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# Early Empathy Development and Cooperation in Toddlers at Risk for an Autism Spectrum Disorder

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UNIVERSITY OF MIAMI

EARLY EMPATHY DEVELOPMENT AND COOPERATION IN TODDLERS  
AT RISK FOR AN AUTISM SPECTRUM DISORDER

By

Nicole M. McDonald

A THESIS

Submitted to the Faculty  
of the University of Miami  
in partial fulfillment of the requirements for  
the degree of Master of Science

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People with autism spectrum disorders (ASDs) have difficulty empathizing with others, contributing to deficits in social interaction and communication. The degree of difficulty empathizing may be related to the level of impairment associated with the ASD. Little is known about the early development of empathy prior to ASD diagnosis. A novel way of studying the early development of ASDs is to study the development of younger siblings of children with ASDs, who are at an increased genetic risk for these disorders, and compare them to children with typically developing older siblings. The current study examined how empathic responding and cooperation, a measure of prosocial functioning, at 24 and 30 months of age differed between children who later received a diagnosis of autism or pervasive developmental disorder-not otherwise specified, and those who did not. Overall, children engaged in more empathic responding at 30 months than at 24 months. As expected, children later diagnosed with autism engaged in less empathic responding than children with no diagnosis. Additionally, lower empathic responding at 24 months predicted higher autism symptomatology at 30 months. In terms of cooperation, children tended to engage in less noncompliant behavior at 30 months than at 24 months. However, no age differences were found for compliant behavior. Contrary to expectations, there were no diagnostic group differences in cooperative behavior nor was there a relation between empathic responding and

cooperation. This was one of the first studies to investigate empathic responding in young children prior to diagnosis with an ASD. Results show that empathy deficits are present from an early age, and may be an important predictor for later diagnosis. Implications for these findings and future directions are discussed.

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# CHAPTER ONE

## INTRODUCTION

### *Empathy Deficits in Autism Spectrum Disorders*

Empathy is the ability to feel or imagine another person's emotional experience. Individuals better at responding empathically are more socially competent and more likely to engage in prosocial, or helping, behaviors (Eisenberg & Fabes, 1998). Among the central deficits in autism spectrum disorders (ASDs) are marked difficulty with social interaction and connecting with others (DSM-IV TR). These social difficulties may be related to a deficit in empathy. While studies have shown deficits in empathic responding and emotion recognition abilities in children and adults with ASDs, little is known about the early development of empathy in this population. In this study, I have examined how early empathic responding and cooperation, which was used as an indicator of prosocial functioning, differed between toddlers who later received an ASD diagnosis and those who did not. The present study was one of the first to investigate these constructs in toddlers prior to diagnosis with an ASD.

ASDs are a set of disorders present by three years of age that consist of impairments in social interaction and communication, as well as restricted interests and repetitive behaviors (DSM-IV TR, 2000). These impairments have a range of severity. The most severe of these disorders is autistic disorder (AD), which requires clinically significant impairment in all three areas (i.e., social, communication, and behavior), as well as a delay in speech and language acquisition. Pervasive developmental disorder – not otherwise specified (PDD) is considered less severe, and is diagnosed when

individuals experience difficulties in these areas, but do not meet full criteria for autistic disorder.

Previous findings show that older children with ASDs have difficulty with empathy-related tasks. Yirmiya, Sigman, Kasari, and Mundy (1992) found that high-functioning children with autism (IQ > 75; 9-16 years) performed less well on empathy-related tasks (i.e., discriminating affective states of others, perspective-taking, and emotional response) than their typically developing peers. Another study found that children with autism had more difficulty on empathy-related tasks than children with other mental health disorders (e.g., Depression, ADHD; Dyck, Ferguson, & Shochet, 2001). Interestingly, in this same study, the performance of children with Asperger's Syndrome, which is considered to be a less severe ASD, did not differ from controls on these tasks.

A few studies have examined empathy in younger children with ASDs by looking at responses to other's simulated distress. In a study examining preschool children's responses to simulated distress in an experimenter, the low-functioning autism group (Nonverbal IQ < 80) was differentiated from all other groups, with nearly half of the children showing no response (Bacon, Fein, Morris, Waterhouse, & Allen, 1998). The high-functioning autism group did not differ from controls, including children with mental retardation, language deficits, and typically developing children, in their overall response/no response rate. However, this study focused mainly on whether the children responded, and did not examine differences in concerned expression. Sigman, Kasari, Kwon, and Yirmiya (1992) compared the responses of autistic, mentally retarded, and typically developing preschool children's responses to negative affect in an experimenter.

They found that while the typically developing and mentally retarded children consistently attended to the adult in distress, the children with autism attended more to the toys and less to the distressed person. Finally, a study examined the empathic responding of very young children diagnosed with autism (20 months), in comparison to chronological age-matched typically developing and developmentally delayed children (Charman et al., 1997). While all of the children in the comparison groups attended to the person in distress, less than half of the autism group looked to the distressed adult. Significantly, none of the children in the autism group showed facial concern in comparison to approximately half of the children in the other two groups.

