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Social Cognition, Language, and Prosocial Behaviors: A Multitrait Mixed-Methods Study in Early Childhood

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ABSTRACT

Research Findings: In this study, we investigated associations among social cognition skills (specifically, emotion knowledge and theory of mind), language abilities, and 3 varieties of prosocial behavior (helping, sharing, and comforting) in early childhood. The effects of age and gender were also taken into account. Participants were 149 Italian children between 24 and 47 months of age ($M = 35.6$ months, $SD = 6.77$ months). We adopted a multitrait mixed-methods research design, using direct measures of emotion knowledge, theory of mind, and language as well as naturalistic observations of children’s free play with peers to detect the frequency with which they engaged in prosocial behaviors. Ordinal logistic regression analyses showed that helping behaviors were especially accounted for by emotion knowledge and gender, whereas variance in sharing behaviors was mostly explained by theory-of-mind ability and language. *Practice or Policy:* The findings encourage those involved in early childhood education to develop training and intervention programs to enhance children’s emotional, linguistic, and cognitive skills. Given that these results were obtained with children as young as 2 and 3 years, preventive intervention should be implemented during the earliest years of life.

In developmental psychology, the early years of life are viewed as a crucial period for the achievement of social-emotional, cognitive, and linguistic milestones. Beginning in toddlerhood, children go through many changes: For example, they make significant advances in social cognition, a theoretical construct that includes the ability to infer the internal states—such as the intentions, goals, emotions, desires, beliefs, and thoughts—of other people (Carpendale & Lewis, 2006; Ornaghi, Brockmeier, & Grazzani, 2014). Two well-known social cognition competencies are emotion knowledge and theory of mind. The former involves the ability to recognize and understand emotions in oneself and others; the latter entails the understanding that people’s actions are guided by inner states such as intentions, desires, and beliefs (Astington, Harris, & Olson, 1988). Even at the emergent stage, social cognition skills are related to language abilities (Grazzani, Ornaghi, Agliati, & Brazzelli, 2016; Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016; Rieffe & Wiefferink, 2017).

A growing body of research has shown that language may provide young children with significant insight into other people’s emotions and thoughts (de Rosnay, Pons, Harris, & Morrell, 2004; Milligan, Astington, & Dack, 2007; Rhee et al., 2013; Strand, Downs, & Barbosa-Leiker, 2016), with key implications for the acquisition of social and emotional competencies. Specifically, children deploy their current social cognition skills and language abilities to win acceptance from peers and engage in social interaction (Menting, van Lier, & Koot, 2011; Slaughter, Imuta, Peterson, & Henry, 2015). As a result, their comprehension of people’s inner states is enhanced still further, and they make increased attempts to enact positive social behaviors (Denham et al., 2012; Ensor & Hughes, 2005). In terms of positive social conduct, the

literature has focused on *prosocial behaviors*, defined as voluntary actions intended to benefit another, showing their associations with psychological well-being, social adjustment, and school achievement (Eisenberg, Eggum-Wilkens, & Spinrad, 2015).

Toddlers begin early on to engage in a variety of prosocial behaviors such as helping, sharing, and comforting (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Svetlova, Nichols, & Brownell, 2010), which are remarkably complex because they require children to interpret when their intervention is relevant and how to act appropriately. Thus, from the very first years of life, both the ability to recognize and understand others' inner states and suitable levels of language may be crucial prerequisites to acting on behalf of others.

However, there is a relative lack of research on the relationships among social cognition, language, and prosociality during early childhood. In fact, little is known about how emotion knowledge and theory of mind generally relate to prosocial behavior in the early years. Furthermore, few studies have examined the links between language and prosocial behavior in early childhood, as observed by Imuta et al. (2016). In addition, prosocial behaviors have mainly been observed in experimental laboratory settings (Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011; Ensor & Hughes, 2005; Rhee et al., 2013; Wu & Su, 2014) rather than in naturalistic contexts (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Denham, 1986). Hence, in the current study, we adopted a multitrait mixed-methods approach to investigate whether emotion knowledge, theory of mind, and language are related to the occurrence of prosocial behaviors in 2- and 3-year-olds.

Emotion knowledge and theory of mind

Toddlers learn early on to recognize and label emotion expressions, and as time goes on they also come to understand that different situations elicit a range of emotions in oneself and others (Bassett, Denham, Mincic, & Graling, 2012). Hence, two distinct components of emotion knowledge gradually emerge: the ability to recognize emotion expressions (emotion recognition) and familiarity with typical and atypical situational elicitors of emotion (emotion situation knowledge).

Alongside their growing emotion knowledge, young children also develop a progressive understanding of the mental states of other people. The classical view of theory-of-mind development suggests that true comprehension of others' internal states is attained at around 4 years, given that most children systematically fail false-belief tasks before this age (Wellman & Liu, 2004). However, children already hold some knowledge of others' minds before the false-belief test milestone. In fact, an understanding of desires develops at around 2 years of age as a toddler judges that two persons (the child and someone else) may have different desires about the same object. Then, at approximately 3 years, children understand that others can hold true beliefs, which are coherent with reality. Later, children judge that two persons may have different beliefs about the same object when they do not know which belief is true or false (Wellman, 2014).

The literature shows that toddlers and preschoolers who are more competent in understanding emotions generally tend to be more accurate in attributing mental states to others. For example, a pioneering study conducted by Denham (1986) with 2- and 3-year-olds identified significant positive correlations between children's emotion knowledge and their cognitive perspective-taking skills. Similarly, Harwood and Farrar (2006) found that preschoolers' affective perspective taking was significantly correlated with their theory-of-mind performance, evaluated by the unexpected identity task and the unexpected location task, independent of age and language ability. Evidence of significant correlations was also reported by de Rosnay and colleagues (2004). These authors found that the association between false-belief understanding and emotion attribution ability in 3- to 6-year-old children remained strong after age was controlled for but lost significance when verbal abilities were taken into account.

