



**How to foster toddlers' mental-state talk, emotion understanding and prosocial behavior: A conversation-based intervention at nursery school**

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## Abstract

Recent years have seen the development and implementation of a range of training programs aimed at improving children's socio-emotional skills. Nevertheless, few studies have been conducted with toddlers attending nursery school. In this study, we adopted observational and experimental paradigms to examine the efficacy of an intervention based on conversing about emotions with small groups of 2-3 year-old children. The intervention was designed to promote toddlers' mental-state talk, emotion understanding (EU) and prosocial behaviour. The training group significantly outperformed the control group in the use of mental-state language, especially emotional-state lexicon, EU and prosocial behaviour towards peers. There was also a significant Group x Age interaction, with the older training group participants displaying greater gains in EU than the younger ones. We discuss the theoretical and practical implications of these findings.

*Keywords:* mental-state talk, emotion understanding, empathy and prosocial behavior, conversational intervention study, toddlers

How to foster toddlers' mental-state talk, emotion understanding and prosocial behavior:

A conversation-based intervention at nursery school

Over the past three decades, a vast number of studies have focused on how children develop social cognition, a theoretical construct encompassing a range of cognitive abilities such as understanding emotions, desires, thoughts, beliefs and other inner states, as well as verbal and socio-emotional skills (Carpendale & Lewis, 2006). The development of social cognition has mainly been investigated in relation to theory-of-mind and emotion understanding. Theory-of-mind (ToM) is the ability to comprehend epistemic inner states such as belief and false belief, while emotion understanding (EU) involves a range of competencies, all related to recognizing and understanding one's own and others' emotional and affective states (Astington, Harris, & Olson, 1988; Doherty, 2009).

Children's developing emotion understanding has received considerable attention in the literature over recent decades (Harris, 2008), given that it is essential both for competent social relationships and for psychological wellbeing; in addition EU has been identified as a key prerequisite for a range of adaptive behaviors related to school readiness (Denham, 2007). Emotion understanding is the main topic of the present study, in which we set out to investigate the effect of an innovative conversational intervention on toddlers' EU and prosocial behavior in the context of nursery school. Observational research has shown that infants as early as 14 months can use the facial emotional cues provided by an adult to interpret unfamiliar situations (Klinnert, Emde, Butterfield, & Campos, 1986). Very young children also recognize sadness and distress on the part of adults and peers (Hepach, Vaish, & Tomasello, 2013) and display a propensity to offer comfort. Interestingly, from 20 months they begin to use the *emotional lexicon* (understood as a subset of mental-state language) to refer to their own and others' emotions, producing utterances such as '*Daddy happy... Mary afraid... me sad...*' (Bartsch & Wellman, 1995).

### **The relationship between child-adult talk and children's emotion understanding**

Numerous longitudinal studies investigating the correlates of EU have reported a relationship between adult talk, discussion and conversation about emotion early in development, and children's later emotion understanding.

The pioneering studies of Dunn and coworkers (e.g., Dunn, Brown, & Beardsall, 1991) assessed 1-3 year olds, finding that children from families in which desires and feelings were frequently discussed were more likely to succeed on emotion comprehension tasks some months later. Children's talk about mental states with friends and mothers also predicts improvements in their emotion understanding (Hughes & Dunn, 1998; Ruffman, Slade, & Crowe, 2002; Taumoepeau & Ruffman, 2006, 2008). In addition, mothers' early use of cognitive verbs in picture-book reading correlates with children's later understanding of emotional states (Adrian, Clemente, & Villanueva, 2007), while mothers' explanations of emotional states in conversation predict children's later emotion comprehension (Garner, Jones, Gaddy, & Rennie, 1997; Laible 2004). More recently, Doan & Wang (2010) conducted a study with a sample of European American and immigrant Chinese children and their mothers. Using a story-reading paradigm, they found that, regardless of culture, mothers' discussion of emotions predicted children's emotion understanding at age three years.

Taken all together, the studies just reviewed suggest that the deployment of psychological language, especially emotional-state lexicon, in child-adult interaction is a key factor in the development of children's emotion knowledge and comprehension.

In addition to correlational investigations, training studies have been conducted to explore how to enhance children's emotion comprehension, a key competence for social adjustment that is related to peer acceptance and popularity (Harris, 2008), school readiness

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3 and academic achievement (Denham, Bassett, & Zinsser, 2012), as well as to advanced social  
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5 skills such as prosocial orientation (Eggum et al., 2011).  
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8 One line of intervention studies has tested evidence-based programs, which are  
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10 designed to promote socio-emotional abilities and conducted by appropriately trained  
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12 teachers. For instance, Izard, Trentacosta, King, and Mostow (2004) developed the *Emotion*  
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14 *Course* aimed at improving the emotion knowledge of preschoolers from low-income  
15  
16 families. Children in the intervention group displayed increased emotion comprehension and  
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18 decreased negative emotion expression with respect to the control group. Similarly,  
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20 Domitrovich, Cortes, and Greenberg (2007) found a 9-month teacher-implemented  
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22 intervention targeting preschoolers' emotion comprehension and social competence to yield a  
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24 positive effect.  
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28 In parallel with this line of inquiry, the area of research centered around the  
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30 *conversational hypothesis* has examined how the mechanism of conversation in everyday  
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32 interactional contexts enhances children's emotional and social competence from early in  
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34 development (de Rosnay & Hughes, 2006; Ornaghi, Brockmeier, & Grazzani Gavazzi, 2011).  
35  
36 For instance, Tenenbaum, Alfieri, Brooks, and Dunne (2008) conducted a training study with  
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38 5-8 year olds, finding that explanatory conversations facilitated their emotion understanding.  
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40 In a training study with preschoolers, Van Bergen, Salmon, Dadds, and Allen (2009)  
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42 encouraged mothers in an experimental group to label their child's emotions and discuss the  
43  
44 causes of emotion during reminiscing conversations. Six months later, the children of these  
45  
46 mothers produced a greater number of causes in an emotion-cause-knowledge task than their  
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48 peers in the control condition.  
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51  
52 In line with this conversational and pragmatic hypothesis, Grazzani Gavazzi and  
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54 Ornaghi (2011) conducted a training study based on the assumption that *active* use of mental-  
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56 state terms in everyday conversation would improve preschoolers' understanding of internal  
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3 states. The training was focused on emotional-state talk and had a positive effect on  
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5 children's comprehension of emotion, especially at 3 years of age. In a recent study with a  
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7 sample of families from low SES backgrounds, Aram, Fine, and Ziv (2013) demonstrated the  
8  
9 potential of shared reading to elicit richer conversations between parents and children and  
10  
11 enhance the latter's social cognition abilities. Finally, significant effects of interventions  
12  
13 focused on adult-children storybook reading and subsequent language exchanges and  
14  
15 conversations have been found in studies with preschool (Ornaghi, Grazzani, Cherubin,  
16  
17 Conte, & Piralli, 2015) and primary school (Ornaghi, Brockmeier, & Grazzani, 2014)  
18  
19 children. The authors reported that conversing on the expression, causes and regulation of  
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21 emotion had a significant effect on the emotion understanding of children in the experimental  
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23 groups.  
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28 Overall, the findings of the training studies just outlined demonstrate that  
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30 conversational activities, which involve commenting on, explaining and discussing emotion  
31  
32 states, lead to gains in children's EU. This in turn suggests that conversation is a powerful  
33  
34 mechanism for psychological development (Turnbull, Carpendale, & Racine, 2009).  
35  
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### 37 **Emotion understanding and prosocial behavior**

38  
39 Emotion understanding has been found to increase concurrently with positive social  
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41 actions, particularly prosocial behavior (Eisenberg, Fabes & Spinrad, 2006), throughout the  
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43 first years of life. Prosocial behavior is generally defined as voluntarily acting to promote  
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45 others' wellbeing, often out of a sense of caring and concern. It encompasses a broad class of  
46  
47 voluntary actions including helping, sharing, comforting, informing and cooperating, all of  
48  
49 which share the underlying intention to benefit another individual, (Brownell, Svetlova, &  
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51 Nichols, 2009; Dunfield & Kuhlmeier, 2013). Displays of prosocial behavior are occasional  
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53 in the first two years of life but increase thereafter in line with overall psychological  
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55 development (Hay & Cook, 2007).  
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Relatively few studies have explored the link between EU and prosocial behaviour in toddlers and preschoolers. A pioneering study by Denham (1986) showed correlations between emotion knowledge and prosocial actions in 2- to 3-year-old children. Recent years have seen the emergence of a more systematic interest in this relationship. For example, Ensor and Hughes (2005) collected maternal ratings of prosocial behavior (such as helping or comforting), finding significant correlations between this measure and toddlers' performance on an emotion-understanding task. Similarly, Ensor, Spencer, and Hughes (2011) identified strong associations between emotion comprehension at 3 years and prosocial behavior at 4 years, even after controlling for the effect of verbal ability, which is known to be related to both. Farrant, Devine, Maybery, and Fletcher (2012) conducted a large-scale research project with Australian children, using both maternal ratings and suitable assessment tasks; they identified significant relationships among preschoolers' empathy, prosocial behavior, and emotion understanding. Moreover, in a longitudinal study with 3-5 year olds, Eggum and colleagues (2011) found that emotion understanding predicted children's prosocial orientation over time. In support of this, Ornaghi et al. (2015) recently reported that an intervention based on storybook reading followed by conversation on emotions had a positive effect on both EU and prosocial orientation in preschoolers. Finally, Cigala, Mori and Fangareggi (2015) found that children with greater perspective taking skills, including cognitive and emotional components, were also more inclined to behave prosocially during peer interactions.

