

Social Skills Differences Between the Autism Spectrum Disorders

Alison M. Kozlowski · Johnny L. Matson ·
Brian C. Belva

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Abstract Social skills deficits are one of the core features of autism spectrum disorders (ASDs), with many believing that this symptom domain is the defining feature of individuals with ASDs. Presently, Asperger's Disorder, Autistic Disorder, and PDD-NOS make up the spectrum, but future revisions to the *Diagnostic and Statistical Manual of Mental Disorders* propose that all of these disorders should be collapsed. Much debate has centered on this decision as some researchers believe the three ASDs to be uniquely different. As such, the purpose of the current investigation was to examine social skills differences between the three ASD groups. Participants were children ages 4 through 16 years who had been diagnosed with Asperger's Disorder, Autistic Disorder, or PDD-NOS and who did not have comorbid intellectual disability. Their scores on the factors of the *Matson Evaluation of Social Skills with Youngsters-II* (i.e., Hostile, Adaptive/Appropriate, and Inappropriately Assertive/Overconfident) were compared. Children with Asperger's Disorder demonstrated significantly greater adaptive/appropriate social skills when compared to children with Autistic Disorder, and they also exhibited greater impairments with respect to hostility. No other differences were noted between ASD groups. The implications of these findings are discussed.

Keywords Autism spectrum disorder · Asperger's disorder · Autistic disorder · PDD-NOS · MESSY-II · Social skills

Social skills are defined as discrete observable responses that are essential for a child to adapt to and cope with his/her environment (Kuhn et al. 2001; Matson et al. 1998a, 1999; Matson and Wilkins 2007). These skills are extremely important if an individual is to get along at school, at home, in the work place, and in social leisure contexts outside the family unit. It has been found that children identified as underdeveloped in social skills are unpopular with their peers and are more likely to be unhappy, anxious, and

A. M. Kozlowski · J. L. Matson (✉) · B. C. Belva
Department of Psychology, Louisiana State University, Baton Rouge, LA 70803, USA
e-mail: johnmatson@aol.com

maladjusted (Matson et al. 1983a; Strauss et al. 1989; Wierzbicki and McCabe 1988). Social skills deficits in children are associated with many different clinical populations including but not limited to those with conduct disorders/behavior problems (Matson et al. 2003, 2005; Matson and Mayville 2001; Rojahn et al. 2003), anxiety disorders (Cartwright-Hatton et al. 2005), attention-deficit/hyperactivity disorder (ADHD; Frankel et al. 1997), intellectual disability (ID; Matson et al. 1998b, 2000; Smith and Matson 2010), and autism spectrum disorders (ASDs; Matson and Wilkins 2007).

One of the core features of ASDs is deficits in or abnormal social skills (Cappadocia and Weiss 2011; Constantino et al. 2003; Gaspar de Alba and Bodfish 2011; Matson et al. 2007; Matson and Wilkins 2009; Wainer and Ingersoll 2011; White et al. 2007). These social deficits are associated with individuals with Autistic Disorder, Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), and Asperger's Disorder (Wing and Potter 2002). However, social skills differences between the different ASDs have rarely been investigated. Shoemaker (2009) conducted a study comparing Autistic Disorder, PDD-NOS, and typically developing children on appropriate social skills. Children with Autistic Disorder had significantly greater social deficits than children with PDD-NOS and children with PDD-NOS possessed significantly greater social deficits than typically developing children (Shoemaker 2009). Additional research has been conducted on the co-occurrence of ID and ASD with respect to social skills (Bakken et al. 2010). While ASDs and ID commonly co-occur (Matson and Shoemaker 2009), Matson et al. (2009) found that in individuals with ID, those with co-occurring ASDs and ID exhibited more social problems than those individuals with ID alone.

Previously, researchers have also examined differences between children with high functioning autism (HFA), defined as those individuals with Autistic Disorder who do not have a comorbid ID diagnosis (Loukusa and Moilanen 2009), versus those with Asperger's Disorder. While both of these groups typically evince social skills deficits, a defining characteristic that differentiates these two groups is that children with HFA typically have a general delay in language (Kuroda et al. 2011; Papadopoulous et al., 2011). Also, Eisenmajer et al. (1996) concluded that children with Asperger's Disorder had a significantly higher verbal mental age than children with HFA. Finally, Szatmari et al. (1995) found significant differences between individuals with Asperger's Disorder and HFA in adaptive behaviors and cognitive measures of language competence but not on aspects of nonverbal communication, nonverbal cognition, or motor development.

