

Associations between Emotional Competence and Prosocial Behaviors with Peers among  
Children with Autism Spectrum Disorder

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The Importance of Emotional Competence for Prosocial Behaviors with Peers among Children  
with and without Autism Spectrum Disorder

**Abstract**

Children with ASD are at risk for disrupted peer interactions. This study contributes to our understanding of how multiple foundational elements of emotional competence are related to children's positive prosocial behaviors. Children's emotion knowledge and emotion regulation (modulation of dysregulation and use of discrete coping strategies) emerged as the most salient factors associated with their prosocial behaviors with peers one year later. The link between children's use of discrete coping strategies and prosocial behavior was strongest for children with low levels, rather than heightened, negative affect. The findings add to our understanding of how emotional development contributes to individual differences in the social-emotional challenges of children with ASD, and have important implications for interventions targeting these children's social-emotional competence.

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During the preschool years, peer interactions can be emotionally-charged situations. In a typical round of play, peers may start a game without a child, purposely destroy something a child is building, and interrupt a child's favorite activity. Learning to respond in socially appropriate ways is a key developmental task for preschoolers. Social competence is reflected through such prosocial behaviors as cooperation, showing kindness, and offering help to others (Ladd & Profilet, 1996). Socially competent children tend to have more supportive, close relationships with peers (Ladd et al., 1999) and these relationships are an important source of support, assistance and security throughout the school day (Hartrup, 1996). Unfortunately, for children with Autism Spectrum Disorder (ASD), social interactions are an area of significant challenge. Even among those with more advanced cognitive and language skills, these children may show difficulties with peer engagement, including lower frequency and poorer quality social initiations and responses with peers, poorer social skills, and more ritualistic behaviors; as a result, they may have more disrupted exchanges, fewer reciprocal friendships, and hold less central positions in peer networks (Bauminger, 2002; Chamberlain, Kasari, & Rotheram-Fuller, 2007). Importantly, however, there is much heterogeneity found with respect to the desire of children with ASD to seek out and initiate social exchanges with their peers. Although many children display aloof behaviors, other children and adolescents with ASD are quite motivated to seek social interactions and friendships (Bauminger et al., 2003). Thus, there is a clear need to

better understand the factors linked to individual differences in social competence with peers among children with ASD.

Denham and colleagues (2003) propose a model which identifies the emotional prerequisites for typical preschoolers' social competence with peers, that is, those indices of emotional competence that appear to have lasting effects on children's social development. Specifically, based on the foundational skills that Rose-Krasnor (1997) identified in her theoretical conceptualization of social competence, the emotional prerequisites identified by Denham et al. (2003) include children's knowledge or understanding about emotions (Denham et al., 1990), emotion regulation, or the modulation of emotional reactivity (Calkins & Mackler, 2011), use of effective coping strategies in the context of peer interactions (Eisenberg, Fabes, Bernzweig, Karbon, Poulin, & Hanish, 1993), and emotional expressiveness (e.g., temperamental negative affect; Rothbart, Posner, & Hershey, 2006). In line with the notion set forth by Denham et al. (2003) that there is a need to understand the emotional prerequisites of young children's social competence in a comprehensive, rather than piecemeal approach, this study sought to understand the relative contribution of emotional prerequisites to the prosocial behaviors of preschoolers with ASD, a population that demonstrates significant social-emotional challenges. Specifically, in a sample of preschoolers with ASD without significant cognitive or language delays and their typical peers, we examined children's emotion knowledge, emotion regulation (i.e., achievement of regulation versus dysregulation), the coping strategies employed by children in emotion-eliciting situations with peers, and emotional expressiveness, as measured by negative temperament. Given the need to better understanding heterogeneity in the prosocial

behaviors of children with ASD, we examined how children's emotional resources were collectively related to subsequent social behaviors.

### **Emotion Knowledge**

One of the key capacities of children's emotional competence involves their knowledge about their own and others' affective experiences. The ability to discriminate and label simple emotions such as happiness, sadness, anger, and fear, emerges by around age two for typically-developing children (Denham & Couchoud, 1990), whereas more complex emotions like pride, embarrassment, guilt, and empathy emerge later, once children begin to show self-evaluation, social comparison, and perspective-taking (Denham, von Salisch, Olthof, Kochanoff, & Caverly, 2002). By the end of preschool, children can identify the linkage between emotion expressions, situations that cause emotions, and consequences of such emotional expressions (Denham & Couchoud, 1990a), and by kindergarten children realize that there are equivocal situations in which other children may feel different and have different emotional reactions than themselves (Denham, Caverly, Schmidt, Blair, DeMulder, Caal, Hamada, & Mason, 2002; Denham & Couchoud, 1990b). Finally, the development of emotion recognition, especially that regarding complex emotions, appears to coincide with children's increased prosocial behaviors in social contexts; for example, from around three to five years, most children are able to respond with positive interventions when others are in need (Denham, McKinley, Couchoud, & Hold, 1990) and emotional knowledge predicts social competence, both concurrently and in kindergarten (Denham, Blair, DeMulder, Levitas, Sawyer, Auerbach-Major, & Queenan, 2003).

In contrast to the typical course of development, some aspects of emotion knowledge appear to be delayed for young children with ASD. There is evidence of neurobiological

underpinnings of such delays, as emotion recognition deficits have been connected to the hypoactivation of the amygdala and fusiform area in the temporal lobe (see Di Marino et al., 2009, for a review). Although a comprehensive review of such work is outside the scope of this study, broadly speaking, findings on group differences have been mixed. There is evidence that children with ASD have specific delays in attending to relevant emotional facial cues in others, as well as recognizing and interpreting the emotional expressions of others due to deficits in processing emotion-related stimuli (e.g., Hobson, Ouston, & Lee, 1988; Miranda, Berenguer, Rosello, Baixauli, & Colomer, 2017), yet they have also been shown to have less difficulty with their basic understanding of those emotions (e.g., Downs & Smith, 2004), relative strengths with respect to recognizing simple emotions (e.g., Heery, Keltner, & Capps, 2003), and more challenges with respect to negative, ambiguous, complex, and social emotions (e.g., Bal et al., 2010; Capps, Yirmiya, & Sigman, 1992; Heery, et al., 2003; Williams and Happe, 2010). Some of these mixed findings may be a function of methodological differences across studies in the duration and intensity of emotion stimuli (e.g., Humphreys, Minshew, Leonard, & Behrmann, 2007) and differences in the developmental functioning levels and matching techniques across samples (Ozonoff, Pennington, & Rogers, 1990).