### **The current study**

The study presented here was carried out using both an experimental and an observational paradigm. It was designed to assess the efficacy of a conversation-based intervention in enhancing 2- to 3-year-old children's mental-state talk, emotion

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3 understanding, and prosocial behaviour, and offers a number of original features with respect  
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5 to existing intervention studies based on storybooks and conversation on mental states.  
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8 First, we conducted our research in an extra-familial educational context, the infant-  
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10 toddler center, while most of the studies reviewed above took place at home, with the primary  
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12 emphasis on mother-child interaction during and after story reading. Second, our intervention  
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14 involved planned interactions between an educator and small groups of four to six children,  
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16 as opposed to dyadic interaction between an adult/caregiver and an individual child. This was  
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18 with a view to also fostering an exchange of perspectives among children. A third novel  
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20 feature was the active participation of trained teachers: intervention in educational contexts is  
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22 often conducted by outside experts, with the disadvantage that teachers/educators may not  
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24 adopt it as part of their daily practice. Finally, our intervention targeted children aged  
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26 between 2 and 3 years, a young age group that has traditionally not been involved in training  
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28 studies.  
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32 Thus, the principal aim of our study was to test the effect of a conversation-based  
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34 intervention, conducted with small groups of children at nursery school, on toddlers'  
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36 development of socio-emotional skills, while controlling for language ability, and examining  
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38 the role of age and gender. With regard to age, between 2 and 3 years key socioemotional and  
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40 cognitive development takes place (Denham, 1998; Dunfield, Kuhlmeier, O'Connell, &  
41  
42 Kelley, 2011; Hughes, 2011) that impacts on the abilities investigated in the present study.  
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44 Concerning gender, the literature reports no key differences in emotion understanding, but  
45  
46 conflicting findings in relation to prosocial behavior: in some studies, females displayed more  
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48 positive conduct than males (e.g., Eisenberg, et al., 2006; Eggum et al., 2011; Newton,  
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50 Goodman & Thompson, 2014), while in others no significant differences were identified  
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52 (e.g., Dunfield et al., 2011; Ornaghi et al., 2015).  
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In sum, we aimed to: (i) verify the impact of training on children's mental-state talk, especially emotional lexicon; (ii) test for training effects on their emotion understanding; and (iii) investigate the impact of training on their prosocial behavior.

Based on previous findings obtained with preschoolers and school-age children, we expected that the training group would outperform the control group on the administered measures. Finally, given the lack of existing training studies with toddlers on our research themes we made no predictions concerning the role of age and gender.

## Method

### Participants

Participants were 105 toddlers (65 girls) with a mean age at pre-test of 29.8 months ( $SD$ : 3.78; range: 21-36 months) and a mean age at post-test of 33 months ( $SD$ : 3.7). Given the broad age range, we took the 50<sup>th</sup> percentile (median = 30 months) as a cut-off point (Wang & Chen, 2013) and split the sample into two age groups, Younger ( $n = 50$ ; 21 girls;  $M_{age} = 27.13$ ;  $SD = 2.59$ ) and Older ( $n = 55$ ; 24 girls;  $M_{age} = 32.80$ ;  $SD = 1.38$ ). The children were native Italian speakers whose linguistic and cognitive development fell within the standards for their age group; they attended seven different infant-toddler centers in the province of Milan, which were all under the same management and shared the same educational programs. All of the toddlers came from middle-class socioeconomic backgrounds. The majority of their parents held a high school diploma or university degree (90% of mothers and 85% of fathers) and were in white-collar employment (75% of mothers and 47.3% of fathers). Other parents were manual workers (7.3% of mothers and 18.3% of fathers), executives or self-employed professionals (10.4% of mothers and 29.1% of fathers), while the remainder were unemployed (7.3% of mothers and 5.4% of fathers). In addition, 40.4% of participants were only children, 48.5% had one sibling, 8.1% had two siblings, and

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3 the remaining 3% three or more siblings. Children were assigned to a training ( $n = 49$ ) or  
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5 control group ( $n = 56$ ) in which they were almost equally divided by gender.  
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8 The 37 teachers who participated in the study had a mean age of 28 years and a mean  
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10 of seven years' teaching experience. Given that they all worked for the same group of early  
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12 childhood education centres, they followed the same educational approach. They were  
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14 selected based on their teaching experience and on their motivation to learn a new  
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16 educational format involving story-reading and eliciting conversation with and among  
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18 children. They too were assigned to either the experimental or the control condition. Teachers  
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20 in the control condition were told that they would have the opportunity to receive the training  
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22 the following year.  
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### 25 **Research design and instruments**

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27 The study comprised three phases, pre-test, intervention, and post-test, for both the  
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29 training and the control group. The intervention began two weeks after the end of the pre-test  
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31 and lasted two months. The post-test started two weeks after the end of the intervention.  
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### 34 **Pre- and post-test measures**

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36 Before and after the intervention phase, parents who were informed during a meeting with the  
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38 teachers and gave consent for their children to participate in the study, were asked to  
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40 complete three instruments assessing their children's competences. The children themselves  
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42 were individually administered a series of measures (presented in counterbalanced order) and  
43  
44 video-observed.  
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### 47 ***Measures completed by parents***

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49 *The PVB* (Caselli, Pasqualetti, & Stefanini, 2007). Verbal abilities were assessed via a  
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51 standardized instrument based on maternal ratings of children between 18 and 36 months of  
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53 age. It comprises four parts. For the purposes of the current study, we administered the first  
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55 part of the test evaluating the child's word production (vocabulary), the second part  
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concerning the ability to formulate phrases of several words (complexity), and the third regarding pragmatic abilities, e.g. in terms of pointing, making gestures, pretending (pragmatics). The rating questionnaire took around 20 minutes to compile and standard scoring procedures from the PVB Manual were applied. In our statistical analyses for the purposes of present study we only included participants' scores for the vocabulary section, which ranged from 0 to 100. Reliability coefficients were Guttman's  $\lambda_4 = .82$  at pre-test and  $.86$  at post-test.

*The Empathy Questionnaire (EmQue)* (Rieffe, Ketelaar, & Wiefferink, 2010). This scale is composed of 20 items representing three facets of empathy that may be observed in very young children: emotion contagion (e.g., "When another child cries, my child gets upset too"), attention to others' feelings (e.g., "When an adult gets angry with another child, my child watches attentively."), and prosocial responses (e.g., "When another child starts to cry, my child tries to comfort him/her"). Parents are asked to rate the degree to which each item, reflecting a specific type of behavior, applied to their child over the previous two months, using a 3-point scale (0 = never, 1 = sometimes, 2 = often). The scores obtained range from 0 to 40. Reliability coefficients were  $\alpha = .81$  at pre-test and  $\alpha = .70$  at post-test. Three partial scores may also be calculated, corresponding to the three dimensions of empathy evaluated by the instrument: emotion contagion (seven items; maximum score = 14), attention to others' emotions (seven items; maximum score = 14), and pro-social behaviour (seven items; maximum score = 12). The respective reliability coefficients for the three subscales were:  $\alpha = .74$  at pre-test and  $\alpha = .66$  at post-test;  $\alpha = .68$  at pre-test and  $\alpha = .67$  at post-test; and  $\alpha = .76$  at pre-test and  $\alpha = .72$  at post-test.

#### ***Measures administered to toddlers***

*The Puppet Interview.* Emotion comprehension was assessed by means of the well-known Puppet Interview (Denham, 1986) in the Italian validated version (Camodeca &

