
Friend: "You go first."
Robby: [shoots ball, makes it]
Friend: "Nice shot."
Robby: "Thanks!"
Friend: [gets ball; shoots] "Man, I missed. P for me. Your turn, Robby."
Robby: [shoots ball, misses] "Aww man. P and P" [passes ball back]
Friend: "Ok – that's a P for you and for me." [gets ball, shoots, makes it]. "Yes!"
Robby: "Nice shot."

Robby: [shoots, misses]. "Man. P-I."
Friend: "P-I for you, just a P for me. My turn." [shoots, misses]. "Uggh. That's a P-I for me too."
Robby: [shoots, makes it] "Yes!"
Friend: "Nice shot" [get ball, shoots, makes it].
Robby: "Swish."[shoots, makes it] "Yes!"
Friend: "Nice." [shoots, makes it].
Robby: [shoots, makes it]
Friend: "Dude – you're on fire!"
Robby: "Hah – right!"
Friend: [shoots, makes it] "Yes!"
Robby: "Ok – we're tied." [shoots, makes it]
Friend: "Yup -We're tied." [shoots, makes it] "Yes! I'm sinking 'em – watch out!"
Robby: "I'm watching."
Friend: [laughs] "Yeah "
[car horn nearby – Robby and Friend briefly look towards sound, then return to game]
Robby: [shoots, makes it]. "Watch that!"
Friend: "Woh- close game." [shoots, misses] "Man. That's Pig for me."
Robby: "Looks like you're the Pig today!"
Friend: "Yup. [laughs] Nice game, Robby."
Robby: "Yeah - nice game"
Friend: "I gotta go. Rematch tomorrow – okay?"
Robby: "Yeah – see you tomorrow."
Friend: "See ya later!" [leaves]
Robby: "Later, man." [waves at friend, then shoots ball]

Part B-Autism (AU): [after voiceover ends]
Scene 1: In family/play room in a house
Adult female [walks into view, towards Robby]: "Hi Robby, what are you doing, playing a videogame?"
Robby: [no response]
Adult female: "Hi Robby. Are you playing a new videogame?"
Robby: [no eye contact; flaps hands, and rocks] "Hi Robby new videogame." [rocks and flaps hands]
Adult female: "I haven't seen that game before."
Robby: [flaps hands, makes vocal sound like explosion]
Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?"
Robby: "Finish game basketball"
Adult female: "Nice job, Robby."
Robby: "Nice job, Robby"

Adult female: [walks out of view]
Robby: [Robby plays videogame for 15 more seconds while body rocking; adult returns with basketball
Adult: "Okay Robby – time to go play basketball."
Robby: [keeps playing]
Adult: [Puts ball in front of Robby, turns off TV screen]
Robby: [yells and hits head]
Adult: "Time for basketball."
Robby: [seems to be calming down] "Time for basketball." [picks up ball, exits room]

Scene 2: Small driveway with basketball hoop
Friend: "Hey – What's up, Robby?"
Robby: "What's up Robby."
Friend: "I don't have a lot of time – just stopped by to see if you wanted to shoot some baskets. Hey - wanna play Pig? [Friend starts to throw ball to Robby, but realized Robby isn't looking] "Catch, Robby."
Robby: "Catch Robby."
Friend: [bounces Robby the ball]
Robby: [Picks up ball; smells ball]
Friend: "Every time you miss, you get a letter of the word Pig. The first to spell Pig loses – P-I-G."
Robby: "P-I-G" [Robby holds up ball and looks at it with one eye closed, smells it again]
Friend: "That's right – P-I-G. Pig. You go first."
[Note: each time friend tries to give ball back to Robby, it should take a moment to get Robby's attention; friend should also have to get ball from Robby most of the time – he's not passing it back; in addition, Robby should be less active and have less movement than friend (other than occasional hand-flapping and rocking) – tendency to stand still, walk slowly to the ball, not dribbling before shooting]
Robby: [Smells, looks at ball again]
Friend: "Your turn Robby."
Robby: "Your turn Robby." [shoots ball, makes it, but no reaction]
[Note: During game, Robby is not watching friend, sometimes looking at his own fingers; he also should occasionally smile or laugh for no apparent reason – not in connection with the game] Friend: "Nice shot!" [gets ball; shoots, misses]
Friend: "Man, I missed. P for me. Your turn, Robby."
Robby: "Your turn Robby."
Friend: [bounces ball back to Robby]
Robby: [looks at ball]
Friend: "Robby – your turn"
Robby: "Your turn" [shoots ball, misses]
Friend: "Ok – that's a P for you and for me." [gets ball, shoots]. "Yes!"
Robby: [shoots, misses]. "P-I."