Language abilities and links with social cognition skills

Research with toddlers and preschoolers has shown that language abilities are key correlates of both emotion knowledge and theory of mind. In fact, Cassidy et al. (2003) assessed language, mental state understanding, and emotion knowledge in children ages 37 to 65 months, reporting positive and significant correlations between language abilities and both theory-of-mind skills and emotion understanding, even when the effects of age were taken into account. Similarly, de Rosnay et al. (2004) administered measures of verbal ability and belief-based emotion tasks to children in the same age range, finding language abilities to be correlated with both false-belief understanding and emotion attribution independent of age.

Significant correlations between emotion knowledge and language were also identified by Strand et al. (2016) in a study on emotion recognition, affective perspective taking, and language in children ages 36 to 67 months. Again, there was a strong relationship between emotion knowledge and language abilities that remained even when the effects of age were accounted for. A further valuable contribution to this line of inquiry has been provided by training studies, in which participation in conversational activities enhanced children's ability to express, recognize, understand, and reflect on emotional experience (Grazzani, Ornaghi, Agliati, et al., 2016; Grazzani, Ornaghi, & Brockmeier, 2016).

With regard to the relationship between language and theory of mind, Ruffman, Slade, Devitt, and Crowe (2006) administered theory-of-mind and language tasks to children at age 3 years and again 1 year later, finding significant positive correlations between these measures. More recently, a meta-analysis by Imuta et al. (2016) confirmed the existence of a significant association between language abilities and theory of mind in children between 2 and 12 years of age. This was in line with the conclusions of an earlier meta-analysis by Milligan and colleagues (2007), which also posited strong links between language abilities and false-belief understanding in children younger than 7 years. It is interesting that Milligan et al. attempted to clarify the causality of these relationships and found bidirectional influences, although language appeared to have a greater effect on false-belief understanding than vice versa. Similarly, Meins, Fernyhough, Arnott, Leekam, and de Rosnay (2013) monitored the development of children over a 2-year period from 26 to 51 months of age, finding that early language abilities predicted later theory-of-mind performance.

Prosocial behaviors: Helping, sharing, and comforting

The understanding that others have emotions and thoughts, along with the ability to explicitly infer these mental states and comprehend linguistic cues, affects the development of positive peer relationships and the emergence of *prosocial behaviors* (Denham et al., 2012; Rhee et al., 2013), defined as voluntary actions intended to benefit others (Eisenberg et al., 2015). Scholars have proposed conceptualizing prosocial behavior as a multidimensional construct that encompasses helping, sharing, and comforting. Helping behaviors are defined as actions intended to fulfill an instrumental need (Dunfield et al., 2011) and can also take the form of providing valuable information to someone who needs it (Liszkowski, Carpenter, & Tomasello, 2008). Sharing behaviors involve the voluntary giving away of a valued resource to another individual who both lacks and desires or needs it (Brownell, Iesue, Nichols, & Svetlova, 2013). Comforting behaviors are actions intended to alleviate the negative emotional or physical state of another person (Zahn-Waxler & Radke-Yarrow, 1990).

Each of these types of prosocial behaviors requires specific cognitive processes enabling the child, respectively, to perceive a given problem, represent its cause and solutions, and feel motivated to act accordingly to alleviate another person's distress (Dunfield, 2014). Given that these behaviors are prompted by the recognition of another person's state of need—whether an instrumental need, a material desire, or emotional distress (Dunfield & Kuhlmeier, 2013)—it is plausible that the ability to identify and understand such inner states may play a key role in prosocial conduct.

Social cognition and prosocial behavior

A body of research suggests that the frequency of prosocial behaviors is affected by emotion knowledge during the preschool (Denham et al., 2012; Ornaghi, Pepe, & Grazzani, 2016) and school (Eggum et al., 2011; Farrant, Devine, Maybery, & Fletcher, 2012) years. The limited number of studies that have explored this topic in toddlerhood suggest that emotion knowledge also plays a role in the occurrence of early prosocial behaviors. For example, based on cross-sectional research with toddlers, Ensor and Hughes (2005) reported that emotion understanding made a unique significant contribution to variance in prosocial behaviors. These findings were replicated by Ensor, Spencer, and Hughes (2011) in a longitudinal study: Children were assessed at three time points from 2 to 4 years of age, and regression analyses showed that performance on emotion understanding tasks at age 3 predicted prosocial behaviors at age 4.

The literature has also been enriched by intervention studies exploring the effects of actively engaging toddlers and preschoolers in dyadic or group conversations about emotions. Such discourses enhance both young children's awareness of internal states in others and their understanding of emotions, consequently also impacting on their ability to identify when and how to respond prosocially (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Garner, Dunsmore, & Southam-Gerrow, 2008; Grazzani, Ornaghi, Agliati, et al., 2016; Ornaghi, Brazzelli, Grazzani, Agliati, & Lucarelli, 2017; Ornaghi, Grazzani, Cherubin, Conte, & Piralli, 2015).