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3 Coppola, 2010). The materials required are two puppets with blank faces and four felt discs  
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5 each depicting the facial expression corresponding to a distinct basic emotion. Based on the  
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7 age of participants, we used four subtasks from the battery to assess expressive  
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9 comprehension, receptive comprehension, affective perspective-taking, and causes  
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11 comprehension. These examined the ability to label emotions (4 items), recognize them (4  
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13 items), deploy emotion knowledge in stereotypical situations (8 items), and identify the  
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15 causes of emotions (4 items). Participants received a score of 2 for a correct response, 1 for  
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17 an incorrect response of the appropriate affective valence, and 0 for a completely  
18  
19 inappropriate response. Each child was assigned a total score ranging from 0 to 40, and four  
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21 sub-scores were calculated for each of the four sections administered (expressive task: max..  
22  
23 8; receptive task: max. 8; affective perspective-taking task: max. 16; and causes task: max. 8).  
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25 Reliability coefficients for the overall measure were  $\alpha = .92$  at pre-test and  $\alpha = .89$  at post-test.  
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27 Coefficients for each of the four sections of the Puppet Interview were also calculated:  $\alpha$   
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29  $= .81$  at pre-test and  $\alpha = .68$  at post-test for the expressive task;  $\alpha = .89$  at pre-test and  $\alpha = .80$  at  
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31 post-test for the receptive task;  $\alpha = .82$  at pre-test and  $\alpha = .74$  at post-test for the affective  
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33 perspective-taking task; and  $\alpha = .80$  at pre-test and  $\alpha = .80$  at post-test for the emotion causes  
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35 task.  
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41 *The Desire-Emotion Task* (Wellman & Woolley, 1990). Children's comprehension of  
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43 the relationship between desire and emotion was assessed by means of the desire-emotion  
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45 task. For the purposes of the present study, from the whole set comprising two parallel sets of  
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47 six stories, concerning Action and Emotion respectively, we used only the latter. Of these six  
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49 stories, two described a Finds-Wanted situation, two a Finds-Nothing situation, and two a  
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51 Finds-Substitute situation. The toddlers were required to predict the story character's  
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53 emotional reaction in each scenario (happy or sad) based on their comprehension of desires in  
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55 mediating emotional experiences. Participants received a score of 1 for a correct response,  
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3 and 0 for a wrong response, yielding a total score of up to 6 and three subtotals with a  
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5 maximum score of 2 each. Reliability coefficients for the overall task were  $\alpha = .64$  at pre-test  
6  
7 and  $\alpha = .66$  at post-test. Coefficients for the three subtasks were respectively:  $\alpha = .60$  at pre-  
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9 test and  $\alpha = .67$  at post-test;  $\alpha = .65$  at pre-test and  $\alpha = .63$  at post-test; and  $\alpha = .69$  at pre-test  
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11 and  $\alpha = .61$  at post-test.  
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14 *Video-observations: use of mental-state language and production of prosocial*  
15  
16 *behavior.*  
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19 The children participating in the research were also individually video-recorded; we  
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21 opted to use a fixed-position video camera operated by a researcher in order to minimize  
22  
23 interference with participants' spontaneous behavior. Each participant was video-recorded for  
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25 a total of 20 minutes in two different situations observed on two different days: free play (10  
26  
27 minutes) and lunch (10 minutes). During the recording sessions, the teachers were present in  
28  
29 the room, but had been asked to intervene as little as possible in the children's exchanges, in  
30  
31 order to facilitate observation of the toddlers' spontaneous behavior. When the video footage  
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33 was subsequently coded, any behaviors deemed by the judges to have been prompted by  
34  
35 teacher intervention as opposed to arising spontaneously were excluded from the data set. It  
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37 only happened twice.  
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41 The three trained observers were blind to the aims of the study and to the children's  
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43 performance on the administered measures. They used a randomly ordered list of children  
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45 and focused on one child at a time.  
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48 Two expert judges who were not aware about the aims of the research applied two  
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50 different types of coding to the recorded material. First, each child's linguistic production  
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52 during the 20 minutes of observation was transcribed and coded for use of the various  
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54 categories of mental-state lexicon listed above, namely physiological, volitional, perceptive,  
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56 emotional, cognitive, and moral. The coders attained 83% agreement at pre-test ( $\kappa = .76$ ) and  
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3 86% at post-test ( $\kappa = .78$ ). A composite variable (overall production of m-s language) and  
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5 single variables for each sub-type of psychological lexicon were generated for the purposes  
6  
7 of statistical analysis.  
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10 Second, the judges coded the occurrence of each child's prosocial behaviors during the  
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12 20 minutes of observation, following categorizations and procedures used by Dunfield and  
13  
14 colleagues (2011) and Thompson and Newton (2013). Specifically, the coding scheme  
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16 allowed for three different kinds of prosocial behavior: *helping*, *sharing*, and *comforting*.  
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18 Helping behaviours are those in which a child assists a peer to complete an action or attain a  
19  
20 goal (for example, Marta sees that Anna is trying to stand up. She goes over to Anna and  
21  
22 helps her up. She follows Anna as she walks across the room and takes her by the hand when  
23  
24 she seems insecure). Sharing behaviours are those in which children unambiguously share an  
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26 object or a toy with another child (for example, Leonardo goes over to Marta who is playing  
27  
28 with wooden blocks and begins to watch her. Marta sees him, offers him a block and says,  
29  
30 "Shall we play together?"). Finally, comforting behaviours are those in which a child offers  
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32 verbal or physical consolation in response to the distress of a peer (for example, Sofia notices  
33  
34 that Matteo is crying and says, "Are you crying?" She goes over to him, hugs him, gives him  
35  
36 a kiss, takes him by the hand and leads him towards the educator). The judges independently  
37  
38 coded children's prosocial behaviours, attaining 82% agreement at pre-test ( $\kappa = .78$ ) and 85%  
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40 at post-test ( $\kappa = .77$ ).  
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#### 45 **The intervention procedure**

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47 The children assigned to the *experimental condition* took part in training sessions  
48  
49 conducted daily with small groups (4/6 children per group) over a two month period. All the  
50  
51 children took part in training sessions at least four times a week for the duration of the  
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53 intervention phase. Composition of the working groups was based on teacher nomination.  
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55 The teachers formed small groups, which were maintained for the entire training period,  
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3 based on the following criteria: each group contained a mix of boys and girls and was made  
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5 up of children who were friendly with one another and used to doing educational activities  
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7 together. At each session, the children first listened to a brief illustrated story based on an  
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9 emotional script and then took part in a conversation about the emotion featured in the story,  
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11 as explained just beyond.

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14 The children assigned to the *control condition* also took part in daily activities in small  
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16 groups (4/6 children per group) over the same two month period. Again, the final sample only  
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18 included those who had attended at least 80% of the sessions (only two children dropped out  
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20 of each group, intervention and control). In contrast with the experimental participants, after  
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22 listening to the same stories, the children in the control groups did not take part in  
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24 conversation but were offered a selection of toys such as Lego, building blocks and jigsaw  
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26 puzzles and allowed to engage in free play.

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30 The participating teachers were provided with ad hoc training over a three-month  
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32 period. They were all asked to follow the same set of guidelines when reading the stories to  
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34 the children, although allowance was made for individual reading styles. In particular, the  
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36 story reading was required to meet the following criteria: the teacher was to read the whole  
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38 text, verbatim and without varying it in any way, and to adopt a sufficiently lively tone of  
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40 voice and pace of reading to maintain the children's attention and curiosity. Furthermore,  
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42 during the training phase all the teachers, who also received a short booklet outlining the key  
43  
44 features of either the experimental or control condition as appropriate, were videotaped while  
45  
46 practising the relevant activities with a pilot group of children. Specifically, the teachers who  
47  
48 had been assigned to the training condition received feedback from the research team on both  
49  
50 the reading and conversation activities, whereas the teachers in the control group were trained  
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52 in the reading only. Supervision of the video-recorded reading/conversation sessions  
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3 continued throughout the research proper, for both the experimental and control group  
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5 teachers.  
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8 The stories were developed ad hoc for the study and presented in a book called *The*  
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10 *Stories of Ciro and Beba* (Ornaghi, Agliati, & Grazzani, 2014). In all, the book contained  
11  
12 eight stories whose age-tuned intelligibility and appeal had been pilot tested with children  
13  
14 that did not take part in the study. A sample story is included in the Appendix. The main  
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16 characters are two rabbits who in the course of a series of adventures feel *scared*, *happy*,  
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18 *angry* or *sad* in turn. The narratives follow the standard story schema: after the scene has  
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20 been set, a critical situation eliciting a particular emotion arises, and action is required in  
21  
22 order to resolve the crisis. Specifically, the stories depict the protagonists as deploying  
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24 prosocial action in order to solve their problems. In addition, the story texts are enriched with  
25  
26 *inner-state language* (Bartsch & Wellman, 1995), primarily emotional language (*gets mad*, *is*  
27  
28 *scared*, *is surprised*, *is happy*, and so on), but also perceptive (they can't *see* anything),  
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30 volitional (that train I really *wanted*) and cognitive (e.g., *decide*) terms.  
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35 The training sessions with the experimental group involved a four-step procedure:  
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37 creation of a suitable context in which to introduce the activity, the story reading,  
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39 conversation about the emotion thematized in the story, and a windup stage. The crucial  
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41 element of the procedure was the *conversation about emotions*, conducted with small groups  
42  
43 of young children. In the course of this conversational activity, the teacher drew on the story  
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45 content to focus on the expression, causes and regulation of emotion (Denham, 1998), as well  
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47 as on prosocial actions such as helping and comforting others.  
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51 The stimulus questions, as illustrated in the Appendix, were designed to encourage the  
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53 participation of all the children in the group, giving them the opportunity to narrate situations  
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55 in which they themselves, their family members and friends, or familiar cartoon/story  
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57 characters, had experienced the emotion being discussed.  
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This procedure, which may seem unusual for use with toddlers, was intended to foster and accelerate the development of children's linguistic abilities. Furthermore, given its focus on the story characters' emotional experience, we expected that it would enhance children's ability to reflect on internal states, the relationship between private experience and manifest actions, and individual differences in both emotional experience and outward behavior (Reddy, 2008; Hughes, 2011).

The sessions with the control group which did not participate in conversation on emotions also comprised four steps: creation of a suitable context in which to introduce the activity, the story reading, a windup stage and free play.

### Data analyses

All statistical analyses were conducted using SPSS (version 21). In order to verify the impact of the intervention on the competences under study, a preliminary repeated measures MANOVA was performed, with Time (pre and post) as a within-subject factor, and Group Condition (experimental vs control group), Age Group (younger vs older toddlers) and Gender as between-subject factors. The dependent variables measured at two time points were language ability (as evaluated by the PVB), spontaneous use of mental-state lexicon (as recorded in the video observations), understanding of the relationship between desire and emotion (as evaluated via the desire-emotion task), emotion understanding (as assessed via the Puppet Interview), empathy and prosocial behavior (as assessed via the EmQue and recorded in the video observations). Effect sizes were calculated using partial eta-squared values ( $\eta_p^2$ ).

