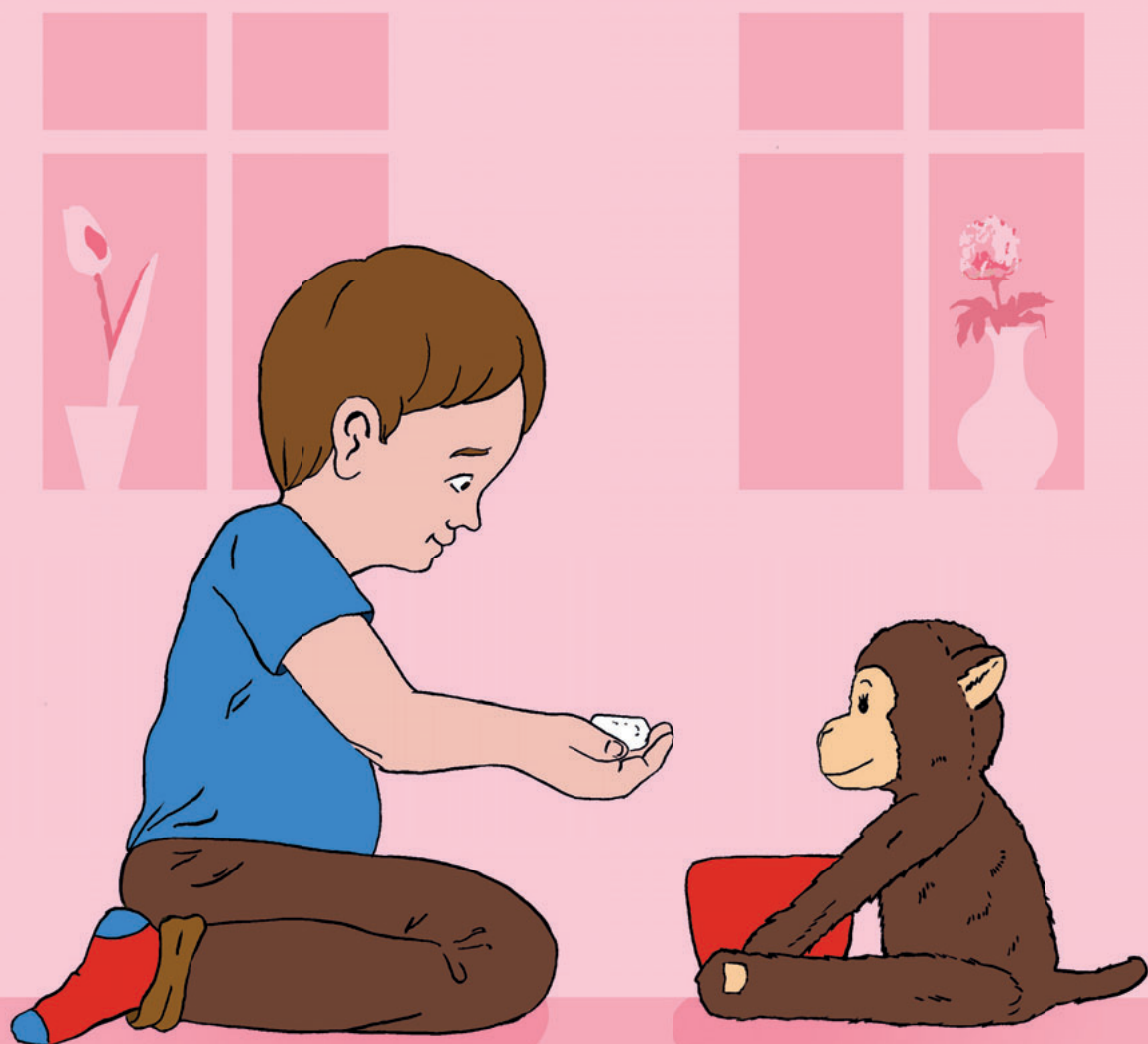


# Little Benefactors:

How Helping and Sharing Develop  
within Social Contexts



Yue Song 宋玥



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# **Little Benefactors: How Helping and Sharing Develop within Social Contexts**

Kleine Weldoeners: Hoe Hulp en Deelgedrag zich Ontwikkelen binnen  
Verschillende Sociale Omgevingen  
(met een samenvatting in het Nederlands)

