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THE ROLE OF SOCIAL COGNITION IN CHILDREN'S PROSOCIAL BEHAVIORS: A MULTI-METHOD STUDY WITH A SAMPLE OF 2-3 YEAR-OLDS

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Abstract

Early childhood is a crucial period for the development of emotion understanding (e.g. emotion recognition and emotion situation knowledge), theory of mind (e.g. diverse-desire and true-belief understanding), and language abilities. These competences are believed to influence prosocial behavior, which includes *helping*, *sharing*, and *comforting*. Nonetheless, a few studies have focused on the relationship among these competences in 2- and 3-year-olds. Furthermore, some associations have been neglected, for instance prosocial behavior in relation to diverse-desire understanding, true-belief, and receptive language. Then, most studies on prosocial behavior have used parent-reports, whereas observations in naturalistic contexts have been rarely carried out.

Hence, the aim of the current study was to deepen the relationship among these skills, controlling also for age and gender, and to examine whether emotion understanding, theory of mind, and receptive language determined prosocial behaviors. Participants were 149 Italian children aged 24-47 months of age (M = 35.63 months; SD = 6.77), recruited through some day-care centers and kindergartens located in Northern Italy. A multi-method approach was used, so each child was directly administered some measures of emotion comprehension, theory of mind, and receptive vocabulary, and observed twenty minutes at school in an unstructured context of free play with peers to detect the frequency of *helping*, *sharing*, and *comforting*.

Results showed some significant links among emotion understanding, theory of mind, and receptive language. Helping behaviors significantly correlated with emotion situation knowledge and receptive language, even when age and gender were controlled. Together, emotion situation knowledge, receptive language, and their interactive effects as well as those with the diverse-desire understanding, controlling for age and gender, were valuable determinants of *helping*. Exploratory mediation analyses revealed that receptive language might be a significant mediator in the relation between emotion situation knowledge and helping behaviors. The implications of findings are discussed.

Keywords: Social cognition, receptive language, prosocial behavior, early childhood

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1. Introduction

Studies in developmental psychology clearly attest that first years of life are crucial for achieving developmental milestones in the social-emotional, cognitive, and linguistic spheres. Children go through many changes especially in toddlerhood, that can be defined as a critical period in children's life (Thompson, 2006).

From two years of age, toddlers begin to recognize themselves and others as intentional agents with separate emotions, desires, beliefs, and goals, first at an implicit level and next explicitly (Wellman, 2014). This insight into others' internal states develops concurrently with an increasing awareness of one's own and others' emotional experiences (Saarni, Campos, Camras, & Whiterington, 2006). Indeed, at around two years of age children start to recognize emotions when nominated by others and thereafter to express them. Later, they also begin to conceptualize the causes of emotions and their behavioral consequences (Bassett, Denham, Mincic, & Graling, 2012; Denham & Couchoud, 1990a; Sette, Bassett, Baumgartner, & Denham, 2015). In other words, toddlerhood is an important period for the development of social cognition, which encompasses emotion comprehension and theory of mind understanding.

The emotion understanding[1] includes two distinct components, namely the recognition of emotion expressions and the knowledge of typical and atypical situational elicitors of emotions (Ackerman & Izard, 2004; Bassett et al., 2012; Denham, 2006). The theory of mind refers to the understanding that others have mental states that guide their actions, such as intentions, desires, and beliefs (Wellman, 2014). In classical studies on theory of mind, a real comprehension of others' internal states was thought to develop when children are 4-year-old, because before this age they systematically fail the false-belief tasks (Baillargeon, Scott, & He, 2010; Wellman, Cross, & Watson, 2001). Recent research has instead challenged this view by attesting that the development of theory of mind begins earlier, because the abilities to attribute intentions, desires, and beliefs to others are acquired prior to the explicit understanding of false belief (Ruffman, 2014; Wellman & Liu, 2004; Wellman, 2014). Nonetheless,

1 To avoid repetitions, the term *emotion understanding* will be used interchangeably with *emotion comprehension*, according to literature (e.g. Harris, 2008).

most studies on theory of mind have kept on focusing on false-belief understanding.

Toddlers and preschoolers who are more accurate in attributing mental states to others tend to be more competent in understanding emotions (Denham, 1986; de Rosnay, Pons, Harris, & Morrell, 2004; Ensor & Hughes, 2008; Harwood & Farrar, 2006; Hughes & Dunn, 1998), even though other studies did not find links between these competences of social cognition (Dunn, 1995; LaBounty, Wellman, Olson, Lagattuta, & Liu, 2007).

Another skill that is consistently developed in early childhood is receptive language, which defines the ability to comprehend words and non-verbal language cues (Barnett, Gustafsson, Deng, Mills-Koonce, & Cox, 2012). Toddlers' and preschoolers' receptive language has been found to be strongly related to the emotion comprehension (de Rosnay et al., 2004; Strand, Downs, & Barbosa-Leiker, 2016) and the theory of mind understanding (Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016; Milligan, Astington, & Dack, 2007; Ruffman, Slade, Devitt, & Crowe, 2006), even if again false-belief has been the most investigated skill.

The understanding that others have emotions and thoughts, along with the ability to explicitly infer these mental states and to comprehend linguistic cues, are expected to affect the development of positive peer relationships and social-emotional competences (Denham, 2006; Denham, Bassett, Brown, Way, & Steed, 2013; Hoffman, 2007). Among these, an increasing interest in literature has gone towards the emergence and development of prosocial behavior, which can be described as voluntary actions intended to benefit another (Eisenberg, Fabes, & Spinrad, 2006). Developmental psychology works indicate that prosocial responding emerges in toddlerhood and increases with age (Hay & Cook, 2007). Recently, scholars have highlighted the need of its conceptualization as a multidimensional construct that includes distinct behaviors, such as *helping*, *sharing*, and *comforting*, characterized by different developmental trajectories and social-cognitive correlates (Brownell, 2013; Dunfield, 2014; Dunfield & Kuhlmeier, 2013; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Svetlova, Nichols, & Brownell, 2010).

The frequency of toddlers' and preschoolers' prosocial behavior seems to be affected by the emotion understanding (Denham et al., 2012; Eggum et al., 2011; Ensor,

Spencer, & Hughes, 2011), whereas the role of theory of mind is controversial. Indeed, we know little about how theory of mind relates to prosocial behavior in early childhood. While some studies have attested positive links (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Eggum et al., 2011; Gross et al., 2015; Imuta et al., 2016; Wu & Su, 2014), some others showed no relations (Ruffman et al., 2006). Moreover, toddlers' and preschoolers' linguistic competences have been found to influence the development of prosocial behavior (Barnett et al., 2012; Ensor & Hughes, 2005; Girard, Pingault, Doyle, Falissard, & Tremblay, 2016; Rhee et al., 2013), but overall no studies have focused on the specific association between receptive language and prosocial behavior in early childhood.

Overall, despite these important premises, studies that have focused on the relation among these competences in toddler years are extremely lacking (Eisenberg, Eggum-Wilkens, & Spinrad, 2015). Hence, the main goal of this study is to investigate the role of emotion comprehension, diverse-desire and true-belief understanding, and receptive language in influencing prosocial behaviors in 2- ans 3-year-olds. Participants in this study were recruited as part of a larger cross-sectional study that examined the development of social-emotional competences in relation to some dispositional differences.

The current work is organized in chapters. First, the literature on social cognition, language abilities, and prosocial behavior is reviewed. The emotion understanding and theory of mind will be defined and their trajectories of development in the first years of life will be illustrated. Because of contrasting results about the gender-related differences in studies on children's emotion understanding, a section will target this issue. Moreover, studies that have examined the relations between emotion comprehension and theory of mind understanding will be presented.

Next, language abilities will be described. The communicative and linguistic development from birth to preschool years will be presented, highlighting the complexity of language as a multifaceted system that encompasses receptive, expressive, and many other skills. Again, some considerations will be done on differences between boys and girls in language skills given that the findings are mixed so far. A section will focus on the relations emerged in literature between language

abilities and social cognition skills.

Thereafter, the attention will be paid to prosocial behaviors and their features. Since each variety of prosocial behavior requires specific cognitive mechanisms related to perception of the problem, representation of cause and solutions, and motivation to alleviate others' distress, the development of *helping*, *sharing*, and *comforting* will be illustrated separately. Next, the correlates of prosocial behavior will be presented distinguishing among three macro-areas of research, namely temperamental dispositions, socialization, and socio-cognitive development. For the aims of this work, the focus will be specifically on the last one. Hence, links with emotion understanding, theory of mind, and language abilities will be discussed. Furthermore, mixed findings about the association between gender and prosocial behavior will be presented.

The chapter ends with an explanation of research questions. The five aims of the current study are illustrated and some hypotheses are developed.

The following chapter will focus on the multi-method design used in the current research. Characteristics of the sample and procedure will be first illustrated. Then, the measures that were directly administered to children will be described one by one, specifying the coding methodology. In particular, tools used in this research were the *Affect Knowledge Test* (AKT; Denham, 1986), the *Diverse-desire Task* (Wellman & Liu, 2004), the *True-belief Task* (Wellman, 1991), and the *Peabody Picture Vocabulary Test* (PPVT-R; Dunn & Dunn, 1981). The final section of the chapter points at the naturalistic observations of prosocial behavior occurred at school during free playtime. The observation grid that was specifically developed to observe helping, sharing, and comforting behaviors will be described.

The next chapter will consist of a presentation of results. Along with the description of preliminary analyses and descriptive statistics, the findings from correlation analyses will be illustrated. Next, hierarchical linear regression will be presented to show which variables explained the variance in prosocial behavior. Finally, exploratory mediation analyses will be shown, even though the results need to be considered very cautiously.

A discussion of findings will follow. The five aims of this research will be recalled and explained in light of previous findings from literature.

The final chapter will present strengths and limits of this study, suggesting challenges for future research. Implications of findings for the educational and scholastic fields will be discussed.

2. Review of the Literature

2.1 Social Cognition

Over the past years, many studies have focused on the development of children's social cognition. Even known as social understanding, it refers to the ability to infer others' internal states, such as intentions, goals, emotions, desires, beliefs, and thoughts (Carpendale & Lewis, 2006; Hughes & Devine, 2015). The origin of this term depends on the scholars' gradual awareness of the strong link among social experiences, cognitive processes, and emotional states, a relationship that also validates the increasing use in literature of the term social-emotional competence (Denham et al., 2012).

From the Piagetian works on the cognitive development, where infants and toddlers were defined as egocentric, equipped with an intuitive thinking, and focused on appearances, the current post-Piagetian literature has moved towards a new representation of the child. The infant is now conceptualized as interested in understanding others' mental world (Hughes & Devine, 2015; Saarni et al., 2006). The development of social cognition starts in the first year of life, when the child begins to understand how human behavior is related to internal states (Thompson, 2006).

Social cognition encompasses emotion comprehension, theory of mind, moral understanding, and empathy (Dunn, Cutting & Fisher, 2002; Hughes, 2011). For the aims of this work, the focus will be on emotion understanding and theory of mind, which will be defined in the next paragraphs.

2.1.1 Emotion understanding

A dimension of emotional competence is the emotion understanding, which generally refers to the ability to recognize emotions in self and others (Denham et al., 2003). It encompasses the ability to identify facial expressions of emotions, to recognize emotional terms, and to understand antecedents and causes of emotions (Denham et al.,

2003; Maló-Machado, Verissimo, & Denham, 2012; Saarni, 1999). Hence, two important and distinct components of emotion understanding emerge, which are the recognition of emotion expressions and the knowledge of typical/atypical situational elicitors of emotions (Ackerman & Izard, 2004; Bassett et al., 2012; Denham, 2006; Denham & Couchod, 1990a). The ability to recognize emotions allows the child to identify facial cues of basic emotions (i.e. happiness, sadness, anger, and fear) and to verbally label them, whereas emotion situation knowledge consists of inferring emotions from social cues (Ackerman & Izard, 2004).

From birth to preschool years we can assist to a huge and gradual improvement of emotion understanding. Generally, the emotional recognition precedes and supports the emotional situation knowledge during preschool years, due to a concurrent development of cognitive and linguistic skills (Bassett et al., 2012; Maló-Machado et al., 2012; Sette et al., 2015). The child little-by-little learns how emotions can be appropriately expressed and exhibited in specific contexts, which is central for the development of the social-emotional competence (Denham, 2006; Denham et al., 2013). Indeed, to date many studies have attested that these components of emotion understanding help preschoolers promote social competences and enhance positive peer relationships (Denham, 2006; Denham et al., 2003; Pecora, Sette, Baumgartner, Laghi, & Spinrad, 2016; Saarni et al., 2006).

2.1.1.1 Origins and development of emotional competence

The development of emotion comprehension begins the first days of life and improves significantly over years. As argued by Trevarthen (2011), infants are able to recognize, respond, and synchronize to others' facial expressions. To support this, from birth to 4-6 months newborns have been found to react to emotion signals, such as the contagious crying in response to the cry of another newborn (Thompson, 2006). Moreover, newborns are immediately engaged in highly affective interactions, primarily by their mothers. Early face-to-face play and experiences of social interaction help the child be in contact with emotional expressions, so that by 3 months infants can discriminate mothers' facial expressions, differentiating happiness from surprise and

anger (Grossman, 2010).

Despite this ability to differentiate positive and negative emotions, until 18 months of age it is harder for toddlers to discriminate negative emotions compared to positive emotions (Widen & Russell, 2008). Indeed, in discrimination tasks children are better at identifying emotions when they have a different valence (e.g. angry vs happy) compared to the same valence (e.g. angry vs sad) (Denham & Couchoud, 1990b). Hence, the ability to distinguish among emotions of the same valence develops later and it may depend on the fact that there are more negative emotions than positive ones to distinguish. In other words, happiness should be easier to differentiate because when the child faces negative emotions he has to discriminate among angry, scared, and sad facial expressions. Specifically, sadness is the first emotional state to be differentiated, followed by anger, and finally by fear, which seems to be the most complicated emotional state to understand for preschoolers (Widen & Russell, 2003; Widen & Russell, 2008). Therefore, even before the language development toddlers seem to be able to recognize emotional faces. On average, at around 24 months of age the child can identify emotions non-verbally by pointing when they are labeled by others (Denham & Couchoud, 1990a). The receptive emotion understanding, in fact, precedes the verbal identification of facial expressions (Denham, 1998).

Then, by the time children are two to three years of age, concurrently with the language development, they begin to show an emotion lexicon and to use descriptive phrases to talk about a restricted range of emotions and feelings (Denham & Couchoud, 1990a; Saarni et al., 2006). The spontaneous verbal expression of emotions is especially elicited in familiar interpersonal contexts, where the child feels at ease in spontaneously talking about their own as well others' emotions (Hughes, 2011). The sequence of development of labeling emotions occurs identically to recognizing facial expressions by pointing. Indeed, preschoolers first label positive facial expressions, defining them as “glad” or “happy”, and then begin to nominate negative expressions. In the beginning children usually use the term “sad” for every negative emotion and only at a later time they successfully distinguish among sadness, anger, and fear (Denham & Couchoud, 1990a; Widen & Russell, 2008; Widen & Russell, 2010). Precisely, fear seems to be the most confounding emotion to distinguish, so that they call it “sadness” even if they are

able to distinguish it from anger (Denham & Couchoud, 1990a).

Finally, three-year-old children begin to identify others' emotions taking into account the specific situational causes so that by four years they are more likely to use the current information to infer others' emotional states (Saarni et al., 2006). Overall, this sequence of development suggests that the comprehension of basic emotions is usually complete by four years of age, even though these skills continue to improve with the entry into school (Hughes, 2011).

2.1.1.2 Are girls more competent?

In Western Countries, girls are expected to display happiness, sadness, or fear whereas boys are allowed to express externalizing emotions, such as anger (Saarni et al., 2006). Hence, it is likely that emotion understanding and gender are somehow associated. However, in literature there are only few evidences of this relationship and results are mixed.

In Denham and colleagues' work (2002) this relationship were examined in 3- and 4-year-olds and girls were found to display more emotional knowledge than boys. Similar results emerged from the study of Gross and her research team (2015), when measures of social cognition were administered to children aged 18-30 months. Furthermore, Sette and colleagues (2015) with a sample of Italian children aged from 2 to 5 years old found that girls were better in emotional situation knowledge than boys.

On the other side, the absence of gender-related differences in emotion understanding emerged in other studies. For instance, Nichols, Svetlova, and Brownell (2009) investigated emotion comprehension in 12- to 24-month-olds without coming across gender differences. Also, Ensor and Hughes (2005) found that emotion understanding and gender were not statistically correlated in toddlers. In line with these results, Grazzani, Ornaghi, Agliati, and Brazzelli (2016) found no gender effects in an intervention study with 2- and 3-year-old children.

These contrasting results suggest that the relationship between emotion understanding and gender may be modulated by other factors. For instance, parents and other socialization agents often encourage positive and internalizing expression of

emotions in girls and externalizing emotions (e.g. anger) in boys, modeling in such way gender-specific patterns of emotional expression (Chaplin, Cole, & Zahn-Waxler, 2005; Eisenberg, Cumberland, & Spinrad, 1998). From a meta-analysis by Chaplin and Aldao (2013) about emotion expressions, significant gender differences were found. Specifically, girls showed more positive emotions and internalizing emotions (e.g. sadness, fear) than boys from middle childhood, whereas boys displayed more anger than girls in toddlerhood and childhood. Hence, the emphasis on many emotions might make girls more competent in emotion understanding than boys. Second, emotion understanding may be equivalent in girls and boys during infancy and preschool years. Gender differences may become stronger with age because over time children have more opportunities to adopt gender roles and because of biologically-based gender differences in emotion expression that gradually unfold (Chaplin & Aldao, 2013).

2.1.2 Theory of mind

The theory of mind classically defines the ability to understand that others have mental states such as intentions, desires, and beliefs that guide their actions (Perner, 1991; Premack & Woodruff, 1978). In other words, the development of theory of mind allows the child to explain and predict others' mental states and the consequent behavior (Wellman, 1990). In the developmental literature, it has also been conceptualized as a form of perspective taking, distinguishing between a cognitive perspective taking ability and an emotional/affective perspective taking ability (Hoffman, 2007). Indeed, as mentioned above, internal states can refer to both an epistemic nature, such as desires, beliefs, and intentions, or an emotional nature, such as emotions and feelings.

The acquisition of a theory of mind seems to be an important milestone in the child's development because of its countless benefits. First of all, it has a social function, given that it allows to comprehend others and so interact with them in an appropriate way (Liverta Sempio, Marchetti, Castelli, Lecciso, & Pezzotta, 2005). Hence, it also promotes communication, indeed it lets the child understand others' communicative intentions. Moreover, the development of theory of mind has been linked with well-being and social adjustment (Imuta et al., 2016), consequently it seems

to have an adaptive and protective function (Liverta Sempio et al., 2005).

As for other domains of child's development, even the acquisition of a theory of mind is characterized by individual differences (Hughes & Devine, 2015). These might depend among others by the child's gender, even if the findings are mixed. Indeed, Charman, Ruffman, and Clements (2002) found that in a sample of 2- to 6-year-olds girls had better performances than boys in false-belief tasks, even though the advantage was weak. In contrast, from other works on toddlers and preschoolers (Eggum et al., 2011; LaBounty et al., 2007; Wellman & Liu, 2004) no gender differences emerged. Scholars have argued that these controversial results may be addressed both to children' individual experiences, such as the family context, and dispositional differences (Thompson, 2006).

2.1.2.1 Desire- and desire-belief psychology

The first studies on theory of mind argued that a real comprehension of others' internal states begins to develop when the child is 4-year-old (Baillargeon et al., 2010; Wellman et al., 2001; Wimmer & Perner, 1983). This conclusion was related to the fact that around this age children were able to pass the false-belief tasks, which evaluate the child's ability to attribute false-beliefs and to predict behavior of others who may have false beliefs. In contrast, younger children would not possess a theory of mind because they had been found to systematically fail false-belief tasks (Wellman, 2014; Wellman et al., 2001). However, recent research has challenged this traditional view by attesting that the development of theory of mind begins earlier, given that some abilities, such as the attribution of intentions, desires, and beliefs to others, are acquired prior to the explicit understanding of false beliefs (Harris et al., 2005; Ruffman, 2014; Wellman & Liu, 2004; Wellman, 2014).