We then conducted further analyses in relation to the three main competences we wished to investigate, namely mental-state language, emotion understanding and prosocial behavior. These in-depth analyses allowed us to assess the effects of the training on the sub-

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3 dimensions of the constructs under study (the various categories of psychological lexicon, the  
4 different EU abilities and the different kinds of prosocial behavior). Specifically, we ran a  
5 series of analyses of variance (ANOVAs), with toddlers' average gains on each subtask –  
6 calculated by subtracting pre-test scores from post-test scores – as the dependent variables  
7 and the factors Group Condition and Age Group as the independent variables.  
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### 14 Results

15  
16 Descriptive statistics for all variables by group condition at both time points are  
17 presented in Table 1. In addition, correlations among variables were run. As shown in Table  
18 2, significant relations were found among age, language, EU and ToM; in contrast, empathy  
19 and prosocial behavior showed very modest and not significant correlations with the other  
20 measures.  
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28 The preliminary analysis of variance revealed a significant effect of Time, Wilks'  $\lambda =$   
29  $.10$ ,  $F(6,91) = 50.35$ ,  $p < .00001$ ,  $\eta_p^2 = .92$ , and a significant Time  $\times$  Group Condition  
30 interaction, Wilks'  $\lambda = .48$ ,  $F(6,91) = 4.78$ ,  $p = .002$ ,  $\eta_p^2 = .50$ . The univariate tests showed  
31 that this interaction was significant for language ability,  $F(1,95) = 5.16$ ,  $p = .03$ ,  $\eta_p^2 = .14$ ,  
32 spontaneous use of mental-state lexicon,  $F(1,95) = 8.25$ ;  $p = .007$ ,  $\eta_p^2 = .21$ , understanding of  
33 the desire-emotion relationship,  $F(1,95) = 5.77$ ,  $p = .02$ ,  $\eta_p^2 = .15$ , emotion understanding,  $F$   
34  $(1,95) = 17.68$ ,  $p < .0001$ ,  $\eta_p^2 = .36$ , empathy,  $F(1,95) = 4.51$ ,  $p = .03$ ,  $\eta_p^2 = .09$ , and  
35 prosocial action,  $F(1,93) = 5.70$ ,  $p = .02$ ,  $\eta_p^2 = .08$ .  
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46 We then broke down the interaction into the simple main effects, applying the  
47 Bonferroni correction for multiple contrasts. For the Group Condition factor, at pre-test there  
48 were significant differences in empathy,  $F(1,95) = 7.36$ ,  $p = .01$ ,  $\eta_p^2 = .14$ . At post-test, there  
49 were statistically significant differences between groups regarding use of mental-state  
50 lexicon,  $F(1,95) = 6.72$ ,  $p = .01$ ,  $\eta_p^2 = .16$ , desire-emotion understanding,  $F(1,95) = 8.01$ ,  $p =$   
51  $.006$ ,  $\eta_p^2 = .10$ , emotion understanding,  $F(1,95) = 15.26$ ,  $p < .0001$ ,  $\eta_p^2 = .18$ , and prosocial  
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behavior,  $F(1,95) = 4.10, p = .04, \eta_p^2 = .07$ . Specifically, the children in the training group obtained higher scores on these measures than their counterparts in the control group (see Table 1). For the Time factor, significant differences between pre- and post-test scores were found for all measures in the training group and for language ability and emotion understanding in the control group, as shown in Table 1.

We also found a significant Time  $\times$  Group Condition  $\times$  Age interaction, Wilks'  $\lambda = .79, F(6,91) = 2.97, p = .02, \eta_p^2 = .20$ . This interaction was only significant for emotion understanding, as evaluated by the Puppet Interview,  $F(1,95) = 4.87, p = .03, \eta_p^2 = .08$ . As shown in Figure 1, children's pre- to post-test gains in EU were significantly greater in the training group, especially for older participants. In the training group, mean EU scores were 8.75 at pre-test and 21.33 at post-test for younger participants, and 15.67 at pre-test and 33.40 for older children. Means in the control group were 8.68 at pre-test and 18.74 at post-test for younger toddlers, and 17.86 at pre-test and 22.38 at post-test for older participants.

Gender was not found to have any significant interaction effect at this stage, and for this reason, it was omitted from all subsequent analyses.

Given that the interaction between Time and Group Condition was significant for the general language measure, we conducted further tests to verify whether the changes in children's vocabulary explained the differences between groups in pre- to post-test improvements on the other measures administered. We conducted a repeated measures analysis of covariance (MANCOVA) with Group Condition as independent variable, scores in the investigated competences as dependent variables, and pre- to post-test gains in vocabulary as covariate. The results showed that changes in language ability, in terms of increases in general vocabulary, did not account for the other differences in progress observed between the two groups from pre- to post-test. In other words, even after gains in vocabulary had been controlled for, the training group made significantly greater progress in

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3 the other abilities under study, Wilks'  $\lambda = .74$ ,  $F(5,93) = 5.82$ ,  $p < .001$ ,  $\eta_p^2 = .28$ . Similarly,  
4  
5 analyses of covariance confirmed the significant interaction among Time, Group Condition,  
6  
7 and Age in relation to EU, which was more liable to improve in the older training participants  
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9 than in the younger ones, Wilks'  $\lambda = .73$ ,  $F(1, 95) = 9.21$ ,  $p < .003$ ,  $\eta_p^2 = .12$ .

### 11 **The effect of the intervention on children's usage of mental state vocabulary**

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14 As stated above, the preliminary analyses showed that the training led to significant  
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16 gains in toddlers' spontaneous use of mental-state lexicon during daily social interaction at  
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18 nursery. We undertook more in-depth analysis of these improvements by investigating the  
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20 effect of the intervention from pre- to post-test on individual categories of mental-state term,  
21  
22 as assessed via observation of spontaneous behavior at nursery school.

23  
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25 As shown by the preliminary multivariate analysis, the toddlers who took part in the  
26  
27 two-month intervention displayed gains in their global spontaneous use of mental-state  
28  
29 lexicon. As illustrated in Figure 2, they specifically improved in the use of perceptible (1.20  
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31 vs .11),  $F_{1,101} = 5.26$ ;  $p = .03$ ;  $\eta_p^2 = .14$ , and emotional terms (1.00 vs .17),  $F_{1,101} = 5.34$ ;  $p =$   
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### 41 **The effect of the intervention on Emotion Understanding**

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44 As reported above, the training group obtained higher total scores at post-test on both  
45  
46 the desire-emotion task and the puppet interview than did the control group. We therefore  
47  
48 performed further analyses to explore participants' gains in emotion understanding in greater  
49  
50 depth. Specifically, we examined the effect of the intervention on children's performances on  
51  
52 each of the three sets of items making up the desire-emotion task (evaluating different desire-  
53  
54 emotion scenarios) and each of the four sub-tasks of the Puppet Interview (evaluating  
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expressive comprehension, receptive comprehension, affective perspective-taking, and understanding of the causes of emotion, respectively).

With regard to the Desire-Emotion task we did not find significant effects for any of the three pairs of items (relative to finding a desired object, finding nothing, finding something else in place of the desired object).

With regard to the Puppet Interview, a significant Group Condition effect emerged for each of the four sub-tasks administered in the current study. Specifically, the training group improved significantly more on all sub-tasks: the expressive task (3.33 vs 2.22),  $F_{1,101} = 4.11$ ,  $p = .04$ ,  $\eta_p^2 = .06$ , the receptive task (3.27 vs 1.70),  $F_{1,101} = 7.99$ ;  $p = .006$ ,  $\eta_p^2 = .11$ , the affective perspective-taking task (6.33 vs 2.75),  $F_{1,101} = 13.87$ ,  $p < .001$ ,  $\eta_p^2 = .17$ , and the emotion causes task (2.73 vs .95),  $F_{1,101} = 6.39$ ,  $p = .01$ ,  $\eta_p^2 = .08$ . Furthermore, a Group Condition  $\times$  Age Group interaction emerged for the expressive task,  $F_{1,101} = 5.11$ ,  $p = .03$ ,  $\eta_p^2 = .07$ , the affective perspective-taking task,  $F_{1,101} = 5.79$ ,  $p = .02$ ,  $\eta_p^2 = .08$ , and the emotion causes task,  $F_{1,101} = 4.56$ ,  $p = .03$ ,  $\eta_p^2 = .06$ , with older participants displaying greater improvements from pre- to post-test. The simple main effects for both Group Condition and Age Group factors are reported in Table 3.

### **The effect of the intervention on empathy and prosocial behavior**

The preliminary analysis showed the training to have had a significant effect on children's empathy as rated by their parents via the EmQue, as well as on their prosocial behavior as assessed via the video-observation sessions. We therefore conducted separate analyses of variance for each of the three EmQue dimensions (emotion contagion, attention to others' feelings and prosocial response), as well as for each of the three types of prosocial behavior observed (helping, sharing and comforting).

With regard to the dimensions of empathy, the Group Condition factor produced a significant effect on attention to the feelings of others, with the training group displaying a

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3 significantly greater post-test improvement on this dimension than the control group (.75 vs -  
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5 1.00),  $F_{1,101} = 10.57, p = .003, \eta_p^2 = .24$ .