Despite the compelling nature of this evidence, findings from other studies have called into question the strength of such associations. For example, no relations between emotion knowledge and prosocial behaviors were found when prosocial actions were directly observed during free play sessions at day care centers (Denham, 1986); in contrast, associations emerged when prosocial behaviors were observed during experimental tasks and structured play situations (Denham, 1986; Garner et al., 2008) or measured via questionnaires completed by mothers (Ensor & Hughes, 2005). Hence, it is likely that the identification of links between social cognition and prosociality may depend on the method used by researchers to obtain data on prosocial behavior. Furthermore, it is important to note that although children have a natural inclination to act on behalf of others (Warneken & Tomasello, 2013), in toddlerhood prosocial actions still occur relatively infrequently (Eisenberg et al., 2015). This may justify the absence of associations between emotion knowledge and prosocial behaviors in some studies of early childhood. Finally, the presence or absence of a relationship with emotion understanding may also depend on the type of prosocial behavior being investigated. For example, comforting is a prosocial action that requires the child undertaking it to have inferred an emotional state and that may therefore be more closely related to emotion knowledge than helping or sharing, which are more goal oriented (Drummond, Hammond, Satlof-Bedrick, Waugh, & Brownell, 2017; Gross et al., 2015).

Regarding the role of theory of mind, little is known about how it relates to prosocial behaviors in early childhood. In a recent meta-analysis, Imuta et al. (2016) attempted to shed light on this relationship by analyzing 76 studies conducted with children between 2 and 12 years of age. They concluded that children who possess an advanced theory of mind are more likely to act prosocially; this link was consistent across different varieties of prosocial conduct (namely, helping, comforting, and cooperating) but did not apply to sharing. The relationship between theory of mind and prosocial behavior was independent of age and gender, although it tended to be stronger in children ages 6 years and older as well as in girls. It is important to note that this comprehensive meta-analysis revealed that only seven out of 76 studies had been conducted with children younger than 3 years of age, and none had investigated subtypes of prosocial behaviors or adopted desire or true-belief understanding measures of theory of mind.

Language abilities and prosocial behavior

Children with limited language abilities are less likely to engage in social interaction, and this reduces their opportunities to learn cognitive and social skills (Hoff, 2014; Menting et al., 2011; Rhee et al., 2013). Indeed, there is evidence of an association between language acquisition and behavioral issues from the preschool years through middle childhood and adolescence: Specifically,

children with poorer language skills are at increased risk for being rejected by peers and developing externalizing behavior problems (Menting et al., 2011). Consistent with this, research on positive social behaviors has revealed that toddlers' and preschoolers' language abilities positively influence the development of prosocial behavior. Note that longitudinal studies have shown that early language capacities predict later prosocial actions (Girard, Pingault, Doyle, Falissard, & Tremblay, 2017; Rhee et al., 2013). Interesting findings have also emerged from studies that investigated the relationship between language and prosociality while assessing whether it was mediated by social cognition skills. For example, Ensor and Hughes (2005) found that verbal abilities influenced prosocial behaviors in 20- to 36-month-old children and that this association was mediated by emotion understanding. Similar mediation analyses were performed by Ornaghi et al. (2016) in a study with older children, specifically 4- to 6-year-olds: It is interesting that in this case, both language and theory of mind contributed to mediating the effect of emotion comprehension on prosocial orientation.

In sum, the existing research on early childhood suggests that language plays a role in the occurrence of prosocial behaviors, although it is still unclear whether this link drives or is driven by associations between social cognition skills and prosocial conduct. More advanced language abilities might be expected to facilitate social interaction, thereby enhancing children's ability to recognize another person's need or difficulty—that is to say, their social cognition. This in turn should progressively enable them to select and implement appropriate prosocial responses. At the same time, prosocial behaviors might promote further positive exchanges with peers, thus fostering the development of social cognition skills with the concurrent intervention of language abilities.

Gender differences

With regard to gender, the existing literature on children's social cognition reports mixed findings. Some studies have indicated that girls score more highly than boys on measures of emotion knowledge (Gross et al., 2015; Sette, Bassett, Baumgartner, & Denham, 2015) and theory of mind (Charman, Ruffman, & Clements, 2002). In contrast, other research with toddlers and preschoolers has found no gender differences in either emotion knowledge (Ensor & Hughes, 2005; Grazzani, Ornaghi, Agliati, et al., 2016) or theory-of-mind competence (Eggum et al., 2011; LaBounty, Wellman, Olson, Lagattuta, & Liu, 2007; Wellman & Liu, 2004).

The situation is no clearer with regard to gender differences in language abilities. Some studies have reported that on average girls display stronger language skills than boys (Bornstein, Hahn, & Haynes, 2004; Rhee et al., 2013). This finding was partially supported by a broad meta-analysis (Eriksson et al., 2012) indicating that gender differences existed across different non-English-language communities. Specifically, girls tended to be linguistically ahead of boys, but the extent of this advantage depended on age, language community, and the specific language skill assessed, which suggests that these potential confounding variables may explain the mixed findings reported on the association between language and gender (Barnett, Gustafsson, Deng, Mills-Koonce, & Cox, 2012; Eriksson et al., 2012; Girard et al., 2017; Pepe & Addimando, 2014).

Similarly conflicting findings have emerged in relation to the role of gender in prosocial behavior. Some studies have identified no gender differences in prosociality (Denham et al., 2012; Dunfield et al., 2011; Wu & Su, 2014), whereas others suggest that girls display more prosocial behaviors than boys during toddlerhood and the early preschool period (Baillargeon et al., 2011; Eisenberg & Fabes, 1998; Girard et al., 2017; Rhee et al., 2013; Tisak, Holub, & Tisak, 2007). These gender-related differences may be underpinned by cultural expectations and parental socialization practices. Specifically, gender stereotypes define girls as caring, responsive, and helpful, whereas boys are expected to be more independent and goal oriented (Eisenberg et al., 2015). Children's caregivers may encourage behaviors that match these stereotyped roles, thus socializing boys and girls in different ways (Baker, Tisak, & Tisak, 2016; Denham, Bassett, & Wyatt, 2010).

