Brief Report

Socio emotional competence in young children with ASD during interaction with their typically developing peers

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ABSTRACT

Background: Building socio-emotional competence (SEC) is a central developmental goal of early childhood that includes the understanding of one’s own and others’ emotions, emotional expression and the use of emotion regulation strategies and social skills. SEC attainment is a major challenge for children with Autism Spectrum Disorder (ASD). However, its behavioral examination in naturalistic settings is scarce.

The current study examined SEC components of young children with ASD compared to typically developing (TD) children during social interaction and investigated group differences and the associations between SEC components.

Method: 26 children with ASD and 26 TD children participated in the current study. SEC was assessed using an adult-mediated interaction with a peer, designed to provide opportunities for cooperation, reciprocity, shared enjoyment, and emotion expression. Additional measures included an emotion understanding task, and parental report on the Vineland Adaptive Behavior Scales.

Results: Compared to the TD group, the ASD group showed poorer emotional understanding, greater emotion dysregulation, and was rated by parents as having poorer social competence. Emotional understanding and emotion regulation difficulties were associated with poorer social competence, and expression of negative emotions was associated with poorer emotion regulation, in both children with and without ASD.

Conclusions: The emotional understanding and emotion regulation difficulties shown by children with ASD, and their associations with poorer social competence, highlight the need to address these in interventions targeting social competence in young children with ASD.

1. Introduction

1.1. Socio-emotional competence in typical development

Building social-emotional competence (SEC) is a central goal in child development, marked by children’s ability to understand their own and others’ emotions, to express their emotions, and to regulate their own emotions. Emotional understanding (EU) involves the identification of one’s own and of others’ emotions, the differentiation between them, and their association with social context, and
with other mental representations, such as desire, belief, and memory (Pons & Harris, 2005; Pons, Harris, & de Rosnay, 2004). Preschoolers can infer basic emotions from expressions or situations and understand better positive emotions than negative emotions. Gradually they differentiate among negative emotions of self and others and develop an emotional language (Pons et al., 2004). Emotional expressiveness includes the experience of one’s own emotions and the ability to send both positive and negative emotional messages to others during moment-to-moment interactions, and during continuous relationships (Denham, 2019). Emotional regulation (ER) is needed when, during interactions, children are overwhelmed by emotion and need to reduce their emotional arousal, or to amplify it, according to the situation. Preschoolers learn to keep, or boost needed emotions, and to tone down unhelpful emotions (Sala, Pons, & Molina, 2014). Children become increasingly emotionally competent over time, and evidence suggests that such emotional competence contributes to their concurrent social competence and well-being, as well as to later social and academic outcomes (Denham, Bassett, & Wyatt, 2015). The theoretical model of SEC, with its postulated associations between the emotional expression, understanding and regulation and of those with social competence was developed by Denham et al. (2003). Their research showed associations between preschoolers’ patterns of emotional expressiveness, emotion regulation, and emotion knowledge and highlighted their contribution to social competence both concurrently and across time (Denham et al., 2003).

Gaining proficiency in emotion understanding, expression, and regulation, helps preschoolers to accomplish different developmental tasks and contributes to the development of social competence during the preschool years. Typically developing children who attempt to understand their own and others’ behavior and emotions and to apply this emotional knowledge in social interactions were shown to present more prosocial behaviors, were rated as more socially skilled by teachers, and were more likable by their peers, even longitudinally (Denham, 2019).

1.2. Socio-emotional competence in children with ASD

Unlike their typically developing (TD) peers, children with autism spectrum disorder (ASD) show difficulties in social competence, including difficulties in developing, maintaining, and understanding relationships with peers (APA, 2013). In addition, children with ASD have difficulties in all three components of emotional competence, which hamper their social functioning (Loveland, 2005). Research indicates children with ASD show difficulties in recognizing and understanding their own emotions (Ben-Itzchak, Abutbul, Bela, Shai, & Zachor, 2016) as well as others’ emotions (Fridenson-Hayo et al., 2016). Children with ASD also exhibit altered emotional expressiveness, including limited facial expressions directed toward others, inappropriate vocal intonation while expressing emotions, and limited use of gestures and body language (Begeer, Koot, Rieffe, Terwogt, & Stegge, 2008). Emotion regulation (ER) is another area of difficulty among children with ASD who struggle to regulate their emotional arousal, express negative emotions more intensely, exhibit disproportionate emotional reactions (Mazefsky, Pelphrey, & Dahl, 2012), and use maladaptive and less effective regulation strategies, compared to TD children (Hirschler-Guttenberg, Golan, Ostfeld-Etzion, & Feldman, 2015). Emotion dysregulation in children with ASD was found to be stable and strongly related to social and behavioral functioning, and in addition predicted increases in social and behavioral difficulties over time (Berkovits, Eisenhower, & Blacher, 2017).