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8 With regard to the different types of prosocial behavior, there were no statistically  
9  
10 significant differences between the two groups, although the training group participants  
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12 displayed greater gains than the control group children for all three forms of prosociality, and  
13  
14 particularly for helping behaviors (.17 vs .10).  
15

### 16 Discussion

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19 The primary aim of the current study, which offers a number of innovative features as  
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21 described above, was to verify the effects of conversation-based intervention at nursery  
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23 school on toddlers' development of socio-emotional skills, while controlling for language,  
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25 and exploring the role of age and gender. More specifically, we wished to investigate whether  
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27 conversational intervention on the theme of emotions, which has been previously found to  
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29 foster the development of a wide range of cognitive and socio-emotional abilities in  
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31 preschool and school-age children (de Rosnay & Hughes, 2006; Ornaghi et al., 2014; Ornaghi  
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33 et al., 2015; Tenenbaum et al., 2008), would also be efficacious at 2-3 years of age. We  
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35 obtained three main findings. First, the training had a positive impact on the development of  
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37 participants' mental-state talk, emotion understanding and prosocial behavior. Second, this  
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39 positive effect was independent of both gender and gains in general vocabulary. Third, the  
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41 training was more effective in enhancing emotion understanding in older than in younger  
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43 toddlers. We now discuss these findings in greater detail.  
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48 As expected, the training group participants displayed significant gains in their  
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50 tendency to make spontaneous use of mental-state vocabulary. This is not surprising given  
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52 that the intervention consisted of conversational activities during which children were  
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54 exposed to and had the opportunity to use internal-state lexicon, especially that relating to the  
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56 sphere of emotions. In line with the reported findings of previous research (e.g., Hughes &  
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Dunn, 1998; Ruffman et al., 2002), conversation on inner states stimulated children to use this vocabulary in the course of their daily interactions with peers and adults. In other words, the conversational activity fostered a dynamic and circular relationship between the available range of inner-state vocabulary and its active use in conversation with others. On the one hand, listening to the stories and to the stimulus questions and input of the educator children took a more active part in the conversation; in turn, this active and spontaneous use in conversational interaction of inner-state talk, and of the emotional lexicon in particular, helped children to consolidate their understanding of its meaning (Nelson, 2007; Ornaghi et al., 2011). Toddlers' initial responses to the teachers' stimulation were linked to the experiences of the story characters (e.g., "I'm happy when I'm at the seaside because I can play on the beach"), as though they were activating a mechanism of repetition and imitation of what they had just heard. Towards the end of the intervention however, the children's linguistic production improved, both in terms of the length of their utterances and in terms of increased attempts to speak about themselves in an original manner by linking aspects of the emotional episode to their personal experience (e.g., "When I want a toy car and my Dad says no, I feel all red, red in the face, in my eyes, in my arms, in my legs, in my tummy and even in my pants").

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It should be emphasized here that while many classic studies on the role of conversation in socio-cognitive development have focused on the dyadic exchange between an adult and a child (for a review, see de Rosnay & Hughes, 2006), the children in the current study, despite their young age participated in *group conversations*. These conversational interactions were all characterized by linguistic exchange in the context of ongoing exposure to the perspectives of others. Not alone were the participating children stimulated to reflect on their own internal states and those of others, but they were also stimulated to compare

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3 different points of view as these emerged in the “here and now” of the adult-guided  
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5 conversation.  
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8 With regard to emotion understanding, the conversational training had an impressive  
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10 positive effect on participants' ability to understand the relationship between desires and  
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12 emotions, the expression of emotion, the causes of emotions, and affective perspective taking.  
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14 Reading stories based on emotional scripts to toddlers, and discussing the expression, causes  
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16 and regulation of emotion with small groups of them, thus proved to be both feasible and  
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18 beneficial. It gave these very young children the opportunity to set about articulating their  
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20 own emotional experience and to compare it with that of others, using the emotions of the  
21  
22 story characters as a starting point. For example, during a conversational exchange with an  
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24 educator, Franca (2 years and 9 months) stated, “I’m scared of the dark”; shortly afterwards,  
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26 Paolo (2 years and 10 months) said that he felt afraid when his uncle’s dog barked loudly, and  
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28 finally, when invited by the educator to name different causes of fear, Franca intervened once  
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30 more to say: “I’m not scared of dogs!”  
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35 In our study the intervention had a particularly strong effect on EU abilities in  
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37 participants over the age of two and a half years. We believe this finding to be of great  
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39 interest given the dramatic changes that occur in children’s linguistic, cognitive and social  
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41 competences between 2 and 3 years of age (Hughes, 2011; Reddy, 2008). Thus, although our  
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43 intervention procedure was effective with toddlers in general, it proved to be particularly  
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45 suited to children aged between 2.5 and 3 years, who had already acquired the attentive,  
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47 linguistic and cognitive development needed to draw the maximum benefit from an  
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49 intervention based on shared story reading followed by conversing on emotion in small  
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51 groups.  
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55 The intervention also had a positive effect on toddlers’ empathic orientation towards  
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57 others, as assessed via parental ratings, than their peers in the control condition, especially in  
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3 terms of their propensity to pay attention to the feelings of others. Nonetheless, this finding is  
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5 to be interpreted with caution, as the intervention and control groups significantly differed on  
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7 the pre-test measure of empathy. Thus, before drawing final conclusions it would be  
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9 necessary to replicate the research with groups showing no pre-test difference on empathy  
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11 scale. . Furthermore, this enhanced sensitivity was also reflected in increased frequency of  
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13 prosocial behavior towards peers in everyday situations at nursery school, a conduct which is  
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15 known to be closely related to both mental-state talk (Drummond, Waugh, Hammond, &  
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17 Brownell, 2014) and EU (e.g., Brownell, Svetlova, & Nichols, 2009; Brownell, Svetlova,  
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19 Anderson, Nichols, & Drummond, 2013; Ensor & Hughes, 2005). Given that the teacher-  
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21 guided conversations during the intervention focused not only on emotion knowledge, but  
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23 also on positive social responses to others' feelings, these findings show the value of  
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25 stimulating reflection on the emotional states of others and on prosocial ways of alleviating  
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27 their emotional distress.  
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32 In relation to prosocial behavior, the intervention did not have a statistically significant  
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34 effect on any of the three different types examined in this study, namely helping, sharing and  
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36 comforting; this was partly because it is rare for children of this age to spontaneously produce  
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38 prosocial behavior (Denham, 1986), as reflected in the low levels of prosocial conduct  
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40 observed in our sample. Nonetheless, the training group registered a larger increase in  
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42 helping behaviors than the control group. For example, Martina sees that Marco is crying  
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44 because Jacopo snatched the toy he had been playing with, goes over to him and asks, "Why  
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46 are you crying?", before going to Jacopo, taking back the toy and returning it to Marco.  
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48 Generally speaking, helping is the type of prosocial behavior most frequently observed in  
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50 children of the age group in our sample and younger, while instances of sharing (which is tied  
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52 up with the concept of ownership) and comforting are relatively infrequent (Dunfield et al.,  
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54 2011; Dunfield & Kuhlmeier, 2013; Newton, Goodman, & Thompson, 2014). It may be  
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3 hypothesized that our conversational intervention, which was designed to stimulate reflection  
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5 on the inner states of the self and others, was particularly effective in enhancing the ability to  
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7 recognize other people's intentions and desires, a prerequisite for the helping behaviors more  
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9 frequently exhibited by the training group.  
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12 An interesting outcome of the study is the fact that the training group toddlers'  
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14 improvements in mental-state talk, EU and prosocial behavior were independent of their  
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16 gains in general vocabulary. Not surprisingly given the conversational nature of the training  
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18 activity, the intervention also had positive effects on participants' general language ability,  
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20 whose positive role in the development of social understanding has been widely documented  
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22 (Milligan, Astington, & Dack, 2007).  
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26 Finally, the outcomes of the training did not vary as a function of gender. This result is  
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28 in line with previous longitudinal and experimental findings in this field of research showing  
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30 that during infancy and preschool age gender *per se* does not explain variance in children's  
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32 social cognition, including in their emotion understanding (e.g., Pons, Harris, & de Rosnay,  
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34 2004; Tenenbaum et al., 2008; Grazzani Gavazzi & Ornaghi, 2011). It is also in line with the  
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36 absence of evidence in the literature for significant gender differences in the prosocial  
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38 conduct of toddlers (Dunfield et al., 2011), although this comparison should be made with  
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40 caution given the relatively low number of spontaneously produced behaviours recorded in  
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42 the present study.  
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46 Overall, our results suggest that specific interventions during infancy, conducted in a  
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48 group context, may promote the acquisition of important socio-cognitive skills (e.g., use and  
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50 comprehension of internal-state language, emotion understanding, perspective-taking). Given  
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52 the associations that have been documented at various stages of development between these  
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54 abilities and social wellbeing (Cassidy et al., 2003; Ensor & Hughes, 2005), school readiness  
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56 (Denham, 2006; Bierman et al., 2008) and reduced behavioral problems (Domitrovich et al.,  
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2007), we believe that early intervention aimed at strengthening them can be of crucial value, particularly when based on the conversational approach.

### **Limitations, educational implications and future research directions**

This study has a number of limitations. One gap in the research design was not having included a further control group of children allowed to converse after the story reading but on topics other than emotional and other mental-states. Inclusion of such a group would have shed further light on the role of conversing specifically about emotions as a linguistic and socio-emotional learning mechanism.

A second limitation of the present study, in which educators were given the opportunity to make their own of an innovative practice devised for implementation with toddlers, was the fact that it did not include measures of professional change – examining key parameters such as increased socio-emotional competence, enhanced observational skills – in the experimental group teachers. The additional research question to be posed is to what extent the educators charged with applying our newly-developed approach, actually acquired new competences with respect to their own prior skill-base, and with respect to their colleagues in the control condition, or truly incorporated this innovative way of working with very young children into their regular teaching practice. In addition, a further limitation is due to the lack of random assignment of children in the working groups to the two research conditions. Finally, the study lacks of quantitative measure of intervention fidelity, a type of information extremely useful in training others to implement and scale up the conversational intervention to enhance young children's social cognition and prosocial behavior.