Friend: "P-I for you, just a P for me. My turn." [shoots, misses]. "Uggh. That's a P-I for me too."
Robby: [shoots, makes it, but no reaction]
Friend: "Nice shot. [in response to Robby's lack of response] Hey, man – why aren't you excited – that was a great shot!" [gets ball, shoots, makes it].
Robby: [shoots, makes it]
Friend: "Dude – you're on fire!"
Robby: "Fire"
Friend: [shoots, makes it] "Yes! I'm sinking 'em – watch out!"
Robby: "Watch out."
Friend: [laughs] "Yeah – watch out!"
[car horn nearby – Friend looks briefly look towards sound, then returns attention to game; Robby reacts as if very startled, covers ears with hands and rocks]
Friend: "Your shot, Robby."
Robby: [Robby leaves one hand on ear, shoots, makes it]
Friend: "Woh- close game."
Friend: [shoots, misses] "Man. That's Pig for me."
Robby: [Robby stops covering ear] "Pig. P-I-G."
Friend: "Yup. Nice game, Robby."
Robby: "Nice game Robby."
Friend: "I gotta go. Rematch tomorrow – okay?"
Robby: "Tomorrow okay."
Friend: "See ya later!" [leaves]
Robby: [Looks at ball, smells ball, shoots again]

Part B-High Functioning Autism (HFA): [after voiceover ends]
Scene 1: In family/play room in a house
Adult female: [walks into view, towards Robby] "Hi Robby, what are you doing, playing a videogame?"
Robby: [no response]
Adult female: "Hi Robby –
Robby: [interrupts; stops game, but does not make eye contact; speech intonation is slightly unusual, over-enunciated, and flat] "the boss level has a dragon car. I beat that 5 times"
Adult female: "I haven't seen that game before."
Robby: "the boss level has a dragon car. I need to beat that again. That's 6 times" [starts playing game again]
Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?"
Robby: "Uggh… [hits head with hand 3 times]… I gotta beat that boss level. Gotta beat the dragon car. Gotta get 6 times… [pause, deep breath]… I can play basketball."
Adult female: "Nice job, Robby."

Robby: "I beat the boss level 5 times."
Adult female: [walks out of view]
Robby: [continues playing for 10 seconds, stands up, and then walks out of view]