Surprisingly, although children with ASD have significant difficulties in all the components of SEC, they have seldom been examined together. Recently, Reyes, Factor, and Scarpa (2020) investigated differences between ER, emotionality, and emotion expression in young children with ASD and compared them to reports of parents to TD children. They found that, compared to TD children, children with ASD were described by their parents as showing decreased ER, increased emotionality, and decreased expression of emotions. In addition, in the ASD group, social skills were positively associated with ER and with expression of emotions (Reyes et al., 2020). Interestingly, while the evaluation of SEC in typical development commonly involves ecological measures, evaluations of SEC among young children with ASD have mostly relied on lab-based paradigms, and/or on parent and teacher reports, rather than on naturalistic measures, which may be more indicative of actual skills and difficulties.

1.3. The current study

The current study examined the SEC components of young children with ASD during social interaction with a peer, and investigated the associations between emotion understanding, emotion regulation, emotion expression and social competence in children with and without ASD. We hypothesized that children with ASD will show difficulties in all SEC components. In accordance with the SEC literature, we hypothesized that the emotional competence components – UE, ER, and the expression of positive and negative emotions will be associated with participants’ social competence in everyday life. In addition, we explored if the associations between SEC components differ between children with and without ASD. Measures included parent reports that provide information on adaptive skills as observed in the home setting, an observation on socio-emotional functioning during a play interaction with a peer, and a lab instrument, measuring emotion understanding, an SEC component that can not be accurately measured in a naturalistic play setting.

2. Method

2.1. Participants

Following ethical approval by Mayanei Hayeshua Medical Center’s Helsinki Committee (#57.10), two groups of 4–7 year-olds participated in the study: (a) 26 children (22 boys; 4 girls) with ASD, previously diagnosed by a physician and a psychologist using DSM-5 (APA, 2013) or DSM-IV-TR (APA, 2010) criteria, whose diagnosis was verified using the Autism Diagnostic Observation Schedule (ADOS-2; Lord et al., 2012); and (b) 26 TD children (22 boys; 4 girls) who were screened out for ASD using the Childhood
Intelligence Scales (Vocabulary, Similarities, Block design, and Matrix reasoning) were scores of at least 4 (minimum 2 standard deviations below the mean). Participants were recruited from public schools, parent groups, and nonprofit organizations for children with ASD in Israel. Groups were comparable on age, gender ($\chi^2(1) = 0.0$, n.s.) and the above mentioned subtests taken from the Wechsler Intelligence Scales (WPPSI-III; Wechsler, 2002; WISC-IV; Wechsler, 2003). Participants’ background measures are detailed in Table 1.

### 2.2. Measures

#### 2.2.1. Emotional expression and emotion regulation

**Emotional expression and emotion regulation** were measured using a 20-minute adult-mediated peer-interaction paradigm, developed for the current study. The paradigm was designed to provide frequent opportunities for cooperation, reciprocity and shared enjoyment as well opportunities for varied positive and negative emotional expressions. This interaction involved a child with ASD (or TD in the control group) and a same-age TD peer, and included four interactive games: (1) *Don’t drop the ball* – a cooperation game in which the children were asked to balance a ball on a piece of cardboard held by both of them (2) *Simon says* – the well-known imitation and trickery game; (3) *Get the chocolate* – a competitive game which required the children to quickly grab a piece of chocolate revealed by the experimenter under a cup (4) *Emotional charades* – an emotion recognition and knowledge game that required the presenting child to demonstrate an emotional expression (defined by the experimenter) without words, and the responding child to guess which emotion was being expressed. In addition, two fake distress manipulations were conducted by the experimenter, who pretended: (1) she got bitten by a mosquito, and (2) she could not find the equipment for the next activity. These two manipulations enabled us to examine the children’s non-verbal and verbal expressions and their pro-social behaviors in empathy related contexts. This structure was developed in order to create a peer interaction that would be as natural as possible, providing opportunities for the expression of socio-emotional behaviors that children with ASD may not show in a completely unmediated free-play. For that aim, and to avoid an order effect, the activities did not have a fixed order and they were counterbalanced between participants.