Proefschrift

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## **Chapter 1**

### **General Introduction**

Prosocial behaviors, such as helping, sharing and comforting, are relatively unique and important features of human society (e.g., Dovidio, Piliavin, Schroeder, & Penner, 2017, for a review, see Melis, 2018). Such behaviors are essential to our species' survival and thriving (e.g., Darwin, 1871; Ebstein, Israel, Chew, Zhong, & Knafo, 2010; Fehr & Fischbacher, 2003; Wilson, 1975), and are valued by all human societies (Padilla-Walker & Carol, 2014). Understanding the emergence and development of prosocial behaviors is therefore a topic that has drawn great interest (Dovidio et al., 2017). In developmental psychology, little empirical research was conducted before the 1970s (Eisenberg, Fabes, & Spinrad, 2006), followed by a rise and blossoming of research on this topic from the 1970s to 1990s. The next decade (1990s to 2000s), witnessed a decline of research. However, a milestone regarding the general development of prosocial behaviors was established in 1998, when a comprehensive meta-analysis was conducted (Eisenberg & Fabes, 1998). In this meta-analysis, Eisenberg and Fabes included studies using experimental, observational, self-report and other report (i.e., parents, teachers, peers) measures on prosocial behaviors (i.e., helping, sharing and comforting), bringing to the forefront the importance of studying how these behaviors change as children mature. After the 2000s and onwards, a resurgence of research interest on prosocial behaviors has occurred (Davidov, Vaish, Knafo-Noam, & Hastings, 2016). Since then, the field has moved forward on three aspects. First, the concept of prosocial behaviors has been further developed; Second, many empirical studies on prosocial behaviors, using standardized, laboratory measures (rather than reported prosocial behaviors), have been conducted; Third, new theories, especially theories regarding the emergence and early development of prosocial behaviors, have been proposed.

Despite these advances, there is still a lack of integration of these lines of research and there are still gaps in the knowledge on the emergence and developmental trajectories of specific prosocial behaviors, and how these are influenced by social contextual factors. The overarching goal of the current dissertation is to delineate the general developmental trajectories of specifically defined prosocial behaviors, and to examine whether, and if yes, how social contextual factors contribute to these developments. Specifically, this dissertation focused on the periods from the early toddlerhood to the early preschool ages, as these are the times when most prosocial behaviors first emerge. In the following, for each of the three aspects (i.e., conceptualizing, assessments, and theories), I will introduce some of developments (and respective challenges) in the research on the emergence and development of prosocial behavior, and then how this dissertation builds on these developments.

There have been many debates about the definition of prosocial behaviors (e.g.,

Batson, 1991; Hastings, Utendale & Sullivan, 2007). For instance, some researchers emphasized the altruistic motivation of the behaviors, and insisted that prosocial behavior should be triggered by a genuine concern for others (Batson, 1991). Some others emphasized the personal sacrifice involved in these behaviors, and insisted that prosocial behaviors have to be costly (e.g., Hastings et al., 2007). Nowadays, researchers have at least agreed that prosocial behaviors are “a voluntary action intended to benefit another or other groups, such as helping, donating, sharing, and comforting” (Eisenberg & Fabes, 1998; Eisenberg et al., 2006). Importantly, this definition actually sets no limits on the motivations for prosocial behaviors (Eisenberg & Fabes, 1998; Eisenberg et al., 2006). That is, prosocial behaviors can be triggered by one, or multiple kinds of motivations, such as genuine concerns of others, self-interests (e.g., rewards, reciprocity), and/or social-oriented motivations (obeying social norms, response to others’ requests) (Eisenberg et al., 2016). Also, by this definition prosocial behavior can be costly or non-costly. The current dissertation employed this definition of prosocial behavior, and did not set constraints on motivations, or the costs. In addition, and in line with this contemporary definition, nowadays most researchers have acknowledged a “multi-dimensional nature” of prosocial behaviors. That is, different types of prosocial behaviors (e.g., helping and sharing) are not or only minimally correlated with each other, emerge at different ages, and follow different developmental trajectories (for reviews, see Dunfield, 2014; Padilla-Walker & Carol, 2014). This dissertation also used this multi-dimensional view by focusing on delineating the developmental trajectory of different types of prosocial behaviors (i.e., helping and sharing) separately using standardized behavioral assessments.

From the early 1950s, researchers already used standardized behavioral assessment to examine prosocial behaviors (e.g., Ugurel-Semin, 1952); however, until the 1990s, these assessments were designed for older preschoolers, children, or adolescents (this will be discussed in chapter 2). Since the 2000s, however, a growing number of studies have focused on infants and toddlers (for reviews, see Dunfield, 2014; Martin & Olsen, 2015). Due to the limited cognitive abilities of infants and toddlers, researchers have developed new standardized tasks to assess prosocial behaviors (e.g., out-of-reach task, Warneken & Tomasello, 2006). In these tasks, researchers often stimulate/scaffold participants’ prosocial behaviors through different steps, from more implicit to direct requests, to assess three types of early emerging prosocial behaviors: Instrumental helping, empathic helping, and sharing. Specifically, *instrumental helping* refers to an action that helps others to complete an action-based goal, such as getting an object that is out of reach (Svetlova, Nichols, & Brownell,

2010). *Sharing* refers to an action that fulfills others' needs for material goods (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). Lastly, *empathic helping* refers to actions grounded in other-oriented concern (Svetlova et al., 2011). Inspired by these studies, the current dissertation used the same or similar standardized behavioral assessments to further examine the early developmental trajectories of these three types of prosocial behaviors. In the next section, we turn to recent theories of the early development of prosocial behaviors.