#### *Typical Empathy Development*

While the previously described studies provide evidence for empathy deficits in children with ASDs, there is still little known about the early development of empathy in this population. Precursors to empathy can be seen as early as 34 hours post-birth in newborns' responses to other infants' cries of distress (Sagi & Hoffman, 1976). In typically developing children, empathic responding is usually first observed during the second year of life (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). By approximately 18 months of age, many typically developing toddlers display concern about other's distress and are capable of a wide variety of helping behaviors (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992; Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008). The current study sought to investigate the empathic responding of young children at risk for an ASD nearer to the age when typically developing children begin to show empathic responding.

### *Empathy and Cooperation*

A second aim of this study was to measure the effect of empathic responding on cooperation, an indicator of social functioning. Kochanska and colleagues have conducted a similar investigation in typically developing children, specifically looking at the relationship between empathy and guilt to rule-compatible conduct (i.e., the degree to which children followed maternal and experimenter rules). The observed empathic distress and guilt of 33-month-old children were associated with their rule-compatible conduct, so that children experiencing more guilt and empathic distress were more likely to follow the given rules (Aksan & Kochanska, 2005). The relation between moral emotions and conduct in these children was stable, yet stronger at 45 months of age (Aksan & Kochanska, 2005).

### *The Current Study*

I examined the empathic responding and cooperative behaviors of toddlers who later received an ASD diagnosis and those who did not. These behaviors were measured at 24 and 30 months of age, ages at which typically developing children would be expected to have begun responding empathically to others in distress. Since autism is generally not diagnosed until preschool age (3-5 years), I have looked prospectively at young children with an increased genetic risk for an ASD (i.e., at least one older sibling diagnosed with an ASD), as well as children with older siblings who show no evidence of having an ASD. Children received a diagnosis of AD, PDD, or no diagnosis at three years of age. I have used the AD/PDD diagnostic differentiation and scores on an observation measure of autism symptomatology as indicators of severity of the ASD. This allowed for

investigation of the relationship between level of impairment and empathy at these early ages.

Empathic responding was measured at both time points from the children's responses to simulated distress in their parent. Children in the different diagnostic groups were expected to differ in their overall amount of empathic responding, with the AD group expected to have the most difficulty at both 24 and 30 months of age. The PDD group was expected to display less empathic responding than children with no diagnosis, but to respond more empathically than the AD group at both time points. Group differences in the level of empathic responding over time were also investigated. Empathic responding was expected to predict level of later autism symptomatology.

Cooperation was measured at both time points from the children's behavior when accomplishing a goal with their parent. Children in the different diagnostic groups were expected to differ in their degree of cooperation with their parent, with the AD group being the least cooperative at both time points. The PDD group was expected to display less cooperative behavior than children with no diagnosis, but to be more cooperative than the AD group, at both time points. However, these analyses were somewhat exploratory, as, to the author's knowledge, no previous studies have investigated this construct in young children at varying risk for ASDs.

The relation between empathic responding and cooperation was also examined, with more empathic children expected to be more cooperative. Since the relation between empathy and behavior has been shown to strengthen as children get older, I expected that this association would be greater at 30 months of age. The relation between empathy and cooperation was also examined separately by diagnostic group.

## CHAPTER TWO

### METHOD

#### *Participants*

Participants were enrolled in an ongoing, longitudinal study at the University of Miami, which examined the early social and emotional development of infants at risk for developing an autism spectrum disorder (ASD). Infants were recruited by referrals from the University of Miami/Nova Southeastern University Center for Autism and Related Disabilities, the Autism Spectrum Assessment Clinic, and the University of Miami Psychological Services Center. A brochure was also distributed at autism-related events and other functions to parents of infants, and mailed to parents of infants whose addresses and names were obtained from Miami-Dade County birth records. Infants were also recruited by contacting child care programs, as well as through word of mouth.

Upon entering the study, infants were placed in a comparison group if they did not have any older siblings diagnosed with or showing any research evidence of an ASD-related disorder. Infants were placed in the at risk group if they had at least one older sibling with a diagnosis of an ASD. Older sibling diagnoses were confirmed by a clinician, based upon DSM-IV diagnostic criteria and results from the Autism Diagnostic Observation Schedule (ADOS). An ASD screener, the Social-Communication Questionnaire (SCQ), was completed by the parent for all older siblings. Older siblings in the comparison group who received an elevated score (SCQ total  $\geq 9$ ) were administered an ADOS.