Despite these limitations, to the best of our knowledge the current intervention study is one of the few conducted with young children to adopt both experimental and observational paradigms in order to draw data from multiple sources: namely, children's performance on a battery of socio-cognitive tasks, children's observed behaviors, and parental ratings. This

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3 research, characterized by a focus on group conversation, contributes to our knowledge of the  
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5 development of socio-emotional skills in infancy, and provides practical direction for  
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7 innovative modes of intervention in socio-educational contexts.  
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10 In fact, our findings suggest that intervention targeting the development of emotion  
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12 understanding in infancy, and based on the format successfully implemented with toddlers in  
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14 the current study, represents a viable option that should be seriously taken into account by  
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16 educational programmers. For example, this kind of intervention could be particularly  
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18 valuable for children from low-income families, who are exposed to more risk factors than  
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20 their middle-class peers. Recent studies, in fact, have pointed up deficits in parental care in  
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22 low-income populations, for example in mothers' use of emotion talk, parents' mental state  
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24 language, and emotionally supportive and responsive parenting at home. Thus, implementing  
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26 effective emotion socialization practices in a context in which young children spend several  
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28 hours a day could represent a key protective factor against difficulties in regulating emotion,  
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30 or external and disruptive behaviors (Brophy-Herb, Stansbury, Bockneck, & Horodyski,  
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32 2012; Giménez-Dasi, Fernández-Sánchez, & Quintanilla, in press), which in turn can lead to  
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34 fully-fledged emotional disabilities.  
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60

## References

- Adrià, J.E., Clemente, R.A., & Villanueva, L. (2007). Mothers' use of cognitive state verbs in picture-book reading and the development of children's understanding of mind: A longitudinal study. *Child Development, 78*(4), 1052-1067.
- Aram, D., Fine, Y. & Ziv, M. (2013). Enhancing parent-child shared book reading interactions: Promoting references to the book's plot and socio-cognitive themes. *Early Childhood Research Quarterly, 28*, 111-122.
- Astington, J.W., Harris, P.L., & Olson (1988). *Developing theories of mind*. Cambridge: Cambridge University Press.
- Bartsch, K., & Wellman, H.M. (1995). *Children talk about the mind*. New York: Oxford University Press.
- Bierman, K. L., Domitrovich, C. E., Nix, R. L., Gest, S. D., Welsh, J. A., Greenberg, M. T., ... & Gill, S. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development, 79*(6), 1802-1817
- Brophy-Herb, H.E., Stansbury, K., Bockneck, E., & Horodyski, M.A. (2012). Modeling maternal emotion-related socialization behaviors in a low-income sample: Relations with toddlers' self-regulation. *Early Childhood Research Quarterly, 27*, 352-364.
- Brownell, C.A., Svetlova, M., Anderson, R., Nichols, S.R., & Drummond, J. (2013). Socialization of early prosocial behavior: Parents' talk about emotions is associated with sharing and helping in toddlers. *Infancy, 18*(1), 91-119.
- Brownell, C., Svetlova, M. & Nichols, S. (2009). To share or not to share: When do toddlers respond to another's needs? *Infancy, 14*(1), 117-130.
- Camodeca, M., & Coppola, G. (2010). Competenza socio-emotiva e difficoltà di relazione in età prescolare: un approccio multidimensionale. [Socio-emotional competence and

- 1  
2  
3 relational difficulties in the preschool years: a multidimensional approach] In E.  
4 Baumgartner (Ed.). *Gli esordi della competenza emotiva* (pp. 51-74), Milano: LED.  
5  
6  
7 Carpendale, J., & Lewis, C. (2006). *How children develop social understanding*. Oxford:  
8 Blackwell Publishing.  
9  
10  
11 Caselli, C., Pasqualetti, P., & Stefanini, S. (2007). *PVB. Primo vocabolario del bambino*.  
12 Milano: F. Angeli (*PVB. The child's early vocabulary*).  
13  
14  
15  
16 Cassidy, K. W., Werner, R. S., Rourke, M., Zubernis, L. S., & Balaraman, G. (2003). The  
17 relationship between psychological understanding and positive social behaviours.  
18  
19  
20  
21  
22  
23  
24 Cigala, A., Mori, A., & Fangareggi, F. (2015). Learning others' point of view: perspective  
25 taking and prosocial behaviour in preschoolers. *Early Child Development and Care*,  
26  
27  
28  
29  
30 de Rosnay, M., & Hughes, C. (2006). Conversation and theory of mind: Do children talk their  
31 way to social-cognitive understanding? *British Journal of Developmental Psychology*,  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
- Denham, S. (1986). Social cognition, prosocial behavior, and emotion in preschoolers:  
Contextual validation. *Child Development*, 57, 194-201.
- Denham, S. (1998). *Emotional development in young children*. New York: Guilford Press.
- Denham, S. (2006). Social-emotional competence as support for school readiness: What is it  
and how do we assess it?. *Early Education and Development*, 17(1), 57-89.
- Denham S. (2007). Dealing with feelings: How children negotiate the worlds of emotions and  
social relationships. *Cognition, Brain, Behaviour*, 11(1), 1-48.
- Denham, S., Bassett, H., & Zinsser, K. (2012). Early childhood teachers as socializers of  
young children's emotional competence. *Early Childhood Education Journal*, 40, 137-  
143.

Running head: FOSTERING TODDLERS' SOCIO-EMOTIONAL SKILLS 30

- 1  
2  
3 Doan, S. N., & Wang, Q. (2010). Maternal discussions of mental states and behaviors:  
4  
5 Relations to emotion situation knowledge in European American and immigrant  
6  
7 Chinese children. *Child Development, 81*, 1490-1503.  
8  
9  
10 Doherty, M.J. (2009). *Theory of mind: How children understand others' thoughts and*  
11  
12 *feelings*. New York: Psychology Press.  
13  
14 Domitrovich C.E., Cortes R.C., & Greenberg M.T. (2007). Improving young children's social  
15  
16 and emotional competence: A randomized trial of the preschool "PATHS" curriculum.  
17  
18 *The Journal of Primary Prevention, 28*, 67-91.  
19  
20  
21 Drummond, J., Paul, E.F., Waugh, W.E., Hammond, S.I., & Brownell, C.A. (2014). Here,  
22  
23 there and everywhere: emotion and mental state talk in different social contexts predicts  
24  
25 empathic helping in toddlers. *Frontiers in Psychology, 5*, 1-11.  
26  
27  
28 Dunfield, K., Kuhlmeier, V.A., O'Connell, L., & Kelley, E. (2011). Examining the diversity  
29  
30 of prosocial behavior: Helping, Sharing and Comforting in Infancy. *Infancy, 16*(3),  
31  
32 227-247.  
33  
34  
35 Dunfield K.A., & Kuhlmeier V.A. (2013). Classifying prosocial behavior: children's  
36  
37 responses to instrumental need, emotional distress and material desire. *Child*  
38  
39 *Development, 84*(5), 1766-1776.  
40  
41  
42 Dunn, J., Brown, J., & Beardsale, L. (1991). Family talk about feeling states and children's  
43  
44 later understanding of others' emotions. *Developmental Psychology, 27*, 448-455.  
45  
46  
47 Eggum, N.D., Eisenberg, N., Kao, K., Spinrad, T.L., Bolnick, R., Hofer, C., ..., & Fabricius,  
48  
49 W.V. (2011). Emotion understanding, theory of mind, and prosocial orientation:  
50  
51 Relations over time in early childhood. *The Journal of Positive Psychology, 6*(1), 4-16.  
52  
53  
54 Eisenberg, N., Fabes, RA., & Spinrad, T.L. (2006). Prosocial development. In: Eisenberg, N.;  
55  
56 Damon, W. (eds.). *Handbook of child psychology. Vol. 3. Social, emotional, and*  
57  
58 *personality development. 6th* edition (pp. 646-718). New York: Wiley.  
59  
60

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2  
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48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
- Ensor, R., & Hughes, C. (2005). More than talk: Relations between emotion understanding and positive behaviour in toddlers. *British Journal of Developmental Psychology*, *23*, 343-363.
- Ensor R., Spencer D., & Hughes C. (2011). You feel sad? Emotion understanding mediates effects of verbal ability and mother-child mutuality on prosocial behaviors: Findings from 2 years to 4 years. *Social Development*, *20*, 93–110.
- Farrant, B.M., Devine, T.A.J., Maybery, M.T., & Fletche, J. (2012). Empathy, perspective taking and prosocial behaviour : The importance of parenting practices. *Infant and Child Development*, *21*(2), 175-188.
- Garner, J.L., Jones, D.C., Gaddy, G., & Rennie, K.M. (1997). Low-income mothers' conversations about emotions and their children's emotional competence. *Social Development*, *6*, 37-52.
- Giménez-Dasi, M., Fernández-Sánchez, M., & Quintanilla, L. (in press). Improving social competence through emotion knowledge in 2-year-old children: A pilot study. *Early Education and Development*.
- Grazzani Gavazzi, I., & Ornaghi, V. (2011). Emotional state talk and emotion understanding: a training study with preschool children. *Journal of Child Language*, *38*(5), 1124-1139.
- Hay, D. F., & Cook, K. V. (2007). The transformation of prosocial behavior from infancy to childhood. In C.A. Brownell & C.B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformations* (pp. 100-131). New York, NY: Guilford Press.
- Harris, P.L. (2008). Children's understanding of emotion. In M. Lewis, J.M. Haviland-Jones, L.F. Barrett (Eds.), *Handbook of emotions*, III ed. (pp. 320-331). New York: Guilford Press.