Despite the complexity of the broader emotion literature, a few consistent trends have emerged. Among those studies that have reported group differences, children with ASD have shown poorer performance on emotion recognition for negative emotions like “angry” and “afraid/fear” in contrast to “happy” (Lozier, Vanmeter, & Marsh, 2014; Nuske, Vivanti, & Dissanayake, 2013; Rump, Giovannelli, Minshew, & Strauss, 2009). Furthermore, challenges associated with knowledge of specific emotions appear to have particular consequences for the

social competence of children and adults with ASD. For example, in a sample of 4 to 7-year-old children, recognition of sadness by children with ASD was the only index of emotion associated with socialization scores on the Vineland Adaptive Behavior Scales II (VABS II; Sparrow, Cicchetti, Balla, & Doll, 2005; Williams & Gray, 2012). Among adolescents with ASD without significant language or cognitive delays, findings suggest that their recognition of sadness is related to their parents' reports of adaptive function, and that they require a greater intensity of sad facial expressions for accurate emotional recognition (Wallace et al., 2011). Finally, among adults with ASD, challenges in recognizing sadness emotions within an emotionally-salient animation was related to social competence, as measured by the reciprocal social interaction subscale of the Autism Diagnostic Observation Schedule (ADOS-2; Boraston, Blakemore, Chilvers, & Skuse, 2007). Together, these findings point to the need to better understand how individuals with ASD apply knowledge of emotions to social situations. Some scholars have argued that because children with ASD have a more limited and scripted repertoire of complex emotions, they may rarely take the perspective of others and have difficulty applying their emotional knowledge to different social situations (Kasari, Chamberlain, & Bauminger, 2001). In the present study, we aim to examine these processes in a sample of *preschoolers* with ASD to understand the relative role of emotion knowledge, in conjunction with other indices of emotional competence, for the prosocial behaviors of children with ASD.

### **Emotion Regulation and Coping Strategies**

Emotion regulation refers to the ability to modulate emotional experiences or expressions to achieve individual goals or social adaptation (Calkins & Hill, 2007; Eisenberg & Spinrad, 2004), and is believed to be a function of emotional reactions and the ability to deploy effective



strategies to cope with such reactions (Cole, Martin, & Dennis, 2004). Work on typically developing children has consistently demonstrated that challenges with emotion regulation predict poor interpersonal interactions and reduced social competence in preschoolers (Calkins & Mackler, 2011). Work on the discrete coping strategies that preschoolers use in the context of emotionally-charged social situations suggest that such skills are critical for maintaining positive exchanges, and eventually forming enduring relationships with peers (Eisenberg & Spinrad, 2004). Typical preschoolers' coping strategies may include attempts to distract themselves from a negative situation, avoidance, or making their dissatisfaction known with aggressive behaviors or venting (e.g., crying). Other common strategies include seeking support from others, and constructive or reframing techniques like instrumental coping and cognitive restructuring. Findings from previous studies suggest that mothers' reports of children's typical coping strategies are related to their social competence in the school setting (Eisenberg, et al., 1993; Fabes, Eisenberg, Karbon, Troyer, & Switzer, 1994).

Emerging evidence suggests that emotion regulation difficulties are linked to many of the behavioral challenges associated with ASD (Cole, Michel, & Teti, 1994; Laurent & Rubin, 2004; Loveland, 2005; Prizant, Wetherby, Rubin, & Laurent, 2003; Samson, Hardan, Podell, Phillips, & Gross, 2015; Wetherby, Prizant, & Schuler, 2000). Parent and teacher reports have reported self-regulatory difficulties for children with ASD, even among children with no intellectual disability (Gomez and Baird, 2005; Ashburner, Zivaniani, & Rodger, 2010), and recent population-based work seems to support the notion that the majority of children with ASD show emotional problems (Totsika, Hastings, Emerson, Lancaster, & Berridge, 2011).

Several studies have aimed to better understand the discrete coping strategies employed by children with ASD to regulate their emotions. For example, Konstantareas and Stewart (2006) observed the adaptiveness of regulatory strategies of young children with ASD in the context of emotional arousal and found that children with ASD were less likely to use advanced strategies (e.g., complying) and more likely to use less advanced strategies (e.g., defending, objections, crying/venting). Similarly, in a study of observed negativity and coping strategies among children with ASD when faced with frustration, Jahromi, Meek, and Ober-Reynolds (2012) found that, children with ASD used significantly more avoidance and venting strategies, and significant fewer constructive strategies compared to their typical peers. Finally, in their study of adolescents with ASD, Mazefsky, Borue, Day and Minshew (2014) found no differences in adolescents' self-report of adaptive emotion regulation strategies (e.g., problem solving) but more use of maladaptive strategies (e.g., rumination, "shutting down"), thus it may be that children with ASD have continued challenges avoiding the more maladaptive coping strategies to regulate emotion. In the present study, we aim to extend these findings to the peer context by measuring emotion regulation together with coping strategies used by preschoolers with ASD in the context of peer interactions and by assessing the relative contribution of both indices of emotional competence for children's subsequent prosocial behaviors with their peers.

### **Temperamental Emotional Expressiveness**

Children's emotional expressiveness, which can be measured by temperamental negative affect, is the final index of emotional competence identified by Denham et al. (2003) as a prerequisite of children's social competence. According to Rothbart and colleagues' conceptualization of temperament, negative affect refers to the frequency, intensity, and duration

of negative experiences and expressions (Rothbart, Posner, & Hershey, 2006). In the context of emotionally charged peer interactions, children with less temperamental reactivity may be better at expressing less intense reactions and maintaining more positive peer interactions (e.g., Goldsmith, Aksan, Esgender, Smider, & Vandell, 2001; Rudasill, Niehaus, Buhs, & White, 2013). Findings on temperamental ratings of children with ASD have been mixed. Parent reports suggest that children with ASD are rated as have more negativity and “difficult” behaviors, including more negative affective expressions like sadness, fear, anger, shame, and guilt (Bailey, Hatton, Mesibov, Ament, & Skinner, 2000; Capps et al., 1992; Kasari & Sigman, 1997; Hepburn & Stone, 2006; Kasari, Jahromi, & Gulrud, 2012; Kasari, Sigman, Mundy, & Yirmiya, 1990) and difficulties in the soothability and perceptual sensitivity subscales of the negativity factor of temperament (see Samyn, Roeyers, & Bijttebier, 2011, for a review) as well as in measures of adaptability and mood (Chuang, Tseng, Lu, Shieh, 2012). On the other hand, others have found no differences in the negativity ratings of children with and without ASD at younger ages (Konstantareas & Stewart, 2006).

Together, the discrepant findings warrant further investigation as they may be related to the age and level of functioning of study samples, that is, differences may be less apparent at younger ages, but may become more pronounced as children with ASD fail to keep pace, developmentally, with increasing social-emotional challenges. Importantly, there may also be important social consequences of the negative affect that is often reported among children with ASD. For example, Dollar, Perry, Calkins, Keane, and Shanahan (2017) argue that the emotional arousal experienced by children with heightened negativity may undermine children’s ability to take in meaningful information from the social setting and to identify effective social

problem solving skills, which could ultimately lead to more aggression and peer rejection (e.g., Pope & Bierman, 1990). Denham et al. (2003) found evidence of such a process in their study of typically-developing preschoolers and kindergarteners. Thus, in addition to examining the role of temperament relative to other emotional prerequisites, in children's prosocial behavior, we also aimed to specifically examined whether negativity served as a barrier in the effect of coping strategies on prosocial behavior among preschoolers with ASD.