Thus, first of all it is necessary to distinguish between two theory of mind systems (Apperly & Butterfill, 2009). Indeed, until two years of age children have been found to have an implicit theory of mind, which operates unconsciously. Later, at around 3-4 years of age, children begin to operate in a conscious and controlled way developing an explicit theory of mind (Ruffman, 2014; Schneider, Nott, & Dux, 2014).

In support to this distinction, there is evidence of a very early understanding of mental states, indeed by the end of the first year children treat themselves and others as intentional agents (Wellman, 2014). For instance, infants have been found to understand adults' intentions by following their gaze towards a salient event or object, which means the child as early as 12-18 months understands that people have intentions and behave accordingly to their desires and goals (Meltzoff & Brooks, 2008; Moll & Tomasello, 2007; Tomasello & Haberl, 2003). Additionally, around the same age infants begin to use the pointing gesture as a way to share attention with the caregiver onto an object, which means the child believes that he can affect the adult's internal states (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Moreover, 18-month-old children engage in pretend plays, suggesting that they are also able to represent reality differently from the perceived one (Nielsen, 2015), and when they are 2-year-old begin to use the psychological lexicon, a vocabulary which includes volitive and emotional terms in the beginning, and it gets enriched with cognitive terms as well the following year (Bartsch & Wellman, 1995).

These abilities have been identified as precursors of theory of mind and attest the children's implicit knowledge of others as people provided with internal states. Eventually, children develop a greater awareness of internal states and acquire an explicit theory of mind that allows them to provide correct answers in theory of mind tasks. As regard to the explicit development of theory of mind, Wellman (2014) has identified two consequent phases that occur before the child's understanding of false belief, respectively the desire psychology and the desire-belief psychology. At around 2 years of age toddlers achieve an explicit desire psychology, which means the child comprehends that people's actions are guided by their desires. Hence, emotional reactions depend specifically on the fulfillment of such desires. Thereafter, at around three years of age, toddlers develop an explicit desire-belief psychology. This achievement allows the child to understand that both desires and beliefs can guide actions. Moreover, in the beginning the child takes into account only true beliefs that reflect the reality and at a later time he understands that others' behavior may be due to false beliefs.

Therefore, the theory of mind understanding has to be conceptualized as an

extended and progressive set of conceptual acquisitions (Wellman, 2014; Wellman & Liu, 2004; Peterson, Wellman, & Slaughter, 2012). Despite the sequence of development is the same for everyone, as mentioned above there are some individual differences so that the time required to master these abilities may vary among children (Hughes & Devine, 2015).

2.1.3 Relations between emotion understanding and theory of mind

The ability to understand what emotions others are experiencing can not develop in isolation from other aspects of emotional and cognitive development (Saarni et al., 2006). In literature, the relationship between emotion understanding and theory of mind has been examined because it is likely that representations of one's own and others' mental states may assist in understanding one's own and others' emotions, especially when the emotion felt by others differ from what the child would experience (Eggum et al., 2011). Indeed, to understand others' emotions children need first to comprehend that others have internal states that make sense of behavior and actions. An alternative speculative interpretation is that emotion understanding may promote the development of theory of mind (Harwood & Farrar, 2006; Hughes & Dunn, 1998). Nonetheless, these conclusions are only speculative.

Despite the hypotheses about the causality of this association, to date a variety of studies has investigated the relation between emotion understanding and theory of mind, identifying positive correlations in toddlers and preschoolers (Denham, 1986; de Rosnay et al., 2004; Ensor & Hughes, 2008; Harwood & Farrar, 2006; Hughes & Dunn, 1998; Kuhnert, Begeer, Fink, & de Rosnay, 2017). The results indicate that children who are more accurate in attributing mental states to others also tend to be more competent in understanding emotions.

Similarly, Cutting and Dunn (1999) reported a significant relation in a sample of 3- and 4-year-olds, but when the family background was accounted for this correlation was no longer significant, highlighting that the child's social context had an impact particularly on the development of theory of mind. Therefore, findings are somewhat mixed, as confirmed from some studies in which no links have emerged (Dunn, 1995;

LaBounty et al., 2007). These controversial results might depend on the age of participants and task used. Indeed, most of these studies administered theory of mind tasks to children older than 3 year old and focused on false belief given that it is still evaluated as an unequivocal marker of mentalistic understanding (Wellman et al., 2001). However, other skills of theory of mind, such as the comprehension of others' desires and true beliefs, are equally important in determining human actions (Astington, 2001). Nonetheless, there is a lack of studies aimed at investigating the relation between emotion comprehension and understanding of others' desires and beliefs, especially in toddlers.

2.2 Language abilities

The acquisition and learning of language is a complex process that in typically developing children happens within the first three years of life. Indeed, scholars have identified toddlerhood as a critical period for the language development, due to rapid advances in language skills (Camaioni, 1999). However, the language begins to be acquired much earlier, that is when the newborn perceives auditory inputs, and from that point he gradually comprehends appropriate nominal references of the words (Thompson, 2006).

Language is a multifaceted system that encompasses a wide range of skills, which include but are not limited to receptive and expressive language (Camaioni, 2001). Receptive language refers to the comprehension of words and non-verbal language cues presented by others, whereas expressive language is the extent to which children are able to use words to effectively transmit concepts to others (Barnett et al., 2012). Despite receptive and expressive language are two related aspects, their development proceeds separately so that accelerations or delays in one area do not imply the same in the other one (Camaioni, 1999). Furthermore, the development of these skills is related to the concurrent learning of several aspects of language, such as phonology, semantics, morpho-syntax, and pragmatics. Phonology describes the speech sounds and their possible combinations in a specific language. Semantics refers to the association between a sound and its meaning, whereas morpho-syntax concerns the

grammatical rules that dictate how a sentence can be expressed in that language. Finally, pragmatics describes the ways to effectively have conversations with others (Camaioni, 2001).

Language development has to be conceptualized into the wide communicative competence, given that it is used for social communication and helps create mental representations (Astington & Baird, 2005; Bruner, 1983). Indeed, language is a social tool that develops through interactions with others, and the use of language provides opportunities to gain social skills (Hoff, 2006). Consequently, evidences of links between language acquisition and behavioral difficulties or social competence from preschool years to middle childhood and adolescence are not surprising. Indeed, children with poorer language skills have been described to be at increased risk of becoming rejected by peers and developing externalizing behavior problems, such as aggression (Horwitz et al., 2003; Menting, van Lier, & Koot, 2011). In contrast, both receptive and expressive language skills have been found to be related to positive behaviors and social competence (Imuta et al., 2016; Rhee et al., 2013).

2.2.1 Developmental pattern of communication and language in the first years of life

The process of language acquisition begins when the child is able to perceive it, in other words when he experiences the native language. This happens very early, in fact from the first hours of life newborns start to analyze the linguistic sounds through their basic perceptual abilities and to launch a gradual process of phonological awareness (D'Odorico, 2005). These abilities allow newborns to join interactions with adults and communicate with the surrounding world (Thompson, 2006).

From birth, infants engage in dyadic interactions with caregivers, even if their capacities are limited. This attests that the development of communication precedes the development of language itself (Camaioni, 2001). Indeed, although the baby is able to emit just vegetative sounds in the beginning and vocalizations only in the following months, the adult always tends to attribute meanings and reacts to child's behavior. In other words, caregivers interpret such sounds as intentions, desires, and communicative

cues (D'Odorico, 2005). Moreover, from birth until the end of the first year of life infants are exposed to a specific type of language, namely the *motherese* or *baby talk* (Camaioni, 1999). Indeed, adults talk with young children using a syntactically simplified language characterized by short sentences, repetitiveness, concrete restricted vocabulary, and exaggerated prosody (Stern, Spieker, Barnett, & MacKain, 1983). This language makes conversations redundant and offers opportunities to process relevant linguistic information, facilitating acquisition and development of language abilities (Spinelli et al., 2016). Hence, all these situations are opportunities for the child to acquire phonology, semantics, syntax, and pragmatics of his native language, and so to develop a receptive and expressive vocabulary (Camaioni, 2001).

Importantly, receptive skills are acquired before expressive ones, that is to say the comprehension precedes and influences the linguistic production (Camaioni, 1999). Therefore, the receptive vocabulary is broader than the expressive vocabulary because the child understands words that he will be able to spontaneously express verbally only thereafter. However, until 8-10 months infants comprehend simple sentences and words only if they are expressed by adults in specific contexts or within a routine, so it is necessary that the child is at least 18-months-old to face a comprehension of words independently from the contextual cues (D'Odorico, 2005).

First words are pronounced between 12 and 30 months of age, with wide individual differences, and from the achievement of this milestone the child's vocabulary is constantly enriched (D'Odorico, 2005). Particularly, the expressive language develops rather slowly but at around 20 months of age an important event occurs, namely the *explosion of the vocabulary* or *vocabulary spurt* (Ganger & Brent, 2004). This switch from a slow vocabulary growth to a fast increase in the number of words allows to combine words together in order to create simple sentences and to gradually understand the morpho-syntactic rules of language (D'Odorico, 2005). However, language development does not run out at this stage, indeed it goes forward across preschool years and even beyond (Camaioni, 2001).

Finally, an important fact about language acquisition is its inter-individual variability. Children differ dramatically in the size of their receptive and expressive vocabularies, the complexity of the structures they produce, and their social-

communicative skills (Hoff, 2006). Moreover, these individual variations are steady. Indeed, results of longitudinal studies attest that children's language abilities are moderately to strongly stable across years, suggesting that the major predictor of language abilities at a given age is language development at an earlier age (Bornstein, Hahn, & Haynes, 2004).

2.2.2 Language and gender differences

Gender may be a possible contributor to individual differences in language development in early childhood. Rhee and other scholars (2013) assessed children's expressive and receptive language from age 14 to 36 months, finding that on average girls had higher levels of language skills compared to boys. Likewise, Bornstein, Hahn, and Haynes (2004) carried out four longitudinal studies, using a multitude of language measures, and showed that girls outperformed boys in language abilities between 1 and 6 years of age. Also the longitudinal study by Huttenlocher and colleagues (1991) with children from 14 to 26 months provided evidence about gender differences in early vocabulary growth. Specifically, they found that girls acquired new words faster than boys but in the age period of 20-24 months there was a decline in gender differences. In support to this, with children aged 3-4 year-old Cutting and Dunn (1999) did not find any significant difference between boys and girls neither in expressive nor receptive language.

Hence, it would appear that girls have an advantage in language acquisition from early childhood and boys fill the gap by age 6 (Bornstein et al., 2004; Huttenlocher et al., 1991), however the issue of gender differences in language development is rather controversial and not clear yet. Many potential confounding variables may intervene, such as the age considered, the language ability assessed, and the language community investigated. Indeed, a huge exploration of gender differences in ten non-English language communities by Eriksson and other scholars (2012) have yielded significant differences between girls and boys on word production both in infants and toddlers, with an advantage for girls, whereas the effect of gender was not statistically significant on word comprehension assessed during infancy. Contrary to the previous findings, the

longitudinal study by Girard and colleagues (2016) highlighted that at three years of age girls and boys were comparable in their performances in expressive language, whereas at five years of age boys outperformed girls.

Moreover, Gleason & Ely (2002) speculated that there are strong stereotypes about gender differences in language development, that take to believe that boys develop language later than girls. Furthermore, it has been reported that mothers tend to speak more with girls than boys (Leaper, Anderson, & Sanders, 1998), so gender differences in language may be reinforced by patterns of mother–child interaction and reflect differences in exposure (Barnett et al., 2012). Nonetheless, some scholars have reported that the amount of parent speech to girls and boys does not differ (Huttenlocher et al., 1991).

2.2.3 The relationship between social cognition and language abilities

Language abilities are important correlates of both emotion understanding and theory of mind (Hughes & Dunn, 2015; Ruffman, Slade, Rowlandson, Rumsey, & Garnham, 2003). This is not surprising given that these skills have an essential feature in common, that is they have a social function and a crucial role in children's' social-emotional competence (Thompson, 2006). Even though there is evidence that social cognition is closely linked to language abilities, the direction of this association is not clear yet. Advanced social cognition may be necessary to acquire language, but at the same time language may also be a powerful tool for the acquisition of social cognition (Tomasello, 2003). Indeed, facilitated by early communication with caregivers, as early as 18 months toddlers begin to infer intentions of adults from their emotional expressions, creating the basis for the language learning (Camaioni, 2001; Thompson, 2006). At the same time, it seems that language provides young children with significant insight into others' mental and emotional states, so it has potentially important influences on the growth of psychological understanding (Thompson & Newton, 2010). Moreover, bidirectional effects between language abilities and social cognition may be in action (Astington & Baird, 2005).

With regard to the relation with emotion understanding, a normative

development consists of increasing interconnections between emotions and cognitive systems, leading to a cognition-dependent emotion comprehension (Ackerman & Izard, 2004). A marker of this interdependence is specifically the association between children's performances on emotion understanding and language abilities. For instance, de Rosnay and other scholars (2004) administered measures of emotion understanding and receptive language to children between 3 and 6 years, and strong positive associations emerged even when the effect of age was accounted for. The same result was reported by Cassidy, Werner, Rourke, Zubernis, and Balaraman (2003) with children aged 37 to 65 months. Indeed, positive and significant relations emerged between a composite measure of language, which assessed syntax and semantics of both expressive and receptive vocabulary, and emotion understanding evaluated with the affective perspective taking task. More recently, Strand, Downs, and Barbosa-Leiker (2016) conducted a study with children aged 36 to 67 months, finding significant correlations between emotion understanding and semantics assessed by receptive vocabulary. Similarly, Grazzani and colleagues (2016) carried out a conversation-base intervention with toddlers and results attested that the children's expressive vocabulary was significantly and positively correlated with their emotion comprehension. On the other hand, Curby, Brown, Bassett, and Denham (2015) involved children ranged in age from 42 to 64 months old and found that emotion knowledge was significantly related to the phonological dimension of receptive language.

Overall, these studies suggest that both expressive and receptive language skills are related to emotion understanding. Some scholars have also examined the direction of this association, exploring both the causal role of language in predicting emotion comprehension (de Rosnay et al., 2004) and the causal role of emotion comprehension on language (Curby et al., 2015). To date, the contribution of a variable on the other one is still unclear, given that bidirectional associations have been found consistent as well, especially with preschoolers older than 4 years of age (Strand et al., 2016).

Despite this uncertainty, further evidence of associations between language and emotion understanding is provided by the child's ability to talk about emotions. Emotion language consists of terms that denote positive and negative emotions (e.g. 'be happy', 'get angry', 'be afraid', 'be sad') (Lecce & Pagnin, 2007). Toddlers begin to use the

emotion lexicon at around 18-20 months of age and gradually integrate it into conversations with caregivers (Bartsch & Wellman, 1995). This provides a common field to discuss and share psychological experiences that are often difficult to comprehend (Thompson, 2006). Hence, language becomes an important vehicle of information about internal states and may promote the expression of emotions (Ensor & Hughes, 2005). Studies on toddlers' mental-states talk indicate a link between the use of emotion lexicon and the development of emotion understanding (Ensor & Hughes, 2008; Grazzani et al., 2016; Ornaghi, Brazzelli, Grazzani, Agliati, & Lucarelli, 2016). Additionally, the access to conversations with adults, especially when rich in mentalistic words, is a powerful promoter of both children's emotion understanding (Grazzani et al., 2016; LaBounty et al., 2007; Ornaghi, Grazzani, Cherubin, Conte, & Piralli, 2015; Taumoepeau & Ruffman, 2006) and mental-state understanding (Grazzani, Ornaghi, & Brokmeier, 2016; Harris, de Rosnay, & Pons, 2005; Ruffman, Slade, & Crowe, 2002; Ruffman et al., 2006).

Indeed, in relation to theory of mind, much research has demonstrated associations with language abilities in both typically developing children (Astington & Jenkins, 1999; Juan & Astington, 2012; Ruffman et al., 2003) and clinical studies about autism, specific language impairments, and deaf children (Astington & Baird, 2005; Farrant, Fletcher, & Maybery, 2006). These relationships have been found especially collecting measures of false-belief and different types of language in preschoolers. For instance, Cutting and Dunn (1999) found that preschoolers' language (a composite measure of expressive and receptive abilities) significantly contributed to false-belief understanding, independently from age and family background. Similarly, Ruffman, Slade, Devitt, and Crowe (2006) administered some tasks of theory of mind (i.e. false-belief, desire-emotion, and emotion-situations tasks) and a test of receptive language when children were 3-year-old and then one year later, finding again positive and significant correlations between these measures. More recently, Imuta and her research team (2016) carried out a meta-analysis on the link among theory of mind, language, and prosocial behavior in children between 2 and 12 years of age, confirming the previous results about a relationship between language abilities and false-belief understanding.

Taken together, these findings demonstrate that different language skills are related to the theory of mind development. Further evidence of such relations is provided by studies that try to determine the causal relation between language abilities and theory of mind understanding. Indeed, conversations may expose children to different points of view and help understand others' perspectives (Harris, 1992). On the other hand, it could be argued that theory of mind may facilitate the acquisition of language. Results of some longitudinal research have provided little support for this interpretation. For instance, Astington and Jenkins (1999) found that toddlers' and preschoolers' general language ability, which included syntactic and semantic skills of both expressive and receptive vocabulary, was a predictor of theory of mind, whereas the reverse did not occur. Ruffman, Slade, and Crowe (2002) followed longitudinally the development of 2- to 3-year-olds across one year. It emerged not only that children's receptive vocabulary was strongly related to theory of mind, but also that earlier language abilities predicted subsequent theory of mind performances independently of their mothers' mental-state discourse. More recently, Meins and other scholars (2013) monitored the development of children across two years from 26 to 51 months, finding that early language production predicted later theory of mind performances. On the contrary, other studies have instead reported reciprocal influences. As an example, a longitudinal work on 3- and 4-year-olds by Slade and Ruffman (2005) showed a link between receptive language and false-belief, and hierarchical regression analyses interestingly displayed a bidirectional relation between these variables. In line with these results, the well-known meta-analysis by Milligan, Astington, and Dack (2007) highlighted a strong relation between language abilities (e.g. general language, semantics, syntax, receptive vocabulary) and false-belief understanding in children under age 7. Furthermore, they tried to shed light on the causality of this association, finding a bidirectional relation even though overall the effect was stronger from language abilities to false-belief task performance. Finally, differentiating the effect of different language abilities, they found that despite the link between receptive vocabulary and theory of mind, the effect size of this association was lower than other language skills.

In summary, literature on early childhood has provided strong evidences of a

relation between children's language abilities and both their emotion comprehension (Cassidy et al., 2003; Curby et al., 2015; Grazzani et al., 2016; Strand et al., 2016) and understanding of others' mental states (Cutting & Dunn, 1999; Imuta et al., 2016; Ruffman et al., 2006). Nonetheless, the direction of influences between language and social cognition skills remains unclear.

2.3 Prosocial behavior: Development and correlates

The term prosocial behavior defines actions intended to benefit others (Eisenberg et al., 2006). As humans, children are by nature social animals who interact with others. From a Darwinian perspective they should be extremely selfish and exclusively interested to benefit themselves (Darwin & Darwin, 1909), however quiet often we can find them act prosocially on behalf of others (Tomasello, 2009). Prosocial behavior may be acted for many reasons, such as anticipation of approval or rewards, sense of fairness and justice, desire to conform with norms, or concern for others (Eisenberg et al., 2015; Thompson & Newton, 2010).

The pioneering studies on prosocial behavior date back to the late 1970s and early 1980s (Yarrow et al., 1976), followed by a decline of interest in the following ten years. In the late 1990s, this topic regained concern with Eisenberg's work on prosociality (Eisenberg et al., 1996), and since then the last decades have seen an increasing interest in prosociality especially in childhood. Prompted by the positive psychology perspective, these studies have begun to shift focus on compassion and tolerance instead of negative aspects of the child's functioning (Eisenberg et al., 2015).