- 1  
2  
3 Heyes, C.M. & Frith, C.D. (2014). The cultural evolution of mind reading. *Science*,  
4  
5 344(6190), 1357-1363.  
6  
7  
8 Hepach, R., Vaish, A. & Tomasello, M. (2013). Young children sympathize less in response  
9  
10 to unjustified emotional distress. *Developmental Psychology*, 49(6), 1132-1138.  
11  
12 Hughes, C. (2011). *Social understanding and social lives. From toddlerhood through to the*  
13  
14 *transition to school*. New York: Psychology Press.  
15  
16 Hughes, C., & Dunn, J. (1998). Understanding mind and emotion: longitudinal association  
17  
18 with mental-state talk between friends. *Developmental Psychology*, 34, 1026-1037.  
19  
20 Izard C.E., Trentacosta C.J., King K.A., & Mostow A J. (2004). An emotion based  
21  
22 prevention program for head start children. *Early Education and Development*, 15,  
23  
24 407-422.  
25  
26  
27 Klinnert, M.D., Emde, R.N., Butterfield, P. & Campos, J.J. (1986). Social referencing: The  
28  
29 infant's use of emotional signals from a friendly adult with mother present.  
30  
31 *Developmental Psychology*, 22, pp. 427-432.  
32  
33  
34 Laible, D. (2004). Mother-child discourse in two contexts: Links with child temperament,  
35  
36 attachment security, and socioemotional competence. *Developmental Psychology*, 40  
37  
38 (6), 979-992.  
39  
40  
41 Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind:  
42  
43 Metaanalysis of the relation between language ability and false-belief understanding.  
44  
45 *Child Development*, 78, 622-646.  
46  
47  
48 Nelson, K. (2007). *Young minds in social worlds. Experience, meaning, and memory*.  
49  
50 Cambridge: Harvard University Press.  
51  
52  
53 Newton, E.K., Goodman, M., & Thompson, R.A. (2014). Why do some toddlers help a  
54  
55 stranger? Origins of individual differences in prosocial behavior. *Infancy*, 19(2), 214-  
56  
57 226.  
58  
59  
60

- 1  
2  
3 Ornaghi, V., Agliati, A., & Grazzani, I. (2014). *The Stories of Ciro and Beba. How to*  
4  
5 *enhance conversation with toddlers on emotions*. Milan: Fronteretro.  
6  
7  
8 Ornaghi, V., Brockmeier, J., & Grazzani Gavazzi, I. (2011). The role of language games in  
9  
10 children's understanding of mental states: A training study. *Journal of Cognition and*  
11  
12 *Development, 12*(2), 239–259.  
13  
14 Ornaghi, V., Brockmeier, J., & Grazzani, I., (2014). Enhancing social cognition by training  
15  
16 children in emotion understanding: A primary school study. *Journal of Experimental*  
17  
18 *Child Psychology, 119*, 26-39.  
19  
20  
21 Ornaghi, V., & Grazzani, I. (2013). The relationship between emotional-state language and  
22  
23 emotion understanding: A study with school-age children. *Cognition & Emotion, 27*(2),  
24  
25 356–366.  
26  
27  
28 Ornaghi, V., Grazzani, I., Cherubin, E., Conte, E., & Piralli, F. (2015). Let's talk about  
29  
30 emotions. The effect of conversational training on preschoolers' emotion  
31  
32 comprehension and prosocial orientation. *Social Development, 24*(1), 166-183.  
33  
34  
35 Pons, F., Harris, P.L., & de Rosnay M. (2004). Emotion comprehension between 3 and 11  
36  
37 years: Developmental periods and hierarchical organization. *European Journal of*  
38  
39 *Developmental Psychology, 1*(2), 127-152.  
40  
41  
42 Reddy, V. (2008). *How infants know minds*. Cambridge: Harvard University Press.  
43  
44  
45 Rieffe, C., Ketelaar, L., & Wiefferink, C.H. (2010). Assessing empathy in young children:  
46  
47 Construction and validation of an Empathy Questionnaire (EmQue). *Personality and*  
48  
49 *Individual Differences, 49*, 362-367.  
50  
51  
52 Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers'  
53  
54 mental state language and theory-of-mind understanding. *Child Development, 73*(3),  
55  
56 734-751.  
57  
58  
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- 1  
2  
3 Taumoepeau, M., & Ruffman, T. (2006). Mother and infant talk about mental states relates to  
4  
5 desire language and emotion understanding. *Child Development*, 77(2), 465-481.  
6  
7  
8 Taumoepeau, M., & Ruffman, T. (2008) Stepping stones to others' minds: maternal talk  
9  
10 relates to child mental state language and emotion understanding at 15, 24, and 33  
11  
12 months. *Child Development*, 79(2), 284-302.  
13  
14 Tenenbaum, H.R., Alfieri, L., Brooks, P.J., & Dunne, G. (2008). The effects of explanatory  
15  
16 conversations on children's emotion understanding. *British Journal of Developmental*  
17  
18 *Psychology*, 26, 249-263.  
19  
20  
21 Thompson, R.A., & Newton, E.K. (2013). Baby altruists? Examining the complexity of  
22  
23 prosocial motivation in young children. *Infancy*, 18(1), 120-133.  
24  
25  
26 Turnbull, W. Carpendale, J., & Racine, T.P. (2009). Talk and children's understanding of  
27  
28 mind. *Journal of Consciousness Studies*, 16(6-8), 140-166.  
29  
30  
31 Van Bergen, P., Salmon, K., Dadds, M. R., & Allen, J. (2009). The effect of mother training  
32  
33 in emotion-rich, elaborative reminiscing on children's shared recall and emotion  
34  
35 knowledge. *Journal of Cognition and Development*, 10, 162-187.  
36  
37  
38 Wang, Y. & Chen, H. (2013). Use of percentiles and Z-score in Anthropometry. In V.R.  
39  
40 Preedy (Ed.), *Handbook of Anthropometry: Physical Measures of Human Form in*  
41  
42 *Health and Disease* (pp. 29-48). New York: Springer.  
43  
44  
45 Wellman H.M., & Woolley J.D. (1990). From simple desires to ordinary beliefs: The early  
46  
47 development of everyday psychology. *Cognition*, 35, 245-275.  
48  
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## Appendix

### Sample story, stimulus questions and extract of conversation

#### Sample story

*"Beba gets mad at the beach"*

Beba is at the seaside. She is playing on the beach with her bucket and spade. She is having a wonderful time. She loves playing in the sand. There she is sitting peacefully by the sea and having fun with her beach toys. Just then, Toby Bear comes over, snatches Beba's bucket and runs off. Beba is mad because she doesn't want the bear to take her bucket. "Give it back, it's mine!". Beba yells at the bear. But Toby doesn't listen to her and starts to play with Beba's bucket himself. Beba is very angry now! Ciro sees that Beba is really mad and tries to help her. He goes over to Toby and says: "Hi, that's Beba's bucket. She wants it back. Would you like to come and build a huge big sandcastle with us?". Toby says yes, so the three friends play together and Beba doesn't feel mad anymore.

#### Examples of stimulus questions in relation to components of emotion comprehension and prosocial orientation

*Expressing emotions*

What kind of face do you make when you are mad?

What do you say when you are mad?

When we are mad, we can also say that we are "angry"... What else can we say?

*Causes of emotion*

Beba got mad because...?

Do you get mad too if somebody takes your toys?

Is there anything else that makes you angry?

*Emotion regulation*

Is there something you do so as not to feel so mad?

When you are very mad, how do you make yourself feel better?

*Prosocial orientation*

Did you see how kind Ciro was to help Beba?

If one of your friends is mad, what do you do?

What can you do to help your friend calm down?

**Sample conversation (extract)**

[...] "Why is Beba mad?", the educator asks as soon as she has finished reading the story.

"Because Toby took his bucket", replies Anna.

The educator nods and completes the answer: "He took it without asking. We all get mad, if someone takes away something that we are using without asking our permission". Then, provocatively, she adds, "So, who is right?"

...the children in chorus shout, "Beba!"

The educator continues: "But Toby wanted to play with it, don't you ever really want to play with a toy that your friend is using?"

The children chorus: "Yeeses!"

"So what can we do about that?" the educator asks.

The children do not reply.

The educator pauses before saying: "We need to find a solution. For example, Toby could say

"May I play with your bucket?"

The children listen thoughtfully.

After a few seconds, Marco breaks the silence and asks: "What if Beba won't give it to him?"

The educator replies: "They can all play together, can't they? What does Ciro do at the end of the story?"

One of the children answers: "He helps them, he asks Toby to play with them. They make up".

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Another child: "They make up".

[...]

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Table 1

*Pre- and post-test means and standard deviations for all variables by Group Condition*

	<i>Pre-test</i>		<i>Post-test</i>	
	Training	Control	Training	Control
Age in months	30.30 (4.18)	30.27 (2.87)	34.30 (4.15)	34.28 (2.67)
Language ability	69.03 (23.25) <sup>c</sup>	76.35 (22.32) <sup>c</sup>	87.17 (17.29) <sup>d</sup>	84.80 (19.75) <sup>d</sup>
Parental ratings of empathy and prosocial behavior	18.40 (5.18) <sup>a,c</sup>	22.43 (3.98) <sup>b</sup>	20.86 (3.80) <sup>d</sup>	22.03 (3.22)
Emotion understanding (Puppet)	12.90 (11.33) <sup>c</sup>	13.50 (10.13) <sup>c</sup>	28.57 (8.28) <sup>a,d</sup>	20.65 (8.47) <sup>b,d</sup>
Desire-emotion understanding	3.47 (1.79) <sup>c</sup>	3.20 (1.70)	4.63 (1.54) <sup>a,d</sup>	3.50 (1.74) <sup>b</sup>
Use of mental-state vocabulary	1.10 (1.51) <sup>c</sup>	.56 (1.36)	4.35 (4.38) <sup>a,d</sup>	1.31 (1.74) <sup>b</sup>
Children's prosocial actions	.30 (.53) <sup>c</sup>	.30 (.56)	.60 (.72) <sup>a,d</sup>	.30 (.56) <sup>b</sup>

*Note.* Numbers in parentheses are standard deviations.