The present study

The main goal of this study was to investigate the impact of social cognition skills, namely, emotion knowledge and theory of mind, and language on the occurrence of prosocial behaviors in 2- and 3-year-olds while taking into account the role of age and gender. To date, little research has been conducted on the relations among these variables in early childhood, with especially few studies applying a multitrait mixed-methods approach.

Our first research hypothesis, in line with the current literature, was that the three varieties of prosocial behaviors (i.e., helping, sharing, and comforting) would not be related to one another. Moreover, we expected that prosocial behaviors in general would be positively associated with social cognition skills and language. Finally, we expected that emotion knowledge, theory of mind, and language would all contribute to accounting for the occurrence of prosocial behaviors.

Method

Participants

Participants were 149 Italian children ages 24 to 47 months (M age = 35.6 months, SD = 6.77 months; 75 girls, 74 boys) enrolled at 18 day care centers and kindergartens in northern Italy. Of the children, 79 (53%) were 2-year-olds (M age = 30.2 months, SD = 3.17 months; 45 girls, 34 boys) and 70 (47%) were 3-year-olds (M age = 41.8 months, SD = 3.73 months; 30 girls, 40 boys). Most were Caucasian (94%). All participants displayed typical development and came from working- and middle-class families, as reported in a sociodemographic questionnaire completed by their parents. All parents provided written informed consent at the outset of the study.

Procedure

A multitrait mixed-methods design was adopted consisting of both directly administered tasks and naturalistic observation. The children were tested individually in a quiet room at their own schools. Overall, the assessment lasted approximately 20 min, and the tasks were presented in a counter-balanced order. Each child was also observed individually over a series of free play sessions that took place on different days. Educators and teachers were encouraged to intervene as little as possible during the observation sessions.

Measures

Emotion knowledge

In order to assess the children's understanding of basic emotions (i.e., happiness, sadness, anger, fear), we administered the short form of the Affect Knowledge Test (Denham, 1986; Italian validated version by Camodeca & Coppola, 2010). This task uses a set of four emotion faces and puppets with blank faces. Specifically, it evaluates children's ability to label emotions (expressive task, four items; "How does she feel?"), recognize emotions (receptive task, four items; e.g., "Point to the sad face"), and identify others' emotions in typical situations (stereotypical script, three items that refer to anger, sadness, and fear) and atypical situations (nonstereotypical script, six items). In the stereotypical scripts, the puppet displays the emotion that most children would feel in the described scenario (e.g., in the script concerning anger, Nancy knocks down the tower that Johnny has just finished building), whereas in the nonstereotypical scripts it expresses a different emotion than the child would normally experience, as indicated by an educator or teacher in a short questionnaire about the child's emotional responses in common everyday situations (e.g., if the child's least favorite food is meat, in the script the puppet is happy to know that he or she is going to have meat for lunch). Participants received a score of 2 for a correct response, 1 for an incorrect response with the correct emotional valence, and 0 for a completely inappropriate response. As recommended in the

literature (Bassett et al., 2012; Sette et al., 2015), two composite scores were assigned: The emotion recognition score was the sum of the scores obtained on the expressive and receptive tasks and ranged from 0 to 16 ($\alpha = .82$). The emotion situation knowledge score was the sum of the scores obtained on the stereotypical and nonstereotypical script tasks and ranged from 0 to 18 ($\alpha = .77$).

Theory of mind

Children's theory-of-mind competence was evaluated using a battery of two tasks, specifically the Italian translations of the Diverse-Desire Task (Wellman & Liu, 2004) and the True-Belief Task (Wellman, 1991), which assess, respectively, children's understanding that other people can have desires that differ from their own and that others can hold true beliefs. These measures of theory of mind were selected on the basis that they are suited to the age groups under study and known to be reliable in the Italian context (Liverta Sempio, Marchetti, Castelli, Lecciso, & Pezzotta, 2005). For each task, children scored 1 point for a correct answer and 0 points for an incorrect answer. Hence, the total score for each task ranged from 0 to 1, which means that the test was either passed or failed. Raykov's (1997) composite reliability coefficient for the theory-of-mind scores was .70.

Language

The Italian version of the Peabody Picture Vocabulary Test–Revised (Stella, Pizzoli, & Tressoldi, 2000) was administered to provide a measure of children's receptive vocabulary. It consists of 180 pages of increasing difficulty, each featuring four pictures from among which the child is asked to indicate the one that corresponds to the word called out by the examiner. Scoring was carried out following the standard procedure, with 1 point assigned for each correct answer and 0 points for each wrong answer. The first five items were not included in the overall score because they are only intended to train the child in how to respond to the items. Thus, possible scores ranged from 0 to 175.