Across years prosocial behavior have been investigated with different methodologies: parent-reports (Ensor & Hughes, 2005; Rhee et al., 2013; Torrens & Kartner, 2016), teacher-reports (Diener & Kim, 2004), observations and tasks during experimental trials in which prosocial actions have been prompted (Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011; Endedijk, Cillessen, Cox, Bekkering, & Hunnius, 2015; Ensor & Hughes, 2005; Garner, Dunsmore, & Southam-Gerrow, 2008; Knafo, Steinberg, & Goldner, 2011; Rhee et al., 2013; Warneken & Tomasello, 2013b; Wu & Su, 2014), and observations in naturalistic contexts (Cassidy et al., 2003;

Denham, 1986). Interestingly, multiple methodologies have led to different outcomes. Indeed, in a laboratory condition the child may exhibit a prosocial behavior because prompted by the adult, while at school the same behavior might not occur spontaneously (Eisenberg et al., 2006).

2.3.1 Definition and characteristics of prosocial behavior

In literature, prosocial behavior can be encompassed in the wide construct of prosocial orientation, which includes also empathy, sympathy, and personal distress (Eggum et al., 2011). Empathy defines the ability to respond affectively to others' emotions (Hoffman, 2007), sympathy refers to feeling sorrow and concern for others (Eggum et al., 2011; Vaish, Carpenter, & Tomasello, 2009), whereas personal distress is a self-focused emotional reaction to a vicarious experience of others' emotions (Eisenberg et al., 2006).

These aspects are related to each other and are considered the motor of prosocial behavior, which is commonly defined as voluntary actions intended to benefit others without getting any personal advantage (Eggum et al., 2011; Eisenberg, Fabes & Spinrad, 2006). Two important aspects emerge from this widely accepted definition. First of all, it highlights the intentionality of prosocial behaviors, given that they are acted voluntarily without any external pressure. Then, 'others' are the focus of prosociality, indeed the child acts when another is in difficulty in completing a task, distressed because of unmet desires or negative emotional/physical states.

In the last years the field of developmental psychology has moved from a perspective of global prosocial behavior towards the conceptualization of it as a multidimensional construct (Eisenberg & Spinrad, 2014). Indeed, it has gradually emerged that prosocial behaviors have domain-specific developmental trajectories and different social-cognitive correlates, which may explain the absence of correlations among the varieties of prosocial behaviors (Dunfield & Kuhlmeier, 2013). In particular, prosocial behavior takes multiple forms, included *helping*, *sharing*, and *comforting,* which are some of the main types discussed in literature (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Dunfield, 2014; Dunfield et al., 2011; Svetlova et al.,

2010; Thompson & Newton, 2013).

Across years, some features of prosocial behavior have been identified. For instance, Michael Tomasello (2009), who included even altruism and cooperation within prosociality, suggested its innate nature. Indeed, prosociality has an early uprising and prosocial behaviors are acted spontaneously since the first years of life (Hepach, Vaish, & Tomasello, 2012). In line with this idea, Hay and Cook (2007) argued that since the first months of life children show an innate tendency to act prosocially and from the second year of life they become more aware of their behaviors. Concerning the spontaneity, Zaki and Mitchell (2013) have also highlighted the intuitive nature of prosocial behavior. Focusing on adults in dangerous situations, they argued that many prosocial actions are acted without thinking, in other words when risks of such behavior are not considered. Therefore, it is likely that these situations activate the same innate mechanisms of prosociality that very young children commonly use. To support this, Warneken & Tomasello (2013a) have shown that 2-year-olds are not influenced by parental behaviors of reinforcement or encouragement of prosocial behaviors, suggesting that prosociality is totally spontaneous and intrinsically motivated.

Another peculiar characteristic of prosocial behavior is its universality (Hamann, Warneken, Greenberg, & Tomasello, 2011; Tomasello, 2009). It can be observed in many different cultures and social contexts (Callaghan et al., 2011), even if it is likely that culture and practices of socialization may play a critical role in its development (Brownell et al., 2016; Tomasello, 2016). Furthermore, comparative studies have shown that prosocial behaviors are acted also by non-humans but the range of prosocial actions exhibited by humans overtakes that one shown by chimpanzees (Warneken & Tomasello, 2009).

2.3.2 The development of *helping*, *sharing*, and *comforting*

Children naturally act on behalf of others since the first years of age despite their rudimentary socio-cognitive abilities. Indeed, by 12-14 months of age toddlers instrumentally help another by bringing or pointing out-of-reach objects (Liszkowski, Carpenter, Striano, & Tomasello, 2006; Warneken & Tomasello, 2007), from 18 months

they share resources with adults (Dunfield et al., 2011), and between 18 and 24 months of age there are increasing concern and comforting behaviors towards others in pain (Svetlova et al., 2010). Worthy of note is the fact that in toddlerhood spontaneous prosocial actions occur at a low frequency (Eisenberg et al., 2015) and are shown more often towards friends than non-friends (White, Ensor, Marks, Jacobs, & Hughes, 2014). Indeed, toddlers are not indiscriminately prosocial and use some cues and information to decide whether to help or not (Dunfield & Kuhlmeier, 2010; Vaish et al., 2009).

Across preschool years frequency and complexity of prosocial behavior generally increase (Denham & Couchoud, 1991; Endedijk et al., 2015; Eisenberg et al., 2015; Rhee et al., 2013), probably because of the concurrent development of cognitive, linguistic, and emotional competences (Eggum et al., 2011; Hay & Cook, 2007; Imuta et al., 2016). Despite this growth in 2- and 3-year-olds, from entrance into preschool and formal schooling we can assist to a decline of these behaviors (Baillargeon et al., 2011). It seems that social and cognitive development helps children understand the specific situation and makes them more selective in acting prosocially (Hay, Payne, & Chadwick, 2004; Vaish, Carpenter, & Tomasello, 2010).

Interestingly, the inter-individual variability in prosociality is steady over time (Eisenberg et al., 2015; Edwards et al., 2015). Indeed, individual differences have been found to be stable across infancy, preschool, and school years (Eisenberg et al., 2015). For instance, Zahn-Waxler, Radke-Yarrow, Wagner, and Chapman (1992) identified a high stability in observed prosocial behavior from 18-20 to 23-25 months. Also Eggum and her research team (2011) have found similar results in children from three to four years of age when prosocial behavior were measured through parent reports.

As mentioned above, *helping*, *sharing*, and *comforting* follow different trajectories of development presumably because of distinct cognitive mechanisms underlying them (Dunfield, 2014). Furthermore, these prosocial behaviors are thought to require different social-cognitive assessments, which refer to three aspects: the representation of the problem taking other's perspective; the representation of the causes of such problem and possible solutions; a motivation to see the person's negative state alleviated by solving the problem (Dunfield, 2014). The identification of someone's distress is necessary but not the only factor that triggers prosocial actions: without

knowing how to intervene and with a lack of willingness to do something, no prosocial behavior will be observed.

Thus, each variety of prosocial behavior consists of different representations of problem and solution, determining distinct ages of onset and patterns of production (Dunfield, 2014). This interpretation is supported by controversial results that show how different measures of prosocial behavior are often not correlated (Dunfield et al., 2011; Dunfield & Kuhlmeier, 2013; Kärtner, Schuhmacher, & Collard, 2014) and by the identification of dissociable neurophysiological activation patterns for helping and comforting behaviors (Paulus, Kuhn-Popp, Licata, Sodian, & Meinhardt, 2013). Given these differences, the development of *helping*, *sharing*, and *comforting* will be described separately in the next paragraphs.

Helping behavior. This type of prosocial behavior is here defined as an action that is intended to alleviate an instrumental need (Dunfield et al., 2011) and to provide valuable information to someone who needs it (Liszkowski, Carpenter, & Tomasello, 2008; Warneken & Tomasello, 2009). It occurs when the child recognizes another's inability to complete an action and tries to assist in goal-directed efforts. Therefore, helping behavior facilitates the acquisition of someone's goal (Dahl, 2015).

Within the first two years of life the child begins to help peers and adults (Dunfield, 2014). We can see infants and toddlers who provide out-of-reach objects or carry something for someone who cannot do it alone. At the same time, from around 12 months of age children begin to inform adults who want or need to know something by pointing to the location of an object that the adult is searching for (Liszkowski et al., 2006; Liszkowski et al., 2008; Warneken & Tomasello, 2015).

Speaking of which, helping behavior as informing can occur verbally, but even before the consolidation of language children can share information non-verbally by pointing. The pointing gesture as a communicative instrument begins to be observable at approximately one year of age (Bates, Camaioni, & Volterra, 1975). In literature some important aims of pointing have been highlighted. Children use the imperative pointing to request and consequently to obtain things, in other words when they want an adult to do something for them. Another purpose of pointing is to share attention to an event or

object, in fact it often occurs along with the exclamation “Look!”, in order to jointly pay attention to something interesting. However, it can also be a powerful prosocial behavior when the infant understands that a person ignores an important information (Knudsen & Liszkowski, 2013).

Given that helping assumes the identification of another's need, to be acted it first requires the attribution of intended goals to others, an ability that appears in infancy (Woodward, 1998). Hence, the child perceives that someone is distressed because of a hard goal and wants to see it achieved. In other words, the child has to recognize the person as an intentional agent with some capacities and informational states. Once the child has understood someone's goal, he also has to identify the appropriate intervention, in other words the best way to act in order to assist in goal-directed efforts (Dunfield, 2014), namely instrumentally helping or communicating helpful information. However, as written above, the representation of the solution is not sufficient without a motivation to act in order to alleviate someone's distress. Indeed, the child has also to be aware that people are glad to see goals achieved (Dunfield, 2014; Liszkowski et al., 2006), and this motivation seems to be intrinsic (Hepach et al., 2012).

Sharing behavior. *Sharing* encompasses behaviors of voluntary giving away a valued resource to another individual who has none and needs or desires it (Brownell, Iesue, Nichols, & Svetlova, 2013). This kind of behavior grants another individual possession or use of a material resource. It is no simple task for younger children, indeed scholars have found that even during preschool years *sharing* occurs less frequently compared with *helping* (Eisenberg et al., 2015). Nonetheless, we can find children at around 18-24 months of age who share food and toys, even though in the beginning resources are shared mainly when someone's desire is expressed and explicit (Brownell, Iesue, et al., 2013; Brownell, Svetlova, & Nichols, 2009; Dunfield et al., 2011). Thereafter, from the second year of age children share food, toys, and other kinds of objects with others more frequently and spontaneously (Hamann et al., 2011; Hay & Cook, 2007).

Sharing behaviors require the ability to recognize an unmet material desire, that means a person desires or needs something he has not got. Consequently, the child has

to identify an unequal distribution of resources which produces a negative emotional state in the other person. The perception of unequal distributions emerges early in childhood and children associate it with unfairness. Indeed, infants pay attention to fair distributions and expect that resources are fairly divided (Sloane, Baillargeon, & Premack, 2012; Sommerville, Schmidt, Yun, & Burns, 2013).

However, the cognitive development alone is not effective to imply the sharing behavior. The willingness to act prosocially is another important factor and depends on the cost of sharing and on the familiarity with the person who potentially receives the resource (Hay, Castle, Devis, Demetriou, & Stimson, 1999; Moore, 2009). Moreover, as mentioned above, sharing is a hard task given that the child has selfish tendencies so he has to overcome an egocentric desire of monopolizing resources. Although children know the concept of fairness since infancy, they keep on preferring advantages for themselves instead of others until school years (Dunfield, 2014). In fact, up to 3 years of age children prefer equal distributions and even in 4- and 5-year-olds there is an aversion for inequality that advantages others (Blake & McAuliffe, 2011; Shaw & Olson, 2012; Wu & Su, 2014).

Comforting behavior. Between two and three years of age children begin to appropriately alleviate others' emotional distress (Dunfield, 2014; Dunfield & Kuhlmeier, 2013). *Comforting*, also known as empathic comforting, includes behaviors intended to alleviate someone's negative emotional state (Zahn-Waxler & Radke-Yarrow, 1990). Two forms of comforting can be identified, namely the psychological comforting, which defines actions aimed at regulating others' internal states by praising, calming down, consoling, and encouraging, and the physical comforting, which consists of taking care of others by soothing a physical pain or effort that causes a distress (Caprin, Caruso, Grazzani, Ornaghi, & Ottoboni, 2015).

These prosocial behaviors are related to the ability of representing others' negative emotional states more than the previous ones. The child has to be able to differentiate and identify emotions and specifically negative emotions. This ability emerges the first months of life, when the infant begins to differentiate facial expressions of positive and negative emotions (Grossmann, 2010). Then, as early as 18

months infants understand that people can have different emotional experiences (Repacholi & Gopnik, 1997). However, these abilities are not sufficient for *comforting* given that causes and solutions need to be mentally represented, and this capacity is likely to emerge from the second to the fourth year of life (Dunfield, 2014). Indeed, by two years of age children recognize that simple desires trigger emotions and behavior (Wellman & Woolley, 1990) and between 3 and 5 they gradually start to predict what situations lead to positive and negative emotions (Denham & Couchoud, 1990a; Widen & Russell, 2003).

As explained for *helping* and *sharing*, even *comforting* requires a motivational component. Once the child has recognized an emotional distress and has identified the appropriate way of intervention, a willingness to alleviate such negative emotional state is required in order to act prosocially (Dunfield, 2014).

2.3.3 The correlates of prosocial behavior

Prosocial behaviors are adaptive and protective factors both in a short and long period. In literature, across time, a wide variety of correlates of prosocial behavior has been identified and they can be connected to three main areas of research: the temperament, the socialization, and the socio-cognitive development (Eisenberg et al., 2015).

The line of research on temperament has suggested a biological nature of prosociality. Indeed, the fact that some children are extremely sensitive whereas other children are unresponsive towards someone's negative emotional states might depend on the intervention of a dispositional tendency to prosociality (Eisenberg et al., 1996; Knafo & Israel, 2012; Laible, Carlo, Murphy, Augustine, & Roesch, 2014). From infancy, the child is biologically provided with some traits, such as surgency, effortful control, and emotion regulation, that shape the temperament (Rothbart, 2011). Their stability across time may explain steady individual differences in prosociality, event though to date relatively little of the empirical work on prosociality has focused on biological factors that determine such behavior (Eisenberg et al., 2006; Gross et al., 2015).

The research on socialization emphasizes the processes of learning that promote this tendency to act prosocially. They can occur in different contexts, such as home and school, and from different subjects, such as parents, educators and teachers, or peers (Hastings, Utendale, & Sullivan, 2007). To date we know that parental behaviors, socio-emotional availability, and responsiveness (Daniel, Madigan, & Jenkins, 2015; Diener & Kim, 2004; Farrant, Devine, Maybery, & Fletcher, 2012), emotional and prosocial socialization practiced by parents, teachers, and other adults (Agliati, Grazzani, & Ornaghi, 2015; Grazzani et al., 2016; Ornaghi et al., 2016; Ruffman et al., 2006), teacher's warmth and closeness (Palermo, Hanish, Martin, Fabes, & Reiser, 2007), and culture (Eisenberg et al., 2006) can affect the development of prosocial behavior.

There is also some evidence of the potential influence of peers and siblings on children's prosocial behavior (Camodeca & Coppola, 2010; Eisenberg et al., 2015). Indeed, they are important and unique socializers because of the specific characteristics of their relationships, such as mutuality, equality, and reciprocity (Eisenberg et al., 2006). Despite the limited research on the role of peers in the development of prosociality, it clearly emerges that preschoolers model their peers' prosocial behaviors. Indeed, peers generally prefer prosocially competent children (Keane & Calkins, 2004) and some studies have found that prosocial children receive more prosociality back by peers (Persson, 2005). Interestingly, interactions with prosocial peers promote prosocial behavior even across time (Eisenberg et al., 2015), preventing them from acting aggressively towards others even the next years (Hoffman, 2007). This means that prosocial children have less conflicts with peers and consequently a higher number of friends (Coleman & Byrd, 2003; Sebanc, 2003).

Taken together, these results suggest that prosocial behavior promotes both social adjustment and psychological well-being (Eisenberg et al., 2015). Moreover, it predicts also scholastic achievements in school years (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000) and has been found deeply related to social-cognitive competences (Eggum et al., 2011; Imuta et al., 2016). In particular, many studies have supported the conclusion of a positive link between prosocial behavior and empathy (Cigala, Mori, & Fangareggi, 2015; Farrant et al., 2012; Findlay, Girardi, & Coplan, 2006; Hoffman, 2007; Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008;

Panfile & Laible, 2012), social cognition (Belacchi & Farina, 2010; Brownell, Svetlova, et al., 2013; Cassidy et al., 2003; Denham, 1986; Denham et al., 2003; Eggum et al., 2011; Imuta et al., 2016; Knafo et al., 2011; Sette, Spinrad, & Baumgartner, 2016), and language abilities (Ensor & Hughes, 2005; Girard et al., 2016; Rhee et al., 2013).

Concerning the relation between empathy and prosocial behavior, Hoffman (2007) made a distinction between affective and cognitive empathy. About the affective component, Hoffman suggested that it gradually develops for levels. In particular, the first level corresponds to the emotion contagion, when infants experience an affective response just by witnessing someone in distress. The second level is the attention to others' feelings, that is children observe someone's distress with an awareness of others' emotions as distinct from ones own. Then, the third level corresponds to prosocial actions, that means children become more responsive to others' emotions and start to react prosocially. The cognitive component of empathy can be instead defined as a form of perspective taking that consists in a gradual awareness of others' internal states (Hoffman, 2007). Many studies have found that both affective and cognitive empathy have effects on prosocial motivation and behaviors (Cigala et al., 2015; Farrant et al., 2012; Hoffman, 2007; Knafo et al., 2008; Panfile & Laible, 2012), so some scholars have started to consider empathy as a precursor of prosocial behavior (Eisenberg et al., 2006; Hoffman, 2007).

On the other side, relatively few studies have examined how variability in social cognition is associated to prosocial behavior in early childhood (Gross et al., 2015). Nonetheless, as early as 24 months preschoolers share, help, and comfort others, attesting that basic social cognition and emergent other-oriented motivation already allow to act prosocially (Brownell, 2013; Dunfield, 2014). Language ability seems to play a crucial role in determining the early development of both social cognition and prosocial behavior as well, however in literature the link between these competences has been barely investigated especially in toddler years (Girard et al., 2016; Imuta et al., 2016; Ornaghi et al., 2016).

Furthermore, gender is expected to contribute to the occurrence of prosocial behavior as well, even if results are unclear to date. Several studies on preschoolers have concluded that girls display more prosocial behavior than boys (Eisenberg et al.,

2006; Girard et al., 2016; Rhee et al., 2013; Romano, Tremblay, Boulerice, & Swisher, 2005), while other suggest no gender differences (Dunfield et al., 2011). This mixed tendency might be explained considering different varieties of prosocial behavior, range of age considered, and practices of socialization (Eisenberg et al., 2006).

For the aims of this study, the next sections will focus on some correlates of prosocial behavior: social cognition, language abilities, and gender.

2.4 The link between social cognition and prosocial behavior

As written above, emotion understanding and theory of mind are expected to be somehow related to prosocial behavior. Although these competences fit into the social cognition construct, they are two distinct components (de Rosnay et al., 2004; Harwood & Farrar, 2006). Therefore, their relations with prosocial behavior will be examined separately in the next sections.

2.4.1 Emotion understanding and prosocial behavior

Emotion understanding is expected to play a key role in the emergence of prosocial behavior. Indeed, the development of social cognition lets the child move from self-concern towards prosocial actions in response to others' needs and emotions (Hoffman, 2007; Knafo et al., 2011).

The pioneering study by Susanne Denham (1986) showed correlations between emotion understanding and prosocial behavior in 2- and 3-year-olds. Thereafter, in another study with toddlers, Ensor and Hughes (2005) found significant correlations between emotion understanding and maternal reports of children's prosocial behavior. Moreover, it also emerged that toddlers' emotion comprehension mediated the relationship between language abilities and prosocial behavior. Further, Garner, Dunsmore, and Southam-Gerrow (2008) examined the linkage between preschoolers' emotion knowledge and their prosocial behavior, finding that emotion explanations predicted prosocial behavior.

Interestingly, these studies suggest that the presence of associations might

depend on the method researchers used to gain the prosocial data. Indeed, Susanne Denham (1986) found that social cognition was related only to prosocial behavior observed in structured tasks, while no relationships emerged when prosocial actions were directly observed during free play at the day-care center. Likewise, the significant correlations yielded by Garner and colleagues (2008) consisted of observations in a structured play situation. Instead, Ensor and Hughes (2005) found a link between social cognition and prosociality when the measure of prosocial behavior was provided by mothers through questionnaires.