Behavioral scoring items were adapted from the MPAC-R Minnesota Preschool Affect Checklist-Revised (Denham et al., 2012), based on appropriateness for the peer-play paradigm context. Items (detailed in the supplementary material) represented three scales: Five items assessing positive emotional expression (Cronbach’s $\alpha = .72$) five items assessing negative emotional expression (Cronbach’s $\alpha = .80$) and thirteen items assessing emotion dysregulation (Cronbach’s $\alpha = .64$). For the analysis, videotapes of the interactions were split into four 5-minute segments, and each segment was scored separately, for the existence (1) or absence (0) of behaviors. Participants’ scores for each behavior in each segment were then summed up, yielding a score of 0–4 for the entire paradigm. Scoring of videotapes was conducted by two trained raters, who were blind to the children’s diagnosis. Average inter-rater reliability was .85 for the expression of positive emotions (EPE) scale, .87 for the expression of negative expressions (ENE) scale and .87 for the emotion dysregulation (ED) scale. Since the number of items varied between scales, scale scores were averaged for each participant, with a score range of 0–4.

#### 2.2.2. Emotional understanding

**Emotional understanding (EU)** was measured using an emotion vocabulary task. Participants were asked to define 16 emotions and mental states (e.g., "tell me what happy means") and to give examples of situations that evoke them (e.g., "Tell me of a time you felt happy"). Scoring was based on Gev, Rosenan, and Golan (2017) and task scores ranged between 0–32. Average inter-rater agreement between two judges who were blind to respondents’ diagnosis was 0.91.

#### 2.2.3. Social competence

**Social competence (SC)** was measured using the socialization scale from the Vineland Adaptive Behavior Scales, 2nd edition (VABS-II; Sparrow, Cicchetti, & Balla, 2005). Parents reported on participants’ interpersonal behavior, peer play and leisure, and coping skills during interactions, on a 0–2 Likert scale. The standardized socialization score has a mean of 100 and a standard deviation of 15.

### 2.3. Procedure

Participants were home-visited twice: on the first meeting, parental informed consent and child’s assent were obtained, the
Wechsler subtests and the emotional vocabulary task were administered to the child, and the CAST and the VABS-II Socialization scale were filled out by the parent. Participants were then asked to invite a friend. Once the friend’s assent and parental consent were obtained, a second meeting was scheduled, in which the peer-interaction paradigm was administered and videotaped.

3. Results

3.1. Descriptive statistics

First, the descriptive statistics of each of the variables (EU, EPE, ENE, ED, and SC) were computed, as detailed in Table 2. Next, Kolmogorov-Smirnoff tests were conducted, to examine if the variables’ scores are normally distributed. With the exception of the EU scores (K-S = .11, NS), the distributions of all other scores significantly differed from normal (EPE: K-S = .16, p < .01; ENE: K-S = .17, p < .001; ED: K-S = .22, p < .001; SEC: K-S = .13, p < .05). Therefore, non-parametric analysis was used to test the research hypotheses.

3.2. Group differences in socio-emotional competence

In order to assess if the SEC measures in the ASD group were lower than those of the TD group, Mann-Whitney tests were conducted for the EU, EPE, ED, and SC scores, with group as the independent variable, with Bonferroni corrections for multiple comparisons. The analyses, detailed in Table 2, showed that compared to the TD group, the ASD group demonstrated poorer emotional understanding, and greater emotion dysregulation, and was rated by parents as having poorer social competence. No significant group differences were found for positive or negative expression of emotion.

3.3. Associations between social and emotional competence measures

Spearman rank correlations were computed over and above group between EU, EPE, ENE, ED and the VABS-II Socialization scores. As shown in Table 3, EU was positively correlated with SC, and ENE was positively correlated with ED. In addition, ED was negatively correlated with SC. These correlations are illustrated in Fig. 1. When correlations were computed separately for each group, Fisher’s Z comparisons showed no significant group difference for any correlation between SEC components.