### **The Current Study**

Given the notable social-emotional challenges among children with ASD, this study aimed to examine the relative contribution of emotional prerequisites to prosocial behaviors in sample of preschoolers with ASD without significant cognitive or language delays and their typical peers. Specifically, in line with Denham et al.'s (2003) framework on the emotional prerequisites of young children's social competence, the first goal of the study was to examine group and individual differences in children's emotion knowledge, emotion regulation, coping strategies in the context of peers, and emotional expressiveness (i.e., negative temperament). Second, the study sought to understand the relative importance of these prerequisites for the children's social competence one year later. Finally, in line with previous work on typically developing children (Denham et al., 2003; Dollar et al., 2017), the study examined whether children's negativity moderated the association between children's coping strategies and children's prosocial behaviors one year later.

### **Method**

#### **Participants**

Participants included 40 children (36 males) with a mean age of 54.57 months at recruitment ( $SD = 11.31$  months) and their parents. Participants were drawn from a university-based preschool and community resource center for ASD in a metropolitan area in the southwest. Participants with ASD were recruited via electronic recruitment materials distributed to parents of children with ASD at the resource center and to parents of typically-developing children at the university preschools. The sample consisted of 20 children with autism ( $M = 58.95$ ,  $SD = 11.50$  months) whose clinical diagnosis of autism was confirmed with the Autism Diagnostic Interview (ADI-R; Lord, Rutter, & Le Couteur, 1994), and 20 typically developing children ( $M = 50.20$ ,  $SD = 11.12$  months) who were matched on gender and expressive language as per Charman (2004). Inclusion criteria required children to have verbal language, including the ability to put together complex sentences. Thus, children with receptive language levels of at least 3 years were included. Children included in the study did not have comorbid diagnoses that would impact the data obtained in the study. All of the children in the typical sample had scores below 15 (i.e., the cutoff criteria for possible ASD) on the Social Communication Questionnaire (SCQ), a companion screener with properties similar to the ADI-R (Rutter, Bailey, Lord, & Berument, 2003). There were no significant differences between the matched groups on mental age or receptive or expressive language (see Table 1 for descriptive data and group difference data on developmental variables). Participants were predominately White (77.5%), whereas 10% were Latino, 7.5% were Asian, and 5% identified their ethnicity as “other”. The majority of the parents (97.5%) were married. Mothers had a mean age of 36.3 years ( $SD = 4.92$ ), and fathers had a mean age of 37.6 years ( $SD = 6.08$ ). With respect to their highest level of education, 5% of

mothers and 5% of fathers earned a high school diploma, 50% of mothers and 47.5% of fathers earned a college degree, and 45% of mothers and 47.5% of fathers earned a graduate degree.

### **Procedure**

Children and their parents attended two laboratory visits that occurred approximately one month apart (visits 1 and 2), and parents completed a follow-up questionnaire approximately one year later. At visit 1, we assessed children's cognitive and language level as well as their emotion knowledge, while parents completed an ADI-R interview and filled out questionnaires. At visit 2, children and parents engaged in a series of laboratory activities and parents completed additional questionnaires. The majority (95%) of parents completed the follow-up one year later ( $M_{age} = 50$  months;  $SD = 10.08$  months).

### **Measures**

**Developmental and diagnostic status.** Language age was measured using the Preschool Language Scale 4 (PLS-4; Zimmerman, Steiner & Pond, 2002), from which we derived children's *expressive language age* and *receptive language age*. This measure is designed for children from birth to 6.11 years and has been validated for use with children with autism (Zimmerman, Steiner & Pond, 2002). Mental age was measured using the Differential Abilities Scale II (DAS-II; Elliot, 2007) which yielded a global composite ability (GCA) score from which we derived children's *mental age* ( $\text{mental age} = [\text{chronological age} \times \text{GCA}]/100$ ). This measure is designed for children 2 years, 6 months to 17 years, 11 months, and has been validated for clinical samples with developmental delay (Elliot, 2007). To confirm the diagnosis of children with ASD, their parents completed the Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 1994), a standardized, structured parent interview which assesses the presence and

severity of symptoms of autism in early childhood. To confirm the status of children in the typical sample, their parents completed the Social Communication Questionnaire (SCQ; Rutter, et al., 2003), an autism screener with properties consistent with the ADI-R; all children in the typical sample had scores below the cutoff criteria for possible ASD on the SCQ.

**Emotion knowledge.** The Affective Knowledge Puppet Task (Denham, 1986) was used to assess children's knowledge of emotion labels and affective perspective taking. To measure *affective labeling*, children examined four faces made of felt, which included expressions of happy, sad, angry, and afraid, and were asked to identify the appropriate emotion expressively (i.e., verbally label) as well as receptively (i.e., point to). Based on past work that highlighted the importance of children's understanding of specific (i.e., negative) emotions for their social competence, we examined these emotion labeling variables separately and also created a composite of the types of negative emotions (i.e., sadness and anger) which are most likely to be relevant in a young child's disrupted peer social interaction.

To measure affective perspective taking, the puppets were used to enact 14 vignettes in which vocal and visual affective cues were paired with the puppets. Affective perspective taking items were broken into *stereotypical affective perspective taking* such that, during eight of the vignettes, the puppets expressed the typical emotion people would feel (e.g., fear during a nightmare). To measure non-stereotypical affect perspective taking, during six of the vignettes, the puppet was described as feeling the opposite of what the child would typically feel, based on mothers' prior reporting in a questionnaire. This portion was carefully designed to require the child to make inferences about an experience the child could understand. After watching the

vignette, the participant was asked, “How does the puppet feel?” and were told to place the correct face on the puppet.

Past research with this measure suggests that it is a valid index of emotional knowledge and related to aspects of social-emotional development (e.g., Denham, et al., 1990; Denham et al., 2012). Specifically, past research has supported the convergent validity of the measure by demonstrating associations between children’s performance on this task and other measures of emotion knowledge (Morgan, Izard, & King, 2010), self-regulation (Denham et al., 2012), and children’s emotional expressiveness and social competence (Denham, 2003). Moreover, the task has successfully been used in prior research on children with developmental delays, including those with ASD (Travis, Sigman, & Ruskin, 2001), Down Syndrome (Kasari, Freeman, & Bass, 2003), and communication disorders (McCabe & Meller, 2004).

**Emotion regulation.** Emotion regulation was assessed using the Emotion Regulation Checklist (ER Checklist; Shields & Cicchetti, 1997), a 24-item parent-report that yields two subscales: negativity/lability (i.e., expressions of negative affect) and emotion regulation (i.e., modulation of emotional expressions), each of which represents a different aspect of emotionality. Using a 4-point Likert-type scale (*Rarely* to *Almost always*), parents reported how often their child exhibits certain behaviors (e.g., “can modulate excitement”). The measure shows positive associations with children’s school and social adjustment (e.g., Shields, Ryan, & Chicchetti, 2001). The measure has also been used in past work with children with ASD and has shown convergent validity with other measures of self-regulation and coping (Jahromi, Bryce, and Swanson, 2013; Scarpa & Reyes, 2011). Because we conceptualized emotion regulation to reflect greater control over emotional expressions, we created an *emotion regulation* composite



measure of the two subscales. The negativity/lability subscale was first reverse-coded to reflect decreasing dysregulation before averaging the standardized subscale scores. The resulting variable reflected higher scores on the emotion regulation subscale and lower scores on negativity/lability subscale (Cronbach's alpha for the present study = .84).