Scene 2: Small driveway with basketball hoop
Friend: "Hey – What's up, Robby?"
Robby: "I beat the boss level 5 times."
Friend: "Cool, man. I don't have a lot of time – just stopped by to see if you wanted to shoot some baskets. Hey - wanna play Pig?" [tosses ball to Robby]
Robby: "I do not have swine."
Friend: "No man – it's a game. Every time you miss, you get a letter of the word Pig. The first to spell Pig loses – P-I-G."
Robby: "Okay. Let the games begin!"
Friend: "You go first."
Robby: [shoots ball, makes it]
Friend: "Nice shot."
Robby: [no response]
Friend: [gets ball; shoots] "Man, I missed. P for me. Your turn, Robby."
Robby: [shoots ball, misses] "Uggh. Uggh." [seems mildly upset]
Friend: "Ok –chill - that's a P for you and for me."
Robby: [seems to calm down]
Friend: [gets ball, shoots]. "Yes!"
Robby: [shoots, misses]. "Uggh... [seems to get really upset]
Friend: "Chill out, man!
Robby: "Yeah – it's no big deal."
Friend: "P-I for you, just an P for me. My turn." [shoots, misses]. "Uggh. That's a P-I for me too."
Robby: [shoots, makes it] "Yes!"
Friend: "Nice shot" [get ball, shoots, makes it].
Robby: [shoots, makes it] "To infinity and beyond."
Friend: "Nice." [shoots, makes it].
Robby: [shoots, makes it].
Friend: "Dude – you're on fire!"
Robby: "Huh?
Friend: "You just keep making baskets."
Robby: "Oh, yes! I am a conflagration."
Friend: [shoots, makes it] "Yes!"
Robby: "It looks like you are also on fire."
Friend: "Right – hah!"
Friend: "Yup -We're tied." [shoots, makes it] "Yes! I'm sinking 'em – watch out!"
Robby: "I am watching you." [stated matter-of-factly]
Friend: [laughs] "Yeah"

[car horn nearby – Friend looks briefly look towards sound, then returns attention to game; Robby reacts as if somewhat startled, continued to be distracted]
Friend: "Your shot, Robby."
Robby: [Robby refocused on game, shoots, makes it]. "Yes."
Friend: "Woh- close game." [shoots, misses] "Man. That's Pig for me."
Robby: "I am the victor."
Friend: "Yup. Nice game, Robby."
Robby: "Yes – you were a worthy contender."
Friend: "Hah! Right! I gotta go. Rematch tomorrow – okay?"
Robby: "Yes – I will see you on the battlefield"
Friend: "See ya later!" [leaves]
Robby: [shoots ball]

Appendix D: Modified CARS and target script elements

Modified CARS Item	Item from script	Expected Rating
I. GETTING ALONG WITH PEOPLE 5. No problems getting along with people; about the same as other kids that age 6. May occasionally have trouble looking people in the eye, be especially shy, might not respond to others as much as someone normally would 7. Sometimes doesn't seem aware of others; it's hard for others to get this child's attention, doesn't try to interact with others very often 8. Almost always seems not aware or not interested in what others are doing. Almost never responds or tries to interact with others, really hard to get this child's attention	TD: Can be observed throughout; responds to others well and sometimes with humor; e.g., *Adult female: "I haven't seen that game before." Robby: "Here – let me show you the demo"*; *Friend: "Woh- close game." [shoots, misses] "Man. That's Pig for me." Robby: "Looks like you're the Pig today!"Friend: "Yup. [laughs] Nice game, Robby." Robby: "Yeah - nice game"* AU: Can be observed throughout; e.g., *Adult female: "Hi Robby. Are you playing a new videogame?" Robby: [no eye contact; flaps hands, and rocks] "Hi Robby new videogame." [rocks and flaps hands]; [Note: each time friend tries to give ball back to Robby, it should take a moment to get Robby's attention; friend should also have to get ball from Robby most of the time – he's not passing it back]* HFA: Can be observed throughout; e.g., *Adult female: [walks into view, towards Robby] "Hi Robby, what are you doing, playing a videogame?" Robby: [no response]* *Adult female: "Hi Robby – Robby: [interrupts; stops game, but does not make eye contact; speech intonation is slightly unusual, over-enunciated, and flat] "the boss level has a dragon car. I beat that 5 times"*	TD: 1 AU: 3 HFA: 2
II. SHOWING FEELINGS AND EMOTIONS 5. No problems showing feelings and handling feelings like most other kids 6. Occasionally has difficulty	TD: *Robby: [shoots ball, misses] "Aww man. P and P" [passes ball back]* AU: Example 1: *Adult: "Okay Robby – time to go play basketball."* *Robby: [keeps playing] Adult: [Puts ball in*	TD: 1 AU: 3 HFA: 3