It is likely that the presence or absence of a relationship may depend also on the type of prosocial behavior investigated. Indeed, *comforting* is a prosocial action that requires to infer an internal state, in other words the child has to figure the negative emotional state in order to act prosocially. Hence, it might be more related to social cognition than *helping* or *sharing*, which are more goal-oriented (Drummond, Hammond, Satlof-Bedrick, Waugh, & Brownell, in press; Gross et al., 2015).

However, since *comforting* is the last type of prosocial behavior that develops in children (Dunfield, 2014) and it is relatively infrequent in toddler years, evidences of an association with emotion understanding might be also related to the range of age considered. Indeed, from a recent work by Grazzani and her research group (2016) with 2- and 3-year-old children, no significant correlations emerged between direct measures of emotion understanding and prosocial behavior neither observed nor assessed by parental reports.

A precious contribution to literature is provided by longitudinal studies, which show that emotion understanding increases concurrently with prosocial behavior across the first years of life (Eisenberg et al., 2006). Eggum and her research team (2011) found that emotion comprehension at 42 months predicted prosocial orientation across one year. Specifically, children who tended to understand one's own and others' emotions were expected to be more motivated for prosocial behaviors concurrently and across years. Similarly, Ensor, Spencer, and Hughes (2011) identified strong correlations between emotion comprehension measured when children were 3 years old and prosocial behavior one year later. Even Denham and colleagues (2012) found that emotion knowledge measured when children were 3-4 year old contributed to prosocial

behavior some months later.

Finally, both studies with older children (Farrant et al., 2012; Ornaghi et al., 2015; Ornaghi, Pepe, & Grazzani, 2016) and research on the effects of emotion socialization on prosocial orientation have reported the same positive link between emotion understanding and prosocial behavior (Brownell, Svetlova, et al., 2013; Garner et al., 2008; Ornaghi et al., 2016; Ornaghi et al., 2015).

2.4.2 Theory of mind and prosocial behavior

The recognition of one's own and others' needs, desires, beliefs, and intentions is likely to facilitate the engagement in prosocial actions (Dunfield, 2014; Hay & Cook, 2007). Indeed, with the development of the ability to monitor and understand mental states, the child may progressively become better at taking others' perspectives into account and intervening in their activities (Tomasello & Carpenter, 2007). Therefore, children who tend to understand one's own and others' internal states are expected to be more motivated for prosocial behaviors concurrently and across years (Eggum et al., 2011), that in turn may lead to the development of a more sophisticated theory of mind (Eisenberg et al., 2006).

A reciprocal link between theory of mind and prosocial behavior is convincing but some researchers have investigated this relationship finding mixed results that vary from positive (Cassidy et al., 2003; Eggum et al., 2011; Gross et al., 2015; Wu & Su, 2014) and null correlations (Ruffman et al., 2006). Moreover, yet we know little about how theory of mind relates to prosocial behavior in early childhood. A recent meta-analysis by Imuta and collaborators (2016) has tried to shed light on this relationship, differentiating the variables that may have provided inconsistent findings. Based on analyses of 76 studies on children between 2 and 12 years of age, data confirmed that children who possess an advanced theory of mind are more likely to act prosocially. This link, despite weak, was consistent across different varieties of prosocial behaviors (i.e. *helping*, *comforting*, and *cooperating*), with the exception of *sharing*, and correlations were stronger for cooperating behavior. The distinction based on the prosocial motivation showed a positive correlation only for spontaneous prosocial

behavior compared to prompted ones. The relationship between theory of mind and prosocial behavior emerged independently by age and sex, even if for children aged 6 and older and girls the association was stronger.

2.5 Language abilities and prosocial behavior

A large amount of studies on the relationship between language and prosociality has been carried out in clinical contexts, investigating language impairments and reduced engagement in prosocial behavior or increased externalizing behaviors (Girard, Pingault, Doyle, Falissard, & Tremblay, 2015; Horwitz et al., 2003). The literature of last ten years have shown some evidences of a link between these two variables from a positive perspective, suggesting similar associations between language competences and the frequency of prosocial behavior in typically developing children (Ensor & Hughes, 2005; Girard et al., 2016; Ornaghi, Pepe, & Grazzani, 2016; Rhee et al., 2013).

Overall few studies have focused on this association, even if prosocial behavior is often linguistically rooted. On one side, linguistic competences may facilitate an involvement in social interactions, increasing the opportunities of understanding one's own and others' feelings, needs, desires, and perspectives, that in turn may create more occasions and motivation of acting prosocially (Harris, 1992). On the contrary, a child with limited language skills is likely to reduce his participation in social interactions, diminishing afterward the opportunities of learning cognitive and social skills. Furthermore, prosocial actions may raise from the recognition of someone's need or difficulty (Dunfield, 2014), which can be expressed verbally by others. Consequently, receptive language may have an important role in triggering prosociality. In the case the child has a hard time in understanding sounds and words, he might scarcely be able to act, given his difficulty in the comprehension of an expressed need. This highlights another lack in literature, that concerns the distinction of many language processes. Indeed, language abilities encompass a wide range of skills, such as expressive and receptive, which in turn consist of many aspects, such as phonology, semantics, syntax, and pragmatics, so their effects on prosociality may vary. However, to date many studies have created composite measures of language skills (Ensor & Hughes, 2005; Rhee et al.,

2013) instead of considering specific linguistic processes (Girard et al., 2016; Grazzani et al., 2016).

Some scholars have tried to shed light on the causal influences between language and prosocial behavior by carrying out longitudinal studies. Barnett and colleagues (2012) found no direct interactions between both receptive and expressive language and social competence in a sample of toddlers, but suggested an influence of sensitive parenting on their development. On the contrary, the results of Girard and colleagues' study (2016) revealed a longitudinal link between better expressive language at three years with increased prosocial behavior at five years.

Furthermore, recent studies have raised questions about direct associations between language and prosocial behavior because of possible confounding variables, including social cognition which has consistently been found to be positively associated with both language (Imuta et al., 2016; Grazzani et al., 2016) and prosocial behavior (Gross et al., 2015). Therefore, some studies have tried to clarify their interactions. Ensor and Hughes (2005) in their cross-sectional study with toddlers found that the relationship between verbal ability and prosocial behavior was mediated by emotion understanding. Moreover, Ornaghi, Pepe, and Grazzani (2016) involved older children, specifically 4- to 6-year-olds, and showed that receptive language contributed with theory of mind to mediate the effect of emotion comprehension on prosocial orientation.

Taken together these findings support associations between language and prosocial behavior. Yet, studies that focus specifically on receptive language in early childhood are limited, although the acquisition of language and social behavior may influence each other particularly before the entry into school, a period in which these competences rapidly develop (Girard et al., 2016).

2.6 Gender differences in prosocial behavior

As presented in previous paragraphs, also gender is expected to contribute to the occurrence of prosocial behavior. Girls are usually found to show more prosocial behavior than boys (Baillargeon et al., 2007; Edwards et al., 2015; Eisenberg et al., 2006; Girard et al., 2016; Rhee et al., 2013; Romano et al., 2005; Volbrecht, Lemery-

Chalfant, Aksan, Zahn-Waxler, & Goldsmith, 2007). These gender-related differences may depend on parental practices of socialization and cultural expectations. Emotion socialization practices, including parental talk about emotions and supportive responses to emotions, have been found to be related to children's social-emotional competences, that encompass prosocial skills (Brophy-Herb, Merckling, Senehi, & Kwon, 2016; Brownell, Svetlova, et al., 2013). The typical gender stereotype defines girls as caring, responsive, helpful, empathic, compassionate, and prosocial whereas boys are expected to be more independent and goal-oriented (Eisenberg et al., 2006; Fabes & Eisenberg, 1998). In Western Countries females should be more attentive to emotional cues, while males should moderately express their feelings (Fivush, Brotman, Buckner, & Goodman, 2000). Moreover, mothers, who are biologically more engaged in taking care, interact more frequently with girls, so they may pass down the responsive behavior and make easier for girls learn to be responsive to others' needs (Eisenberg et al., 1998). Consequently, girls may be more susceptible to emotion socialization than boys (Denham, Bassett, & Wyatt, 2010), that in turn makes girls to adhere to the expectations of 'nice' behavior on behalf of others.

However, some studies have found no gender differences (Denham et al., 2012; Dunfield et al., 2011; Wu & Su, 2014). This mixed tendency might be explained also by the specific type of prosocial behavior investigated (Eisenberg et al., 2006). In support of this, from a meta-analysis by Fabes and Eisenberg (1998) emerged that girls were more prosocial than boys, however gender-related differences were weaker for instrumental helping. Indeed, although females have been reported to display more other-oriented prosocial behavior based on emotional reactions, such as *comforting*, males tend to behave prosocially mainly by helping in goal-directed efforts (Eisenberg et al., 2006). These findings may also be due to the measures of prosocial behavior. Gender differences emerged when prosocial behavior was observed in naturalistic contexts but not in structured and experimental situations (Fabes & Eisenberg, 1998). Moreover, differences were larger for self- and other-report measures of prosociality than for direct observations, suggesting that adults' conceptions of how males and females are supposed to behave influence their responses. In other words, it is likely that adults perceive girls as more prosocial than behavioral data actually indicate (Eisenberg

et al., 2006).

Furthermore, the range of age considered might affect the results. Indeed, it may be that gender differences in prosocial behaviors emerge during late toddlerhood and early preschool period whereas before two years of age they are barely observable. Baillargeon and his research team (2011) highlighted that gender-related differences in prosocial behaviors were not present at 17 months of age, but emerged over the next two years. Again, this may be due to socialization practices that put pressure on girls to be responsive to physical and emotional needs of others in late toddlerhood (Hay & Cook, 2007).

2.7 Overview of research questions and hypotheses

In light of the above literature review, which leaves some unanswered questions, the current study aims at examining what skills explain the frequency of prosocial behavior in 2- and 3-year-olds.

Primarily, the links among the potential determinants, namely emotion understanding, theory of mind, and receptive language, need to be investigated. Because of mixed findings from literature that suggest positive (e.g. de Rosnay et al., 2004) and null correlations (e.g. LaBounty et al., 2007) between emotion comprehension and theory of mind, no predictions are done. In line with the results of previous studies, receptive language is instead expected to be related to both emotion comprehension and theory of mind understanding (Hughes & Dunn, 2015).

Moreover, children's cognitive, linguistic, and social-emotional competences tend to increase across preschool years (Camaioni, 2001; Hughes, 2011; Wellman, 2014), so positive associations with age are expected for all these study variables. Finally, there are controversial results concerning gender differences for both emotion understanding (Ensor & Hughes, 2005; Sette et al., 2015) and language abilities (Bornstein et al., 2004; Eriksson et al., 2012; Girard et al., 2016). Thus, associations with gender will be investigated without making strong predictions.

The second aim is to analyze the occurrence of three varieties of prosocial behaviors. First, *helping*, *sharing*, and *comforting*, will be examined to determine

whether they correlate to each other. Previous studies suggested that they rely on different cognitive mechanisms and need to be considered as distinct varieties of prosocial behavior (Dunfield & Kuhlmeier, 2013; Gross et al., 2015; Imuta et al., 2016), so they are hypothesized not to correlate with each other. Moreover, the frequency of prosocial actions was found to be related to age (Dunfield, 2014), whereas associations with gender are still controversial (Denham et al., 2012; Edwards et al., 2015). Hence, given the results from prior studies, the child's age is expected to be linked to differences in the frequency of prosocial behavior. On the other hand, no hypotheses are developed about gender-related differences because of previous controversial findings.

The third aim is to examine prosocial behaviors in their relation with emotion comprehension, theory of mind understanding, and receptive language, also controlling for age and gender. Literature on toddlers and preschoolers reports that prosocial behavior is linked to social cognition (Gross et al., 2015; Imuta et al., 2016), and that *helping*, *sharing*, and *comforting* relate differently to social cognition (Drummond et al., in press; Dunfield & Kuhlmeier, 2013). Thus, expected results for the current study are finding that social cognition is positively linked to prosocial behaviors. Further, it is likely that *helping* and *sharing* may depend less heavily on social cognition than *comforting* (Drummond et al., in press). Concerning language, to date many scholars have shown that language abilities are related to prosocial behavior (Imuta et al., 2016; Rhee et al., 2013). However, overall there is a lack of research on their links in toddlerhood. Furthermore, most studies investigating language in relation to prosocial actions have taken into account composite measures of language abilities, whereas specifically receptive vocabulary has been little considered even though scholars have recommended to examine the role of different language processes (Girard et al., 2016). Therefore, despite the findings of prior studies were not focused on receptive vocabulary, also here language is expected to be related to the frequency of prosocial behavior.

As written above, this work more specifically is intended to examine the determinants[2] of prosocial behavior. Hence, the fourth aim is to explore whether individual differences in emotion comprehension, theory of mind understanding, and

2 According to Shmueli's (2010) work, the use of *determinants* instead of *predictors* reflects the aim of this study, namely a causal explanation and not an empirical prediction.

receptive language contribute to differences in prosocial behaviors, even controlling the effects of age and gender. Indeed, literature on toddlers and preschoolers reports that social cognition (Eggum et al., 2011; Ensor & Hughes, 2005; Gross et al., 2015; Imuta et al., 2016) and language abilities affect the frequency of prosocial behaviors (Ensor & Hughes, 2005; Girard et al., 2016). Moreover, the occurrence of prosocial actions seem to be affected by increasing age (Dunfield, 2014), and gender may contribute as well to differences in prosocial behavior, even though the findings are mixed so far (Denham et al., 2012; Edwards et al., 2015). Thus, age, gender, and abilities in emotion understanding, theory of mind, and receptive language are expected to contribute to differences in the frequency of prosocial behavior.

Finally, the fifth goal is to explore whether social cognition mediates the relationship between receptive language and prosocial behavior, or instead receptive language mediates the relationship between social cognition and prosocial behavior. Both these possibilities are plausible and emerged in studies focused on toddlerhood and preschool years (Ensor & Hughes, 2005; Ornaghi, Pepe, & Grazzani, 2016). Therefore, because of these somehow conflicting results, no hypotheses are developed.

3. Method

3.1 Participants

The participants were 149 Italian children aged from 24 to 47 months (M age = 35.6 months, SD = 6.77 months; 75 girls, 74 boys), enrolled in ten day-care centers and eight kindergartens of the provinces of Vercelli, Novara, and Biella (Piemonte, Italy). There were 79 (53%) 2-year-olds (M age = 30.2 months, SD = 3.17 months) and 70 (47%) 3-year-olds (M age = 41.8 months, SD = 3.73 months). Children were typically developing and came from working- and middle-class families. Among these, 70 were only children (49,3%), 60 had one sibling (42,3%), and 12 had two or more siblings (8,4%). Age in months, gender, and number of siblings were collected as social-demographic variables and provided by parents within some questionnaires that will not be taken into account in the current study.

3.2 Procedure

A multi-method design was used, consisting of naturalistic observations during free playtime and tests directly administered to children. Participants were recruited during winter, spring, and autumn. Managers or coordinators of day-care centers and kindergartens were first contacted by phone or in person to verify their interest to take part in the research study. After their written approval, they were asked to distribute specific consent forms to parents of 2- and 3-year-olds who attended their school (see Appendices A and B). Parental written consent was obtained for every child before the beginning of the research study.

After a first phase in which the experimenter was present during the school routines in day-care centers and kindergartens for a few days, in order to familiarize with the children, each child was both invited to take part in a test session and observed (for a summary of every measure used in the current study, see Table 1). The tests were individually administered to the children in the attended school. The order of

presentation of tasks was counterbalanced between subjects. Overall, the assessment lasted approximately twenty minutes and was conducted in a quiet room. In the event the child showed an evident decrease in the levels of attention or was not in the mood, the test session was stopped and resumed another day. At the end of the test session, children were rewarded for their participation with a funny sticker.

A different day every child was observed. Children were aware that the observer would have been there to see them playing. Before the beginning of the observation, educators or teachers were asked whether the child that day acted the usual behavior. In the case they reported that an event or a condition could have not reflected the typical behavior of the child (e.g. sickness, unusual bad mood), the observation was postponed. Educators and teachers were encouraged to intervene as less as they could during the observation and to let children behave the way they used to do.

3.3 Direct measures

For the test session, the Italian versions of the *Affect Knowledge Test* (AKT; Denham, 1986; for the Italian translation, see Camodeca & Coppola, 2010), a battery of two theory of mind tasks (the *Diverse-desire Task* by Wellman & Liu, 2004, and the *True-belief Task* by Wellman, 1991), and the *Peabody Picture Vocabulary Test* (PPVT-R; Dunn & Dunn, 1981; Italian version validated by Stella, Pizzoli, and Tressoldi, 2000) were individually administered to each child. In the next paragraphs each test will be described in detail.

3.3.1 The *Affect Knowledge Test*

The *Affect Knowledge Test* (AKT), also known as Puppet Interview (Denham, 1986), is a measure of emotional competence for children from 2 year old. More specifically it looks at the knowledge of four basic emotions: happiness, sadness, anger, and fear. In the current study, the short form of the AKT was used (Denham et al., 2013), which requires about ten minutes to administer.

It consists of four sessions, respectively expressive task, receptive task,

stereotypical script, and non-stereotypical script (see Appendix C). The first two parts require a set of four faces which represent the four basic emotions. As the name 'puppet interview' suggests, the next two sessions imply the use of puppets. Indeed, the examiner acts out some scenarios in which Gianni (for boys) and Paola (for girls) live some emotional situations. Apart from these two main puppets, there is an additional one, the mother of Gianni/Paola, who is used during some of the non-stereotypical script tasks.

The *expressive task* considers the ability to label emotions, indeed children are asked to verbally name, one by one, the emotions depicted on four faces. The tester points each face and asks the child to label them, using the prompt question: “How does he/she feel?”. Next, in the *receptive task* the experimenter shuffles the faces and asks the child: “Where is the [emotion] face?”. The child is invited to non-verbally identify, by pointing, the four emotional faces, coherently with verbal labels provided by the tester. After this session, the child is trained, that means the tester labels and shows the facial expression of each emotion, exaggerating gestures, vocal expression, and body language. The aim is to teach emotions, in preparation for the next two parts of the test.

The *stereotypical script* requires the child to identify the emotional face shown by the main puppet, male or female according to the child's gender. It consists of three scenarios, in which the puppet respectively feels sad, angry, and scared. The social situations acted out with puppets by the examiner in these vignettes are typical, which means the puppet feels an emotion that commonly most children experience in such situation. For instance, Gianni experiences anger at having a block tower destroyed by Paola, that is a typical emotion felt by children who are subjected to this provocation.

Successively, in the *non-stereotypical script* again the child is asked to place the face that depicts the puppet's emotion. However, this time the six acted situations are atypical, in other words the puppet experiences an emotion that is different from that one the child would display in such situation. Thus, for this task children are required to take the puppet's affective perspective to identify the appropriate emotion. For this session a caregiver is usually asked to fill out a short questionnaire about the child's typical emotional responses in some common situations (e.g. to go to the day-care center or to see a big but friendly dog), in order to know what emotion the child would,

and so would not, experience (see Appendix D). Due to procedural issues, in this study this questionnaire was given to educators and teachers, who were easily able to answer the questions. This choice was also due to avoid the risk of not receiving the questionnaires back (see Sette et al., 2015).

Figure 1. Administration of the AKT

Coding. For each task, 2 points were given for the correct identification of the emotion, 1 point if the child identified an incorrect emotion that was within the same emotional valence (e.g. 'sadness' instead of 'anger'), and 0 points when the chosen emotion was incorrect and with the opposite valence (e.g. 'happiness' instead of 'fear'). Therefore, for the first two sessions the scores range from 0 to 8, for the stereotypical script from 0 to 6, and for the non-stereotypical script from 0 to 12. Moreover, an overall score of emotion understanding ranging from 0 to 34 can be created by summing the scores of the four sections.

Instead of keeping four different scores, one for each task, or only a total score, in the current study two composite scores were used, respectively emotion recognition

and emotion situation knowledge. This choice arose by the results of the recent study carried out by Sette, Bassett, Baumgartner, and Denham (2015) with an Italian sample of preschoolers, that analyzed the structure of the AKT. They compared a one-factor model (the total sum of the sessions) with a two-factor model (*emotion recognition*, that is the sum of expressive and receptive tasks, and *emotion situation knowledge*, that is the sum of stereotypical and non-stereotypical scripts). The authors found that the second model fitted better than the first one, suggesting that emotion recognition and emotion situation-based knowledge are two separate but related components of emotion knowledge. The same finding also emerged from a study with American preschoolers (Bassett et al., 2012), so the same structure has been used even in this study.