### **Theories on the Early Development of Prosocial Behaviors**

In line with a growing number of studies that has focused on infants and toddlers (For reviews, see Dunfield, 2014; Martin & Olsen, 2015), theories regarding how prosocial behavior develops during these early periods have been developed. Specifically, three main views/approaches have been proposed in the past two decades, including (1) The natural-tendency view (e.g., Warneken & Tomasello, 2006; 2009; 2014), (2) the social-interactional view (e.g., Dahl, 2015), and (3) the socialization view (e.g., Brownell et al., 2016). These views differ in the degree of focus on how maturation and social contextual factors contribute to the development of prosocial behaviors. We introduce these three views below.

**Natural-Tendency View.** The natural tendency view stresses that prosocial behaviors are deeply rooted in human nature (e.g., Warneken & Tomasello, 2006; 2009; 2014), and socialization processes (e.g., values, social norms, practices) contribute in shaping and refining the expression of their pre-disposed prosocialities after their emergence (for a review, see Warneken, 2016). This view is supported by four lines of empirical research. First, human being's closest evolutionary relatives (e.g., Chimpanzees) also engage in some prosocial behaviors (e.g., Melis, Hare, & Tomasello, 2008; Muller & Mitani, 2005; Warneken & Tomasello, 2009; Warneken & Tomasello, 2006). Second, infants and toddlers show a natural inclination (motivation) for being prosocial (Hepach, Vaish, & Tomasello, 2012; Hepach, Vaish, Grossmann, & Tomasello, 2017). Third, limited by their cognitive abilities, many socialization processes may not have kicked in *yet* for infants' and toddlers' prosocial behaviors. For instance, toddlers seem too young to internalize parents values and goals (Grusec & Goodnow, 1994), or that they could be effectively reinforced for engaging in prosocial behaviors (Warneken & Tomasello, 2009). Fourth, multiple studies show that prosocial behaviors are self-rewarding. Specifically, sharing leads to an increase of happiness in toddlers (Aknin, Hamlin, & Dunn, 2012), and this emotional benefit has been found in two different cultures (Aknin et al., 2012; 2015), suggesting the emotional benefit is a psychological mechanism that sustains the emergence and early development of prosocial behaviors. Overall, the natural tendency view states that a biological predisposition is the

foundation for prosocial behaviors. Socialization processes are not fundamental for the *emergence* of prosocial behaviors, and may have only *limited* effects on the early development of prosocial behaviors before age three (Warneken, 2016).

**Social-Interactional View.** The social-interactional view proposes that socialization processes (e.g., specific social experiences, involving requests, participation, and praising) contribute to both the emergence and development of prosocial behaviors (e.g., Dahl, 2015). Different from the natural-tendency view, which emphasizes the natural inclination to be prosocial, researchers argue that infants and toddlers are actually constantly given opportunities to engage in helping (e.g., Dahl, 2015; Hammond, Al-Jbouri, Edwards, & Feltham, 2017; Rheingold, 1982), or receive social reinforcements after they helped others (e.g., Dahl, 2015; Dahl et al., 2017). Moreover, parents' encouragement and praise (Dahl, 2015; Dahl et al., 2017) and provision of opportunities to be prosocial (Hammond & Carpendale, 2015; Hammond et al., 2017; Waugh, Brownell, & Pollock, 2015) have been found to be associated with one-year-olds' helping, the age when this behavior just emerges. Moreover, the effect of social interactions seems to be dependent on age. For instance, parents' encouragement/praise was found to be positively associated with helping in daily chores for 13- to 15-month-olds, but negatively associated one year later (Dahl, 2015). A possible explanation for this is that children who helped *less* one year later, might be prompted more (e.g., encouragement/praise) by their parents (Dahl, 2015). Overall, the social-interactional view emphasizes that both a biological predisposition and social contextual factors (e.g., parents' practices) contribute to the *emergence* of prosocial behaviors (e.g., Gottlieb, 1991; Oyama, Griffiths, & Gray, 2003). As for the early development of prosocial behaviors, however, the relationship between these social contextual factors and prosocial behaviors are dynamic and depend on children's ages which could reflect their skill level of behavior (Tzetzis, Votsis, & Kourteissis, 2008). In general, this view suggests that the relationship should be positive at younger age (i.e., when the behavior emerges), but gradually becomes non-, or even negative at older age as all children become fully capable of conducting the behavior.