**Coping strategies in emotionally-arousing peer interactions.** The Parents Reports of Children's Reactions (Fabes, Eisenberg, Karbon, Troyer, & Switzer, 1994; Eisenberg, Fabes, Nyman, Bernzweig, and Pinuelas, 1994) was used to assess the child's responses to emotion-eliciting situations. This measure consisted of 44 items asking parents to report on their child's typical coping strategies in response to specific situations that may require emotion regulation, (e.g., when the child has been ridiculed by a peer, when other children are playing without the child, and when a peer has disrupted the child's activity). The present study obtained good internal reliability on all of the measure's subscales (all reported Cronbach's alphas below were those obtained in the present study). Specifically, responses reflected typical coping strategies employed by preschoolers: (1) seeking support (e.g., seeks the emotional support of an adult but not by crying; Cronbach's alpha = .90), (2) cognitive restructuring (e.g., actively tells himself that it isn't something to get upset about; Cronbach's alpha = .87), (3) instrumental coping (e.g., asks the other children why they won't let him play; Cronbach's alpha = .80), (4) aggressive coping (e.g., physically or verbally tries to hurt others to release frustration; disrupts the game so others cannot play; Cronbach's alpha = .92), (5) distraction/avoidance (e.g., does something else to forget the problem; leaves the scene; Cronbach's alpha = .85), (6) venting (e.g., cries to release frustration or to get adult intervention; Cronbach's alpha = .90).

In terms of evidence of convergent validity, the authors report an association between ratings of their children's coping strategies and children's heart rate variability, a physiological index of their emotion regulation (Fabes et al., 1994). Associations have also been found between ratings of coping strategies and observations of children's social skills and measures of children's sociometric status among peers (Eisenberg et al., 1992). To our knowledge, the measure has not been used with children with ASD. Because of our study's small sample size, it was necessary to reduce the overall number of coping strategy variables. Thus, consistent with the authors of the measure, we created a composite measure of coping strategies (i.e., an average of standardized scores) to reflect greater use of coping strategies that have been shown to be positively associated with social wellbeing (i.e., instrumental coping) and less use of strategies that were identified as negatively associated with children's social wellbeing (i.e., acting out/aggressive strategies) in past work with this measure (Eisenberg et al., 1993).

**Temperamental negativity.** Temperamental negativity was assessed using the Child Behavior Questionnaire–Short Form (CBQ-SF; Putnam & Rothbart, 2006; Rothbart, Ahadi, Hershey, & Fisher, 2001), a parent-report temperament measure. Using a 7-point Likert-type scale (*extremely untrue of my child* to *extremely true of my child*), parents reported how true particular statements were about their child's behaviors (e.g., “Has temper tantrums when s/he doesn't get what s/he wants”). The measure has been widely used to assess parents' reports of their children's temperament, and a growing number of studies have demonstrated good internal reliability and convergent validity with their use of this measure for children with ASD (e.g., Adamek, Nichols, Tetenbaum, Bregman, Ponzio, & Carr, 2011). Based on the factor structure

proposed by Putnam and Rothbart (2006), the CBQ-SF *negativity factor* included fear, sadness, anger/frustration, distress, and low soothability (Cronbach's alpha for the present study = .79).

**Children's Prosocial Behaviors with Peers.** Social competence was assessed using the prosocial behaviors subscale of the Child Behavior Scale (CBS; Ladd & Profilet, 1996), which reflects the degree to which children engage with their peers in a positive, socially-competent manner, including how much they help their peers, recognize feelings, are concerned about distress, are kind toward peers, are cooperative, and have concern for moral issues. The measure was designed to assess peer-related social competence among typically developing children and those demonstrating peer rejection and social difficulties. Past work using this measure with children with ASD has demonstrated convergent validity with indices of self-regulation and social-communication (Jahromi, Bryce, & Swanson, 2013). Cronbach's alpha for the present study was .84.

## Results

### Analytic Plan

To start, we assessed whether there were group differences (between children with ASD and those with typical development) in any of the emotion prerequisite using ANCOVAs. Mental age was included as a covariate to account for the fact that, although ASD and TD groups were matched on mental age, there was nevertheless variability in children's mental age that was related to measures of emotion knowledge ( $r$ s ranged from .35 to .55,  $p$ s ranged from .04 to < .001). Next, we assessed the associations among the emotional prerequisites and between the prerequisites and prosocial behavior. Based on the results of the latter correlations, we identified those behaviors that had the strongest associations with prosocial behavior. We then tested the

relative contribution of those emotional prerequisites on the prosocial behaviors using a hierarchical multiple regression that was conducted using full-sample data. Interactions were tested by group. Interaction terms were created with standardized and centered variables. Finally, in line with work suggesting that negative affect may operate as a moderator on the link between children's regulation and their social competence, we tested a model that included interactions between our index of coping with negative affect.

### **Group Differences in Emotion Knowledge**

Differences were tested between children with ASD and those with typical development for each of the measures of emotional knowledge. As an added control for cognitive level, mental age was included as a covariate in each analysis. No significant differences were found in children's expressive or receptive affective labelling, or in children's stereotypical affective perspective taking responses. Importantly, a significant group difference was found for non-stereotypical affective perspective taking,  $F(1,38) = 7.83, p = .01$ , Cohen's  $d = .91$ . Children with ASD ( $M = 1.12, SD = .72$ ) demonstrated lower affective knowledge on the non-stereotypical perspective-taking component of the task than did those with typical development ( $M = 1.66, SD = .44$ ). See Table 1 for descriptive and group difference data on study variables and Table 2 for bivariate correlations among study variables.

### **Group Differences in Coping Strategies with Peers**

Next, differences were tested between children with ASD and those with typical development for all emotion regulation coping strategies. A significant difference was found in *seeking support*,  $F(1, 38) = 7.32, p = .01$ , Cohen's  $d = 1.02$ , ( $M_{ASD} = 3.48, SD_{ASD} = 1.69$  and  $M_{TYP} = 4.72, SD_{TYP} = 1.12$ ), *cognitive restructuring*,  $F(1, 38) = 12.21, p = .001$ , Cohen's  $d = 1.09$

( $M_{ASD} = 1.38$ ,  $SD_{ASD} = .67$  and  $M_{TYP} = 2.30$ ,  $SD_{TYP} = .98$ ), and *instrumental coping*,  $F(1, 38) = 17.63$ ,  $p < .001$ , Cohen's  $d = 1.33$  ( $M_{ASD} = 2.17$ ,  $SD_{ASD} = .89$  and  $M_{TYP} = 3.56$ ,  $SD_{TYP} = 1.17$ ). The above mentioned strategies were used more frequently by typically developing children. Finally, a marginal difference emerged in children's reported use of *aggressive coping*,  $F(1, 38) = 4.07$ ,  $p = .05$ , Cohen's  $d = .64$  ( $M_{ASD} = 3.57$ ,  $SD_{ASD} = 1.74$  and  $M_{TYP} = 2.65$ ,  $SD_{TYP} = 1.05$ ); children with ASD used marginally more of this strategy. No group differences were found in the use of *distraction/avoidance* strategies or in the use of *venting*. Based on the above findings, a composite measure was created to reflect greater use of positive forms of coping (e.g., cognitive restructuring, seeking support, and instrumental coping) and less use of negative forms of coping (e.g., aggressive) for use in subsequent analyses. The composite measure showed significant group differences, even after controlling for mental age,  $F(2, 37) = 21.33$ ,  $p < .001$ , Cohen's  $d = 1.41$ , such that children with typical development showed more positive coping strategies ( $M = 4.37$ ,  $SD = .62$ ) than children with ASD ( $M = 3.29$ ,  $SD = .88$ ).