showing feelings and emotions - might occasionally have too big or small of a reaction/feeling; might occasionally show feelings that don't seem related to things going on around the child 7. Seems to have difficulty showing feelings and emotions several times - might have too big or small of a reaction/feelings several times, might seem to have feelings and reactions that don't seem related to what's going on around the child several times 8. Almost never seems to show appropriate feelings or handle feelings appropriately; if the child gets in a certain mood, it might be really hard to change that mood, or the child's mood might change a lot even though it doesn't seem like there's anything going on that is related	*front of Robby, turns off TV screen] Robby: [yells and hits head] Adult: "Time for basketball."* Example 2: *[Note: During game, Robby is not watching friend, sometimes looking at his own fingers; he also should occasionally smile or laugh for no apparent reason – not in connection with the game]* HFA: Example 1: *Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?"* *Robby: "Uggh… [hits head with hand 3 times]… I gotta beat that boss level. Gotta beat the dragon car. Gotta get 6 times… [pause, deep breath]… I can play basketball."* Example 2: *Robby: [shoots ball, misses] "Uggh. Uggh." [seems mildly upset] Friend: "Ok –chill - that's a P for you and for me." Robby: [seems to calm down]Friend: [gets ball, shoots]. "Yes!" Robby: [shoots, misses]. "Uggh... [seems to get really upset] Friend: "Chill out, man!*	
III. ABILITY TO MOVE AND HANDLE BODY MOVEMENTS 5. No problems moving around and being coordinated like most other kids 6. Might have just a few problems moving around/being coordinated like others; might be a little clumsy; might have just a few odd body movements that seem unusual 7. Might have several strange or unusual body movements or might do these movements sometimes (like strange finger movements, rocking, spinning	TD: [playing game] AU: *Robby: [no eye contact; flaps hands, and rocks] "Hi Robby new videogame." [rocks and flaps hands]* HFA: [playing basketball game]	TD: 1 AU: 3 HFA: 1

around, walking on toes) 8. Has a lot of unusual body movements or does these movements a lot; even if others try to get the child to stop these movements might continue		
IV. USING TOYS AND OTHER OBJECTS 5. Seems to have a normal interest in toys and other objects like other kids that age 6. Just a few problems with using toys and other objects like normal; might be interested in toys or objects in a way that seems a little unusual or childish (like banging the toy or sucking on it) 7. Several problems with toys and other objects – either doesn't seem very interested in toys like others that age, or might be interested in the toy in an unusual way – for example, focusing on a part of the toy that doesn't seem very important, being interested in the way light reflects off the object, moving the object around the same way over and over, or only playing with one toy or object all of the time 8. A lot of problem with toys and other objects (even more often or in a more intense way than described above); it's really difficult to distract the child when playing with the toy or object of interest	TD: [plays videogame and basketball] AU: *Friend: [bounces Robby the ball] Robby: [Picks up ball; smells ball] Friend: "Every time you miss, you get a letter of the word Pig. The first to spell Pig loses – P-I-G." Robby: "P-I-G" [Robby holds up ball and looks at it with one eye closed, smells it again]* HFA: [plays videogame and basketball]	TD: 1 AU: 3 HFA: 1