Following the final visit (36 months), younger siblings received a diagnosis of Autistic Disorder (AD), Pervasive Developmental Disorder – Not Otherwise Specified



(PDD), or No Autism Spectrum Disorder (No ASD). Diagnoses were made by an experienced, independent clinician who was blind to sibling group status. Diagnostic decisions were based upon results from the Autism Diagnostic Inventory – Revised (ADI-R; administered to parent at 36 months), the ADOS (administered to child at 30 months), and clinical judgment. Reliability for diagnoses was assessed by a second expert clinician who reviewed the video and records for all of the cases in the current sample. Good diagnostic reliability was established (Kappa=.93, 96% agreement). One diagnostic classification disagreement was present between the clinicians and was resolved by consensus. In addition, ADOS severity scores were calculated for each child based upon the criteria presented in Gotham, Risi, Pickles, and Lord (2007). Severity scores in the current study ranged from 1 to 10, with a score of 4 or 5 indicating PDD and a score of 6 or greater indicating AD. ADOSes were scored by an experienced, independent clinician who had achieved at least 80% reliability with a designated ADOS trainer.

The current study reports data from the 24- and 30-month time points. Only children with complete data were included in analyses. Six early participants missed the 24-month time point due to difficulty being contacted as a result of the study originally concluding at 18 months. An additional eleven participants were lost due to attrition and missed appointments, and eight due to technical difficulties with recorded data. Twenty-eight children (AD=4, PDD=6, No ASD=18) were included in the final sample. See Table 1 for further participant information.

### *Overview*

At the 24- and 30-month time points, the families visited the university laboratory to participate in a 1.5- to 2.0-hour session. The families were reimbursed \$60 for each

visit. A graduate student and/or research coordinator conducted all sessions. The visits began with a seven-minute free play, followed by an empathy elicitor, and clean-up task. Trained research assistants and graduate students coded digital video recordings of the visits.

*Assessment of Child Empathy, 24 and 30 months*

*Procedure.* Prior to the session, a graduate student gave the parent the following instructions related to the empathy elicitor: “After you and [child’s name] play for a while, I will step into the room to alert you to begin pretending that you have something in your eye. Act like it really bothers you by saying ‘Oh, I have something in my eye.’ Carry on like this for a while but don’t say your child’s name or suggest your child do anything to help you feel better. You can begin your acting as soon as I leave the room.” Instructions were attempted to be outside of the hearing of the child. If the parent did not begin the empathy elicitor at first prompting, the examiner prompted the parent unobtrusively up to two times. The task lasted approximately one minute. It was terminated once the examiner re-entered the room and instructed the parent to tell the child that her eye feels better.

*Coding.* An empathy coding system originally established by Zahn-Waxler, Radke-Yarrow, Wagner, and Chapman (1992) and adapted by Young, Fox, and Zahn-Waxler (1999) was utilized for this study. An undergraduate research assistant blind to sibling group status and eventual diagnosis was trained and became reliable in this coding system. Each episode was given ratings on four empathy-related dimensions: Empathic Concern (1-4), Prosocial Behavior (1-4), Arousal Level (1-5), and Global Empathy (1-7). See Table 2 for more specific information on these dimensions. For quality assurance

purposes, the parent's performance was given a Credibility rating of 1 – not believable, 2 – passable, or 3 – particularly authentic, as well as an Affective Intensity rating of 1 – little or no affect, 2 – moderate level of affect, or 3 – high affect and pain expressed.

*Reliability.* Fifteen out of 56 (27%) of the total 24- and 30-month sample were double-coded to establish reliability. Good reliability was established along the four empathy-related dimensions. Absolute-agreement intra-class correlations for these dimensions were as follows: Empathic Concern (.75), Prosocial Behavior (.89), Arousal Level (.90), and Global Empathy (.82). In terms of parent performance, there was 100% agreement for Credibility and Affective Intensity scores. However, there was little variation in these scores. All parents in this sample were rated as having a passable performance, and the majority of parents were rated as expressing a moderate level of affect. These ratings are consistent with those reported in Young, Fox, and Zahn-Waxler (1999). Parent performance scores were not correlated with Empathy scores, so they were not included in further analyses.

#### *Assessment of Child Cooperation, 24 and 30 months*

*Procedure.* Cooperation was assessed at 24 and 30 months of age. Following the empathy elicitor, the experimenter entered the room and informed the parent to clean up with the child as they normally would at home. This task continued until the toys were put away or five minutes had passed.

*Coding.* The Child Compliance subscale of the Clean-Up Task Coding Manual (Guisti, Mirsky, Dickstein, & Seifer, 1997) was used to code child cooperative behaviors. A research assistant blind to sibling group status, eventual diagnosis, and performance on

the empathy elicitor, was trained and became reliable in this coding system. Videos of the episodes were coded in 15-second segments.

For Cooperation, one of six codes was given per 15-second segment. The six codes were: Time Out, Committed Compliance, Situational Compliance, Passive Noncompliance, Overt Resistance, and Overt Defiance. The predominant behavior for each segment was assigned, with the exception of Overt Resistance and Overt Defiance, which were assigned if present at any point during the segment. Time Out was coded when there was no on-task clean-up behavior by the child, and the mother *explicitly* suspended the expectation that the child should be cleaning. Committed Compliance was coded when the child displayed a wholehearted embrace of the parental agenda. Situational Compliance was coded when the child was receptive to parental agenda, but displayed only half-hearted cooperation, and was only responsive to immediate parental objectives. Passive Noncompliance was coded when the child was passively reluctant to accept parental agenda, was non-cooperative, or was ignoring parental directives without anger. Overt Resistance was coded when the child overtly refused parental agenda without clearly articulated anger or defiance. Overt Defiance was coded when the child overtly defied, rejected, or protested parental agenda with accompanying anger or defiance.