Prosocial behavior

The Prosocial Behavior Observation Grid was developed ad hoc by the research team to record the occurrence of children's spontaneous helping, sharing, and comforting behaviors toward peers in the school setting (see the Appendix). In devising the instrument, we drew on experimental protocols described in the literature (Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011), adapting them to suit naturalistic, paper-and-pencil observation. Two observers, who had previously spent time getting to know the children and their teachers or educators, were trained in identifying children's prosocial behaviors during unstructured free play and entering detailed descriptions of the observed helping, sharing, and comforting behaviors in the Prosocial Behavior Observation Grid. Following previous observational research (e.g., Grazzani, Ornaghi, Agliati, et al., 2016), each child was observed for 5 min on four separate occasions, yielding a total of 20 min of observation time per participant. A single researcher observed each child while refraining from having any kind of interaction with him or her. Helping behaviors were reported when a child's peer was in need of either instrumental assistance or information. A helping behavior was described as instrumental when a child assisted a classmate's goal-directed efforts (e.g., helped another child to free his or her leg from a string) and as informing when a child provided a peer with needed information or explained how to carry out an activity (e.g., by showing a classmate who was struggling to complete a jigsaw puzzle where to place the pieces). Behaviors were categorized as sharing when a child gave away material things (e.g., food, a toy) to a peer who had none of this resource and desired or needed it. Comforting behaviors were recorded when a peer had displayed and/or verbally expressed a negative emotional or physical state; these included psychological comforting, when the action was intended to modify the other child's negative internal state (e.g., kissing a classmate who was crying), and physical comforting, when the action was intended to soothe another's physical distress (e.g., rubbing the back of a child who was coughing).

At a later stage, two expert judges, who were different from the observers and unaware of the purposes of the study, independently coded the prosocial behaviors reported in the grid. In particular, they verified that each description of a prosocial behavior was in keeping with the

corresponding standard definition of prosocial behavior provided in literature and had been assigned to the correct category of prosocial behavior. The interrater agreement between the two judges was $\kappa = .85$. In the case of interrater disagreement between the judges, the specific behavior was analyzed and discussed until unanimous agreement was reached. Finally, three total scores—for helping, sharing, and comforting, respectively—were calculated by summing the occurrences of each of these varieties. In the current study, the occurrences of helping and sharing behaviors for each child ranged from 0 to 2, whereas the occurrence of comforting behaviors ranged from 0 to 3.

Overview of analyses

Preliminary testing of the data suggested that the study variables were generally normally distributed, with skewness and kurtosis values falling within the accepted range of ± 2 (George & Mallery, 2010). The only exception was comforting prosocial behavior: Even after the scores for comforting had been transformed statistically, they continued to be highly skewed, and consequently the comforting dimension of prosocial behavior was not included in any of the subsequent analyses.

Next correlations between helping and sharing prosocial behaviors were computed. Then correlations between emotion knowledge, theory-of-mind understanding, language, prosocial behaviors, age, and gender were calculated. In order to avoid Type I error, we applied a Bonferroni correction (Frane, 2015); p was set at .01.

Finally, to investigate the relationship between children's prosocial data (scores for the outcome variables ranging from 0 to 2) and the other study variables, we performed ordinal logistic regression analyses (as suggested by Fox, 2008). The initial model was set to have the occurrences of two different prosocial observed behaviors (helping and sharing) as the target variables, theory-of-mind scores as a fixed-effect variable, and language and emotion knowledge as covariates. Finally, age and gender were entered as control variables. The effects of theory-of-mind performance, language, and emotion knowledge were evaluated. We compared models by testing the fit of the full-null model with the null model and evaluating measures of likelihood. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated to measure effect sizes and evaluate the associations of the other variables with prosocial behaviors. The Mahalanobis distance criterion ($p > .001$) was used to identify and skip multivariate outliers. As a result, four outliers were removed. We conducted statistical analyses in SPSS using raw unstandardized scores for each of the measures.

Results

Descriptive statistics and correlations

Means, standard deviations, and actual ranges for all study variables are reported in Table 1. Zero-order correlations are presented in Table 2. Prosocial behaviors were not significantly correlated. With regard to the link between prosociality and the other variables in the research design, helping was significantly correlated with emotion situation knowledge ($r = .35, p < .001$) and language competence ($r = .30, p < .001$). Indeed, language was significantly correlated with all social cognition skills except for true-belief understanding, with which language displayed a correlation that tended toward statistical significance. Furthermore, age correlated significantly with scores obtained on all directly administered tasks with the exception of the true-belief understanding task.

To further clarify whether the associations between study variables remained after the effects of age group and gender were controlled for, we conducted partial correlation analysis (see Table 3). Again, the prosocial behaviors were not significantly correlated with one another. Helping continued to be significantly correlated with emotion situation knowledge ($r = .33, p < .001$) and language ability ($r = .31, p < .001$). Finally, language scores remained significantly associated with both components of emotion knowledge ($r_s = .40$ with emotion recognition and $.43$ with emotion situation knowledge, respectively, $p < .001$).

Table 1. Descriptive statistics for all study variables.

Variable	M	SD	Range
Emotion recognition	9.50	4.01	0–16
Emotion situation knowledge	12.82	3.79	0–18
Diverse-desire understanding	.72	.45	0–1
True-belief understanding	.65	.65	0–1
Language	24.23	14.7	1–68
Helping behaviors	0.43	0.71	0–2
Sharing behaviors	0.57	0.57	0–2
Comforting behaviors	0.18	0.51	0–3

Table 2. Zero-order correlations between study variables.

Variable	1	2	3	4	5	6	7	8	9
1. ER	—								
2. ESK	.43**	—							
3. DD	.16 [†]	.20	—						
4. TB	.20	.14	-.072	—					
5. Language	.55**	.60**	.28*	.16 [†]	—				
6. Helping	.20	.35**	.16 [†]	.034	.30**	—			
7. Sharing	.088	-.059	.13	-.11	-.14	-.17	—		
8. Age	.50**	.58**	.28*	.21	.62**	.18	.042	—	
9. Gender	-.21	-.024	-.009	-.092	-.17	.15	.037	-.12	—

Note. Spearman nonparametric correlations were run for gender. ER = emotion recognition; ESK = emotion situation knowledge; DD = diverse-desire understanding; TB = true-belief understanding.