3.3.2 The theory of mind battery: *Diverse-desire Task* and *True-belief Task*

The *Diverse-desire Task* and the *True-belief Task* provide measures of theory of mind, even known as cognitive empathy. They were originally developed respectively by Wellman and Liu (2004) and Wellman (1991), and refer to the child's ability of taking the others' perspective. Indeed, the diverse-desire and the true-belief tasks assess the understanding that other people can have respectively desires and beliefs, which may differ from his/her own.

In the *Diverse-desire Task*, the examiner shows a male or female doll, according to the child's gender, and a paper depicting a carrot and a cookie (see Appendix E). The explanation is the following: “Here's is Maria/Marco. It’s snack time, so s/he wants a snack to eat. Here are two different snacks: a carrot and a cookie”. The child is asked to answer the own-desire question: “Which snack would you like best? Would you like a carrot or a cookie best?”, to know which is the child's desire. Thus, the next examiner's statements will reflect the opposite of the child's desire. In other words, if the child chooses the cookie, the tester will say: “Well, that’s a good choice, but Maria/Marco really likes carrots. S/he doesn’t like cookies. What s/he likes best are carrots”, while if the child chooses the carrot, the tester will state: “Well, that’s a good choice, but Maria/Marco really likes cookies. S/he doesn’t like carrots. What s/he likes best are cookies”. Then, the child is asked the target question: “So now it’s time to eat.

Maria/Marco can only choose one snack, just one. Which snack will s/he choose? A carrot or a cookie?".

For the *True-belief Task*, the child is shown a paper with a girl or a boy, according to the child's gender. The examiner begins saying: "Here's Anna/Luca. S/he desires to play with her/his cat, but s/he can't find it". At this point, two pictures are shown, one depicting a garden and the other one depicting a kitchen. The examiner proceeds with the target question: "Anna/Luca believes that the cat is in the garden. Where will Anna/Luca look for her/his cat?" (see Appendix F).

Coding. For both the tasks, the child will score 1 point for the correct answer and 0 points for an incorrect answer. Consequently, the total score for each task ranges from 0 to 1 and suggests that the test is passed or failed.

3.3.3 The *Peabody Picture Vocabulary Test*

The *Peabody Picture Vocabulary Test* (Dunn & Dunn, 1981) measures the receptive, or hearing, vocabulary from preschool years to adulthood. No verbal answers are required, indeed the child is only asked to point the picture that best corresponds to the word that the examiner has pronounced.

It consists of an easel with 180 pages, and each one includes four pictures. The first five items are for the pre-test phase, while the remaining 175 items represent the test itself. The difficulty of the items gradually increases, starting from words like 'hand', 'snake', and 'pen' that are recognized by most preschoolers, to reach items such as 'delivering', 'elbow' or 'claw' that are hard for many young children. The test can be administered in about 10-15 minutes.

For each page on the easel, the examiner says the target word and asks the child to point the picture that best illustrates the meaning of such word. The stimulus words can be preceded by a prompt question, such as "Where is [word]?", or by statements like "Point to [word]" and "Show me [word]". The examiner is allowed to give feedback during the test to motivate the child, praising when both a correct or incorrect answer is provided. On the contrary, it is not permitted to tell the child whether the

response is correct or incorrect.

Before the beginning of the test, young children are trained with three items in order to teach them how to give the desired answers. Only in the case the child correctly identifies these items the examiner proceeds with the test. For the test itself, the examiner starts with the item that identifies the child's age and goes ahead to reach the ceiling level. Specifically, the test begins with the appropriate picture for the child's age, that is usually the basal level. Indeed, from the first item administered the child should not fail for at least eight consecutive items, and this situation is common for most children. However, the child sometimes fails in the recognition of a picture before correctly pointing eight consecutive items. In this case, the items before the starting point are administered until the child correctly identifies eight consecutive pictures. The administration of the test proceeds until the ceiling level is established, that is when the child fails in the recognition of at least six words in a string of eight consecutive items.

Coding. One point is attributed for every picture correctly identified by the child. The identification of basal and ceiling items allow to establish the critical range for the child. The total score of receptive vocabulary is obtained subtracting the total number of errors from the highest item achieved, that is the ceiling. Therefore, the overall score range from 0 to 175, even if most scores totalized by preschoolers fall within the first quarter.

3.4 Naturalistic observations of prosocial behavior

As written above, children were observed for spontaneous prosocial behaviors with peers. The naturalistic observation is an informative but not frequently used methodology, given the amount of time needed to carry it out. Nonetheless, it provides rich details about the children's behaviors in preschool years (Eisenberg & Mussen, 1989).

Children were observed in situations of unstructured free play. Each naturalistic observation occurred in the school context and the setting of observations was a room, garden, or space typically used for playtime. Hence, toys and objects available to use

were those children typically played with daily. The observer kept distance from children not to interfere with typical interactions between the child and peers or educators/teachers. Furthermore, educators and teachers were encouraged not to interact with children during the observation sessions.

Prosocial behaviors were recorded using a paper-pencil methodology and reported on an observation grid specifically developed (see Appendix G). Such grid was inspired to the experimental trials presented by Dunfield and her research team (Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011) and adapted to naturalistic observations. The frequency of every single behavior was indicated.

The observations focused on prosocial behaviors of *helping*, *sharing*, and *comforting* acted by the target child during playtime with peers. Overall, each child was observed for spontaneous prosocial behaviors for twenty minutes at least two different days. Specifically, each session of naturalistic observation lasted five minutes, repeated four times.

Coding. Three categories of prosocial behavior were coded in the observation grid: *helping*, *sharing*, and *comforting*. *Helping* consisted of two sub-categories: *instrumental helping*, when the child instrumentally assisted someone in goal-directed efforts (e.g. to help a child to free her leg from a string), and *informing*, when the child provided a needed information or explained how to carry out an activity (e.g. to point the right position of a jigsaw puzzle to a child who struggles to complete it). The s*haring* category referred to give away material things (e.g. some food, a toy, some clothes) to someone else who desired or needed it. On the other hand, *comforting* included two subcategories, namely the psychological comforting and the physical comforting. The first one referred to actions aimed at altering another's negative internal state (e.g. to kiss a child who is crying); instead, *physical comforting* referred to actions intended to soothe another's physical effort or distress (e.g. to rub the back of a child who is coughing). For some examples of these varieties of prosocial behaviors, see the Appendix F.

The action was coded as prosocial when someone was in a situation of need, desired something, or displayed and/or commented a negative emotional state.

Whenever one of these prosocial actions turned up, it was coded within the category as many times as it occurred during the twenty minutes of observation. Importantly, an agreement between two expert judges was found for the coding. In case of disagreement, the specific behavior was examined and discussed until shared agreement was achieved.

Single scores for the three categories were calculated. For helping and comforting behaviors, a composite score of the respective two subcategories (i.e. instrumental helping and informing; psychological and physical comforting) was obtained to have a total score of *helping* and *comforting* respectively.

Table 1. Summary of the measures used in the current study

Measure	Author	Structure	Investigated variable
Affect Knowledge Test **(AKT)**	Denham, 1986 (Italian version: Camodeca & Coppola, 2010)	17 items (8 emotion recognition, 9 emotion situation knowledge)	Emotion understanding
Battery of theory of mind: ***Diverse-desire Task*** **and** ***True-belief Task***	Wellman & Liu, 2004 and Wellman, 1991 (Italian translation)	2 items each	Theory of mind
Peabody Picture Vocabulary Test **(PPVT-R)**	Dunn & Dunn, 1981 (Italian version: Stella, Pizzoli, & Tressoldi, 2000)	From 1 to 175 items	Receptive language
Observation Grid of Prosocial Behavior	Conte & Grazzani, 2015 (inspired to Dunfield et al., 2011; 2013)	20 minutes per child (4 observations, 5 minutes each)	Prosocial behaviors (*helping*, *sharing*, and *comforting*)

3.5 Strategies of analyses

All the analyses were computed through the Statistical Package for the Social Sciences (SPSS) and raw unstandardized scores for every measure were used in statistical analyses.

First of all, the whole database was cleaned up from univariate and multivariate outliers in order to have no scores excessively far from the normal distribution of data (Barbaranelli & D'Olimpio, 2007). In particular, outliers were explored for children's performances in the AKT, the PPVT, the *Diverse-desire Task*, and *True-belief Task*. When outliers were found, the score was transformed to the minimum or maximum threshold value, depending on the child's performance respectively under or over the mean score.

In this preliminary phase, the sample was analyzed to ascertain that boys and girls were homogeneously distributed by age, and so comparable. Therefore, a Chi-Square test was applied using age and gender as categorical variables (Barbaranelli & D'Olimpio, 2007). Specifically, gender was a dummy variable (0 = males; 1 = females), whereas for this analysis participants were attributed to two age groups, respectively 2-year-olds (range 24-35 months; 45 girls and 34 boys) or 3-year-olds (range 36-47 months; 30 girls and 40 boys). The Chi-Square test revealed no significant relations between age and gender ($\chi 2$ (1, 149) = 2.95, p = .086), so girls and boys were equally distributed by age.

In the next section, preliminary analyses on children's scores will be reported. Reliability and normality were assessed to verify the internal consistency of the measures and the normal distribution of data, respectively. Analyses of reliability were done for the two components of the AKT and the two theory of mind tasks. In particular, Cronbach's alpha (1951) was measured for the items of the AKT to check whether two components of emotion understanding, respectively emotion recognition (i.e. the sum of expressive and receptive items) and emotion situation knowledge (i.e. the sum of stereotypical and non-stereotypical script items), were statistically reliable. Indeed, as previously explained, in literature a two-factor model for the AKT has been described as more reliable than an overall aggregate score of emotion understanding

(Bassett et al., 2012; Sette et al., 2015). For the diverse-desire and true-belief tasks, instead, Krippendorff's alpha (2011) was computed to verify the possibility of creating a composite measure of theory of mind.

Analyses of skewness and kurtosis were made to verify the normal distribution of the scores obtained in the four single tasks of the AKT (i.e. expressive task, receptive task, stereotypical script, and non-stereotypical script), the performances in the PPVT, and in the frequency of observed prosocial behaviors.

Thereafter, descriptive statistics for the study variables will be reported. Specifically, mean scores, standard deviations, and ranges for AKT, *Diverse-desire Task*, *True-belief Task*, PPVT, and observed prosocial behaviors are presented. Furthermore, specific occurrence of *helping*, *sharing*, and *comforting* are shown.

To achieve the main goal of this study, the next section will focus on the variables that may affect the frequency of prosocial behaviors, in other words the determinants of prosocial behavior (for a distinction between indicators, determinants, and predictors see Shmueli, 2010). Interrelations among emotion comprehension, theory of mind understanding, and receptive language are first reported. Notably, bivariate correlations were carried out to show whether there were relationships among emotion recognition, emotion situation knowledge, diverse-desire and true-belief understanding, and receptive language. First-order correlations were then conducted to clarify whether the links among these study variables existed whilst age group and gender. In addition, the link with age in months and gender was considered for the measures of social cognition and receptive language[3].

Thereafter, analyses will focus on prosocial behavior. Before examining the relation between prosocial behavior and the variables included in this study, zero-order correlations were computed to examine the link among *helping*, *sharing*, and *comforting*, even controlling for age and gender. Age and gender were considered as well to investigate their links with prosocial actions. After this step, relations with emotion understanding, theory of mind, and receptive vocabulary were analyzed, also controlling for age group and gender.

3 Except for first-order correlations, other statistical analyses investigating the relationship of study variables with children's age were always conducted using age in months instead of age group (i.e. 2 or 3 year old) as control variable.

To achieve the main goal of this work, the analyses will point to the competences that explain the variance in prosocial behaviors. Multiple linear regressions were conducted to understand the influence and weight of the study variables in explaining prosocial actions. Using age and gender as control variables, regression models were first tested starting from direct statistically significant correlations with prosocial behaviors. Next, interactive effects were added based on correlations between the determinants. The Enter method was used to add variables to the analyses.

Finally, exploratory mediation analyses will be described. They were performed to understand whether social cognition mediated the relation between language and prosocial behavior, or instead receptive language mediated the link between social cognition and prosocial behavior. Hence, two mediation analyses were computed using Preacher and Hayes's (2008) macro for SPSS.

4. Results

4.1 Preliminary analyses

Concerning the AKT, Cronbach's alpha values were calculated for assessing reliability of emotion recognition and emotion situation knowledge. Cronbach's alphas for the eight emotion recognition and the nine emotion situation knowledge items were .82 and .77, respectively. Consequently, the acceptable Cronbach's alpha values justified the use of these two components of emotion understanding for the next statistical analyses.

For the two theory of mind tasks, Krippendorf's alpha was calculated because both the tasks consisted of categorical answers. Kalpha for the *Diverse-desire Task* and *True-belief Task* was negative and not acceptable, indeed the value was -.034. This outcome revealed that the *Diverse-desire Task* and *True-belief Task* needed to be considered as two distinct aspects of theory of mind and could be not aggregated to create a composite measure.

Furthermore, the normality of AKT, PPVT, and prosocial behaviors was tested given that a normal distribution of data is an underlying assumption for parametric testing (Thode, 2002). Preliminary analyses revealed no significant issues with skewness or kurtosis in AKT and PPVT. Indeed, the items showed normal distribution considering the criteria proposed by George and Mallery (2010) of skewness and kurtosis values within ± 2. Specifically, the normality was tested for all the AKT sub-scales. The scores obtained in the expressive task ranged from 0 to 8 (M = 3.07; SD = 2.71). Scores were normally distributed, with skewness of .37 (SE = .20) and kurtosis of -1.17 (SE = .40). For the receptive task, again scores ranged from 0 to 8 (M = 6.43; SD = 1.91), with skewness of -1.00 (SE = .20) and kurtosis of .077 (SE = .40). In the stereotypical script, participants' scores ranged from 1 to 6 (M = 4.42; SD = 1.34) and were normally distributed, with skewness of -.57 (SE = .20) and kurtosis of -.25 (SE = .40). Finally, the scores obtained by children in the non-stereotypical script ranged from 1 to 12 (M = 8.27; SD = 2.91), with skewness of -.38 (SE = .20) and kurtosis of -.70 (SE

= .40), showing a normal distribution. Normality test was used also for the PPVT. Analyses showed scores ranging from 1 to 68 (M = 24.4; SD = 14.8), with skewness of .75 (SE = .20) and kurtosis of .023 (SE = .40).

Furthermore, a normality test was performed for the three varieties of prosocial behaviors, namely *helping*, *sharing*, and *comforting*. Analyses of distribution revealed no significant deviations from normality of *helping* and *sharing*, again considering values of skewness and kurtosis within ± 2 (George & Mallery, 2010). Indeed, the frequency of observed helping behaviors for each child ranged from 0 to 2 (M = .040; SD = .69), with skewness of 1.43 (SE = .20) and kurtosis of .61 (SE = .40). The frequency of observed sharing behaviors for each child ranged from 0 to 2 (M = .058; SD = .83), with skewness of .93 (SE = .20) and kurtosis of -.89 (SE = .40). On the other side, comforting behaviors did not respect the criteria of normality (George & Mallery, 2010), in fact observed prosocial actions of comforting, that ranged from 0 to 3 (M = . 18; SD = .18), had skewness and kurtosis values of 3.16 (SE = .20) and 10.4 (SE = .40), respectively. Because of the non-normal distribution and the fact that the metric is different compared to *helping* and *sharing*, *comforting* will be shown only in the descriptive statistics and within the correlations with the other varieties of prosocial behavior but will not be taken into account for the next analyses.

4.2 Descriptive statistics

Means, standard deviations, and ranges for the variables included in this study are presented in Table 2.

Table 2. Descriptive statistics for all study variables

Variables	Means	SD	Ranges
AKT Emotion recognition (ER)	9.49	4.06	0-16
AKT Emotion Situation knowledge (ESK)	12.6	3.97	0-18
Diverse-desire Task (DD)	.70	.46	0-1
True-belief Task (TB)	.64	.48	0-1
Receptive language (PPVT)	24.4	14.8	1-68
Prosocial behavior (*Helping*)	.40	.69	0-2
Prosocial behavior (*Sharing*)	.58	.83	0-2
Prosocial behavior (*Comforting*)	.18	.51	0-3

The specific incidence of observed *helping*, *sharing*, and *comforting* and the total number of prosocial behaviors are shown in Figure 2. Sharing behaviors were observed more frequently (87 episodes), followed by helping behaviors with a total of 67 episodes. It was found that *informing* was the type of helping more commonly used by 2- and 3-year-olds. Only 26 occurrences of comforting behaviors were observed, with a higher frequency of *psychological comforting* compared to *physical comforting* (see Appendix H for some examples).

	Instrumental helping	*Informing*	
Helping	23	44	**67**

	Sharing of toys and food	
Sharing	87	**87**

	Psychological comforting	*Physical comforting*	
Comforting	21	5	**26**

Tot Prosocial behaviors	**180**

Figure 2. Overall incidence of prosocial behaviors

4.3 Interrelations among emotion understanding, theory of mind, and receptive language

The associations among the variables were addressed performing correlational analyses (see Table 3). First of all, bivariate correlations were computed between the two dimensions of social cognition. Overall, children's emotion comprehension and theory of mind were partially correlated. Indeed, the emotion recognition was significantly related to performances in the *True-belief Task* (r = .21, p = .009) and had a tendency to significance with the *Diverse-desire Task* (r = .16, p = .057), whereas the emotion situation knowledge significantly and positively correlated with the *Diverse-desire Task* (r = .17, p = .038) but not with the *True-belief Task*.

The PPVT was significantly related to all the study variables. Strong and statistically significant correlations emerged with the two components of emotion understanding (both $p < .001$). The receptive vocabulary was also positively related to the two theory of mind tasks, even though the relation with the *Diverse-desire Task* was stronger (r = .27, p = .001) than that one with the *True-belief Task* (r = .18, p = .026).

Table 3. Correlations among emotion understanding, theory of mind, and receptive language

	1	2	3	4	5
1. AKT (ER)					
2. AKT (ESK)	.46***				
3. DD	.16†	.17*			
4. TB	.21**	.11	-.034		
5. PPVT	.56***	.57***	.27**	.18*	

AKT (ER) = AKT Emotion Recognition; AKT (ESK) = AKT Emotion Situation Knowledge; DD = Diverse-desire understanding; TB = True-belief understanding; PPVT = Receptive language.

† p = .057, * $p < .05$, ** $p < .01$, *** $p < .001$.

First-order correlations among these variables controlling for children's age group (2 or 3 year old) and gender are shown in Table 4. Partial correlations showed that relations between the two components of the AKT and the two theory of mind tasks were no longer significant. On the contrary, the PPVT and the two components of the AKT were still statistically significant. Indeed, PPVT was significantly and strongly related to the emotion recognition (r = .43, p < .001) and the emotion situation knowledge (r = .45, p < .001), even controlling for age and gender. However, the PPVT was no more significantly related to the theory of mind tasks, even though it tended to significance with the *Diverse-desire Task* (r = .15, p = .064).

Table 4. Partial correlations among emotion understanding, theory of mind, and receptive language controlling for age group and gender

	1	2	3	4	5
1. AKT (ER)					
2. AKT (ESK)	.36***				
3. DD	.076	.072			
4. TB	.15	.030	-.087		
5. PPVT	.43***	.45***	.15†	.074	

AKT (ER) = AKT Emotion Recognition; AKT (ESK) = AKT Emotion Situation Knowledge; DD = Diverse-desire understanding; TB = True-belief understanding; PPVT = Receptive language.

† p = .064, *** p < .001.

4.4 Age and gender in relation to social cognition and receptive language

Correlational analyses with age and gender are displayed in Table 5[4]. The results revealed that age was significantly related to performances in the AKT, the theory of

4 Correlational analyses of age and gender with prosocial behaviors are shown in the next paragraph.

mind tasks, and the PPVT. Apart from a marginal and negative correlation between the emotion recognition of the AKT and gender, no significant gender-related differences were found in any of the other variables.