The primary score used for analyses was the proportion of Committed Compliance codes within an episode. Additionally, Situational Compliance and a combined Noncompliance score were used for analyses. The combined Noncompliance score was calculated for the purpose of simplifying analyses. It was comprised of the total proportion of segments coded as Passive Noncompliance, Overt Resistance, or

Overt Defiance within an episode. Time Out codes were treated as uncodeable, and proportions of other codes were computed without Time Out segments included in the total number of segments.

*Reliability.* Twenty-eight of 54 (52%) of the total 24- and 30-month Cooperation sample were double-coded to establish reliability. Acceptable reliability was established between coders for the codes across episodes, with the three types of noncompliance combined into one Noncompliance code ( $Kappa=.70$ ). In addition, good reliability was established for the three proportion scores used in analyses. Absolute-agreement intra-class correlations for proportion scores were as follows: Committed Compliance (.81), Situational Compliance (.77), and Noncompliance (.93).

## CHAPTER THREE

### RESULTS

#### *Empathy*

Pearson's correlations were computed for empathy-related dimensions within and between each time point (see Table 3). Within each time point, nearly all empathy-related dimensions were correlated with each other. Some empathy-related dimensions were correlated across time points. Namely, levels of Empathic Concern and Global Empathy were stable over time. Also, 30-month Empathic Concern was correlated with 24-month Prosocial Behavior and 24-month Global Empathy.

Descriptive statistics for ratings on empathy-related dimensions by Diagnosis group are presented in Table 4. A 3 (Diagnosis) x 2 (Age) Mixed Design ANOVA was conducted, with Global Empathy rating used as the dependent variable. Levene's test of equality of error variances was run due to unequal group sizes, and was not significant. As expected, there was a main effect of Diagnosis,  $F(2,25)=9.27, p<.01, \text{partial } \eta^2=.43$ . Bonferroni follow-up analyses indicated that the AD group responded less empathically than the No ASD group,  $p<.01$ . The differences between the PDD group and the AD and No ASD groups were not significant. Also in line with hypotheses, there was a main of Age, with children overall responding more empathically at 30 months than at 24 months,  $F(1,25)=6.68, p<.05, \text{partial } \eta^2=.21$ . There was no interaction between Diagnosis and Age,  $F(2,25)=1.38, ns$ . These data are presented in Figure 1.

Age and Diagnosis group differences in Empathic Concern, Prosocial Behavior, and Arousal Level were also analyzed. Three 3 (Diagnosis) x 2 (Age) Mixed Design ANOVA tests were conducted. For Empathic Concern, a main effect was found for

Diagnosis,  $F(2,25)=6.17, p<.01, \text{partial } \eta^2=.33$ . Bonferroni follow-up analyses indicated that the AD group displayed less empathic concern than the No ASD group,  $p=.01$ . There were no other significant effects for Empathic Concern. For Prosocial Behavior, main effects were found for Diagnosis,  $F(2,25)=5.73, p<.01, \text{partial } \eta^2=.31$ , and Age  $F(1,25)=6.68, p<.05, \text{partial } \eta^2=.21$ . Bonferroni follow-up analyses suggested that the AD group engaged in less prosocial behavior than the No ASD group,  $p<.01$ . No significant interaction was found for Prosocial Behavior. Finally, for Arousal Level, the main effect for Diagnosis was marginally significant,  $F(2,25)=3.53, p<.05, \text{partial } \eta^2=.22$ , with Bonferroni follow-up analyses showing that the AD group was significantly less aroused during the empathy elicitor than was the No ASD group,  $p<.05$ . There were no other significant findings for Arousal Level.

The relation between empathic responding and autism severity was also analyzed. A regression analysis was conducted, with 24-month Empathy as the predictor variable and 30-month ADOS severity as the criterion variable. Empathy at 24 months was correlated with,  $r(27)=-.58, p<.01$ , and predicted ADOS severity at 30 months,  $F(1,26)=13.06, p<.01$ , indicating that children responding more empathically at 24 months exhibited less autistic symptomatology at 30 months. These results are displayed in Figure 2. In addition, 30 month Empathy was negatively correlated with ADOS severity,  $r(27)=-.52, p<.01$ .

Gender differences in empathic responding were also assessed. No gender group differences were found. However, there was a significant interaction effect for Age and Gender, with girls improving more over time in their use of prosocial behavior than boys,  $F(1,26)=4.70, p<.05, \text{partial } \eta^2=.15$ . No other gender differences were found.