### **Associations among Emotional Prerequisites and Children's Prosocial Behavior**

**Correlations of emotional prerequisites with prosocial behavior.** Partial correlations were calculated to understand the association between prosocial behavior and emotional prerequisites. Mental age was included as a control in these correlations. Prosocial behavior was positively correlated with emotion regulation,  $r(31) = .49$ ,  $p = .004$ , and with the composite of positive forms of coping strategies,  $r(31) = .53$ ,  $p = .001$ . In terms of individual coping strategies, prosocial behavior was positively correlated with seeking support,  $r(31) = .49$ ,  $p =$

003, cognitive restructuring,  $r(31) = .47, p = .006$ , and instrumental coping,  $r(31) = .64, p < .001$ .

With respect to emotion knowledge variables, prosocial behavior was positively correlated with children's receptive emotion labelling,  $r(31) = .35, p = .04$ , and expressive labelling,  $r(31) = .52, p = .002$ . In terms of children's knowledge of individual emotions, prosocial behaviors were positively correlated with each measure of ability to label emotions, happy,  $r(31) = .36, p = .03$ , sad/angry composite,  $r(31) = .45, p = .008$ , and scared,  $r(31) = .41, p = .02$ .

**Intercorrelations among emotional prerequisites.** Partial correlations, controlling for mental age revealed that non-stereotypical emotion knowledge was positively correlated with emotion regulation,  $r(31) = .49, p = .01$ , and with the composite of positive coping strategies,  $r(31) = .63, p = .00$ . Correlations at the level of individual coping strategies revealed relations between prosocial behavior and seeking support,  $r(31) = .49, p = .003$ , and instrumental coping,  $r(31) = .63, p = .001$ . Labeling of emotions (expressively) was positively correlated with the composite of positive coping strategies,  $r(31) = .35, p = .04$ , seeking support,  $r(31) = .36, p = .04$ , and cognitive restructuring,  $r(31) = .42, p = .02$ . Knowledge of happy emotional states was positively correlated with seeking support,  $r(31) = .35, p = .05$ , and knowledge of scared emotional states was positively correlated with cognitive restructuring,  $r(31) = .36, p = .04$ .

The composite of coping strategies was positively correlated with emotion regulation,  $r(31) = .63, p < .001$ . Individually, the use of aggressive coping strategies was negatively correlated with emotion regulation,  $r(31) = -.56, p = .002$ , whereas seeking support and instrumental coping were positively correlated with emotion regulation,  $r(31) = .37, p = .03$ , and

$r(31) = .38, p = .03$ , respectively. Finally, emotional expressiveness (temperamental negativity) was positively correlated with venting strategies,  $r(31) = .53, p = .002$ , support-seeking strategies,  $r(31) = .34, p = .05$ , and instrumental coping,  $r(31) = .42, p = .01$ . See Table 2 for bivariate correlations among key study variables.

### **Hierarchical Regression Testing Relative Contribution of Emotional Prerequisites on Children's Prosocial Behaviors with Peers**

A hierarchical multiple regression analysis was conducted to test the relative contribution of emotional prerequisites on children's social competence. Stepwise models were tested such that group and mental age were first entered as covariates. Next, a regulation component (i.e. emotion regulation or coping strategies) was added to the model along with emotion knowledge. Prosocial behavior was tested as the dependent variable in these models. Due to issues of multicollinearity between coping skills and emotion regulation (which broadly capture the same regulatory construct), these variables were tested in separate models. When emotion regulation was tested as the regulatory component, the best fitting model for prosocial behaviors as the dependent variable included the variables emotion regulation and emotion knowledge ( $R = .68, R^2 = .37, F(5,30) = 5.81, p = .002$ ). Beta coefficients for the three independent variables were emotion regulation,  $B = .47, t = 2.47, p = .01$ ; emotion knowledge,  $B = .50, t = 3.06, p = .005$ ; and negativity,  $B = .23, t = 1.57, p = .13, ns$ . Table 3 presents information from regression analyses. The same pattern of results emerged when coping strategies was tested as the regulatory component, ( $R = .65, R^2 = .33, F(5,30) = 4.48, p = .004$ ). Beta coefficients for the three independent variables were coping strategies,  $B = .40, t = 2.28, p = .03$ ; emotion knowledge,  $B = .44, t = 2.57, p = .02$ ; and negativity,  $B = .08, t = .58, p = .57, ns$ .

Finally, in line with prior work (e.g., Denham et al., 2003), that found an interaction between negativity and emotion regulation in promoting social competence, we explored whether such an interaction would appear in our sample using both the emotion regulation and coping strategies variables as the regulation component main effect and negativity as the moderator. Because Denham and colleagues (2003) found this interaction to change with children's chronological age, we also added chronological age as a second covariate along with mental age. Results revealed a significant model when we tested coping strategies, negativity, and the interaction between coping strategies and negativity ( $R = .64$ ,  $R^2 = .31$ ,  $F(5,30) = 4.25$ ,  $p = .005$ ). Beta coefficients for the three independent variables were coping strategies,  $B = .56$ ,  $t = 3.85$ ,  $p = .001$ ; negativity,  $B = .28$ ,  $t = 1.81$ ,  $p = .07$ ; and the interaction between negativity and coping strategies,  $B = -.37$ ,  $t = -2.29$ ,  $p = .03$ . The test of simple slopes revealed that there was a stronger positive association between coping strategies and prosocial behavior at low levels of negativity (-1 SD below the mean;  $B = 1.0$ ) and average levels of negativity ( $B = .56$ ) than at high levels of negativity (+1 SD above the mean;  $B = .12$ ). See Figure 1.

### Discussion

For children with ASD, including those without significant language and cognitive delays, disrupted peer relationships can be a source of significant challenge. This study makes an important contribution to our understanding of the how multiple elements of emotional competence may be related to positive prosocial behaviors for these children, and the relative contribution of emotional prerequisites to children's social outcomes. Our study revealed several important patterns of findings. First, children's emotion knowledge, especially that which reflects an understanding of others' non-stereotypical emotional experiences, and their emotion



regulation (measured both as avoidance of dysregulation as well as discrete coping strategies) emerged as two salient factors linked with their prosocial behaviors with peers, above and beyond other indices of their emotional competence. Moreover, use of discrete coping strategies in the context of peers was associated with children's prosocial peer behavior one year later, and there was evidence that the link between such strategies and prosocial behavior was strongest for those with manageable (i.e., low or average) rather than heightened negative affect.