**The Socialization view.** The socialization view suggests that prosocial behavior stems from the internalization of learned standards of behavior for how to interact with others (e.g., Chudek & Henrich, 2011; Boyd & Richerson, 2005). According to this perspective, newborns are neutral in interacting with other people (i.e., without a preference for being prosocial or not). Thus, there is no "pre-disposed prosociality". Prosocial behaviors emerge "*from human infants' participation in a unique socioemotional environment*", and

prosociality specifically “*arises from experience-expectant processes that occur in the normative social environment*” (p. 2, Brownell et al., 2016). Some empirical evidence supports this view. For instance, infants and toddlers enjoy joining with housework even if they are actually not helping with it (Rheingold, 1982), and 18-month-olds show an increase in helping after being primed with affiliation (Over & Carpenter, 2009). In addition, socialization processes continue to support the further development of prosocial behavior after its emergence. For instance, parents’ general socialization practices (such as talking about emotions; Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013) or age appropriate encouragement of prosocial behavior (Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015; Pettygrove, Hammond, Karahuta, Waugh, & Brownell, 2013) were positively associated with helping in infants and toddlers, albeit the size of the association varied across prosocial behaviors and the age of the child. Overall, this perspective stresses that prosocial behavior is not pre-deposited in human nature; rather it is the socialization processes that are *fundamental* for the emergence of prosocial behaviors. In addition, age-appropriate socialization processes continue to support the development of prosocial behaviors throughout infancy and toddlerhood and beyond.

In summary, although all three views acknowledge the importance of both nature and nurture in the development of prosocial behaviors, the key difference among the three views is how important socialization processes are for prosocial behaviors, and at what age. The *natural-tendency view* proposes that socialization processes do not contribute to the emergence of prosocial behaviors, and have very little (if any) influence before age three. The *social-interactional view* proposes that socialization processes play important roles in stimulating or scaffolding the emergence of prosocial behaviors. However, once the child is fully cognitively capable of engaging prosocial behaviors, the effect of social context (e.g., practices) might be non-existent or even negative. The *socialization view* proposes that socialization processes are not only important for the emergence of prosocial behaviors, but are important for the maintenance and further development of these behaviors as well. The studies in the current dissertation were designed to further investigate these proposed views and addresses certain gaps in the literature, on which I will elaborate in the next section.

### **Aims of This Dissertation**

Inspired by the three previously described theoretical views, the studies included in this dissertation focused on whether and how the emergence and early development of prosocial behaviors is related to different types of social contextual factors, using experimental manipulation, longitudinal, and cross-sectional designs. Two aims guided the

studies in this dissertation, which are discussed hereafter. Table 1 displays which aims are tested in which chapter, including a brief description of the samples used to test these aims.

**Aim 1: Delineating the developmental trajectories of prosocial behaviors.**

***The development of prosocial behaviors, from infancy throughout adolescence.*** In **Chapter 2**, we conducted a meta-analysis regarding the development of two prosocial behaviors (i.e., instrumental helping and sharing). This chapter was inspired by a previous meta-analysis (Eisenberg & Fabes, 1998), though we extended it in two ways in line with recent developments. First, the previous meta-analysis included experimental, observational, self-report and other-report (parents, teachers, peers) studies on prosocial behaviors. For each behavior (e.g., helping and sharing), Eisenberg and Fabes (1998) delineated the developmental trajectories by aggregating all four kinds of studies. However, there is evidence that developmental trajectories may be dependent on the method of assessment used. For instance, sometimes age differences drawn from self-/other-report studies differed from observational studies (Eisenberg & Fabes, 1998). Thus, we felt it was necessary to examine the development of each type of behavior based on the method of assessment. **Chapter 2** specifically focused on experimental and observational studies, and delineated the developmental trajectory for each method (i.e., experimental or observational) separately. Second, regarding the early development of prosocial behaviors, Eisenberg and Fabes (1998) used a relatively wide age range for young children (0-3 years). However, in the past two decades, there has been a substantial increase in studies focusing on children younger than age three (for reviews, see Dunfield, 2014; Martin & Olson, 2015; Paulus, 2014; Paulus & Moore, 2012). Consequently, there is a need to further examine age differences during this specific period. Thus, in Chapter 2, we further compared children younger than age three as two age groups (infancy and toddlerhood), which allows us to examine possible age difference more closely.