[†] $p = .050$ – $.070$. * $p < .01$. ** $p < .001$.

Table 3. Partial correlations between study variables, controlling for the effect of age group and gender.

Variable	1	2	3	4	5	6	7
1. ER	—						
2. ESK	.29**	—					
3. DD	.06	.067	—				
4. TB	.12	.058	-.13	—			
5. Language	.40**	.43**	.15	.053	—		
6. Helping	.21	.33**	.13	.025	.31**	—	
7. Sharing	.10	-.072	.14	-.11	-.17	-.18	—

Note. ER = emotion recognition; ESK = emotion situation knowledge; DD = diverse-desire understanding; TB = true-belief understanding.

** $p < .001$.

Ordinal logistic regression analyses

Ordinal regression analyses were conducted to obtain a more detailed picture of how children's social cognition skills and language were related to prosocial behaviors by considering the complex network of reciprocal associations among them (see Table 4). With regard to helping behaviors, the test of the full model against the null model was statistically significant, likelihood $\chi^2(5) = 26.45$, $p < .001$.

This indicates that the regressors were associated with helping behaviors, Pearson's $\chi^2(269) = 246.3$, $p = .83$; pseudo- $R^2 = .21$. A statistically significant effect of emotion situation knowledge score was found ($b = 0.22$, $p = .006$; OR = 1.24, CI [0.061, 0.37]), with higher emotion situation knowledge scores associated with helping behaviors (if helping score = 0, then $M = 12.01$, $SD = 3.77$; if helping score = 1, then $M = 13.96$, $SD = 3.37$; if helping score = 2, then $M = 15.07$, $SD = 2.65$). The effect of language was small ($b = 0.026$, $p = .069$; OR = 1.29, CI [-0.009, 0.062]), and gender ($b = -0.90$, $p = .027$; OR = 0.49, CI [-1.70, 0.102]) had a statistically significant effect, with boys ($M = 0.32$, $SD = 0.63$) displaying fewer helping behaviors than girls ($M = 0.53$, $SD = 0.76$). No statistically significant associations were found for age and theory-of-mind scores. With regard to

Table 4. Results of ordinal regression analyses considering helping and sharing prosocial behaviors.

Variables	Helping					Sharing				
	Estimate	Wald	p	95% CI		Estimate	Wald	p	95% CI	
				Lower	Upper				Lower	Upper
ESK	0.22	7.48	.006	0.06	0.37	0.001	0.001	.95	-0.13	0.12
ToM Cat = 0	-0.74	0.70	.40	-2.47	0.99	-0.93	4.39	.036	-1.82	-0.06
ToM Cat = 1	0.11	0.05	.82	-0.81	1.03	0.66	2.34	.13	-0.18	1.49
ToM Cat = 2	-0.22	0.15	.70	-1.33	0.89	-0.52	0.96	.33	-1.56	0.52
ToM Cat = 3	0 ^a					0 ^a				
Language	0.03	2.15	.069	-0.01	0.06	0.04	5.79	.019	0.007	0.08
Age	-0.05	1.50	.22	-0.13	0.03	0.07	4.08	.057	-0.002	0.14
Gender = male	-0.90	4.90	.027	-1.70	-0.10	-0.05	0.02	.89	-0.76	0.66
Gender = female	0 ^a					0 ^a				

Note. CI = confidence interval; ESK = emotion situation knowledge; ToM Cat = 0 = both theory-of-mind tasks failed; ToM Cat = 1 = Diverse-Desire Task passed, True-Belief Task failed; ToM Cat = 2 = Diverse-Desire Task failed, True-Belief Task passed; ToM Cat = 3 = both theory-of-mind tasks passed; N = 145.

^aBaseline parameters.

sharing behaviors, the full model was statistically significant, likelihood $\chi^2(5) = 13.94, p = .030$. This indicates that all other variables were associated with the response variable, Pearson's $\chi^2(269) = 276.1, p = .38$; pseudo- $R^2 = .11$. Although this second model accounted for less variance, the pattern of relations it represented overlapped with that of the first model. A statistically significant effect of theory of mind was found ($b = 0.93, p = .036$; OR = 0.39, CI [0.062, 1.82]), with children who failed both theory-of-mind tasks ($M = .33, SD = 0.77$) displaying fewer sharing behaviors than the rest of the sample ($M = 0.60, SD = 0.83$). Language had a small but statistically significant effect ($b = 0.042, p = .019$; OR = 1.52, CI [0.007, 0.077]). There were no significant effects of gender, but there was a tendency for sharing behavior to vary with age ($b = 0.067, p = .057$; OR = 1.95, CI = [-0.002, 0.135]), such that older children produced sharing behaviors more frequently than younger children. No statistically significant associations were found between sharing behaviors and emotion situation knowledge scores.

Discussion

The general aim of the current study was to investigate the role of social cognition skills and language in the occurrence of children's prosocial behaviors while taking into account the effects of age and gender. There were two main findings. First, helping and sharing behaviors were not significantly correlated with each other. Second, social cognition skills, language abilities, and the control variables contributed to explaining helping and sharing behaviors, but according to different patterns. Specifically, emotion situation knowledge and gender significantly contributed to explaining the occurrence of helping behaviors, with language playing a marginal role; in contrast, theory-of-mind performance and language abilities mainly accounted for sharing with peers. We now discuss each of these two major findings in turn.