4. Discussion

The current study examined the SEC components of young children with ASD, compared to the TD children, during social interaction with a peer. In addition, we explored the associations between emotion understanding, emotion regulation, emotion expression and social competence in children with and without ASD.

As predicted, compared to TD children, children with ASD showed emotion understanding, emotion regulation and social competence difficulties. The groups did not significantly differ on the expression of either positive or negative emotion. Emotional

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>ASD Mean</th>
<th>ASD Median</th>
<th>ASD Std. Dev.</th>
<th>ASD Range</th>
<th>TD Mean</th>
<th>TD Median</th>
<th>TD Std. Dev.</th>
<th>TD Range</th>
<th>Mann-Whitney U</th>
<th>Z</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional understanding</td>
<td>19.62</td>
<td>20.50</td>
<td>6.93</td>
<td>4-31</td>
<td>24.27</td>
<td>24.00</td>
<td>4.56</td>
<td>12-32</td>
<td>197.50</td>
<td>-2.58</td>
<td>0.13</td>
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<tr>
<td>Expression of Positive Emotion</td>
<td>2.82</td>
<td>3.00</td>
<td>0.60</td>
<td>1.00-3.80</td>
<td>2.48</td>
<td>2.60</td>
<td>0.69</td>
<td>1.20-3.60</td>
<td>246.50</td>
<td>-1.69</td>
<td>0.06</td>
</tr>
<tr>
<td>Expression of Negative Emotion</td>
<td>0.65</td>
<td>0.60</td>
<td>0.62</td>
<td>0.00-2.00</td>
<td>0.72</td>
<td>0.60</td>
<td>0.60</td>
<td>0-2.00</td>
<td>313.50</td>
<td>-0.454</td>
<td>0.00</td>
</tr>
<tr>
<td>Emotion Dysregulation</td>
<td>0.38</td>
<td>0.23</td>
<td>0.32</td>
<td>0.00-1.15</td>
<td>0.12</td>
<td>0.08</td>
<td>0.20</td>
<td>0-0.92</td>
<td>119.00</td>
<td>-0.06</td>
<td>0.32</td>
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<tr>
<td>Vineland Socialization</td>
<td>97.73</td>
<td>94.00</td>
<td>16.04</td>
<td>79-146</td>
<td>121.31</td>
<td>122.00</td>
<td>14.20</td>
<td>90-146</td>
<td>87.00</td>
<td>-4.60</td>
<td>0.41</td>
</tr>
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</table>

** p < .01.

### Table 3

<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>EPE</th>
<th>ENE</th>
<th>ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional understanding</td>
<td>.16</td>
<td>.07</td>
<td>-.13</td>
<td>.32</td>
</tr>
<tr>
<td>Expression of Positive Emotion</td>
<td>.07</td>
<td>.24</td>
<td>.29</td>
<td>.32</td>
</tr>
</tbody>
</table>
| Expression of Negative Emotion | .10| -.19| -.24|-.40**

* p < .05.
** p < .01.

Wechsler subtests and the emotional vocabulary task were administered to the child, and the CAST and the VABS-II Socialization scale were filled out by the parent. Participants were then asked to invite a friend. Once the friend’s assent and parental consent were obtained, a second meeting was scheduled, in which the peer-interaction paradigm was administered and videotaped.

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Fig. 1. Scatterplots of the significant correlations between socio-emotional competence components.
a. Emotional understanding and social competence

b. Expression of Negative Emotion and Emotion Dysregulation

c. Emotion dysregulation and social competence

Fig. 1. Scatterplots of the significant correlations between socio-emotional competence components. 
a. Emotional understanding and social competence.
b. Expression of Negative Emotion and Emotion Dysregulation.
c. Emotion dysregulation and social competence.
understanding and emotion regulation difficulties were associated with poorer social competence, and expression of negative emotions was associated with poorer emotion regulation, in both children with and without ASD. These findings mirror the reports on direct associations of emotional understanding and emotion regulation with social competence, which were reported by Denham et al. (2003) in TD children and extend them to children with ASD. However, unlike Denham et al.’s findings, our reports showed no direct link between emotional expressiveness and social competence, and suggest that for the expression of negative emotion, these links may be mediated by emotion regulation.