***The early development of prosocial behaviors.*** In addition to meta-analytically reviewing the existing studies, the current dissertation also used standardized behavioral assessments to examine the early development of three prosocial behaviors (i.e., instrumental helping, sharing, and empathic helping). *Instrumental helping* emerges by 12 to 14 months of age (e.g., Hammond et al., 2017; Liskowski, Carpenter, Striano, & Tomasello, 2006), develops rapidly before age two, and then the increase seems to stop between age two to three (for a review, see Dunfield, 2014). *Sharing* emerges later than instrumental helping. Although some researchers propose that sharing emerges within the first year of life (e.g.,

Hay, 1999), other researchers propose that this behavior only reliably emerges around age two (e.g., Brownell, Iesue, Nichols, & Svetlova, 2013). The developmental trajectory of sharing is also debated. Some researchers found an increase between 18 and 24 months (Brownell et al., 2013), whereas others found no increase in sharing from 2 to 4 years (Grusec, 1991). In addition, some researchers even observed a decrease in sharing from 18 to 24 months, and a slight increase from 24 to 30 months (Hay, Castle, Davies, Demetriou, & Stimson, 1999). Lastly, *empathic helping* also emerges around age two (e.g., Dunfield, 2014), and it seems to develop (i.e., increase) throughout and beyond toddlerhood (Dunfield, 2014; Dunfield & Kuhlmeier, 2013).

These prior studies on age differences in toddlers' and young preschoolers' prosocial behaviors revealed that instrumental helping emerges and develops first, followed by sharing and empathic helping. Nevertheless, most of the studies are cross-sectional. That is, researchers recruited participants from two, or more age groups, and then compared their prosocial behaviors in these assessments. Thus, for understanding the *development* of these behaviors, more longitudinal studies are needed to control for between-individual differences. However, to date, only one study has used a longitudinal design to examine the early development of instrumental helping (Dahl, 2015), and no studies with standardized behavioral assessments have focused on sharing, or empathic helping. Accordingly, **Chapter 5** used a longitudinal design to examine the development of instrumental helping, sharing, and empathic helping from early toddlerhood (22 months of age) to late toddlerhood (28 months) into the early preschool years (34 months).

**Aim 2: Examining how social contextual factors may (or may not) contribute to the development of prosocial behaviors.**

The second aim of the current dissertation is to investigate the role of social contextual factors in the early development of prosocial behaviors. Contextual factors are the special characteristics of setting that need to be considered in understanding why a certain set of behaviors are observed. In the current dissertation we focused on three levels of social contextual factors, that is, distal (culture), intermediate (goals, values, and practices), and situational contextual factors (resource availability, affiliation, and choice). In addition, we focused on different types of prosocial behaviors (e.g., instrumental helping, sharing and empathic helping). Moreover, we employed experimental, longitudinal, and cross-sectional studies. We elaborate our studies based on each of these levels below.

**Culture.** Culture is a broad concept that includes belief systems, knowledge, values, and all other practices (Erickson, 2002). Quiet often researchers examine similarities and/or



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differences between cultures but do not measure the values or belief system that may underlines these differences. For this reason, we label culture when examined in the way as a distal factor. The current dissertation examined the effect of culture on toddlers' and young preschoolers' prosocial behaviors based on the natural-tendency view (**Chapter 3**) and the socialization view (**Chapter 4**). The natural-tendency view proposes that prosocial behaviors are deeply rooted in human nature, and thus are universal across cultures and time (e.g., Warneken, 2016). A line of research focusing on the emotional benefits of prosocial behaviors provides evidence supporting this view. Specifically, world-wide studies in adults found that across cultures, there is a causal, positive relationship between spending money for others and happiness (e.g., Aknin et al., 2013). More importantly, both a study in Canadian toddlers and a study in Vanuatu young preschoolers found that sharing leads to a higher level of happiness (Aknin et al., 2012; Aknin et al., 2015), supporting the idea that an increase of happiness after sharing is indeed a universal, psychological mechanism. Nevertheless, compared with the abundance of cultures examined in studies with adults, only two samples have been tested in toddlerhood and the young preschool age, leaving it unclear whether similar findings would be found in other cultures. Moreover, previous studies all focused on sharing behavior, but whether and how other prosocial behaviors can lead to an increase of happiness is unknown. Thus, based on the previous two studies, we further examined this proposed mechanism (i.e., an increase of happiness after prosocial behaviors) in three types of prosocial behaviors (i.e., instrumental helping, sharing, and empathic helping), in Dutch toddlers and young preschoolers, and Chinese preschoolers (**Chapter 3**). Based on the natural-tendency view, we expected an increase of happiness after different types of prosocial behaviors, at different ages, and across different cultures.