Associations between helping and sharing

The first major finding was that, as expected, there were no significant associations between helping and sharing even after we controlled for the effects of age and gender. This result is consistent with the outcomes of previous studies reported in the literature. For example, Dunfield et al. (2011) investigated the same varieties of prosocial behavior as we did and found no correlations between helping and sharing behaviors, although they measured these via standardized prosocial tasks rather than naturalistic observations. In addition, their sample was younger than ours, which means that the present evidence extends the age range in which distinct prosocial behaviors have been found to be uncorrelated. Similar results were reported by Gross et al. (2015) in a study with 18- to 30-month-old toddlers who were administered

prosocial tasks measuring instrumental helping and sharing. Finally, our finding is also in line with results obtained by Dunfield and Kuhlmeier (2013) in controlled experiments with 2- to 4-year-old children: Again, these scholars found that helping and sharing behaviors were not correlated with each other, even when age was controlled for.

Overall, our findings are consistent with the conceptualization of prosocial behavior as a multifaceted and multidimensional construct. They suggest that helping and sharing are independent behaviors underpinned by distinct sociocognitive mechanisms (Thompson & Newton, 2013). Indeed, although all prosocial behavior is aimed at alleviating the negative state of another person, the type of problem and solution involved is different for each variety (Dunfield, 2014; Dunfield & Kuhlmeier, 2013). Specifically, with regard to the problems being represented, helping requires recognizing another person's intention to achieve a goal, whereas sharing demands the ability to identify unequal access to resources. With regard to the solutions, children must correct unintended outcomes to help a peer and distribute their own resources if they wish to share something with someone (Dunfield, 2014).

The contributions of social cognition skills, language, age, and gender to accounting for variance in helping and sharing behaviors

The second major finding was that the variables under study had different relationships with helping versus sharing behaviors. As expected, the ordinal regression analyses showed that social cognition scores were associated with the occurrence of prosocial behaviors. However, the patterns of association were different for the two varieties of prosocial conduct, with emotion situation knowledge accounting for variance in helping and theory of mind explaining variance in sharing.

With regard to helping, our results confirm prior research findings highlighting the role of emotion knowledge in children's prosocial orientation (Denham, 1986; Denham et al., 2012; Ensor & Hughes, 2005; Ensor et al., 2011). Based on their own personal experiences, it may be implicitly clear to children that being unable to complete a task or achieve a goal causes negative emotions, such as anger, frustration, and sadness. Hence, it is likely that as early as 2 or 3 years of age, children can take a peer's affective perspective and imagine the potential emotional effects of failing to achieve a given purpose. Given that children intrinsically desire to see others happy (Dunfield, 2014; Hepach, Vaish, & Tomasello, 2012), it is probable that the outcome of this line of reasoning will be prosocial helping behavior. The observational data recorded in the grids supported this finding. For instance, one observer described a free play situation in a day care center in which a boy and girl (the target of the observation) were making shapes out of play dough. The boy used a cutter to form a person, but the resulting shape was missing a leg. He looked sadly at his creation and said, "Oh no, it's broken." The girl, who was working on her own play dough, looked at the boy and at his play dough and said, "I can do it for you." She went over to the boy, who made room for her, and she helped him to make a fully formed person shape. It is likely that the girl understood why the boy was sad and realized that helping would allow him to achieve his goal and consequently make him happy.

On the other side, we found that theory-of-mind performance played a key role in the occurrence of spontaneous sharing behaviors. It is interesting that children who failed both theory-of-mind tasks displayed fewer sharing behaviors than children who passed at least one theory-of-mind task. This outcome bears out the findings of previous studies that identified positive links between theory of mind and prosocial behavior in the early years of life (Cassidy et al., 2003; Wu & Su, 2014). Again, the descriptions of sharing behaviors recorded in the observation grids were consistent with the quantitative results obtained. In a kindergarten, for example, children were drawing and a girl told the teacher that there were no orange pencils. The target girl glanced at the pen holder and stated, "I have the orange, here you are," holding out the pencil she was using. This account suggests that the girl understood her classmate's desire for an orange pencil to continue drawing and that this had prompted her to give up a resource by handing it to her friend.

It is important to note that it might be argued that these results are partly at odds with the findings of Imuta et al.'s (2016) meta-analysis, in which sharing was reported to be the only variety of prosocial behavior not associated with theory-of-mind skills. One simple explanation for this seeming contradiction may lie in the fact that, as mentioned above, although the meta-analysis concerned subjects from 2 years of age and older, the number of studies involving young children was very small. In contrast, the participants in our study were specifically 2- and 3-year-olds, an age group with whom caregivers often emphasize the need for sharing. Indeed, beginning in the early years, children are frequently encouraged by adults to share toys or food with peers, and this encouragement often takes the form of prompting them to adopt another person's point of view. These social experiences shaped by caregivers gradually lead children to become aware that people desire things and that having access to or being deprived of such resources can impact on both emotional states and social exchanges (Brownell, Iesue, et al., 2013). This may have the effect of reinforcing young children's association between other people's desires and the expected sharing behaviors.

In addition to the key contribution of social cognition skills to explaining prosocial behaviors, we found that language also played a role. This is in line with the scant existing literature concerning the specific influence of language on prosocial behavior, supporting the idea that prosocial behaviors in early childhood are underpinned by linguistic skills (Ensor & Hughes, 2005; Girard et al., 2017; Rhee et al., 2013). Specifically, in the current study, more advanced language abilities significantly encouraged sharing resources with peers. Given that needs and desires are often conveyed through terms such as *mine* and *yours*, better language abilities may both facilitate children's understanding of others' mental states and improve their ability to efficiently share with others (Brownell, Iesue, et al., 2013).