### *Cooperation*

Pearson's correlations were computed for cooperation dimensions (i.e., Committed Compliance, Situational Compliance, and Noncompliance) within and between each time point (see Table 5). Noncompliance was negatively correlated with Committed and Situational Compliance within each time point, so that children who engaged in more compliant behaviors were less likely to engage in noncompliant behaviors within the same clean up episode. In addition, Committed and Situational Compliance were negatively correlated only at 30 months, so that children who engaged in more dedicated clean up behaviors were less likely to engage in clean up behaviors dependent on parent prompts at 30 months but not at 24 months.

Descriptive statistics for cooperative behaviors by Diagnosis group are presented in Table 6. In order to analyze group differences, three 3 (Diagnosis) x 2 (Age) Mixed Design ANOVAs were conducted, with proportion of Committed Compliance, proportion of Situational Compliance, and proportion of Noncompliance used as the dependent variables. Levene's test of equality of error variances was not significant. Contrary to expectations, no main effects of Diagnosis were found for any cooperation dimension. A marginally significant main effect of Age was found for Noncompliance,  $F(1,25)=3.23, p=.08, \text{partial } \eta^2=.11$ , with children tending to engage in more noncompliant behaviors at 24 months rather than at 30 months. No age differences were found for Committed or Situational Compliance. As well, no gender differences in cooperative behavior were found.



### *Empathy and Cooperation*

The relation between Empathy and Cooperation was analyzed within and between time points using correlation and regression analyses. First, a regression was conducted with 24-month Empathy as the predictor and 30-month Committed Compliance as the criterion. Contrary to expectations, 24-month Empathy did not predict 30-month Committed Compliance,  $F(1,27)=.08, ns$ . In addition, no significant correlations were found between 24-month Empathy and any of the 24-month Cooperation dimensions. Since Empathy was found to not predict later Committed Compliance, the alternative hypothesis was also explored. Yet, 24-month Committed Compliance did not predict 30-month Empathy,  $F(1,27)=.95, ns$ . There were no significant correlations found between 24- or 30-month Empathy and any of the 24- or 30-month Cooperation dimensions. The relation between Empathy and Cooperation was also explored differentially by Diagnosis group and Gender, however, no significant associations were found.

## CHAPTER FOUR

### DISCUSSION

The current study was one of the first to investigate empathic responding in toddlers prior to diagnosis with an ASD. Children later diagnosed with autism showed less overall empathic responding than children with no diagnosis. More specifically, children later diagnosed with autism showed deficits in the degree to which they expressed concern and engaged in prosocial behavior with their distressed parent. Children later diagnosed with PDD did not differ significantly from either group in their mean levels of empathic responding. However, the finding that children with lower levels of empathic responding at 24 months of age showed higher levels of autistic symptomatology at 30 months of age suggests that severity of ASD diagnosis is, in fact, related to the level of empathy deficit.

The current study extends findings showing empathy deficits in preschool-aged children with an ASD (Bacon et al., 1998; Sigman et al., 1992), indicating that these deficits are present as early as 24 months of age and prior to diagnosis with autism. The present study also reproduced findings from a previous study that showed deficits in facial concern in toddlers given an early diagnosis of autism (Charman et al., 1997), providing further support that children with autism show deficits in their expressed concern for others from quite early in their development. As well, this is the first study to find that early levels of empathic responding predict later levels of autism symptomatology. This finding suggests that observed or reported empathy deficits may be an important early marker for ASD risk and may become a useful tool for early assessment of ASD, when used in concert with other measures.

Contrary to expectations, children later diagnosed with an ASD were not different from children with no diagnosis in their cooperative behaviors during a parent-child clean up task. Although children later diagnosed with an ASD were expected to have lower levels of committed compliance, and higher levels of situational compliance and noncompliance, no group differences were found. While relatively few studies have investigated the cooperative abilities of children with ASDs, this finding is somewhat inconsistent with previous studies indicating lower levels of cooperation in children diagnosed with an ASD (Colombi, Liebal, Tomasello, Young, Warnekan, & Rogers, 2009; Liebal, Colombi, Rogers, Warneken, & Tomasello, 2008). This inconsistency may be due to a variety of factors. One such factor is the use of different measures. Previous studies finding lower levels of cooperation in young children with autism have used more unique tasks, such as a task in which a toy was enclosed in a tube and required two people to retrieve it, while the current study used a more familiar clean up situation (Colombi et al., 2009; Liebal et al., 2008). In addition, previous studies have measured child cooperation with an experimenter, while the current study measured cooperation within a parent-child interaction. The children in this study were also younger, on average, than the children in previous studies. In the current study, levels of compliance, particularly committed compliance, were fairly low for all groups, especially at 24 months of age. It may be that with the more familiar situation (i.e., clean up) and cooperative partner (i.e., parent), as well as the relatively young ages of participants fostered lower levels of cooperation within all groups. As such, it might be informative to investigate cooperation at a later time point, when children are typically more cooperative, in order to have sufficient variety to assess group differences. It is also

possible that a parenting factor, such as type of guidance used, is more predictive of cooperation than eventual diagnosis in these children.