Many different areas of social skills deficits have been researched in children with ASDs including social behavior in the context of orientation and communication; social skills in terms of interactions, play, and communication; and social contact and insight problems (Stella et al. 1999; Wing et al. 2002). In addition, Bellini et al. (2007) have identified many different social skill deficits that individuals with ASDs experience such as difficulties with initiation of social interactions, maintaining reciprocity, shared enjoyment, perspective-taking, and inferring the interest of others. The improvement of social skills is essential for children with ASD due to previous research suggesting that increased social skills may make a child more popular with others and/or increase the number of social interactions others initiate with the ASD child (Matson and Wilkins 2007). Thus, it is important that psychologists assess and monitor social skills in children with ASDs. One such measure that is useful in

assessing children with ASDs in addition to other psychopathology is the *Matson Evaluation of Social Skills with Youngsters II (MESSY-II)*; Matson 2010). The *MESSY-II* allows for the assessment of appropriate and inappropriate social skills in order to determine whether or not deficits or excesses exist, thereby guiding treatment (Matson et al. 2010).

While many researchers have investigated differences between Autistic Disorder and Asperger's Disorder, research is still needed on the differences in social skills between these groups. The purpose of this study was to determine differences between Autistic Disorder, Asperger's Disorder, and PDD-NOS on appropriate and inappropriate social skills using the *MESSY-II*. Based on previous research (Shoemaker 2009), it is hypothesized that children with Autistic Disorder would display significantly greater social deficits than children with PDD-NOS or Asperger's Disorder.

Method

Participants

Fifty-seven children diagnosed with an ASD (i.e., Asperger's Disorder, Autistic Disorder, and PDD-NOS), between the ages of 4 and 16 years ($M=8.37$; $SD=3.22$), and their parents/legal guardians participated. The majority of child participants were male (84.2%). Child participants were identified as Caucasian (89.5%), African American (1.8%), Hispanic (1.8%), or Other/Unidentified (6.9%). Children were recruited from a variety of clinic, community, and school settings throughout the United States of America. ASD diagnoses were reported by parents/legal guardians as those that had been given by licensed psychologists and/or psychiatrists. In order to be included in the study, the child must have had an ASD diagnosis and have had the appropriate social skills assessment completed, as described below. Additionally, children were excluded if they had a comorbid diagnosis of ID as reported by their parents or reported IQ testing results in the ID range. Child participants were then divided into groups based on their diagnoses: Asperger's Disorder ($n=17$), Autistic Disorder ($n=20$), and PDD-NOS ($n=20$). Demographic information for children according to group is reported in Table 1. Limited information was available regarding the informants themselves; however, the majority were reported to be the biological mother ($n=48$). Other informants included biological fathers and grandparents.

Measure

Matson Evaluation of Social Skills in Youngsters-II (MESSY-II); Matson 2010) The *MESSY-II* is a revised version of the original *MESSY* (Matson et al. 1983b); it is an informant-based measure which assesses appropriate and inappropriate social skills in children ages 2 through 16 years (Matson 2010). It is comprised of 57 items which are rated on a 5-point Likert-type scale ranging from a score of 1 (not at all) to a score of 5 (very much). A three-factor solution for the *MESSY-II* has been empirically supported through an exploratory factor analysis: Hostile, Adaptive/Appropriate, and Inappropriately Assertive/Overconfident (Matson et al. in press). Factor scores were

Table 1 Demographic characteristics of sample by group

	ASD group		
	Asperger's disorder (<i>n</i> =17)	Autistic disorder (<i>n</i> =20)	PDD-NOS (<i>n</i> =20)
Age, in years			
Mean (<i>SD</i>)	10.00 (3.67)	7.60 (2.93)	7.75 (2.69)
Range	5–16	4–15	4–13
Gender,%			
Male	100.0%	90.0%	65.0%
Female	0.0%	10.0%	35.0%
Ethnicity,%			
Caucasian	82.3%	85.0%	100.0%
African American	5.9%	0.0%	0.0%
Hispanic	5.9%	0.0%	0.0%
Other/Unidentified	5.9%	15.0%	0.0%

computed by summing the scores of the items contained within each factor. Higher scores on the Hostile and Inappropriately Assertive/Overconfident factors correspond to excesses of inappropriate social skills while lower scores on the Adaptive/Appropriate factor indicate impairments in appropriate social skills. The *MESSY-II* has a high degree of internal consistency across all designated age groups and has demonstrated good to strong convergent and discriminant validity (Matson et al. 2010). Additionally, cutoff scores have been created according to age cohorts (Matson et al. 2011a).

Procedure

Participants were recruited from a variety of clinic, community, and school settings throughout the United States of America through the distribution of flyers and professional referrals. The present study was one part of a larger set of studies, and so a multitude of measures were administered to the parents/legal guardians for child participants including a demographic questionnaire, *MESSY-II* (Matson 2010), ASD assessment measure, psychopathology screener, challenging behavior inventory, and measure of adaptive functioning. Only the *MESSY-II* and portions of the demographic questionnaire were used in the current study. This study was approved by the Louisiana State University Institutional Review Board and informed consent was obtained from parents/legal guardians for all child participants.