The socialization view proposes that prosocial behaviors emerge and develop within certain sociocultural contexts (Brownell et al., 2016). Accordingly, in the early years, there might be cultural differences in prosocial behaviors. The empirical findings, however, are mixed. While some studies did find cultural differences (Giner Torrens & Kärtner, 2017; Rochat et al., 2009), others did not (Aime, Broesch, Aknin, & Warneken, 2017; Kärtner, Keller & Chaudhary, 2010). Thus, it is unclear whether culture has already played a role in the development of prosocial behaviors at this age. In addition, because different cultures may all endorse prosocial behaviors, this may lead, on average, to the same level of prosocial behaviors across cultures (Giner Torrens & Kärtner, 2017). Accordingly, cultural effects may not be visible in the mean level of young preschoolers' prosocial behaviors, but in their relationships to specific, social-cultural factors, such as parents' goals (Kärtner et al., 2010),

and practices (Giner Torréns & Kärtner, 2017). Thus, we compared the relationship between young preschoolers' prosocial behaviors and three kinds of social-cultural factors (i.e., parents' values, goals, and practices) (Chapter 4). By examining these processes we move closer to discussing social cultural factors that might influence the development of prosocial behavior. We next turn to these factors which are categorized as intermediate.

***Intermediate social contextual factors (parents and teachers): Value, goals, and practices.*** Socializing agents (e.g., parents and teachers) transmit their values and goals to children (Verkasalo, Lönnqvist, Lipsanen, & Helkama, 2009), for instance, through socialization practices (Grusec, & Kuczynski, 1980). Values are the core, situation-pervasive ideas and beliefs of an individual or society that guide their behaviors in daily situations (Verkasalo et al., 2009). Two types of values, self-enhancement and self-transcendence values, have been found to be strongly associated with prosocial behaviors (Schwartz, 1973; 2006). Specifically, self-enhancement values emphasize personal success, status and dominance in the society, and are negatively related to prosocial behaviors. Self-transcendence values stress the welfare of others, and are positively related to prosocial behaviors (for a review, see Schwartz, 2010). However, this research evidence is drawn from studies on adolescents and adults, leaving it unclear whether these values may relate to prosocial behaviors in young children already. Therefore, in **Chapter 4**, we examined whether parents' values (i.e., self-enhancement and self-transcendence) relate to young preschoolers' prosocial behaviors.

To date, researchers have focused on three types of parents' socialization goals (i.e., obedience, prosocial behavior, and autonomous goals) in relation to young children's prosocial behaviors, and found that obedience goals were positively related to toddlers' helping (Kärtner et al., 2010), while no relationships were found for prosocial behavioral or autonomous goals and helping. However, this study only focused on helping in one age group (i.e., 19 months) cross-sectionally. In addition, parents' goals may contribute to the development of prosocial behaviors longitudinally because toddlers may need time to internalize these goals. Thus, in **Chapter 4**, we examined the relationship between these three aforementioned goals (i.e., obedience, prosocial behavior, and autonomous goals) and a range of prosocial behaviors. Additionally, in **Chapter 5**, we examined whether and how parents' goals when toddlers were 22 months (wave 1) would predict toddler's prosocial behaviors 6- and 12-months later (wave 2 and 3 respectively).

How parents' practices relate to prosocial behaviors in young children has drawn considerable research interest over the past few years (e.g., Dahl, 2015; Dahl et al., 2017;

Gross et al., 2015; Hammond et al., 2017). To date, most studies have concentrated on specific parents' practices, such as parents' encouragement/praise of prosocial behaviors (e.g., Dahl, 2015), and providing opportunities to help (e.g., Hammond et al., 2017). However, parents may use more than one kind of practice in supporting prosocial behaviors. The current dissertation focused on how parents' *combined* practices (including cognitive support, praise, encouragement, and social reward) play a role in prosocial behaviors by asking parents to report on how frequently they used these practices in daily activities. Similar to parents' goals, in **Chapter 4** we examined this relationship at young preschool children from Dutch, Indian and Chinese samples. In addition, in **Chapter 5** we examined dynamic relationships between parents' practices and toddlers prosocial behaviors from early toddlerhood (22-month), to late toddlerhood (28-month) and to the early preschooler ages (34-months).

Next to examining the role of parents, the current dissertation focused on how daycare teachers' practices related to prosocial behaviors from early toddlerhood to the early preschool age (**Chapter 5**). Daycare teachers are important socializing agents, who may provide social contexts for prosocial interactions to develop within classrooms through their practices (Eisenberg, Cameron, Tryon, & Dodez, 1981; Kienbaum, 2001). However, there is a lack of studies on how teachers' practices may (or may not) play a role in the early development of prosocial behaviors.