To the author's knowledge, this is the first study to examine the relation between empathic responding and cooperation in a sample at risk for an ASD. In contrast to similar investigations conducted by Kochanska and colleagues, no relation was found between these two constructs. While this is inconsistent with hypotheses, there are a few factors that may explain this lack of relation. First, Aksan and Kochanska (2005) measured similar concepts in slightly older children (33 and 45 months). In their study, the relation between moral emotion (i.e., guilt and empathy) and rule-compatible conduct was significant but relatively small at 33 months, and somewhat stronger at 45 months of age. It may be that cooperation is not yet stable at these early ages, and would relate to each other at a later age. As well, the current study used a "do" task to measure cooperation, while results from Aksan and Kochanska (2005) were primarily reliant on a "don't" task. It may be that toddlers are more familiar with and find it easier to comply with comparatively simple "don't" rules. Additionally, as discussed previously, there were relatively low levels of committed compliance in the current study. This lack of variety in cooperative behavior may have diminished this study's ability to discover a relation between empathy and cooperative behavior. Significantly, the current study was also different from previous work, in that it included children who were not typically developing. While significant associations were not found when this relation was investigated separately by group, it will be important to re-examine with a larger sample to re-assess whether the ability to empathize is more or less important for cooperative behavior for children with an ASD.

### *Limitations*

While the present study is significant in that it is one of the first to find that young children with autism show deficits in empathic responding from an early age and prior to ASD diagnosis, it has several limitations. The first, and most substantial, limitation is the relatively small sample size, particularly the size of the ASD groups. Although uneven groups are to be expected in an at risk sample and significant results were found despite this limitation, the small size of the ASD groups likely affected the ability to discriminate between the children later diagnosed with PDD and the other groups. However, when using a continuous metric to measure autism symptomatology (i.e., ADOS severity), a strong negative relation was found between level of autism symptomatology and empathic responding. In addition, the current study included only one measure of empathy at each time point. It is possible that, because of this, some of the children's behavior may have been unduly influenced by situational factors unrelated to the child's empathic ability. That the performer in the empathy elicitor was the parent rather than an experimenter is both a strength and a limitation. This allows for the assessment of empathy within the parent-child relationship, and adds to the literature on autism and empathy that has primarily assessed responses to the distress of an experimenter. On the other hand, the actor being the parent rather than an experimenter necessitates a loss of standardization in protocol administration. Finally, while this study included earlier ages than nearly all comparable studies, it could have been improved by measuring empathy during the second year of life, when it is first emerging.

*Future Directions*

More research is needed to further explore the nature of empathy deficits in children with ASDs, as well as influences on and implications of empathy development in these children. As alluded to in the above discussion on limitations, empathic responding should be measured during the second year as well as the third year of life and later in order to have a clearer picture of what developmental trajectories look like in children at risk for an ASD. In addition, it will be important to investigate possible contributors to individual differences in empathic ability, such as characteristics of parent-child interaction in infancy, to determine whether aspects of the environment have more or less of an influence on empathy development in children who go on to have an ASD diagnosis, in comparison to typically developing children. Lastly, future studies should further investigate implications of these empathy deficits at later ages, including the relation to social factors such as cooperation and social competence, as well as empathy outside of the parent-child relationship.

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Figure 1

Mean Empathy rating by Diagnosis group over time (AD=4, PDD=6, No ASD=18)