V. HANDLING CHANGE 5. No problems handling change – not too stressed over change 6. When an adult tries to change the activity the child might continue the same activity or use the same materials 7. The child has more problems with changes in the routine; might try to continue the same activity, might be difficult to distract, might become angry or unhappy when the routine changes 8. Has a lot of problems with change – might have a severe reaction when there is a change; if the change is forced, the child might become really angry or won't listen and follow directions, might have a tantrum	TD: *Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?" Robby: "Sure! That sounds like fun!"* AU: *Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?" Robby: "Finish game basketball" Adult female: "Well it looks like you're doing a real good job, Robby." Robby: "Good job, Robby" Adult female: [walks out of view] Robby: [Robby plays videogame for 15 more seconds while body rocking; adult returns with basketball Adult: "Okay Robby – time to go play basketball. "Robby: [keeps playing] Adult: [Puts ball in front of Robby, turns off TV screen] Robby: [yells and hits head] Adult: "Time for basketball." Robby: [seems to be calming down] "Time for basketball." [picks up ball, exits room]* HFA: *Adult female: "That's cool! Hey - I know you weren't expecting it, but one of your friends wants to play basketball. Do you want to finish your game and go play basketball?" Robby: "Uggh… [hits head with hand 3 times]… I gotta beat that boss level. Gotta beat the dragon car. Gotta get 6 times… [pause, deep breath]… I can play basketball."*	TD: 1 AU: 3 HFA: 3
VI. LOOKING AT THINGS 5. No problems with looking at things/using sense of sight 6. Occasionally needs reminders to look at objects; just occasionally may stare off into space or may avoid looking others in the eye 7. Frequently must be reminded	TD: [nothing specific – should be observed throughout] AU: Example 1: *Robby: [no eye contact; flaps hands, and rocks] "Hi Robby new videogame." [rocks and flaps hands]* Example 2: *Friend: "I don't have a lot of time – just stopped by to see if you wanted*	TD: 1 AU: 3/4 HFA: 2

to look at what he or she is doing; may frequently stare into space, avoid looking people in the eye; may frequently look at objects from an unusual angle or hold objects very close to eyes while looking 8. Consistently avoids looking at other people or certain objects; may always avoid eye contact or show extremely unusual ways of looking at objects (looking at things from unusual angle or up really close)	*to shoot some baskets. Hey - wanna play Pig? [Friend starts to throw ball to Robby, but realized Robby isn't looking]* Example 3: *Robby: "P-I-G" [Robby holds up ball and looks at it with one eye closed, smells it again]* HFA: *Robby: [interrupts; stops game, but does not make eye contact; speech intonation is slightly unusual, over-enunciated, and flat] "the boss level has a dragon car. I beat that 5 times"*	
VII. LISTENING TO THINGS 5. No problems with listening to things/using sense of hearing 6. Occasionally has some lack of response to sounds or mild overreaction to some sounds; may not respond right away (some delay before responding); may be distracted by sounds 7. Response to sound varies; often ignores a sound the first few times; may be startled or cover ears when hearing everyday sounds 8. Extreme overreaction and/or under-reaction to sounds, regardless of type of sound	TD: *[car horn nearby – Robby and Friend briefly look towards sound, then return to game] Robby: [shoots, makes it]. "Watch that!"* AU: *[car horn nearby – Friend looks briefly look towards sound, then returns attention to game; Robby reacts as if very startled, covers ears with hands and rocks] Friend: "Your shot, Robby."* *Robby: [Robby leaves one hand on ear, shoots, makes it]* HFA: *[car horn nearby – Friend looks briefly look towards sound, then returns attention to game; Robby reacts as if somewhat startled, continued to be distracted] Friend: "Your shot, Robby." Robby: [Robby refocused on game, shoots, makes it]. "Yes."*	TD: 1 AU: 3 HFA: 2
VIII. TASTE, SMELL, AND TOUCH RESPONSE AND USE 5. Explores new objects like other kids the same age (usually just feeling and looking; tasting or smelling when appropriate) 6. Puts objects in mouth, tastes or	TD: [no specific example – should be observed throughout] AU: *Friend: [bounces Robby the ball] Robby: [Picks up ball; smells ball] Friend: "Every time you miss, you get a letter of the word Pig. The first to spell Pig loses – P-I-G." Robby: "P-I-G" [Robby holds up ball*	TD: 1 AU: 2/3 HFA: 1