Table 5. Correlations of age and gender with social cognition and receptive language

	Age	Gender
AKT (ER)	.48***	-.17*
AKT (ESK)	.51***	.026
DD	.25**	.024
TB	.23**	-.060
PPVT	.62***	-.13

AKT (ER) = AKT Emotion Recognition; AKT (ESK) = AKT Emotion Situation Knowledge; DD = Diverse-desire understanding; TB = True-belief understanding; PPVT = Receptive language.

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

4.5 Prosocial behaviors and their links with age and gender

The results of zero-order correlations among the three varieties of prosocial behaviors revealed that *helping*, *sharing*, and *comforting* did not significantly correlate with each other, even though a negative tendency to significance was found between *helping* and *sharing* (r = -.16, p =.060). When a partial correlation was computed to verify whether this marginal relation between *helping* and *sharing* was determined by age group and gender, a statistically significant correlation emerged (r = -.17, p = .047).

Zero-order correlations of prosocial behaviors with age and gender were not statistically significant. *Helping* and *sharing* were not significantly related to age, r = . 12, p = .16, and r =.064, p = .44, respectively. No significant associations emerged with gender as well, with r = .13, p = .11 for helping behaviors and r =.047, p = .57 for sharing behavior.

4.6 *Helping* and *sharing*: Links with emotion understanding, theory of mind, and receptive language

The relations of prosocial behaviors with emotion understanding, theory of mind, and receptive language are reported in Table 6. The results revealed that *helping* significantly correlated with the emotion situation knowledge of the AKT (r = .20, p = .014), whereas no significant relations emerged with neither the emotion recognition or the two theory of mind tasks. A positive and significant correlation was found with the PPVT (r = .20, p = .016).

No significant correlations of the study variables with s*haring* emerged, although a tendency to significance with the *Diverse-desire Task* was found (r = .15, p = .070). An independent-samples T-test was conducted to compare the frequency of *sharing* in children who passed and failed the theory of mind task. The difference between the two conditions was not statistically significant, nonetheless there was a tendency to significance. Hence, sharing behaviors tended to be observed more often in children who passed the *Diverse-desire Task* (M = .66, SD = .85) than those who failed it (M = .39; SD = .75); t (91,4) = -1.91, p = .059.

Table 6. Correlations of *helping* and *sharing* with emotion understanding, theory of mind, and receptive language

	AKT (ER)	AKT (ESK)	DD	TB	PPVT
Helping	.11	.20*	.13	.029	.20*
Sharing	.10	-.044	.15†	-.078	-.098

AKT (ER) = AKT Emotion Recognition; AKT (ESK) = AKT Emotion Situation Knowledge; DD = Diverse-desire understanding; TB = True-belief understanding; PPVT = Receptive language.

† p = .070, * p < .05.

First-order correlations controlling for age group and gender revealed that the correlations of *helping* with the emotion situation knowledge and the PPVT were still statistically significant (see Table 7). Given that partial correlations showed that *sharing* had only a tendency to significance with the PPVT (r = -.16, p = .059), this prosocial behavior was removed from the next analyses.

Table 7. Partial correlations of *helping* and *sharing* with emotion understanding, theory of mind, and receptive language controlling for age group and gender

	AKT (ER)	AKT (ESK)	DD	TB	PPVT
Helping	.12	.19*	.11	.028	.24**
Sharing	.11	-.057	.15	-.090	-.16†

AKT (ER) = AKT Emotion Recognition; AKT (ESK) = AKT Emotion Situation Knowledge; DD = Diverse-desire understanding; TB = True-belief understanding; PPVT = Receptive language.

† p = .059, * p < .05, ** p < .01.

4.7 The role of the study variables in determining prosocial behaviors

Multiple regression analyses were computed to examine the role of children's social cognition and receptive vocabulary in explaining the frequency of helping behaviors. Given that correlational analyses revealed that the emotion recognition and the two theory of mind tasks were statistically unrelated to *helping,* they were not included to optimize the number of components of regression equation[5]. Previous analyses showed that *helping* significantly correlated with the emotion situation knowledge of the AKT and the PPVT. Although age and gender were not found related to helping behaviors, they were entered as controls on the first step. The emotion situation knowledge of the AKT was entered on the second step and the PPVT was

5 Even though no statistically significant correlations emerged between diverse-desire understanding and helping behaviors, the *Diverse-desire Task* will be taken into account when interactive effects will be investigated (see p. 68) because of its significant links with the determinants of *helping*.

entered on the third step. As reported in Table 8, the results of the regression indicated that age and gender alone had a tendency to significance in explaining helping behaviors, F (2,142) = 2.75, p = .067. The emotion situation knowledge and the PPVT, when added to these control variables, were found to be valuable determinants of helping behaviors, F (3,141) = 3.04, $p < .05$, and F (4,140) = 3.02, $p < .05$, respectively.

Table 8. ANOVA for the determinants of *helping*

	Model	df	*F*	*p*
1	Regression	2	2.75†	.067 [a]
	Residual	142		
	Total	144		
2	Regression	3	3.04*	**.031** [b]
	Residual	141		
	Total	144		
3	Regression	4	3.02*	**.020** [c]
	Residual	140		
	Total	144		

a. (Constant), Age, Gender.

b. (Constant), Age, Gender, AKT Emotion Situation Knowledge (ESK).

c. (Constant), Age, Gender, AKT Emotion Situation Knowledge (ESK), Receptive language (PPVT).

† = *tendency to significance*, * = *significant values*

As displayed in Table 9, it was found that the emotion situation knowledge explained 6,1% of the variance in the frequency of observed *helping*, despite it had only a tendency to statistical significance, F (1,141) = 3.52, p = .063; R^2 Adjusted = .041. With the inclusion of the PPVT, the final model explained 7,9% of the variance in helping behaviors but it was not found to be significant, F (1,140) = 2.84, p = .094; R^2 Adjusted = .053.

Table 9. Model summary: The explanatory power of age and gender, emotion situation knowledge, and receptive language in *helping*

Model	R	R^2	R^2 Adjusted	SE	Change Statistics				
					ΔR^2	ΔF	df1	df2	*p* ΔF
1	.19[a]	.037[†]	.024	.68	.037	2.75	2	142	.067
2	.25[b]	.061[†]	.041	.68	.023	3.52	1	141	.063
3	.28[c]	.079	.053	.67	.019	2.84	1	140	.094

a. (Constant), Age, Gender.

b. (Constant), Age, Gender, AKT Emotion Situation Knowledge (ESK).

c. (Constant), Age, Gender, AKT Emotion Situation Knowledge (ESK), Receptive language (PPVT).

[†] = *tendency to significance*

The unique contribution of these variables in explaining *helping* was tested by assigning coefficients to each of them. Given that the second model had the best explanatory power, even though with a mere tendency to significance, the beta weight and statistical significance were examined (see Table 10, model 2). The analysis showed that age and gender on the first step did not significantly determine helping behavior (B = .004, *p* = .69, and B = .19, *p* = .093, respectively). The emotion situation knowledge, when added on the second step, had a tendency to statistical significance in predicting helping behaviors (B = .032, *p* = .063).

Table 10. Regression coefficients of age, gender, emotion situation knowledge, and receptive language

Model		B	SE_B	β	t	*p*
1	(Constant)	-.19	.32		-.61	.54
	Age	.014	.009	.14	1.64	.10
	Gender	.21†	.11	.15†	1.80	.074
2	(Constant)	-.23	.32		-.74	.46
	Age	.004	.010	.039	.40	.69
	Gender	.19	.11	.14	1.69	.093
	AKT (ESK)	.032†	.017	.18†	1.88	.063
3	(Constant)	-.027	.34		-.080	.94
	Age	-.004	.011	-.037	-.35	.73
	Gender	.22†	.11	.16†	1.93	.055
	AKT (ESK)	.019	.018	.11	1.03	.31
	PPVT	.009	.005	.19	1.69	.094

AKT (ESK) = AKT Emotion Situation Knowledge; PPVT = Receptive language

† = *tendency to significance*

To test the role of receptive language in explaining helping behaviors, the PPVT was entered on the second step and the emotion situation knowledge on the third step. The analysis showed that the model with age, gender, and PPVT was significant, F (3,141) = 3.67, p = .014. Again, age and gender on the first step explained 3,7% of the variance with a tendency to significance, F (2,142) = 2.75, p = .067, but adding the PPVT on the second step produced a significant result, F (1,141) = 5.35, p = .022, and accounted for an additional 3,5% of the variance in *helping* (R^2 = .072, R^2 Adjusted = .053) (see Table 11). The beta coefficients indicated that gender (B = .23, p < .05) and the PPVT (B = .011, p < .03) significantly contributed to the frequency of helping behaviors (see Table 12, model 2).

The third model was found to be significant as well, F (4,140) = 3.02, p = .020,

showing that the emotion situation knowledge was a valuable determinant of helping behaviors together with the other variables. As reported in Table 11, the inclusion of the emotion situation knowledge on the third step contributed to additional 0,7% of the variance in helping behavior, but its explanatory power was not significant (R^2 = .079, R^2 Adjusted = .053, p = .31). The beta analysis revealed that gender had a tendency to significance in determining helping behaviors (B = .22, p = .055), whereas the PPVT and the emotion situation knowledge did not significantly determine changes in *helping* (B = .009, *ns*, and B = .019, *ns*, respectively) (see Table 12, model 3).

Table 11. Model summary: The explanatory power of age and gender, receptive language, and emotion situation knowledge in *helping*

Model	R	R^2	R^2 Adjusted	SE	Change Statistics				
					ΔR^2	ΔF	df1	df2	p ΔF
1	.19[a]	.037[†]	.024	.68	.037	2.75	2	142	.067
2	.27[b]	.072*	.053	.67	.035	5.35	1	141	**.022**
3	.28[c]	.079	.053	.67	.007	1.06	1	140	.31

a. (Constant), Age, Gender.

b. (Constant), Age, Gender; Receptive language (PPVT).

c. (Constant), Age, Gender; Receptive language (PPVT); AKT Emotion Situation Knowledge (ESK).

[†] = *tendency to significance*, * = *significant values*

Table 12. Regression coefficients of age, gender, receptive language, and emotion situation knowledge

Model		B	SE_B	β	t	*p*
1	(Constant)	-.19	.32		-.61	.54
	Age	.014	.009	.14	1.64	.10
	Gender	.21†	.11	.15†	1.80	.074
2	(Constant)	.044	.33		.14	.89
	Age	-.001	.011	-.008	-.075	.94
	Gender	.23*	.11	.17*	2.07	**.040**
	PPVT	.011*	.005	.24*	2.31	**.022**
3	(Constant)	-.027	.34		-.080	.94
	Age	-.004	.011	-.037	-.35	.73
	Gender	.22†	.11	.16†	1.93	.055
	PPVT	.009	.005	.19	1.69	.094
	AKT (ESK)	.019	.018	.11	1.03	.31

PPVT = Receptive language; AKT (ESK) = AKT Emotion Situation Knowledge.

† = *tendency to significance*, * = *significant values*

Reciprocal correlations among the study variables could affect the results. Indeed, emotion situation knowledge was found to be significantly correlated to diverse-desire understanding and receptive language, which in turn had significant correlations with the diverse-desire understanding.

Hence, another multiple regression was conducted to see whether the addition of interactive effects among emotion understanding, theory of mind, and receptive language predicted helping behaviors. The regression was tested as follow: *helping* as dependent variable; age and gender on the first step to control their effects; the emotion situation knowledge of the AKT on the second step[6]; the receptive language on the third step; interaction effects between emotion situation knowledge and diverse-desire

6 In order to keep a stable model of regression, the emotion situation knowledge was entered on the second step to check variations resulting from the inclusion of the other variables.

understanding, receptive language and emotion situation knowledge, receptive language and diverse-desire understanding at the fourth step.

It was found that the model including the three interaction effects was statistically significant, F (7,137) = 2.16, p = .041. The inclusion of these interactive effects increased the explained variance in helping behaviors. Together, all the variables accounted for 10% of the variance in *helping*, however it was not statistically significant, F (3,137) = 1.02, p = .39, R^2 Adjusted = .054. The beta values revealed that gender and the PPVT contributed more to helping behaviors, with a tendency to significance (B = .22, p = .057, and B = .036, p = .076, respectively). Coefficients of regression of the variables included in the fourth model are presented in Table 13[7].

Table 13. Regression coefficients of age, gender, emotion situation knowledge, receptive language, and interactive effects

Model		B	SE_B	β	t	*p*
4	(Constant)	-.26	.45		-.57	.57
	Age	-.006	.011	-.063	-.59	.56
	Gender	.22†	.11	.16†	1.92	.057
	AKT (ESK)	.021	.035	.12	.59	.56
	PPVT	.036†	.020	.77†	1.79	.076
	AKT (ESK) x PPVT	-.001	.001	-.47	-1.05	.30
	DD x PPVT	-.013	.013	-.33	-1.00	.32
	DD x AKT (ESK)	.032	.024	.31	1.34	.18

AKT (ESK) = AKT Emotion Situation Knowledge; PPVT = Receptive language; DD = Diverse-desire understanding.

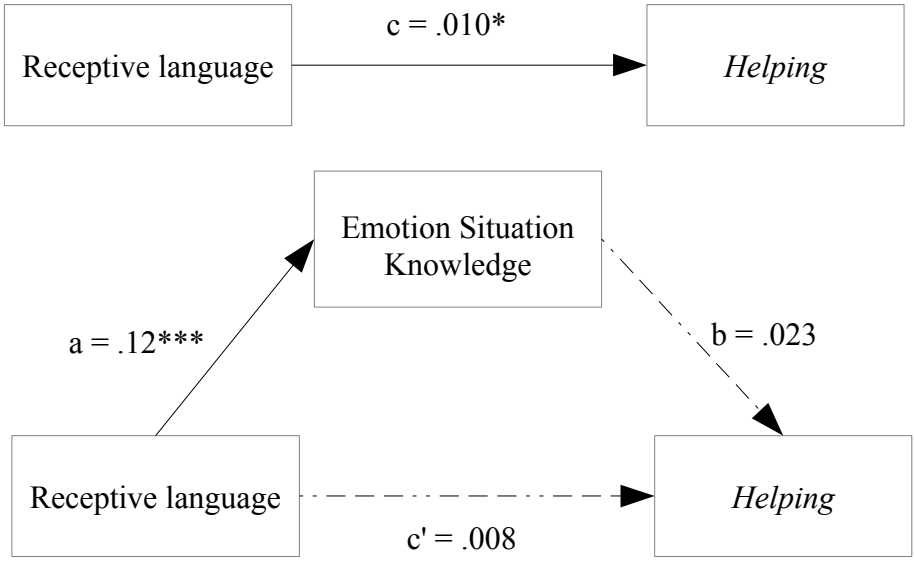
† = *tendency to significance*

7 See Table 10 (p. 66) for regression coefficients of previous models.

4.8 Emotion situation knowledge and receptive language as potential mediators of prosocial behaviors

In order to deepen the impact of social cognition and receptive language on the frequency of *helping*, exploratory mediation analyses were conducted using Preacher and Hayes's (2008) macro for SPSS. Previous analyses showed that within the social cognition construct only the emotion situation knowledge was in relation with helping behaviors and had a role in explaining them. Therefore, this was the only component of social cognition to be considered in these mediation analyses. Further, age was considered as a covariate. Because of the relatively small size of this sample, a bootstrap non parametric resampling procedure with 1,000 sample simulations was applied to obtain estimates of the indirect effects along with their 95% confidence intervals.

A first model examined the emotion situation knowledge as a mediator of the relation between the receptive language and helping behaviors. The model was statistically significant and explained 5,5% of the variance in *helping, F* (3,141) = 2.73, $p = .046$. As reported in the path a of Figure 3, the receptive language was a significant determinant of the emotion situation knowledge, B = .12, $p < .0001$, but path b showed that the indirect effect of the emotion situation knowledge on helping behaviors was not statistically significant, B = .023, $p = .21$. Moreover, bootstrap analysis of the indirect effect of emotion situation knowledge on the path between receptive language and *helping* suggested a bias-corrected 95% confidence interval that included a zero value, CI [-.001, .007]. Thus, results did not support the hypothesis that the influence of children's receptive language on helping behavior was mediated by their emotion situation knowledge. The receptive language had a significant direct effect on helping behaviors, B = .010, $p = .040$, and this effect was no longer significant when the emotion situation knowledge was entered as a mediator, B = .008, $p = .16$ (see path c and c', respectively). Analyses of the covariates showed that age did not play a statistically significant role, B = -.004, $p = .69$.

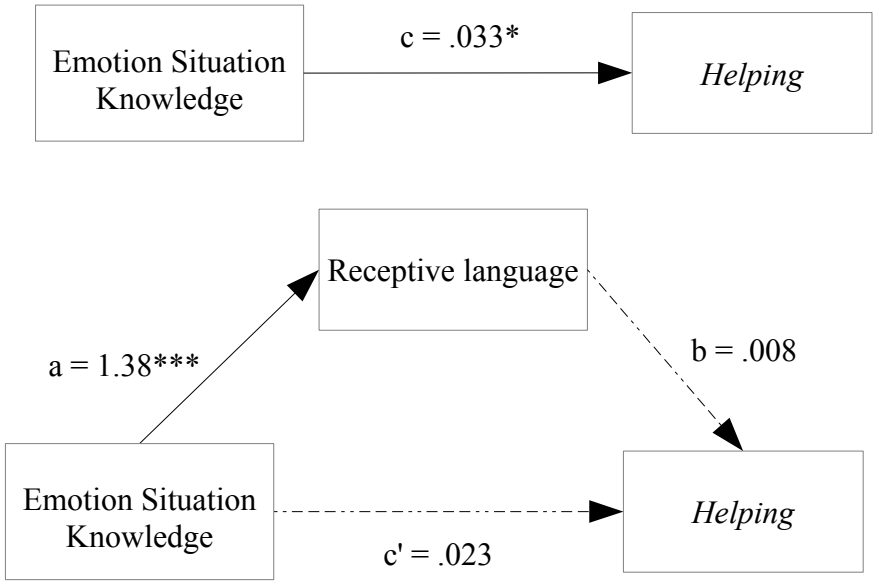


The mediation model reports unstandardized coefficients (B).
Solid lines represent significant effects, whereas dashed lines indicate non-significant effects. * $p < .05$, *** $p < .001$.

Figure 3. The mediating role of emotion situation knowledge in the relationship between receptive language and *helping*, covarying for age.

A second model assessed the receptive language as a mediator of the relation between the emotion situation knowledge and helping behaviors. The model was statistically significant and accounted for approximately 5,5% of the variance in *helping, F* (3,141) = 2.73, $p = .046$. As path a in Figure 4 illustrates, the emotion situation knowledge was a significant determinant of the receptive language, B = 1.38, $p < .0001$, but again path b showed that the receptive language did not significantly account for variance in helping behaviors, B = .008, $p = .16$. Bootstrap analysis of this indirect effect suggested a bias-corrected 95% confidence interval that included a zero value, CI [-.003, .027]. Again, results did not allow to support that the influence of children's emotion situation knowledge on *helping* was mediated by their receptive language, even though $p = .16$ suggested a potential mediating role of the receptive language. Indeed, the path c indicated that the emotion situation knowledge had a significant direct effect on *helping*, B = .033, $p = .050$, and that this effect was no longer

significant when the receptive language was entered as a mediator, B = .023, p = .21 (see path c'). Again, analyses of the covariates indicated that age did not play a statistically significant role (p = .69).



The mediation model reports unstandardized coefficients (B).
Solid lines represent significant effects, whereas dashed lines indicate non-significant effects. * $p < .05$, *** $p < .001$.

Figure 4. The mediating role of receptive language in the relationship between emotion situation knowledge and *helping*, covarying for age.

5. Discussion

The aim of this research was to investigate the role of social cognition and language in the occurrence of children's prosocial actions. More specifically, the purpose was to identify whether 2- and 3-year-old children's emotion comprehension, understanding of others' desires and beliefs, and receptive language explained the frequency of their prosocial behaviors. In doing so, the effects of age and gender were taken into account.

A first major finding of this study was that children's emotion comprehension, theory of mind understanding, and receptive language were positively related. More precisely, the receptive vocabulary had positive correlations with all these study variables. Its relations were found especially strong with the emotion recognition and the emotion situation knowledge, even when children's age and gender were controlled, which is consistent with the current literature on early childhood (Cassidy et al., 2003; Curby et al., 2015; Grazzani et al., 2016; Strand et al., 2016).