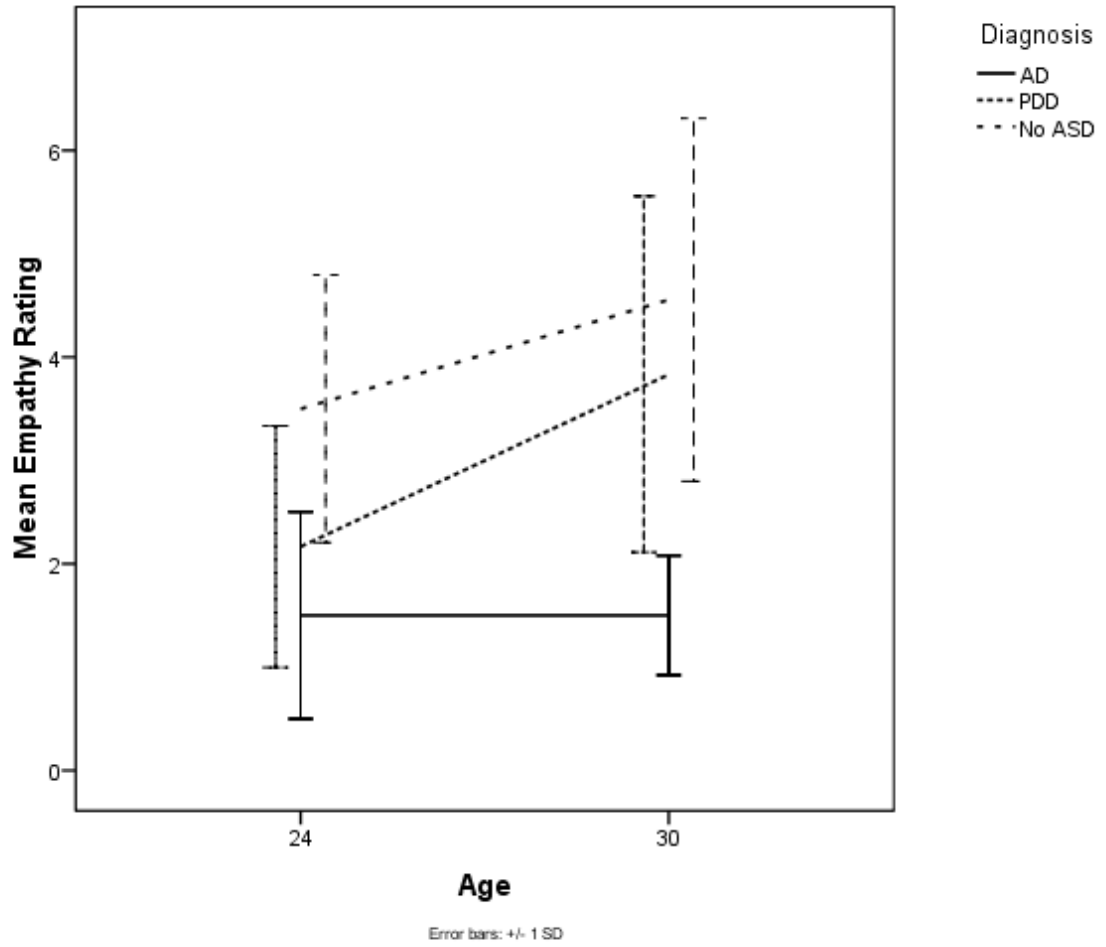


Figure 2

24-month Empathy and 30-month ADOS severity score (n=28)