Following application of a post-hoc Bonferroni correction to all measures, the values marked with the superscripts *a* through *d* were found to be statistically significant. The letters *a* and *b* denote the comparisons between experimental and control groups for each of the pre-test and post-test measures; *c* and *d* indicate comparisons between pre-test and post-test scores within the training and control groups, respectively.

Table 2  
*Intercorrelation among variables under study*

	1	2	3	4	5	6	7
1. Age in months	-						
2. Vocabulary	.38**	-					
3. Use of mental-state language	.46**	.50**	-				
4. Desire-emotion understanding	.37**	.46**	.48**	-			
5. Emotion understanding (Puppet)	.25*	.50**	.46**	.41**	-		
6. Parental ratings of empathy and prosocial behavior	.12	.31	.33	.09	.01	-	
7. Prosocial behavior	.15	.01	.03	.02	.16	.11	-

Note: Correlations were calculated on pre-test data  
\*  $p < .05$  \*\*  $p < .01$

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Table 3

*Toddlers' average gains on sub-measures of Desire-emotion, EU, EmQue and Prosocial Behavior as a function of Group Condition and Age*

	<i>Younger Group</i>		<i>Older Group</i>	
	Training group	Control group	Training group	Control group
<i>Desire-emotion</i>				
Finds	.58 (1.08)	-.05 (.91)	.22 (1.00)	-.33 (.91)
Finds nothing	.42 (.79)	.05 (1.22)	.39 (.77)	.09 (.94)
Finds substitute	.25 (1.13)	.31 (1.00)	.50 (.86)	.52 (1.03)
<i>EU (Puppet)</i>				
Expressive	2.83 (2.29)	2.94 (1.51) <sup>c</sup>	3.67 (2.37) <sup>a</sup>	1.57 (1.86) <sup>b,d</sup>
Receptive	3.83 (2.72)	2.74 (2.42) <sup>c</sup>	2.89 (2.14) <sup>a</sup>	.76 (2.17) <sup>b,d</sup>
Perspective taking	4.25 (5.56) <sup>c</sup>	2.95 (3.39)	7.72 (4.18) <sup>a,d</sup>	1.67 (3.41) <sup>b</sup>
Causes	1.67 (2.96)	1.42 (2.06)	3.44 (2.91) <sup>a</sup>	.52 (2.40) <sup>b</sup>
<i>EmQue</i>				
Emotion contagion	.44 (1.13)	.08 (2.18)	.36 (1.80)	1.0 (1.00)
Attention to others	1.34 (2.12) <sup>a</sup>	-.92 (1.32) <sup>b</sup>	.27 (1.27) <sup>a</sup>	-1.33 (2.08) <sup>b</sup>
Prosocial responses	1.33 (1.73)	.11 (1.38)	1.27 (2.00)	1.33 (4.16)
<i>Prosocial behavior</i>				
Helping	.25 (.45) <sup>a</sup>	-.10 (.46) <sup>b,c</sup>	.11 (.32)	.19 (.40) <sup>d</sup>
Sharing	.00 (.74)	.00 (.33)	.17 (.51)	-.09 (.44)
Comforting	.08 (.28)	-.05 (.34)	.00 (.34)	.09 (.44)

*Note.* Standard deviations are reported in parentheses

On application of a post-hoc Bonferroni correction to all measures, the values marked with the superscripts *a* through *d* were found to be statistically significant. The letters *a* and *b* denote the comparisons between training and control groups for each Age Group; *c* and *d* indicate comparisons between the scores of younger and older children scores within the training and control groups, respectively.

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Figure 1

*Toddlers' pre- to post-test improvement in emotion understanding as a function of Group Condition and Age*

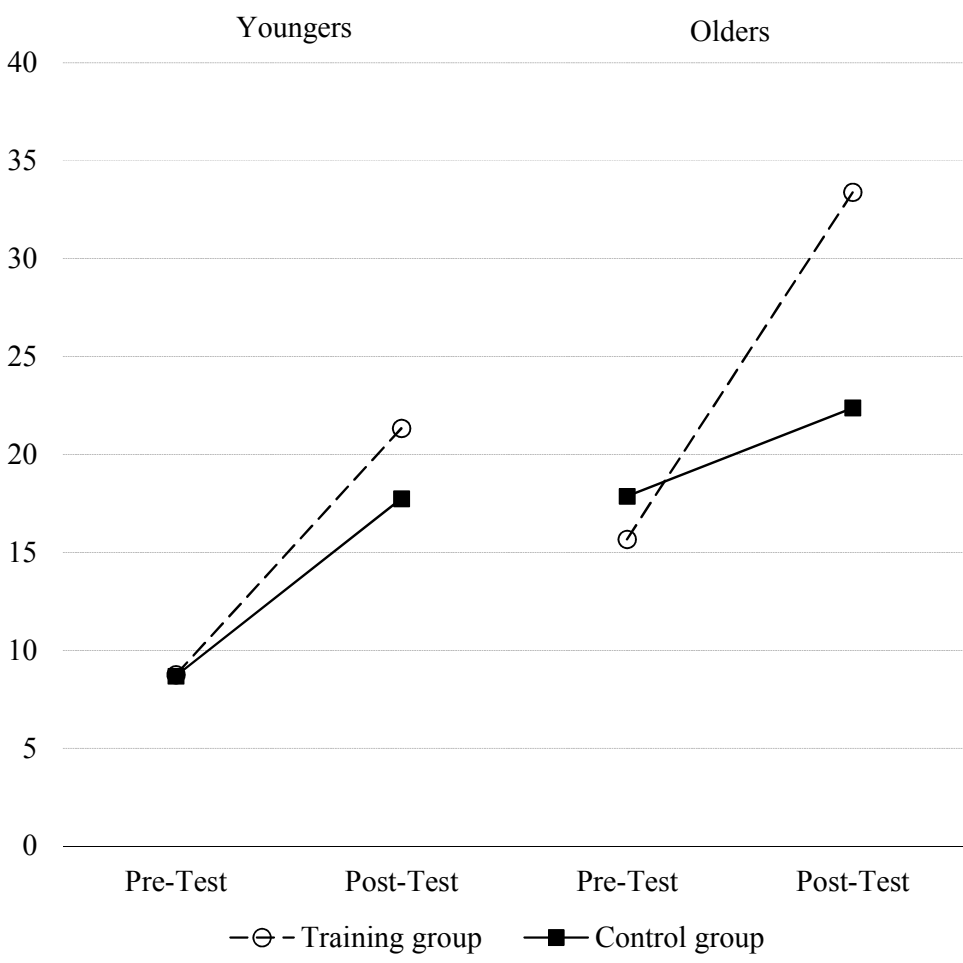
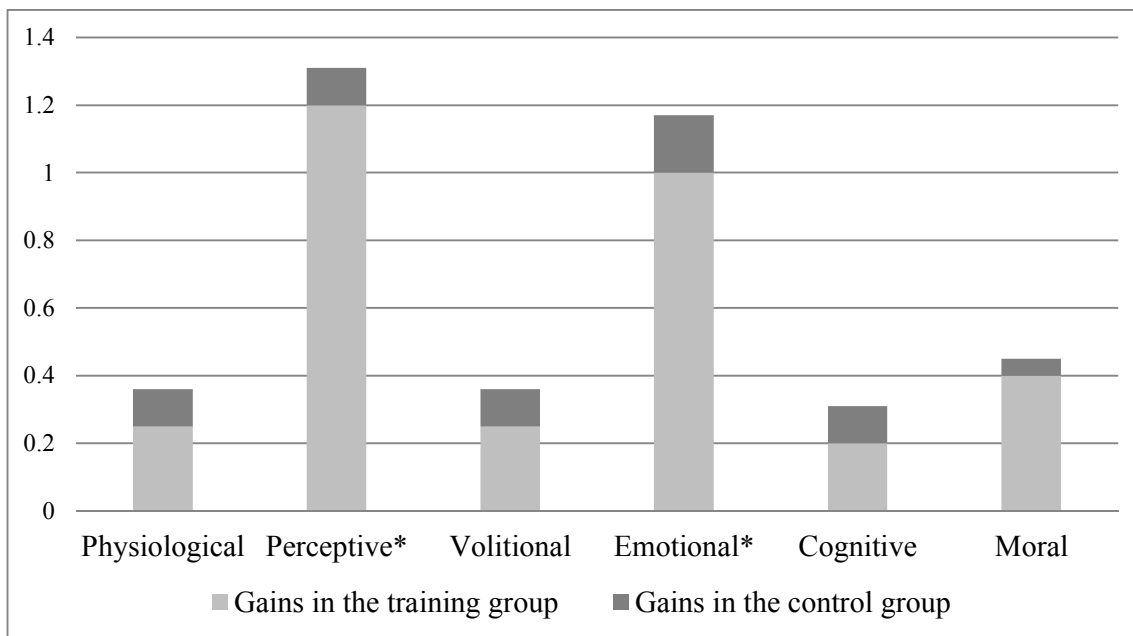


Figure 2

*Participants' pre- to post-test gains in the use of the different categories of mental-state language as a function of Group Condition*



Note : \* < .05

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