The second main finding was that overall helping and sharing behaviors towards peers were observed more frequently than *comforting*, according to literature on prosocial behavior (Dunfield, 2014; Brownell, 2013; Svetlova et al., 2010). Furthermore, when the occurrences of *helping* and *sharing* were investigated in relation to the other study variables, controlling for age and gender, children's emotion situation knowledge and receptive vocabulary were strongly linked only to helping behaviors towards peers.

Another major finding was that emotion situation knowledge, receptive vocabulary, and their interactive effects, as well as those with the understanding of others' desires, explained the occurrence of helping behaviors. These results concur with prior research that highlighted the contribute of emotion understanding (Denham et al., 2012; Eggum et al., 2011; Ensor, Spencer, & Hughes, 2011) and language abilties (Barnett et al., 2012; Ensor & Hughes, 2005; Girard, et al., 2016; Rhee et al., 2013) onto prosocial behavior. Moreover, these findings shed light on the debate about the role of theory of mind in explaining the frequency of helping behaviors (Imuta et al., 2016;

Ruffman et al., 2006), given that children's diverse-desire understanding had an influence only through its associations with both emotion situation knowledge and receptive language.

Finally, in this work children's receptive vocabulary had the most important role of influence on the frequency of helping behaviors displayed with peers. This result was supported by the the mediation analyses, which suggested the main contribution of receptive language instead of emotion situation knowledge in explaining the occurrence of helping behaviors.

These outcomes will be discussed extensively in the following sections.

5.1 Evidences of positive links among emotion understanding, theory of mind, and receptive language

The results pointed to significant interrelations among emotion understanding, theory of mind, and receptive language. In line with some previous studies, this research provides evidence of positive correlations between emotion comprehension and theory of mind understanding in 2- and 3-year-olds (Denham, 1986; de Rosnay et al., 2004; Ensor & Hughes, 2008; Harwood & Farrar, 2006; Hughes & Dunn, 1998). Children's emotion comprehension was related to their understanding of others' desires and beliefs, but the performances in the social cognition tasks were not completely related to each other.

Indeed, children's emotion recognition was found to be significantly linked to the understanding of others' beliefs and showed a tendency to significance with the understanding of others' desires. It is possible that these relations may depend on the need of understanding and using a psychological lexicon, which is somehow requested in all the three tasks. Indeed, in the labeling task of the AKT children access to their emotional lexicon to nominate the facial expressions, whereas in the *Diverse-desire Task* and *True-belief Task* children are requested to understand volitive and cognitive terms, respectively. On the other side, the recognition of emotions experienced by others in typical and atypical situations turned out to be significantly related only to the understanding of others' desires. It is likely that this link may depend on the specific

content of the scripts in the AKT. Indeed, most of the items refer somehow to others' desires (e.g. desire to stay with mum or to play with peers) rather than beliefs. The relations between emotion comprehension and theory of mind dissolved when age group and gender were controlled, concurring also with studies that found no relations between these skills in early childhood (Dunn, 1995; LaBounty et al., 2007).

An important finding is that children's receptive language was significantly related to the performances in any other task administered in the test session. As expected, children with a richer receptive vocabulary were also more competent in emotion understanding, even when age and gender were controlled. This finding provides further evidence of relations between language abilities and emotion understanding in 2- and 3-year-olds (Cassidy et al., 2003; Curby et al., 2015; Grazzani et al., 2016; Strand et al., 2016). Further, the results concur with other studies that reported associations with the theory of mind understanding in early childhood (Imuta et al., 2016; Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013; Milligan et al., 2007). However, most of prior studies investigated the understanding of another's false belief rather than desire and true belief. Therefore, the current study highlights that similar relations may emerge when other measures of theory of mind understanding are used as well. The receptive vocabulary was more strongly associated with the performances in the *Diverse-desire Task*, which may be easier for toddlers than the *True-belief Task* (Wellman, 2014). Thus, age might explain these relations, indeed the significant links with the two theory of mind tasks dissolved when age group and gender were accounted for, but a tendency to significance remained exactly with the understanding of others' desires.

5.2 The occurrence of prosocial behaviors: Predominance of *helping* and *sharing*

A first finding consisted in the fact that helping and sharing behaviors occurred more frequently than *comforting*. Indeed, only twenty-six comforting behaviors were recorded during observations. This is not surprising, given that prosocial responses to

others' emotional distress emerge later in children's development compared to tendencies to help others and share material things with them (Dunfield, 2014; Brownell, 2013; Svetlova et al., 2010). Comforting behaviors begin to develop only a few months after the other varieties of prosocial behavior and are especially observed between 2 and 3 years of age (Dunfield, 2014; Dunfield & Kuhlmeier, 2013; Svetlova et al., 2010). Nonetheless, it is likely that appropriate strategies of *comforting* may need time to be internalized, so the frequency of spontaneous emotional responses towards others might be low before the fourth birthday.

Overall, also the other types of prosocial behaviors were not observed so often. In fact, during almost fifty hours of naturalistic observations, only 180 occurrences were recorded. Therefore, this study confirms that 2- and 3-year-olds spontaneously act on behalf of others (Dunfield, 2014; Eisenberg et al., 2015; Zaki & Mitchell, 2013), but in naturalistic contexts prosocial behaviors may be observed at a lower frequency (Denham, 1986; Eisenberg et al., 2006). Furthermore, before 4 years of age children tend to require explicit communicative cues in order to act prosocially (Wu & Su, 2014) and it is likely that within everyday interactions children mainly intersect implicit cues.

As expected, *helping*, *sharing*, and *comforting* did not correlate with each other in the current study. This finding is consistent with conceptualizations of prosocial behavior as a multifaceted and multidimensional construct (Dunfield, 2014; Dunfield et al., 2011; Gross et al. 2015; Thompson & Newton, 2013). However, a negative significant correlation emerged between *helping* and *sharing* when age and gender were controlled, although this link should be considered very cautiously because of the low occurrences. Some scholars have attested that the varieties of prosocial behavior, despite their differences, rely on overlapping skills (Eisenberg et al., 2015; Thompson & Newton, 2013). Hence, this relation might depend on the fact that both *helping* and *sharing* are more goal-oriented compared to *comforting* (Drummond et al., in press; Gross et al., 2015).

5.3 Age and gender in relation to the study variables

Some considerations about the links emerged with age and gender are required,

since these controlling variables have been generally accounted by developmental psychology scholars for their effects on children's social-emotional, cognitive, and linguistic competences. As expected, the results revealed that age was significantly associated to performances in emotion understanding, theory of mind tasks, and receptive vocabulary. Increasing age affected children's performances, which is unsurprising as the present research investigated these competences in early childhood. Indeed, it is well-known that the first years of life are characterized by a fast development and enhancement of cognitive, emotional, and linguistic competences (Hughes, 2011; Wellman, 2014).

Gender-related differences were found only for the emotion recognition skills. Studies that investigated gender effects on emotion comprehension attested an advantage for girls (Denham et al., 2012; Gross et al., 2015; Sette et al., 2015) or null associations in early childhood (Ensor & Hughes, 2005; Grazzani et al., 2016; Nichols, Svetlova, & Brownell, 2009). The results of this work suggest instead that boys recognized and expressed emotions better than girls. There are evidences from previous studies that boys use more negative emotion expressions than girls especially in the period that precedes the entry into school (Chaplin & Aldao, 2013). Thus, it is possible that the current finding might depend on the predominance of facial expressions with a negative valence in the AKT. Indeed, the expressive and receptive items that constitute the emotion recognition component focus on three negative emotions (i.e. anger, fear, sadness) and only on one positive emotion (i.e. happiness).

Furthermore, the emotion knowledge may be influenced by many factors, such as socialization practices (Chaplin et al., 2005). Given that the development of emotional competences is increasingly accounted in school contexts, it is likely that teachers and educators have increased their efforts in engaging children in emotion conversations, and especially boys may have been more encouraged in the identification of their own and others' emotions in order to fill the gap with girls.

With regard to helping and sharing behaviors, no associations emerged with neither age nor gender. Overall, previous studies have reported fewer associations with age when the design of the study was naturalistic or correlational (Fabes & Eisenberg, 1998). Moreover, the current findings are in line with studies that showed no gender-

related differences for prosocial behaviors (Denham et al., 2012; Dunfield et al., 2011; Eisenberg et al., 2006; Fabes & Eisenberg, 1998; Wu & Su, 2014). Prior studies suggested that girls may display more comforting behaviors than boys due to a higher attention to others' emotional distress (Fabes & Eisenberg, 1998), but this speculation was impossible to verify since *comforting* was not considered for correlational analyses.

5.4 *Helping* and *sharing*: Links with emotion understanding, theory of mind, and receptive language

The results showed that the frequency of helping behaviors acted by children was significantly related to their emotion situation knowledge, even when age and gender were controlled. This finding concurs with research that suggested links between emotion understanding and prosocial behavior (Denham, 1986; Ensor & Hughes, 2005; Garner et al., 2008). However, no correlations emerged with the performances in the emotion recognition tasks of the AKT. This suggests that *helping* is not simply related to the recognition of others' facial expressions, but rather to the ability of taking on their affective perspective. This is interesting because no significant correlations emerged after all with the theory of mind tasks, which similarly require understanding someone's perspective. A possible explanation may lie in the fact that the items of the emotion situation knowledge lead the child to identify the puppet's emotional state and probably to experience it, a feeling that may be more related to a motivation to help (Imuta et al., 2016; Knafo et al., 2011). On the contrary, the two theory of mind tasks require the child only to recognize other's mental states, which may be less related to a motivation to instrumentally help another or provide valuable information (Dunfield, 2014).

After all, a tendency to significance was found between the frequency of sharing behavior and the understanding of someone's desire, which is consistent with some previous studies that found associations between theory of mind and prosocial behavior in early childhood (Cassidy et al., 2003; Eggum et al., 2011; Imuta et al., 2016; Wu & Su, 2014). This is not surprising, since for definition *sharing* consists of giving a valued resource to someone who needs or desires it (Brownell, Iesue, et al., 2013). This tendency to significance dissolved when age group and gender were accounted for.

Given that the understanding of others' desires significantly correlated with age, it is likely that the links with sharing behavior were driven precisely by the age group of participants. Indeed, the theory of mind understanding develops increasingly fast from toddlerhood to childhood (Peterson et al., 2012; Wellman, 2014), but its association with prosocial behavior has been found weaker in preschoolers compared to older children (Imuta et al., 2016). Since children are frequently encouraged by adults to share toys and food with peers, especially in early childhood, it is possible that 2- and 3-year-olds share without performing a real social and cognitive insight (Tomasello, 2016).

Taken together, it seems that the occurrence of helping behaviors may be more related to the emotion comprehension, whereas the frequency of sharing behavior may be more related to the theory of mind understanding. This variability in associations depending on different types of prosocial behavior is consistent with prior findings in early childhood and one more time suggests that there are multiple forms of prosocial behaviors (Dunfield, 2014; Dunfield et al., 2011; Svetlova et al., 2010). Unfortunately, the impossibility to include comforting behaviors in the analyses did not allow to understand whether *helping* and *sharing* relied more heavily on social cognition than prosocial emotional responses (Gross et al., 2015; Imuta et al., 2016).

Another significant link emerged between helping behaviors and receptive vocabulary, which is consistent with limited studies on the relation between language development and prosocial skills in toddlerhood (Ensor & Hughes, 2005; Girard et al., 2016; Rhee et al., 2013). The results of the current work add evidence to the fact that this relation emerges with receptive vocabulary, reinforcing those studies that found the same result using composite measures of language (Ensor & Hughes, 2005; Rhee et al., 2013) or measures of expressive skills (Girard et al., 2016; Grazzani et al., 2016) in early childhood. Moreover, this association remained also controlling for age group and gender, suggesting a strong relation that is independent from other factors. This is understandable, since both language and prosocial behavior have an essential feature in common, that is they have a social function (Thompson, 2006).

5.5 The contribution of emotion situation knowledge, diverse-desire understanding, and receptive language in explaining the variance of helping behaviors

Children's emotion situation knowledge and receptive vocabulary were found to play a key role in the occurrence of helping behaviors in early childhood. A first result was that children's ability of taking on others' affective perspective increased the probability of displaying helping behaviors, which is consistent with previous studies carried out with toddlers and preschoolers (Denham et al., 2012; Eggum et al., 2011; Ensor, Spencer, & Hughes, 2011). Children instrumentally help others or provide important information in order to assist in goal-directed efforts. Based on their experiences, they may implicitly have clear that an inability to complete a task and generally to achieve a goal may trigger a broad range of negative emotions, such as anger, frustration, and sadness. Hence, it is likely that as early as 2 or 3 year old they take the peer's affective perspective and imagine the potential emotional effects of a failed purpose. Since children have an intrinsic motivation to see another happy (Dunfield, 2014; Hepach et al., 2012), the consequence of such reasoning should be a prosocial helping behavior.

Second, as expected, receptive language skills played an important role in the tendency of displaying helping behaviors towards peers. Despite a lack of studies focusing on the influence of receptive language on prosocial behavior in early childhood, this work supports the limited literature on linguistic roots of prosocial behavior (Barnett et al., 2012; Ensor & Hughes, 2005; Girard, et al., 2016; Rhee et al., 2013). The influence of receptive vocabulary may be due to the fact that peers often express verbally their inability to achieve a goal. Therefore, children need to appropriately understand others' needs or requests in order to help (Dunfield, 2014). A richer receptive vocabulary might let children understand the peers' needs and consequently provide help. These skills may facilitate children's involvement in social interactions, increasing their opportunities of both comprehending expressed needs and acting prosocially (Harris, 1992). On the contrary, children with a poorer receptive

vocabulary might be less prosocial because they do not catch the linguistic cues that denote others' intentions and needs. Thus, it is likely that they may limit their participation in social interactions, with a chain reaction in reducing the social and linguistic learning (Horwitz et al., 2003) and the frequency of prosocial behavior.

Furthermore, the results highlighted the contribution of age and gender. In particular, the weight of gender effects tended to significance in many steps. Although children's gender was not found associated with their emotion situation knowledge or receptive vocabulary, it is likely that its impact on helping behaviors may depend on other factors that were not investigated in the current study. For instance, gender has been found to be a correlate of empathy (Smith, 2006), which in turn is related to prosocial behavior (Cigala et al., 2015; Farrant et al., 2012; Findlay et al., 2006; Hoffman, 2007; Knafo et al., 2008).

Finally, also the interactive effects among emotion situation knowledge, diverse-desire understanding, and receptive language contributed to explaining the occurrence of helping behaviors. This finding might not appear remarkable if we consider the age of participants in this research. Indeed, 2- and 3-year-olds go through many changes in early childhood and begin to acquire a lot of competences in emotional, cognitive, linguistic, and social spheres of their lives. Nonetheless, the improvements within each domain cannot be considered separately from the others, in fact the processes involved are extremely entwined and together contribute to create the totality of the child's psychological development (Hughes, 2011; Thompson, 2006; Wellman, 2014).

5.6 The mediation role of receptive language in the relation between emotion situation knowledge and helping behaviors

To date, there is a lack of studies in early childhood that have tested direct effects of emotion understanding and receptive language in explaining the frequency of prosocial behavior (Ensor & Hughes, 2005). The current results suggested that the tendency to help peers was mainly explained by children's receptive vocabulary. As mentioned above, the receptive language represents an important tool for children's involvement in social interactions with peers (Dunfield, 2014; Harris, 1992).

The mediation analyses performed in the current work were exploratory and showed that the indirect effects were not statistically significant, probably due to the small sample size (Harrell, 2001). Nonetheless, a comparison between the two mediation analyses encouraged to conclude that the model with the receptive language as mediator may be more convincing, concurrent with the results obtained by Ornaghi, Pepe, and Grazzani (2016) with preschoolers. The fact that the current findings are not in line with Ensor and Hughes' (2005) work, despite a comparable age of participants, may depend first on the number of toddlers they involved. Indeed, 36 children aged between 20 and 36 months took part in their study compared to 149 children of the present work, and a wide sample is usually recommended for mediation analyses (Baron & Kenny, 1986). Second, they created a composite measure of expressive and receptive language, whereas Ornaghi and colleagues used a single measure of receptive language, that is the same of the current study.

Before concluding, it is worthy of note the fact that the mediation analyses suggested that emotion situation knowledge and receptive language had bidirectional relations, confirming the studies previously carried out in early childhood (Curby et al., 2015; De Rosnay et al., 2004; Strand et al., 2016). Despite these reciprocal influences, overall the results suggested that children's receptive language played an important role in explaining helping behaviors. Therefore, future studies aimed at investigating the relation between socio-emotional and cognitive competences in early childhood should preferably take the receptive vocabulary into account.

6. Conclusion

6.1 Strengths and contribution of the present study

The current work contributes in many ways to the existing literature. A first strength of this study is its focus on 2- and 3-year-olds. In particular, toddlerhood has been recognized as a critical period for the development of many different competences (Thompson, 2006). However, there is a lack of studies that have investigated the variables included in the current work focusing on this period. For instance, most studies have administered measures of false-belief understanding (Ensor & Hughes, 2008; Imuta et al., 2016; Milligan et al., 2007). Originally, this study focused on theory of mind skills that develop prior false-belief understanding, namely diverse-desire and true belief understanding. Moreover, to date a few studies have focused on the link between prosocial behavior and language abilities in toddler years. Speaking of which, composite measures of expressive and receptive vocabulary have been often used, whereas single measures of receptive language have been barely investigated.

Another strength of this study consists in the multi-method approach that was used. Test sessions and detailed observational measures were combined. For children below the age of 3 years, direct measures are rather infrequent, in fact parent-report instruments have been usually preferred to gain information about children's skills. For instance, parent-reports have been frequently used as a measure of prosocial behavior (Ensor & Hughes, 2005; Rhee et al., 2013; Torréns & Kärtner, 2016). Otherwise, when prosocial behaviors were observed, this happened in structured experimental contexts (Denham, 1986; Dunfield et al., 2011; Dunfield & Kuhlmeier, 2013; Garner et al., 2008). Undoubtedly, the naturalistic observation is more expensive in terms of time, but it provides a big and rich amount of information.

Furthermore, this study adds important evidence to the growing literature on the link between social cognition skills, language abilities, and prosocial behaviors in toddler years. In particular, the analyses revealed the important role of the affective perspective taking and the receptive language, together with their interactive effects

with the diverse-desire understanding, in determining prosocial behavior.

Finally, the attempt to perform mediation analyses is particularly original. Indeed, studies that have considered the mediation role of social cognition and language abilities in their relation with prosocial behavior in 2- and 3-year-olds are extremely lacking.

6.2 Limitations of the study

Beside the strengths in mind, some criticisms need to be accounted. First of all, the generalizability of these results is limited by the relatively small size of the sample that reduces the statistical power of analyses. Moreover, children were mainly Caucasian and belonged to working- and middle-class families. Hence, replications with a larger and a more diverse sample are needed.

A second limitation of the study lies in the cross-sectional design. Because of a single data collection, every prediction has to be developed cautiously. Future research using a longitudinal design may enhance the understanding of the processes that underlie the frequency of prosocial behavior from toddlerhood through childhood.

Moreover, at this age children display a few prosocial behaviors in naturalistic contexts (Denham, 1986), so future research should combine different measures, such as naturalistic and experimental observations, or use multiple informants, for instance parent- and teacher-reports. Moreover, toddlers have been found to be selective in their prosocial behaviors, in fact they tend to be prosocial especially with friends compared to non-friends (White et al., 2014). Therefore, next studies should distinguish the recipients of prosocial behavior.

Given that the current study suggested an important role of receptive language in determining prosocial behavior in very young children, additional studies should address this issue by focusing on different language skills, such as phonology, semantics, syntax, and pragmatics, and clarify their potentially different relations with prosocial behaviors.

Moreover, mediation analyses did not provide significant results, probably because of the relatively small size of the sample (Harrell, 2001). Thus, future studies

should add statistical power to the current findings by increasing the number of participants, in order to verify whether the tendencies to significance emerged here can be replaced by clear significant results.