smells when not really appropriate 7. May be somewhat unusually interested in touching, smelling, or tasting objects or people 8. Seems to be very unusually interested in touching, smelling, or tasting objects – more for the sensation	*and looks at it with one eye closed, smells it again]* HFA: [no specific example]	
IX. TALKING/COMMUNICATING 5. Talks to other people like other kids the same age 6. Some talking seems a little slower than normal; may occasionally repeat what others say; occasionally uses odd words or has slightly unusual way of saying things 7. May not talk very much; talking may include frequently copying what someone else says; may ask questions excessively or just talk about one topic over and over 8. Does not seem to talk/use regular speech; may make sounds or squeals; may make noises that sound like talking but aren't real words, or might use some words or phrases in an unusual way that is hard to understand	TD: [no specific example – should be observed throughout] AU: Multiple examples of frequently copying what someone else says. E.g., *Adult female: "Hi Robby. Are you playing a new videogame?" Robby: [no eye contact; flaps hands, and rocks] "Hi Robby new videogame.";* *Adult female: "Well it looks like you're doing a real good job, Robby." Robby: "Good job, Robby";* *Friend: "Hey – What's up, Robby?" Robby: "What's up Robby.";* *Friend: "Your turn Robby." Robby: "Your turn Robby."* HFA: Example 1: talking excessively about beating videogame, i.e., *"the boss level has a dragon car. I beat that 5 times"; "the boss level has a dragon car. I need to beat that again. That's 6 times", I gotta beat that boss level. Gotta beat the dragon car. Gotta get 6 times"* Example 2: unusual way of saying things, i.e., a) *"Let the games begin!";* b) *Robby: "To infinity and beyond." "Dude – you're on fire!" Robby: "Huh? Friend: "You just keep making baskets. "Robby: "Oh, yes! I am a conflagration." Friend: [shoots, makes it] "Yes! "Robby: "It looks like you are also on fire."* c) *Robby: "I am the victor." Friend: "Yup. Nice game, Robby." Robby: "Yes – you were a worthy contender." Friend: "Hah!*	TD: 1 AU: 3 HFA: 2/3

	Right! I gotta go. Rematch tomorrow – okay?" Robby: "Yes – I will see you on the battlefield"	
X. BODY LANGUAGE/FACIAL EXPRESSIONS 5. Uses body language and facial expressions like other kids the same age 6. May not use as much body language or facial expressions as others – may not use pointing and gesturing to specifically show what wants 7. Has difficulty asking for and showing needs using body language and facial expressions and has trouble understanding body language and facial expressions of others 8. Only uses odd gestures that don't seem to have meaning and doesn't seem to understand gestures or facial expressions of others	TD: [should be present throughout] AU: *Robby: [shoots, makes it, but no reaction] Friend: "Nice shot. [in response to Robby's lack of response] Hey, man – why aren't you excited – that was a great shot!" [gets ball, shoots, makes it].* HFA: [may be subtle – may be observed in some of the lack of response to friend during game]	TD: 1 AU: 2/3 HFA: 1/2
XI. ACTIVITY LEVEL 5. Seems as active as other kids the same age 6. Seems mildly over or under-active – may be restless or slow moving at times 7. May be frequently over-active, have lots of energy, and be difficult to calm down; on the other hand, may seem slow and tired and might need lots of prompting to get moving and do things 8. Shows extremes of activity or inactivity and may switch from	TD: [should be present throughout] AU: *[Note: each time friend tries to give ball back to Robby, it should take a moment to get Robby's attention; friend should also have to get ball from Robby most of the time – he's not passing it back; in addition, <u>Robby should be less active and have less movement than friend</u> (other than occasional hand-flapping and rocking) – tendency to stand still, walk slowly to the ball, not dribbling before shooting]* HFA: [may be no observable difference]	TD: 1 AU: 2/3 HFA: 1/2

one extreme to the other		
		Total Expected Rating TD: 11 AU: 30-34 HFA: 19-22