Our finding of an association between non-stereotypical emotion knowledge (i.e., when the story character's emotion was different than that which the child him/herself would have felt in that situation) and children's prosocial behaviors was consistent with past work on typically-developing preschoolers. For example, Denham et al. (2003) found children's equivocal (non-stereotypical) emotional knowledge to be related to social competence. These authors argue that the ability to correctly deduce a peer's emotions may be related to both children's very likelihood to react pro-socially as well as the degree to which their responses are likely to be meaningful and supportive of the individual's particular emotional state (e.g., in support of sadness rather than anger). Such a finding is in line with Braverman et al.'s (1989) notion that children with autism with specific challenges in social cognition may engage in less monitoring of the social environment, which may reduce their opportunity to learn from this context, and to respond in a timely and accurate way to social situations. It may be that the difficulty children with ASD face with non-stereotypical emotional knowledge could be a function of their delays in theory of mind, which is defined as children's ability to consider multiple perspectives and attribute different mental states (e.g., beliefs and emotions) to others (Ashwin, Chapman, Colle, & Baron-Cohen, 2006; Baron-Cohen et al., 2000). Although such abilities develop in

neurotypical children by around 4 years of age, children with ASD show continued challenges with these skills (Baron-Cohen et al., 2000). Overall, these findings are consistent with Chamberlain et al.'s (2007) conclusions that children with ASD need a great deal of support strengthening their repertoire of emotion knowledge and linking such knowledge to different social situations; as will be discussed below, social skills intervention efforts have been developed for children with ASD, aimed at targeting both theory of mind and emotion knowledge (e.g., Bauminger, 2007; Young & Posselt, 2012).

Our study found important group differences in the coping strategies used by children in the context of peer interactions which are consistent with findings from laboratory tasks and extend our knowledge of the degree to which children with ASD are able to rely on more sophisticated means to regulate their distress in the context of peers. Specifically, we found that children with ASD were reported to use less instrumental coping, cognitive restructuring, and support seeking than their mental age and language age-matched peers, whereas children with ASD used marginally more aggressive coping strategies. In the lab setting, when faced with a toy removal, Konstantareas and Stewart (2006) found that children with ASD used fewer adaptive strategies (e.g., engaging in an alternate activity) but more defending behavior. Similarly, using frustration tasks in the lab (i.e., locked box and impossible puzzles tasks), Jahromi et al. (2012) found that children with ASD used fewer constructive strategies than their typical peers and that support-seeking behaviors were not effective (i.e., not likely to be temporally associated with a subsequent decrease in negativity) for children with ASD, despite being effective for typically developing children. The fact that children with ASD in our study were reported to use less support-seeking strategies when faced with challenging peer situations

may reflect a disinclination among these children to turn to others for instrumental support or poorer planning skills (i.e., inability to foresee the potential than an adult may effectively solve the social situation). What is particularly interesting is the fact that, in a study of adolescents with ASD, Rieffe et al. (2011) found that adolescents with ASD also *self*-reported less use of social support-seeking as a means of coping with a problem as compared to their typical peers. We should highlight that our measure of coping strategies relied on parent report, and therefore findings should be confirmed with future work using observations of children's behaviors with peers. What also remains to be explored are potential factors that are associated with children's coping strategy use (e.g., planfulness and flexibility) as well individual differences in the effective deployment of coping strategies. It may be, for example, that underlying attentional skills influence children's strategy-use by aiding in the monitoring of emotion arousal. Future work should continue to explore these children's use of coping strategies, as there appear to be continued challenges selecting the more adaptive and/or inhibiting the less adaptive strategies even into adolescence (Mazefsky, Borue, Day, & Minshew, 2014).

An interesting pattern of findings emerged regarding children's negative emotional expressions. First, we found no differences between groups in temperamental negativity. These findings are consistent with those of Konstantareas and Stewart (2006) who also found no differences in temperamental negativity (measured by the same measure we used in our study, the CBQ) among preschoolers ASD and their typically-developing matched peers. These authors argued that non-significant differences may reflect the fact that even typically-developing children at this young age are likely to have moments of uncontrollable negativity, and that parents of children with ASD may perceive such behaviors to therefore be somewhat

normative among their own children. Second, we had expected to find that more negative affect would be related to decreased prosocial behaviors in line with the notion that the expression of more positive than negative affect is generally associated with more friendliness and assertiveness, and less aggressiveness. It has been argued that negative affect may not only inhibit children's own prosocial behaviors but also evoke fewer positive initiations from peers (Denham et al., 2003). Interestingly, we did not find negativity to be related to prosocial behaviors after taking into account the other emotional prerequisites. This finding is similar to that of Denham et al. (2003), who found emotion regulation to be a more salient predictor of social competence than emotional expressiveness, and who argued that children's enduring moods and patterns of negativity may be less important than how they respond to these experience (i.e., with regulated versus dysregulated responses). Such a finding appears to be true even for children with ASD. Finally, when we tested the potential interaction between negativity and children's affective regulation, we found that a positive association between coping strategies and prosocial behaviors emerged at low levels of negativity, and was weak at high levels of negativity. This finding might suggest that, at least within this sample of preschoolers with ASD, heightened temperamental negativity is a risk factor that could undermine the relative effectiveness of coping strategies in the promotion of social behavior. It may be that these children can deploy effective coping strategies in the context of mild and manageable negativity, but that heightened negativity serves as a barrier to this process. It is interesting that Denham and colleagues (2003) also found this interaction in their longitudinal study of typically developing preschoolers; the authors concluded that children who experience less intense negativity and avoid unrestrained outbursts when they do feel negative are also more likely to

use more constructive strategies, such as active problem solving and cognitive restructuring. Because our measure of temperamental negativity relied on parent report, we cannot assume that moments of negativity were actually linked to children's use of coping strategies with peers in real life situations. Future work that connects these variables observationally is necessary to confirm such processes. That said, our study offers a first step in understanding how these factors may work together in their association with the positive social outcomes of children with ASD, and suggest that, despite the fact that negativity is not significantly different for this group, the consequence of heightened negativity may be detrimental to either the deployment or effectiveness of coping strategies to promote positive interactions with their peers.

### **Implications**

Most intervention efforts targeting children's self-regulation incorporate the principles of cognitive-behavior therapy (CBT), which emphasizes children's awareness or recognition of their emotional reactions while strengthening their capacities to problem solve and achieve positive social and emotional outcomes. CBT has been found effective for anxiety in adolescents with ASD (Wood, Drahota, Sze, Har, Chiu, & Langer, 2009) and a study targeting emotional reactions (anger and anxiety) and coping strategies also found positive results (Scarpa & Reyes, 2011). Others have addressed the social challenges of children with ASD by targeting underlying emotion recognition together with social-cognitive skills (e.g., theory of mind); results have revealed improvements in children's ability to identify components of facial expressions (Ryan & Charragain, 2010) as well as in theory of mind performance (Stichter et al., 2010). Another example of a promising approach is Ratcliffe and colleague's (2014) Emotional Based Social Skills Training (EBSST), which incorporates understanding one's own and others'