***Situational factors.*** Situational factors comprise a number of different characteristics such as situational cues (objective physical stimuli in an environment), psychological situation characteristics (subjective meanings and interpretations of situations), and/or situation classes (Rauthmann, 2017). In the current dissertation, we focused on three situational factors, that is, resource availability, affiliation, and choice. In addition, by using experimental designs, we manipulated the situations under which prosocial behaviors occur, in order to examine a stronger causal link between these situational contextual factors and prosocial behaviors.

***Resource availability.*** How resource availability may affect prosocial behaviors has gained growing interest in the past two decades (e.g., Posid, Fazio, & Cordes, 2015). This line of research can directly speak to the question about how prosocial behaviors are affected by the cost of them. Based on the rationale that contextual factors can affect different prosocial behaviors, it is plausible that resource availability may affect both sharing and helping. Nevertheless, resource availability is especially relevant for sharing, because children need to give up some resources in order to share. Especially, this may be important for 1- and 2-year-

olds' sharing, because they have just earned to engage in this behavior and are (sometimes) reluctant to do so. Indeed, Even 1- and 2-year-olds are capable of differentiating between a resource poor condition (e.g., 2 items) and resource rich condition (e.g., 8 items) (e.g., Sarnecka & Gelman, 2004; Xu, 2003), implying that they may be able to recognize the cost involved in sharing based on the number of resources available. Nevertheless, to date no experimental study using standardized behavioral assessments has directly manipulated resource availability to examine 1- and 2-year-olds' sharing. In the current dissertation, we examined the role of resource availability in two chapters for two aspects of sharing. First, it may affect the behavior itself. Studies in preschoolers have shown that preschoolers were less likely to share in a resource poor (than rich) condition, because the cost of sharing one item is relatively higher. Second, it may affect happiness after sharing. Happiness in a resource poor condition may be higher than in a resource rich condition, as researchers found that costly sharing leads to more happiness than non-costly sharing (Aknin et al., 2012; 2015). However, previous studies compared whether the sharing was costly or not, but not the degree to which the sharing was costly (e.g., high or low). Thus, more studies are needed in further examining this question.

In the current dissertation, we examined the role of resource availability in two chapters. In **Chapter 3**, we examined whether the increase of happiness after sharing would differ based on how many resources were available for sharing. In **Chapter 6**, we examined the effect of resource availability on three types of young toddlers' prosocial behaviors ( i.e., sharing, instrumental helping, and empathic helping).

*Affiliation.* Drawn from evolutionary theory, the relationship between the experience of social affiliation and prosocial behaviors may be fundamental, automatic and implicit (Over & Carpenter, 2009), and building a sense of affiliation is an important way in promoting toddlers' prosocial behaviors (e.g., Giner Torrens & Kärtner, 2018). Nevertheless, at what age social affiliation may promote which type of prosocial behavior is unclear. For instrumental helping, toddlers (up to 25 months old) were more likely to engage in instrumental helping towards experimenters who moved in synchrony (Cirelli, Einarson, & Trainor, 2014), mimicked previously (Carpenter, Uebel, & Tomasello, 2013), participated in interactive play with them (Barragan & Dweck, 2014). Moreover, they were more likely to help after a prime of affiliation (Over & Carpenter, 2009). However, studies in 30- and 42-month-olds showed that instrumental helping was not affected by the experience of reciprocity (Warneken & Tomasello, 2013), implying a null effect of affiliation on instrumental helping after 25 months of age. In addition, if the affiliation effect on prosocial

behaviors is fundamental, then we would expect this effect on other types of prosocial behaviors, in addition to instrumental helping. Nevertheless, to date only one study on reciprocity showed that 30-month-olds' sharing was not affected by experience of reciprocity (Warneken & Tomasello, 2013), and no study has directly tested a social affiliation effect on sharing before age three. In **Chapter 7** we observed toddlers' instrumental helping and sharing after priming of affiliation, in order to further examine the boundaries for how affiliation may, or may not affect prosocial behaviors at early ages.

*Choice.* Having choice in sharing *initially*, seems to be important for stimulating sharing *subsequently* (Chernyak & Kushnir, 2018), because children can “*rationally infer their prosociality through the process of making difficult, autonomous choices*” (p. 1971, Chernyak & Kushnir, 2013). In one study, 3- to 4-year-olds were given choice, or were commanded to share with a puppet initially (phase 1), and then they were given opportunity to share with a new puppet subsequently (phase 2). Indeed, for those who did share in phase 1, children who were given choice shared more than those who were commanded to share in phase 2 (Chernyak & Kushnir, 2013). However, whether the choice is important for prosocial behavior under age three is unclear. The presence of a positive choice effect on subsequent prosocial behaviors is based on two priors. First, children should be able to understand that they have a choice. Empirical evidence showed children younger than age three may already meet this prior, for instance, they can reason about alternative possibilities for actions (Kushnir, 2012). Second, and more importantly, they should spontaneously engage in prosocial behaviors when having a choice initially. This, however, may not be the case even for 3-year-olds. Instructions (including commanding) seem to be important, and sometimes even necessary, for stimulating toddlers' and young preschoolers' prosocial behaviors (e.g., Brownell, Svetlova, & Nichols, 2009). Thus, giving choice *initially* may not have effect on 3-year-olds' *subsequent* sharing, because they may still need some instructions before they could share when having a choice. In **Chapter 8**, we examined the potential effect of choice on 2- to 3-year-olds' *subsequent* sharing, in order to further test the boundaries of when giving choice is useful to young children's subsequent sharing behavior.