Finally, the current study focuses on the role of children's social cognition and language skills in influencing the frequency of prosocial behavior. However, future research should take into account other factors that may contribute to individual differences in the occurrence of prosocial behaviors, such as children's temperamental characteristics and caregivers' social-emotional socialization practices (Eisenberg et al., 2015). Indeed, prosocial behaviors may be affected by both a biological disposition to act on behalf of others (Gross et al., 2015; Knafo & Israel, 2012; Laible et al., 2014) and by practices of socialization adopted by adults (Agliati et al., 2015; Grazzani et al., 2016; Ruffman et al., 2006).

6.3 Implications of findings

A better understanding of the processes involved in determining prosocial behavior in early childhood has important implications. The results of this study showed that emotion situation knowledge, receptive language, and their interactive effects with diverse-desire understanding, controlling for age and gender, explained the differences in the frequency of helping behaviors. Therefore, the more the child is competent in emotion understanding, theory of mind, and language skills, the more he tends to help others.

These findings have to be an incentive to promote training and interventions aimed at enhancing children's emotional, linguistic, and cognitive skills. Indeed, programs that foster these competences have been found extremely effective especially when they target the overall development (Grazzani et al., 2016; Ornaghi et al., 2015; Ornaghi et al., 2016). Positive effects on children's psychological well-being, social success, and academic achievements are expected, also in a long-term perspective (Caprara, Gerbino, Luego Kanacri, & Vecchio, 2014). In fact, prosocial children have positive peer relationships, they are less rejected, and have fewer conflicts, consequently the risks of developing aggression and bullying get reduced. Educational and scholastic

contexts can incredibly benefit from this peaceful atmosphere, because interactions among peers will be based on compassion and respect instead of abuses of power.

Given that in the current work these relations and influences emerged as early as 24-month-old, efforts should be done to realize preventive interventions in the first years of development. Children at risk for reduced social-emotional competences may be a specific target, but typically developing children can take advantage as well. Notably, day-care centers and kindergartens might be special contexts in which these interventions may occur, with educators and teachers as the best socializers (Ciucci, Baroncelli, & Toselli, 2015; Majorano, Cigala, & Corsano, 2009). Nonetheless, the promotion of these competences in the school context should be associated with efforts in the main caregiving environment. Families should be guided in fostering emotional, linguistic, and cognitive competences as well, working in synergy with school in order to appropriately promote their children's prosocial behaviors.

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Appendices

Appendix A – Letter requesting participation for parents

Prof.ssa Ilaria Grazzani

Dipartimento di Scienze Umane per la Formazione

Università degli Studi Milano-Bicocca

Dott.ssa Elisabetta Conte

Dottorato di ricerca in Scienze della Formazione e della Comunicazione

Università degli Studi Milano-Bicocca

LO SVILUPPO DELLA COGNIZIONE SOCIALE E DELL'ORIENTAMENTO PROSOCIALE. LEGAMI CON TEMPERAMENTO INFANTILE E STRESS GENITORIALE

Cari genitori,

Il mio nome è Ilaria Grazzani e chiedo il vostro supporto per un progetto di ricerca condotto da Elisabetta Conte, studentessa all'ultimo anno di dottorato in Scienze della Formazione e della Comunicazione 'Riccardo Massa' presso l'Università degli Studi Milano-Bicocca.

Obiettivi della ricerca

Lo scopo principale del presente studio è di indagare la relazione tra tratti temperamentali del bambino, livelli di stress genitoriale, e sviluppo della cognizione sociale e dell'orientamento prosociale nella prima infanzia. La cognizione sociale si riferisce alla comprensione degli stati mentali ed emotivi altrui (es. comprensione delle emozioni), mentre l'orientamento prosociale include l'empatia e il comportamento prosociale (es. aiutare chi è in difficoltà). Mettere in luce questi aspetti dello sviluppo infantile permetterebbe di sviluppare programmi scolastici di supporto da implementare precocemente in modo tale da potenziare le competenze sociali ed emotive di ciascun bambino.

Ci si aspetta che prendano parte alla ricerca circa 100 bambini di 2 e 3 anni e i rispettivi genitori.

Che cosa implica la partecipazione a questa ricerca?

Ogni bambino verrà osservato per 20 minuti in un contesto di gioco libero con gli altri bambini. Inoltre sarà coinvolto individualmente in alcune prove sulla cognizione sociale, che durano circa 20-30 minuti. Tali prove consistono in storie e scenari che

richiedono l'utilizzo di immagini e pupazzi. Prima di iniziare questa sessione individuale, al bambino verrà chiesto se è felice di partecipare. Nel caso in cui non acconsenta o mostri segni di disagio, la sessione individuale verrà immediatamente interrotta. I tempi e le modalità di coinvolgimento dei bambini verranno stabiliti con le educatrici in modo da interferire il meno possibile con la normale routine.

Ai genitori (madre o padre) verrà chiesto di completare alcuni questionari sulle caratteristiche socio-cognitive e comportamentali del bambino, e su sensazioni e percezioni nel ruolo genitoriale. Il completamento di tali questionari richiede all'incirca 10-15 minuti.

Che cosa accadrà alle informazioni raccolte?

All'inizio dello studio a ciascun partecipante verrà assegnato un codice numerico. I dati personali, come nomi e cognomi, saranno custoditi in sicurezza e separati dalle altre informazioni. I risultati che emergeranno dallo studio saranno utilizzati per la tesi di dottorato di Elisabetta e presentati a conferenze o riviste scientifiche. Tuttavia l'identità dei partecipanti non sarà mai divulgata.

La partecipazione è volontaria?

Sì, la partecipazione è completamente volontaria. Se una famiglia accetta di prendere parte allo studio e in seguito cambia idea, è libera di ritirarsi in qualunque momento. Se richiesto, eventuali dati fino a quel momento ottenuti dal genitore o raccolti con il bambino verranno cancellati. Per eventuali chiarimenti o informazioni su qualunque aspetto dello studio, non esitate a contattarci.

Come si può comunicare il proprio interesse a partecipare?

Se desiderate partecipare a questo studio, per favore completate il modulo di consenso allegato e consegnatelo alla scuola dell'infanzia/asilo nido/micronido frequentato da vostro figlio. Potete tenere questa copia informativa. Grazie per il tempo utilizzato per considerare questo progetto.

Cordiali saluti,
Prof.ssa Ilaria Grazzani Dott.ssa Elisabetta Conte

Appendix B - Consent form for parents

Prof.ssa Ilaria Grazzani

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Modulo di consenso per genitori

LO SVILUPPO DELLA COGNIZIONE SOCIALE E DELL'ORIENTAMENTO PROSOCIALE. LEGAMI CON TEMPERAMENTO INFANTILE E STRESS GENITORIALE

- Ho letto il foglio informativo e ho compreso scopi e procedure dello studio.
- Desidero prendere parte a questo progetto di ricerca e autorizzo mio/a figlio/a a partecipare.
- Capisco che la partecipazione allo studio è completamente volontaria e sono libero/a di ritirarmi in qualunque momento.
- Capisco che tutte le informazioni personali che potrebbero identificarmi sono strettamente confidenziali e non saranno divulgate in alcun modo.
- Comprendo che questa ricerca verrà pubblicata in una tesi o rivista scientifica e che i partecipanti non potranno essere identificati in nessun modo.
- Comprendo che al termine della ricerca potrò avere una copia dei risultati.

Nome del bambino: _____

Nome della scuola dell'infanzia/asilo nido/micronido: _____

Nome del genitore: _____

Firma del genitore: _____ Data: ___/___/_____

Numero di telefono: _____

Appendix C – The *Affect Knowledge Test* (AKT) [8]

Sessione 1: Expressive Task **"Come si sente qui?"**				Sessione 2: Receptive Task **"Mostrami la faccina che si sente _____"**				Addestra-mento
Triste	Arrabbiato	Felice	Spaventato	Triste	Arrabbiata	Felice	Spaventata	
……..	…….....	……..	…….....	……..	…….....	……..	…….....	
2 = emozione corretta, 1 = emozione errata, valenza esatta, 0 = emozione errata								

Sessione 3: Stereotypical Task

1. **TRISTE**	**Paola/Gianni:** "Stiamo camminando per tornare a casa". **F/S:** "Adesso ti spingo e ti faccio cadere!". **Paola/Gianni:** "Aihoooo! Mi fa male!! Aihooo!!"	
2. **ARRABBIATO**	**Paola/Gianni:** "Guarda! Sto giocando con le costruzioni e ho fatto questa torre! E ne sono proprio contento! Non è bellissima?"**.** **F/S:** "No! Secondo me è proprio brutta! Adesso la faccio cadere tutta!". CRASH	
3. **SPAVENTATO**	Shhhhhh!!!! P. e G. stanno dormendo. **Paola/Gianni:** "Oh! Sto sognando! C'è una tigre che mi sta inseguendo!!!! Oh nooooo!!!!"	

Sessione 4: Non-stereotypical Task

1. [mamma e bambino] Ecco che arriva **Paola/Gianni** con la sua mamma		
A. **Felice**: "Stiamo arrivando a scuola. Mi piace la scuola, ci divertiamo un sacco!"	B. **Triste**: "Non mi piace la scuola. Mi manca la mamma, non andare via, mamma!"	
2. [mamma e bambino] **Paola/Gianni:** "Ciao mamma. Cosa stai cucinando?"		
A. **Arrabbiato**: (cibo preferito) "Puah! Che brutto! Non lo voglio mangiare!"	B. **Felice**: (cibo che piace meno) "Mmmmh! Gnam, gnam! Buonissimo!"	
3. [bambino] **Paola/Gianni:** "Sta arrivando un cane grandissimo"		
A. **Spaventato**: "Sembra cattivo; ha i denti così grandi…"	B. **Felice**: "Sembra buono; mi sta sorridendo con quei dentoni"	

8 Original English version can be requested here: http://denhamlab.gmu.edu/semeasures.html

4. [bambino e fratello/sorella] **Paola/Gianni:** “Stiamo giocando con le costruzioni. Stiamo facendo una casa”. **F/S:** “Io vado a giocare con Mario/Maria e tu non puoi venire, pappappero!		
A. **Arrabbiato**: “Voglio giocare pure io! Sei brutto e antipatico!”	B. **Triste**: “No, ti prego, dai… Fai giocare anche me. Non lasciatemi solo!”	
5. [bambino e fratello/sorella] **F/S:** “Sei un fratello/sorella cattivo/a! [e gli dà un pugno] Se lo dici a mamma o a papà ti picchio di nuovo, anzi, anche più forte”		
A. **Arrabbiato**: “Smettila! Guarda che ti do un pugno anch’io!”	B. **Spaventato**: “No, ti prego, non farmi male. Ti prometto che non lo dico a mamma e papà”	
6. [mamma e bambino] **Paola/Gianni** sta usando la penna della mamma. **Mamma**: “Ti ho detto che non devi mai usare la mia penna! Se lo fai di nuovo, guarda che ti punisco”		
A. **Triste**: “Non voglio che mi punisci. Mi dispiace di aver usato la tua penna”	B. **Spaventato**: “No, ti prego! Non lo faccio più, promesso! Ma non punirmi!”	

Appendix D - The AKT Questionnaire for teachers and educators

Questionario AKT

(per la somministrazione della sessione 4)

Legga le frasi che seguono e pensi a come possa sentirsi _____.

Le chiediamo di cerchiare l'emozione che il bambino/la bambina esprimerebbe con maggiore probabilità in una situazione simile (se non ha mai sperimentato una determinata situazione, provi a immaginare quale emozione possa esprimere).

1) Andare a scuola.

Felice **Triste**

3) Qual è il cibo preferito, qualcosa che lo/a rende davvero felice? _____

E quello che gli/le piace meno? _____

5) Vedere un cane grosso, ma amichevole.

Felice **Spaventato**

7) Se altri bambini non lo lasciano giocare**.**

Arrabbiato **Triste**

9) Se un bambino gli/le dà un pugno e dice che se lo dice alla maestra, lo/la picchierà di nuovo.

Arrabbiato **Spaventato**

11) Se dopo essersi comportato male, gli si dice che se lo fa di nuovo sarà punito/a**.**

Triste **Spaventato**

Appendix E - The *Diverse-desire Task*

(Original English version by Wellman & Liu, 2004)

"Questa/o è Maria/Marco. É ora di merenda, allora lei/lui vuole qualcosa da mangiare. Qui ci sono due diverse merende: una carota e un biscotto. Quale ti piace di più? Preferiresti la carota o il biscotto?" (own-desire question).

[Se il bambino sceglie il biscotto] "Ottima scelta, ma a Maria/Marco in realtà piacciono le carote. Non le/gli piacciono i biscotti. Le/gli piacciono di più le carote".
[Se il bambino sceglie la carota] "Ottima scelta, ma a Maria/Marco in realtà piacciono i biscotti. Non le/gli piacciono le carote. Le/gli piacciono di più i biscotti".

"Adesso è ora di mangiare. Maria/Marco può scegliere solo una cosa da mangiare, soltanto una. Quale merenda sceglierà? La carota o il biscotto?"(target question).

Appendix F - The *True-belief Task*

(Original English version by Wellman, 1991)

VERSION FOR BOYS

"Questo è Luca. Luca *desidera* giocare con il suo gattino, ma non lo trova. Il gattino può essere sia in cucina che in giardino. Luca *crede* che sia in giardino. Secondo te, Luca dove cercherà il suo gattino?".

VERSION FOR GIRLS

"Questa è Anna. Anna *desidera* giocare con il suo gattino, ma non lo trova. Il gattino può essere sia in cucina che in giardino. Anna *crede* che sia in giardino. Secondo te, Anna dove cercherà il suo gattino?".

Appendix G – Observation Grid of Prosocial Behaviors

(Conte & Grazzani, 2015)[9]

Child code: _____	[ ] M [ ] F
School: _____	
Observer: _____	

This observation grid is developed for toddlers and preschoolers. Every single occurrence of *helping*, *sharing*, and *comforting* has to be reported.

N.B. Helping behaviors occur when the recipient needs help in a goal-directed action. Sharing behaviors occur when the recipient desires or needs a material object. Comforting behaviors occur when the recipient experiences a negative emotional state.

Varieties of Prosocial Behaviors		Observation n°1	Observation n°2	Observation n°3	Observation n°4	Total
		Date: __/__/__	Date: __/__/__	Date: __/__/__	Date: __/__/__	
		Time:	Time:	Time:	Time:	
HELPING	INSTRUMENTAL HELPING (e.g. to give an out-of-reach object)					
	INFORMING (e.g. to point/say the location of an object; to provide strategies)					
					HELPING =	**____**
SHARING	SHARING (e.g. to give a toy, food, or cloth; to let play with a toy)					
					SHARING =	**____**
COMFORTING	PSYCHOLOGICAL COMFORTING (e.g. to hug or kiss; to reassure)					
	PHYSICAL COMFORTING (e.g. to rub a child's back when coughing; to cover with a blanket)					
					COMFORTING =	**____**

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Appendix H – Examples of observed helping, sharing, and comforting behaviors

Instrumental helping

- Elio watches Edoardo, who has a hard time to collect a small insect in the garden. Elio asks him: “Do I pick it up?” and Edoardo goes back to let him gather it for him.
- Sofia looks at Francesco, who is pushing a car into a long tunnel. He can't make it go ahead because in the tunnel there is a stuck car. While he tries hard to push his car inside, Sofia stretches her arm into the tunnel and grasps the stuck car. Francesco happily exclaims: “Well done Sofia! You got it!”.
- Edoardo begins to push a heavy toy box towards its specific place, so Elio stands up from the couch saying: “I'm good and strong!”. He picks the box but struggles to carry it. Edoardo asks him: “Do I help you?” and Elio answers: “Yes!”, so they begin to carry the box together.
- Michelle is wandering along the garden when her foot gets stuck in a toy string. She tries to free her shoe but she can't, so she tries to walk, probably hoping that the string may fall by itself. She looks bother by the string and stops, so Giada knees and pulls the string out of Michelle's shoe.
- Angelica looks at Azzurra, who accidentally makes a basket of meal tickets fall down. The teacher begins to collect them but then has to take care of Azzurra, so Angelica spontaneously collects the tickets still on the floor and passes them to the teacher.
- Gabriele struggles in climbing the slide in the playground and Alice pushes him upwards so that he can reach the highest rungs.

Informing

- Martina looks at Samuele, who is shaking on the chair looking for a piece of

biscuit that fell down. She points at the piece of biscuit and says: “On the chair”.

- Francesco is giving crackers to the children and Martina takes one. She sees that Gaia has not received it, so she says to Francesco: “Look, you didn't give it to Gaia!”.
- The educator explains to Iris how to create a flower-shaped playdough saying: “Push hard, it doesn't work because you haven't pushed enough. You can stand and press”. After a while, Arianna looks at Rayen who has a hard time in making good shapes with the playdough, so she stands up and tells him: “Because it's less effort. Like this it's easier”.
- Chiara sees that some children are looking for a chair. She says: “Sit down. There's a seat, sit down!” and points to an empty chair. Doha reaches it and sits.
- Lucia is coloring a paper with Michelle. Lucia asks her: “Is it like this?” and emphasizes the way in which she is grasping the pencil. Michelle raises her gaze and looks at her grip. She answers: “Like this. Do like this, and oplà!”, emphasizing the handhold as well.
- Camilla looks at Luna, who points to a package of biscuits on the cupboard. Camilla has listened to the teacher who said that those biscuits are for the following day, so reaches Luna and says: “They're for tomorrow morning. There are no more for today”.

Sharing

- Alessia is colouring her magic tablet. Margot is attentively looking at her drawing, then she asks Alessia: “Can I do one thing?”. Alessia passes the pen to Margot and watches her drawing.
- Chiara says to the teacher: “Teacher, there is no orange [felt pen]”, so the teacher checks in the can of markers. Giulia looks with them, then exclaims: “I've got the orange, Chiara”. She picks the orange felt pen from her own pencil case and gives it to Chiara.
- Giulio says he wants to draw a whale. Jacopo enthusiastic says: “I've the red [felt pen]!”, but Giulio looks at him and says: “The red?! I need the blue”.

Jacopo looks at his own felt pen, which actually is red and not blue. Thus, he corrects himself: “I've the blue” and gives it to Giulio.

- Alice plays with the building blocks. Federica sits in front of her and grasps some blocks to make a tower. Given that Federica has run out the blocks around, Alice passes one of her own blocks to her. Federica thanks Alice.
- Nicholas is collecting tennis balls, so Aurora passes one of her balls to him. Nicholas smiles to her and places the ball together with the others.
- Stefania plays with dress-up clothes and says that she needs a top to go to the beach. Elena shows the top she has picked up from to the floor to Stefania and passes it to her.

Psychological Comforting

- Some girls are playing with dolls. Margot moves away a plastic box with whom Francesca wanted to play. Francesca complains and looks close to tears while she stands up and walks fast to Margot. Alessia stares at the scene and looks at Margot, who says: “Oh... Keep it!” and pushes the box a little towards Francesca. Alessia moves the box closer to Francesca, who calms down.
- Accidentally, Vanj has pushed Augusto, who has bumped his rear on the floor. Augusto stands up and angrily walks towards Vanj. Giulio stands in front of Augusto and keeps his shoulder calming him down: “But he didn't do it on purpose. It was an accident”. Augusto stops and starts to calm down.
- Rayen suddenly bursts into tears because Arianna has just bitten his hand. Gioele reaches him and says: “Kiss”, then kisses Rayen on the nose.
- Alessio, one of the youngest boys, has been brave and has just gone down the slide by himself. He looks a little shaken, so Tommaso hips happily and exclaims: “Bravo!” and claps his hands, followed by Gloria.
- Iris whines for her boy-shaped playdough: “It's broken...”, so Arianna reaches her. She asks: “Do I do it?” and Iris nods. Arianna makes a perfect boy-shaped playdough and shows it to Iris smiling: “Here you are!”. Iris smiles back.

Physical Comforting

- Michelle and Giada are playing on the trikes. Michelle says to Giada: “We can't go on the rocks. Come!” and goes down the trike. Giada stands up a little but gets upset because she is not able to stand up. Michelle reaches her and gently pushes her upwards to let her rise.
- Giulia reaches Giorgio, the youngest child in the classroom, who sits by himself on the bench. She looks sweetly at him, grasps his hand, and drives him to the other side of the bench. They sit together, then Giorgio takes his pacifier off and with a sad facial expression begins to cough hard. Giulia, understanding, watches him and rubs his back. Giorgio puts the pacifier back his mouth.