Research Design

Prior to computing statistical analyses, the *MESSY-II* data were reviewed in order to ensure that item values were present and valid (i.e., within the constraints of the measure's scoring criteria). In the case that a participant was missing data, the missing datum point was replaced with the item's mean score of the participant's ASD group. Next, a priori tests were run to determine if the ASD groups differed on

demographic variables. Chi-square analyses were used to investigate gender and ethnicity differences between groups and an analysis of variance (ANOVA) was used to inspect age differences. The groups significantly differed according to gender [$\chi^2(2, N=57)=9.24, p=.01$] and by age, $F(2, 54)=3.83, p=.04$. All of the children diagnosed with Asperger's Disorder were male, as were nearly all the children with Autistic Disorder. The PDD-NOS group was more divided among genders with 35% of children being female. Ages between the Autistic Disorder and PDD-NOS group were not largely discrepant; however, the children diagnosed with Asperger's Disorder tended to be significantly older than the children in the other ASD groups. Lastly, the groups did not significantly differ with respect to ethnicity [$\chi^2(6, N=57)=8.35, p=.21$].

Since gender and age significantly differed between the ASD groups, two separate ANOVAs were computed to determine if these demographic variables were related to the outcome variables (i.e., the three factor scores on the *MESSY-II*). The first ANOVA was run with gender as the independent variable and the Hostile, Adaptive/Appropriate, and Inappropriately Assertive/Overconfident factor scores as the dependent variables. Gender was not significantly related to any of the outcome variables: Hostile [$F(1, 55)=0.17, p=.68$], Adaptive/Appropriate [$F(1, 55)=0.16, p=.69$], or Inappropriately Assertive/Overconfident [$F(1, 55)=0.31, p=.58$]. The second ANOVA used age as the independent variable and the same three factor scores as the dependent variables. Similarly, age was not significantly related to the Hostile factor [$F(12, 44)=1.26, p=.28$], Adaptive/Appropriate factor [$F(12, 44)=0.53, p=.89$], or Inappropriately Assertive/Overconfident factor [$F(12, 44)=1.76, p=.09$]. Since gender and age were both not found to be related to any of the outcome variables, despite differing significantly by group, they were not entered as covariates in subsequent analyses.

Next, histograms of the outcome variables (i.e., factor scores of the *MESSY-II*) were inspected by ASD group to make certain they fell along a normal distribution. Box's test of equality of covariance matrices and Levene's test of equality of error variances were also employed. Homogeneity of variance was met for the Adaptive/Appropriate factor [$F(2, 54)=0.67, p=.56$] and the Inappropriately Assertive/Overconfident factor [$F(2, 54)=2.47, p=.09$], but not for the Hostile factor [$F(2, 54)=4.99, p=.01$]. All other assumptions were met. A multivariate analysis of variance (MANOVA) was then conducted with ASD group as the independent variable and scores on the *MESSY-II* factors (Hostile, Adaptive/Appropriate, and Inappropriately Assertive/Overconfident) as the dependent variables. A significant MANOVA was followed up with three ANOVAs. The alpha level for each of the ANOVAs was set at $.05/3=.017$ in order to control for inflation of familywise error. Post hoc tests were computed to find where the differences were when an ANOVA was significant. Since a violation of homogeneity of variance existed for the Hostile factor, Tamhane's T2 post hoc tests were employed for all tests to control for unequal variances.

Results

There was a significant main effect for ASD group on the MANOVA for the three *MESSY-II* factors, Wilks' $\Lambda=.59, F(6, 104)=5.30, p<.001$. The significant main

effect of ASD group was followed with three ANOVAs for each of the *MESSY-II* factors. A significance level of $.05/3=.017$ was used to control for inflation of familywise error while running multiple comparisons simultaneously. There was a significant main effect of ASD group for the Hostile factor [$F(2, 54)=6.83, p=.002$] and Adaptive/Appropriate factor [$F(2, 54)=6.64, p=.003$], but not for the Inappropriately Assertive/Overconfident factor [$F(2, 54)=2.93, p=.062$]. The significant ANOVAs for the Hostile and Adaptive/Appropriate factors were followed with Tamhane's T2 post hoc tests. Results of Tamhane's T2 post hoc tests are presented in Table 2.