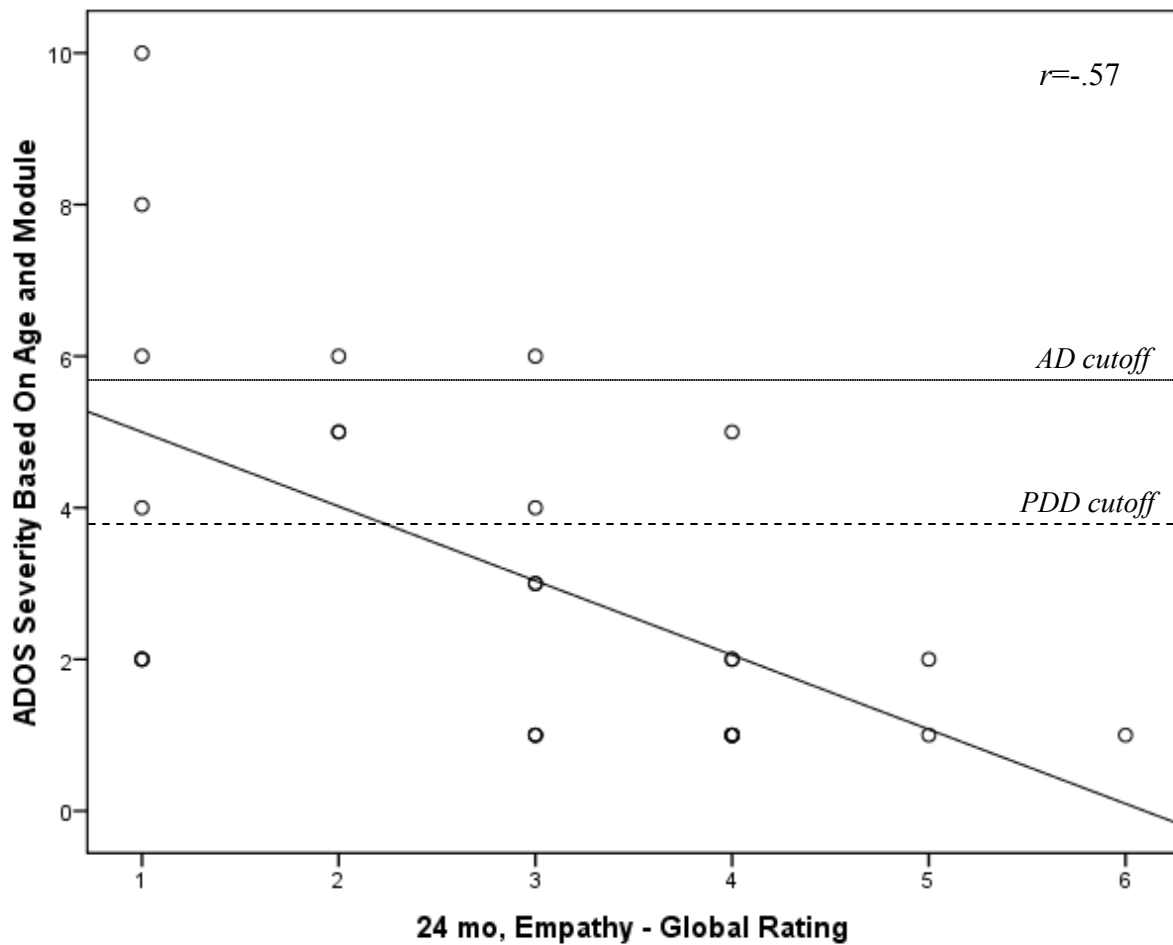


Table 1

*Participant information by Diagnosis*

Diagnosis group	<i>N</i>	Male	Female
AD	4	3	1
PDD	6	5	1
No ASD	18	10	8
Total	28	18	10

Table 2

*Description and ratings of empathy-related dimensions*

Measure	Description	Ratings
Empathic Concern	Facial, gestural, and vocal signs of distress and sympathy	1 = none 2 = sobering of attention, slight concern 3 = moderate concern, including brow furrowing 4 = strong facial concern, brow furrowing, reflecting sadness; sympathetic expression
Prosocial Behavior	Children's attempts to comfort or relieve parent's distress.	1 = none 2 = briefly assisting 3 = moderate assistance 4 = repeated or prolonged assistance
Arousal Level	Body tension (e.g., stiff posture, discontinuing play, attention to parent)	1 = child ignores parent 2 = child attends to victim with little body tension, play is uninterrupted 3 = moderate arousal, play is disrupted 4 = moderately high arousal, body tension and postural freezing 5 = high arousal, prolonged body tension and postural freezing
Global Empathy	Overall quality of the children's empathic responding	1 = none 3 = mild concern, no prosocial action 5 = moderate concern, some prosocial behavior 7 = strong expressions of concern and caring behavior

Table 3

*Correlations between empathy-related dimensions within and between time points (n=28)*

Dimension	1	2	3	4	5	6	7	8
<i>24 months</i>								
1. Empathic Concern	—	.36	.68**	.68**	.39*	.23	.00	.29
2. Prosocial Behavior		—	.29	.74**	.43*	.12	.23	.27
3. Arousal Level			—	.75**	.27	.11	.27	.27
4. Global Empathy				—	.51**	.16	.29	.38*
<i>30 months</i>								
5. Empathic Concern					—	.58**	.66**	.83**
6. Prosocial Behavior						—	.51**	.87**
7. Arousal Level							—	.76**
8. Global Empathy								—

\* Significant at .05 level

\*\* Significant at .01 level

Table 4

*Means (and SDs) for empathy-related dimensions by Age and Diagnosis*

Diagnosis group ( <i>n</i> )	Empathic Concern (1-4)	Prosocial Behavior (1-4)	Arousal Level (1-5)	<b>Global Empathy (1-7)</b>
<i>24 months</i>				
AD (4)	1.25 (.50)	1.00 (.00)	2.00 (1.41)	<b>1.50 (1.00)</b>
PDD (6)	1.50 (.55)	1.17 (.41)	2.33 (1.21)	<b>2.17 (1.17)</b>
No ASD (18)	1.94 (.54)	1.78 (.94)	2.94 (1.11)	<b>3.50 (1.30)</b>
<i>30 months</i>				
AD (4)	1.25 (.50)	1.00 (.00)	1.25 (.50)	<b>1.50 (.58)</b>
PDD (6)	1.67 (.52)	2.67 (1.51)	3.33 (1.86)	<b>3.83 (1.72)</b>
No ASD (18)	2.28 (.83)	2.78 (1.11)	3.06 (1.11)	<b>4.56 (1.76)</b>

Table 5

*Correlations between cooperative behaviors within and between time points (n=28)*

Dimension	1	2	3	4	5	6
<i>24 months</i>						
1. Committed Compliance	—	-.07	-.59**	.21	-.13	-.06
2. Situational Compliance		—	-.76**	.21	.14	-.32
3. Noncompliance			—	-.30	-.03	.29
<i>30 months</i>						
4. Committed Compliance				—	-.44*	-.44*
5. Situational Compliance					—	-.61**
6. Noncompliance						—

\* Significant at .05 level

\*\* Significant at .01 level

Table 6

*Means (and SDs) for proportion of cooperative behaviors by Age and Diagnosis*

Diagnosis group ( <i>n</i> )	Committed Compliance	Situational Compliance	Noncompliance
<i>24 months</i>			
AD (4)	.13 (.25)	.38 (.29)	.50 (.35)
PDD (6)	.15 (.26)	.41 (.31)	.45 (.29)
No ASD (18)	.14 (.20)	.31 (.25)	.55 (.34)
<i>30 months</i>			
AD (4)	.23 (.27)	.37 (.35)	.40 (.43)
PDD (6)	.29 (.39)	.40 (.43)	.31 (.35)
No ASD (18)	.18 (.23)	.47 (.31)	.31 (.28)