Our findings of emotion regulation difficulties in young children with ASD during an interaction with a peer extend previous reports on emotion dysregulation, shown by toddlers during interaction with their parents (Hirschler-Guttenberg et al., 2015), and parental reports on emotion dysregulation in preschoolers with ASD (Reyes et al., 2020). These findings emphasize the need for peer-interaction focused research on self- and co-emotional regulatory behaviors (Shire, Shih, Bracaglia, Kodjoe, & Kasari, 2020). Like Reyes et al. (2020), our results showed a direct association between participants’ emotion dysregulation and their social competence. Furthermore, the positive correlations found between emotion dysregulation and expression of negative emotions raise a question about emotion regulation as a potential mediator between emotional expression abilities and social competence. This direction should be examined in a larger sample of children with ASD. However, based on our findings, the inclusion of emotion regulation components in peer and school-based interventions targeting social skills of preschoolers and children with ASD (e.g., Bauminger-Zviely, Eytan, Hoshmand, & Ben-Shlomo, 2020) is warranted.

Our findings that young children with ASD show poorer emotional understanding, compared to their TD peers, support previous reports (Fridenson-Hayo et al., 2016). Research showed positive associations between emotion understanding and social competence in children with ASD (Hudepohl, Robins, King, & Henrich, 2015). Our findings offer further support to these associations. The difficulties children with ASD showed in emotional understanding, and the associations of these abilities with social competence, highlight the need for interventions that target emotional understanding in children with ASD (Fridenson-Hayo et al., 2017; Gev et al., 2017), as means to improve their social competence.

The semi-structured, peer-interaction activities, employed in the current study, provided an opportunity to observe children’s behavior during different emotion regulation challenges, including dealing with frustration, impulse control, empathy, and the need for self-regulation required to stay engaged during social interaction. Regulatory behaviors were globally coded, i.e., over and above activity. Whereas these semi-structured activities and global coding managed to highlight emotion regulation challenges in the ASD group, compared to the TD group, the depiction of emotional expressiveness difficulties in ASD, compared to TD children may have not been sensitive enough, and an unstructured observation of children’s peer interaction may be more appropriate for these purposes (Denham et al., 2012). Alternatively, a more fine-tuned analysis of children’s behaviors in response to the challenges introduced by peer interaction focused research on self- and co-emotional regulatory behaviors (Shire, Shih, Bracaglia, Kodjoe, & Kasari, 2020). Like Reyes et al. (2020), our results showed a direct association between participants’ emotion dysregulation and their social competence. Furthermore, the positive correlations found between emotion dysregulation and expression of negative emotions raise a question about emotion regulation as a potential mediator between emotional expression abilities and social competence. This direction should be examined in a larger sample of children with ASD. However, based on our findings, the inclusion of emotion regulation components in peer and school-based interventions targeting social skills of preschoolers and children with ASD (e.g., Bauminger-Zviely, Eytan, Hoshmand, & Ben-Shlomo, 2020) is warranted.

5. Limitations

There are several limitations to the current study: First, our study is limited by the relatively small sample size, as well as by a small number of girls. Recent findings on gender differences within the autism spectrum (Dean, Harwood, & Kasari, 2017) raise questions about the potential difference of girls’ vs. boys’ emotional expression and regulation, in response to the challenges introduced by peer interaction. Next, our attempt to provide an ecologically valid play encounter for the children and to avoid an order effect of activities limited our ability to examine the SEC components separately for each activity. The scoring, which relied on Denham et al.’s M-PAC, limited the score range of the SEC components and prevented an examination of their manifestation across time. It is also important to note that our findings refer mainly to children with ASD who have friends. It is possible that SEC components may be differently manifested among children with ASD who do not have friends. Moreover, since the inclusion criteria excluded children with significant cognitive disabilities, findings cannot be generalized to all children with ASD. Finally, while all questionnaires were previously used in research on young children with ASD, the adult-mediated peer-interaction paradigm was developed for the current study and was not normed for children with ASD.

6. Conclusions

We conclude children with ASD show emotional understanding difficulties, and emotion regulation difficulties during peer interaction. These difficulties are associated with poorer social competence in children with and without ASD. The different components of emotional competence and their direct and indirect association with social competence should be given more attention in the context of peer-interaction and in the planning of interventions targeting socio-emotional skills in children with ASD.

Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.rasd.2021.101818.

References