Discussion

Impairment in social skills is often considered the defining diagnostic feature of ASDs (Garcia-Villamisar and Dattilo 2011; Gillis et al. 2011; Mahan and Matson 2011; Rutter 1968; Sevin et al. 2007), with deficits in this domain leading to a multitude of negative consequences. These deficits are also highly correlated to collateral problem behaviors (Matson et al. 2011a, b, c, d). Although all three ASDs (i.e., Asperger's Disorder, Autistic Disorder, and PDD-NOS) are said to experience significant social skills deficiencies (Lugnegård et al. 2011), little research to date has examined the differences between social skills among the ASDs. Given that PDD-NOS is deemed a milder form of Autistic Disorder, commonly seen as a catch-all diagnosis when ASD symptoms are present but not frequent or severe enough to warrant any other specific ASD diagnosis (Tidmarsh and Volkmar 2003), it is understandable that individuals with PDD-NOS may exhibit less social impairments compared to their peers with Autistic Disorder (Shoemaker 2009). However, such comparisons have not yet been examined as closely between those with Asperger's Disorder and Autistic Disorder or between Asperger's Disorder and PDD-NOS. As such, the goal of the current study was to investigate the social skills differences between children with Asperger's Disorder, Autistic Disorder, and PDD-NOS according to the *MESSY-II*, a social skills assessment tool commonly used for children with ASDs.

Table 2 Mean scores and standard deviations of significant MESSY-II factors according to ASD group

	ASD Group		
	Asperger's disorder <i>M (SD)</i>	Autistic disorder <i>M (SD)</i>	PDD-NOS <i>M (SD)</i>
Hostile Factor	65.00 (24.27) ^b	43.67 (14.36) ^a	48.25 (15.55)
Adaptive/Appropriate Factor	55.30 (15.28) ^b	40.10 (12.87) ^a	49.25 (10.25)

^a Based on Tamhane's T2 post hoc analyses, significantly different from the Asperger's Disorder group ($p<.05$)

^b Based on Tamhane's T2 post hoc analyses, significantly different from the Autistic Disorder group ($p<.05$)

^c Based on Tamhane's T2 post hoc analyses, significantly different from the PDD-NOS group ($p<.05$)

Among the three factors comprising the *MESSY-II*, two factors differed significantly between children with Asperger's Disorder and Autistic Disorder—the Hostile and Adaptive/Appropriate factors. Children with Asperger's Disorder had significantly greater endorsements than children with Autistic Disorder on both of these factors, signifying greater impairments in social skills related to hostility and less impairment with respect to adaptive/appropriate social skills. No other significant differences were found between any of the groups on the Hostile or Adaptive/Appropriate factors, nor were there any significant differences between ASD groups on the Inappropriately Assertive/Overconfident Factor.

The significant differences found within the current investigation highlight some of the underlying differences between Asperger's Disorder and Autistic Disorder. While children with Asperger's Disorder presented with greater adaptive/appropriate social skills attainment and demonstration, they also engaged in increased levels of negative social skills related to hostility. Yet, no differences were found between groups on the Inappropriately Assertive/Overconfident factor, suggesting that group differences were specific and not only indicative of broadband social skills lying along a single continuum. That is, Asperger's Disorder did not appear to just be a variation of Autistic Disorder characterized by decreased levels of social impairments overall. Though communication is a differentiating factor between Asperger's Disorder and Autistic Disorder, with the former group displaying no significant impairments while the latter does, this dissimilarity cannot solely account for the differences found herein. If this were the case, then differences would be across all social skills factors since no one area appears to rely on communication skills more so than any other. Therefore, the differences found between Asperger's Disorder and Autistic Disorder warrant further examination to determine how individuals with Asperger's Disorder are unique in their social skills presentation (Liu et al. 2011).

The lack of differences in social skills between children with Autistic Disorder and PDD-NOS was somewhat surprising, especially given previous researchers showing that children with Autistic Disorder demonstrate greater social skills impairments than children with PDD-NOS (Shoemaker 2009). The absence of differences between Autistic Disorder and PDD-NOS may point to a general lack of discriminability of children with Autistic Disorder from children with PDD-NOS primarily according to social skills. As such, it shows that while children with PDD-NOS may not meet the full criteria for Autistic Disorder as it stands, their social skills impairments may mimic those seen in children meeting full criteria. Therefore, other symptoms comprising the core features of Autistic Disorder need to be considered when differentially diagnosing. At the same time, this would mean that children with PDD-NOS who may no longer meet criteria for an ASD diagnosis with the forthcoming *DSM-V* changes continue to display social skills impairments that warrant intervention.

Similarities in social skills between children with Asperger's Disorder and PDD-NOS was somewhat less surprising as both are often considered less severe forms of ASD. However, the lack of differences should be explored further. One possibility is that communication deficits are not necessary for either diagnosis, bringing the diagnoses more in line with one another than is the case for Asperger's Disorder and Autistic Disorder. It is also possible that relevant social skills that differentiate the two ASD were not adequately represented in the measure used in this study. These factors require further study.

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