emotions, emotional problem solving or coping strategies, and emotion regulation skills in one-on-one counseling settings within school as well as trainings at home with parents. Also, positive effects on social behaviors were demonstrated by Young and Posselt (2012), who incorporated a strong emotion understanding component in their social skills training DVDs called “The Transporters”, which used cartoon character vehicles to teach lessons on understanding faces and matching facial expressions with felt emotions. It is noteworthy that when Williams, Gray, and Tonge, 2012 aimed to extend these findings to children with ASD with lower levels of cognitive functioning, children’s improvements were limited to the recognition of anger emotions, and the effects were not maintained at follow-up. Thus, future social-emotional interventions for youth with ASD will need to focus on children with lower levels of cognitive functioning and/or minimally verbal children to fully assess whether findings can be generalized to the broader population. Importantly, Bauminger (2002; 2007) has found that children with ASD can show improvements in social problem solving alongside emotion knowledge, including understanding of complex emotions (Bauminger 2002; Bauminger, 2007; Sticher et al., 2010; Solomon et al., 2004), and results have been reported to have been maintained at follow-up (Bauminger, 2007). Given the link between emotion recognition and children’s capacity to regulate their emotion, the above mentioned work is a promising approach to improve children’s self-regulatory challenges. The direct instruction of emotional knowledge is a key component of these interventions that has shown promising results, but it may be that the application piece of social competence is what needs further development for many children. Bauminger’s (2007) work is notable, in that she incorporates practice with peers into her intervention. Future work should continue to take such curriculum out of the one-on-one (e.g.,

counseling) setting and into the classroom or other group setting, with peers so that everyone gains access to the same knowledge and opportunities to practice the strategies among their peers using the real-life, nonstereotypical and often nuanced types of social situations that tend to occur classroom-wide.

### **Limitations and Future Directions**

The study had several limitations that may point to directions for future research. First, our sample of preschoolers with ASD did not have significant language or cognitive delays, thus our findings cannot be generalized to the broader population of children with ASD, including those with intellectual disabilities and/or significant language delays. Moreover, while we utilized a research-reliable ADI-R to confirm children's diagnoses, the study would have been strengthened by including an additional observational diagnostic measure like the ADOS-2. Additionally, while we used a combination of direct child measures (i.e., to measure emotion knowledge) and parent report, it will be important for future research to continue to examine these constructs with a wider range of measures and carefully controlled samples; such work with help to further elucidate many of the mixed findings resulting from this line of research. Moreover, given the often nuanced aspects of social interactions that result in challenges for children with ASD, it will be important for future work to measure emotional and social capacities in real-life settings with peers using observational measures. Our sample was carefully controlled and matched on key elements of children's developmental functioning, including mental age, expressive language, and receptive language. That said, the relatively small size of our sample may have undermined some of our findings, in particular, those from the regression analyses, and precluded the application of conservative controls for multiple

comparisons. As such, our work is a first step toward understanding these processes in children with and without ASD, and future work should aim to test these types of constructs in larger samples, and using longitudinal models like those employed by Denham and colleagues (Denham et al., 2003). Finally, future work should also explore the role of gender in these relations. For example, Denham et al (2013) found that emotion regulation was a stronger predictor of social competence for typically developing girls than boys. Because of the predominance of boys within the ASD population, most studies like ours have too few, if any, girls to test such assumptions. An effort should be made in future research to better understand whether patterns of emotional competence and social competence are similar for girls with ASD.

In conclusion, this study makes an important contribution to our understanding of how different components of emotional competence work together to promote the social competencies of children with ASD and the salience of children's knowledge of emotions in non-stereotypical situations and emotion regulation for the promotion of these processes. Our findings also point to the importance of focusing on key dimensions of emotion knowledge for future research. It will be important for future intervention research to continue to explore the role of underlying skills that promote these children's social competence, while also identifying ways to intervene in situ, such that interventionist can model and practice social-emotional skills in the presence of children with ASD and their typical peers, together, to maximize the potential generalization of such knowledge and skill development.



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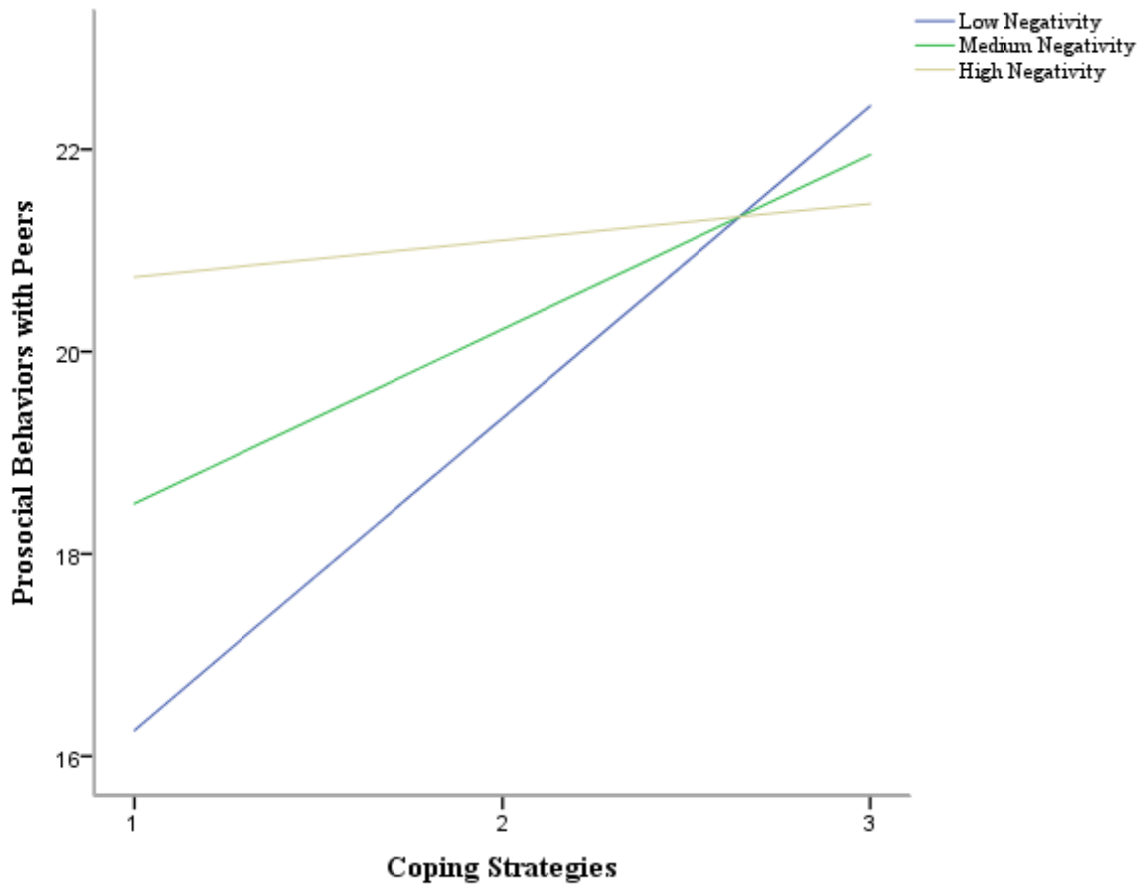
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Figure 1. Interaction between Negativity and Coping Strategies in Predicting Prosocial Behaviors



Note: Low Negativity is graphed at -1 SD below mean, Medium Negativity is graphed at the mean, and High Negativity is graphed at +1 SD above mean