The role of language skill in prosociality was also confirmed in relation to helping. Although in the regression model for helping behavior the effect of language only tended toward statistical significance, the correlation analyses revealed a positive association between language ability and helping that remained after we controlled for age and gender. This finding suggests an association between language and helping that is independent of other factors, a plausible outcome given that these variables are closely bound together in children's lives and both fulfill a social function. Indeed, language abilities are primarily social resources that a child can deploy to interact appropriately with others (Hoff, 2014). Having more advanced language skills will thus help children to engage in positive social exchanges and to verify that their prosocial actions have been effective, increasing their confidence in their own abilities. This can make them increasingly attentive toward others' goals and encourage them to interact with others, thereby further extending their social opportunities to act on behalf of others.

Finally, with regard to the control variables, the current findings suggest that in toddlerhood girls engage in more helping behaviors than boys. This outcome contributes to the debate over the role of gender in prosocial behavior and is in keeping with other studies that have reported that girls are more prosocially oriented than boys (Baillargeon et al., 2011; Girard et al., 2017; Rhee et al., 2013; Tisak et al., 2007), especially when prosocial behaviors are measured in naturalistic rather than experimental contexts (Eisenberg & Fabes, 1998). A possible explanation of these gender-related differences may lie in early gender socialization, which can foster a representation of girls as more sensitive and helpful than boys (Eisenberg et al., 2015).

Conclusions

Strengths, limitations, and implications for education

The present study, by adopting a multitrait mixed-methods approach that combined direct testing with in-depth naturalistic observations of participants, adds key evidence to the growing literature on both the independence of different types of prosocial conduct and the associations among emotion knowledge, theory of mind, language abilities, and prosocial behavior in 2- and 3-year-olds.

Nevertheless, the study is not without limitations. First, although we made every effort to randomize the participating children and education providers, it was not possible to control for

organizational variables. Specifically, given that the children attended many different day care centers and kindergartens, and sometimes were also in different classrooms within the same educational institution, our outcomes could have been affected by differences in educational contexts and teacher–child relationships, as suggested in the literature (Curby, Brock, & Hamre, 2013; Denham, Bassett, & Miller, 2017; Hipson & Séguin, 2015). Unfortunately, the overall size of our sample did not allow us to cluster the data by classroom or educational institution in order to run more sophisticated analyses. A larger and more diversified sample would not only strengthen the statistical power of the analyses already conducted but also enable additional in-depth statistical tests, such as hierarchical linear modeling and mediation analysis.

A second limitation of the study lies in its cross-sectional design. Future research may enhance understanding of the processes underpinning prosocial behaviors from toddlerhood through childhood by adopting a longitudinal design and taking into account other factors that may contribute to individual differences in the occurrence of prosocial behaviors, such as children's temperamental characteristics (Gross et al., 2015; Laible, Carlo, Murphy, Augustine, & Roesch, 2014) and caregivers' socialization practices (Grazzani, Ornaghi, Agliati, et al., 2016; Ruffman et al., 2006).

A third limitation of the current study lies in the difficulty we encountered in detecting a sufficient number of spontaneous prosocial behaviors to perform appropriate statistical analyses. Although the children did spontaneously engage in prosocial conduct, the overall occurrence of these behaviors was relatively low, which is common in naturalistic observations of free play (Brownell, Iesue, et al., 2013). Despite the significant amount of time we spent observing children's behavior during their interactions with peers, occurrences of comforting behavior were insufficient to support quantitative analysis of this variety of prosocial behavior. This issue prompts reflection on the true efficacy of naturalistic observations of spontaneous prosocial behaviors. Future studies on prosocial conduct and its associations with social cognition skills and language abilities should supplement naturalistic observations with information obtained via experimental tasks. In addition, regarding the independence of different prosocial behaviors, neurophysiological assessment might offer evidence of specific activation patterns. For instance, Paulus, Kuhn-Popp, Licata, Sodian, and Meinhardt (2013) found significant correlations between frontal activation and infants' empathic reactions in a comforting task as well as significant correlations between temporal activation and infants' performances in an instrumental helping task.

Despite these shortcomings, our findings strongly encourage those involved in early childhood education to design training and intervention programs to enhance the emotional, linguistic, and cognitive skills associated with children's prosocial behaviors. Interventions that foster these competencies have already proven extremely effective, especially when they have targeted children's overall development (Cigala, Mori, & Fangareggi, 2015; Grazzani, Ornaghi, Agliati, et al., 2016; Ornaghi et al., 2015). Indeed, prosocially oriented children tend to have positive peer relationships, suffer less peer rejection, and engage in fewer conflicts with peers, all factors that reduce the risk of aggressive behavior and bullying (Denham et al., 2003). Educational and school settings stand to benefit significantly from ad hoc intervention programs: A higher proportion of peer interaction based on compassion and respect rather than on the abuse of power will make for a more peaceful atmosphere. Given that in the current study the interrelationship among social cognition skills, language, and prosocial behaviors emerged as early as 24 months, efforts should be made to conduct preventive intervention with children during their first years of life.

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Appendix: Prosocial Behavior Observation Grid

	Observation N°1	Observation N°2	Observation N°3	Observation N°4	
	Date: __/__/__	Date: __/__/__	Date: __/__/__	Date: __/__/__	
Types of Prosocial Behaviors	Time:	Time:	Time:	Time:	Total
INSTRUMENTAL HELPING (H)					
INFORMING (H)					
SHARING (S)					
PSYCHOLOGICAL COMFORTING (C)					
PHYSICAL COMFORTING (C)					

Note: H = Helping behavior; S = Sharing behavior; C = Comforting behavior.