Table 1.  
*Descriptive Statistics for Developmental and Study Variables*

	Autism			Typical			Group Differences
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	
<b>Developmental Level</b>							
Chronological Age	58.95	11.50	[40 -77]	50.20	11.12	[33-78]	$F(1, 38) = 5.98, p = .02, d = .77$
Mental Age	57.78	16.80	[32-93]	52.95	13.66	[28-85]	$F(1, 38) = 1.99, p = .32, d = .32$
Expressive Language Age	56.70	12.36	[32-83]	58.05	12.01	[37-81]	$F(1, 38) = .12, p = .72, d = .11$
Receptive Language Age	60.20	13.53	[39-81]	58.05	11.63	[45-81]	$F(1, 38) = .29, p = .59, d = .17$
<b>Emotion Regulation**</b>	66.45	8.30	[53-79]	73.80	6.91	[57-81]	$F(1, 38) = 9.26, p = .004, d = .96 **$
<b>Temperamental Negativity</b>	2.42	.79	[.93 -3.9]	2.57	.96	[.60-4.3]	$F(1, 38) = .26, p = .61, d = .17$
<b>Emotion Knowledge</b>	1.76	.43	[.25-2.0]	1.75	.41	[.75-2.0]	$F(1, 38) = .002, p = .96, d = .02$
Affective Labeling							
Expressive Labeling	1.66	.50	[.25-2.0]	1.63	.55	[.00-2.0]	$F(1, 38) = .02, p = .88, d = .05$
Receptive Labeling	1.84	.48	[.00-2.0]	1.86	.39	[.50-2.0]	$F(1, 38) = .02, p = .88, d = .04$
Happy	1.90	.31	[1.0-2.0]	1.95	.22	[1.0-2.0]	$F(1, 38) = .35, p = .56, d = .18$
Sad	1.82	.49	[.00-2.0]	1.85	.36	[1.0-2.0]	$F(1, 38) = .03, p = .85, d = .06$
Angry	1.77	.47	[.00-2.0]	1.77	.63	[.00-2.0]	$F(1, 38) = .08, p = .78, d = .08$
Scared	1.52	.62	[.00-2.0]	1.47	.66	[.00-2.0]	$F(1, 38) = .06, p = .81, d = .07$
Affective Perspective Taking							
Stereotypical	1.21	.76	[.00-2.0]	1.44	.55	[1.0-2.0]	$F(1, 38) = 1.20, p = .27, d = .34$
Non-Stereotypical **	1.12	.72	[.00-2.0]	1.66	.44	[.40-2.0]	$F(1, 38) = 7.83, p = .01, d = .91 **$
<b>Coping Strategies with Peers</b>							
Distraction/Avoidance	3.25	1.21	[1.7-6.2]	3.11	.87	[1.8-4.8]	$F(1, 38) = .18, p = .67, d = .13$
Aggressive Coping*	3.57	1.74	[1.0- 6.0]	2.65	1.05	[1.0-4.6]	$F(1, 38) = 4.07, p = .05, d = .64 *$
Venting	3.69	1.43	[1.0- 6.2]	3.48	1.29	[1.0-5.6]	$F(1, 38) = .22, p = .65, d = .15$
Seeking Support**	3.48	1.29	[1.0-7.0]	4.72	1.12	[2.6-7.0]	$F(1, 38) = 7.32, p = .01, d = 1.02 **$
Cognitive Restructuring**	1.37	.66	[1.0-3.0]	2.30	.98	[1.0-4.5]	$F(1, 38) = 12.21, p = .001, d = 1.11 **$

EMOTIONAL AND PROSOCIAL COMPETENCE IN ASD

2

Instrumental Coping***	2.17	.89	[1.0-4.0]	3.56	1.17	[1.0-6.0]	$F(1, 38) = 17.63, p < .001, d = 1.33$ ***
Coping Strategy Composite ***	3.29	.88	[1.5-4.6]	4.37	.62	[3.3-5.6]	$F(2, 37) = 21.33, p < .001, d = 1.41$ ***
<b>Prosocial Behaviors with Peers*</b>	15.33	2.89	[11-21]	17.63	2.98	[11-21]	$F(1, 38) = 5.65, p = .02, d = .78$ *

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*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 2

*Means, Standard Deviations, and Bivariate Correlations among Study Variables for Sample (N = 40).*

		<b>M</b>	<b>SD</b>	1	2	3	4	5	6	7	8
1	Temperamental Negativity	2.49	.87	--							
2	Expressive Emotion Labelling	1.65	.52	.201	--						
3	Receptive Emotion Labelling	1.85	.43	.051	.529**	--					
4	Coping Strategies Composite	3.83	.93	.036	.169	.162	--				
5	Stereotypical Perspective-taking	1.32	.67	-.021	.298	.298	.147	--			
6	Non-Stereotypical Perspective-taking	1.38	.65	.173	.591***	.468**	.510***	.490**	--		
7	Emotion Regulation	70.1	8.40	-.329	.161	.115	.584***	.076	.011	--	
8	Prosocial with Peers	16.5	3.12	.130	.407**	.281	.559***	-.049	.290	.478**	--

*Note.* \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . Bivariate correlations are presented without covariates.

Table 3.

*Stepwise Hierarchical Regressions Testing Relative Contribution of Emotional Prerequisites on Children's Prosocial Behaviors with Peers*

**Dependent Variable: Prosocial Behavior with Peers<sup>a</sup>**

	<i>B</i>	<i>t</i>	<i>p-value</i>
Model $F(5, 30) = 5.81, p = .002; R^2 = .37$			
Group	-.01	-.05	.97
Mental Age	-.40	-2.43	.02*
Emotion Regulation **	.47	2.47	.01**
Emotion Knowledge **	.50	3.06	.005**
Negativity	.23	1.57	.13

**Dependent Variable: Prosocial Behavior with Peers<sup>b</sup>**

	<i>B</i>	<i>t</i>	<i>p-value</i>
Model $F(5, 30) = 4.48, p = .004; R^2 = .33$			
Group	.03	.16	.88
Mental Age	-.35	-2.05	.05
Coping Strategies **	.40	2.28	.03*
Emotion Knowledge **	.44	2.57	.02*
Negativity	.08	.58	.57

**Dependent Variable: Prosocial Behavior with Peers<sup>c</sup>**

	<i>B</i>	<i>t</i>	<i>p-value</i>
Model $F(5, 30) = 4.25, p = .005; R^2 = .31$			
Group	.02	.16	.88
Mental Age	.02	.31	.76
Chronological Age	-.34	-1.29	.20
Coping Strategies**	.56	3.85	.001**
Negativity*	.28	1.81	.07*
Coping Strategies x Negativity**	-.37	-2.29	.03*

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ ; Stepwise models were tested in which group and mental age were first entered as covariates, emotional prerequisites were entered in a stepwise fashion as independent variables; <sup>a</sup> Emotion regulation was tested as the regulation component; <sup>b</sup> Coping strategies was tested as the regulation component; <sup>c</sup> Stepwise model in which group, mental age, and chronological age were first entered as a covariates, coping strategies and negativity, as well as their interaction term, were entered in a stepwise fashion as independent variables.