### Study Design and Samples

The samples used in this dissertation are described below, and their most important characteristics are summarized in Table 1.

**Sample 1.** The total sample for the meta-analysis consisted of  $k = 298$  samples stemming from 174 articles, together containing  $N_{\text{mean}} = 28,238$  participants. Empirical (experimental and/or observational) studies that examined instrumental helping and/or

sharing on an individual level rather than group, class, daycare/school level, with at least two age groups which were 18 years or younger, and published in peer-reviewed journals (in English) before January 7, 2018 were included. Information coded from these studies included study type (experimental or observational), design (cross-sectional or longitudinal), definition of target behavior (instrumental helping and/or sharing), mean age of each group, manipulations in the experiment (e.g., the experimenter gave 12 or 30 stickers to the children, and ask them to share these stickers with either one or multiple recipients, Posid, Fazio & Cordes, 2015), and categories of dependent variables (e.g., the likelihood that participants helped or shared, number of items shared). In addition, four potential moderators of age differences on helping and/or sharing were coded as well, namely recipients' need (high vs. low/unknown); reciprocity of recipient (family, friend, enemy, and stranger/unknown); sociability of recipient (prosocial, antisocial, and neutral/unknown); and object shared (food, toy and other objects, and money).

**Sample 2.** The second sample consisted of 115 Dutch toddlers (and their parents and teachers) who participated in a 3-wave longitudinal study on prosocial behaviors. Participants were recruited through 23 daycares in several urban or suburban areas across the Netherlands. Participants mainly came from middle-class backgrounds; the majority of the parents identified as Ethnic Dutch (94.7% mothers, 91.6% fathers). Most parents (82.1% mothers, 72.6% fathers) had a Bachelor's degree or higher. Toddlers participated in standardized, (prosocial) behavioral tasks at each wave. Specifically, they participated in three standardized behavioral tasks (one for sharing, instrumental helping and empathic helping) *across* three waves (wave 1,  $n = 115$ ,  $M = 21.82$ ,  $SD = 3.60$ ; wave 2,  $n = 105$ ,  $M = 28.19$ ,  $SD = 4.05$ ; and wave 3,  $n = 101$ ,  $M = 34.09$ ,  $SD = 3.98$ ). Also, at wave 2, 76 toddlers participated in a priming experiment, and at wave 3, 95 toddlers (young preschoolers at wave 3) participated in a choice experiment. Next to assessing the toddlers, at each wave their parents (mainly mothers) also reported on their children's prosocial behaviors, parents' values, child-rearing goals and socialization practices related to prosocial behaviors. Moreover, at each wave, daycare teachers reported on their own socialization practices related to prosocial behaviors.

This sample was used in 6 empirical chapters. Specifically, **Chapter 3** included toddlers who participated at wave 1 (study 1) and at wave 3 (study 2). This chapter used data on toddlers' happiness while interacting with the experimenters in three behavioral tasks (sharing, instrumental helping and empathic helping). **Chapter 4** included toddlers and their parents who participated at wave 3. This chapter used data on toddlers' behaviors in three behavioral tasks as mentioned above (sharing, instrumental and empathic helping), and

parents' reports on their children's prosocial behaviors, their own values, goals, and socialization practices related to prosocial behaviors. **Chapter 5** included all toddlers ( $N = 115$ ), their parents and teachers that participated at any wave in the 3-wave longitudinal study. This chapter used data at each wave, including toddlers' behaviors in three behavioral tasks as mentioned above, parent ratings of their own goals and socialization practices related to prosocial behaviors, and teacher-reports on their socialization practices related to prosocial behaviors. **Chapter 6** included 113 toddlers who participated at wave 1, and 9 extra toddlers needed to round out the numbers for conditions. This chapter used data on toddler's sharing, instrumental and empathic helping and information on resource availability. **Chapter 7** included 76 toddlers who participated in the priming experiment at wave 2. This chapter used data on toddlers' behavior in one new instrumental helping task, and one new sharing task. These tasks are different from the three behavioral tasks used at all three waves. **Chapter 8** included 95 toddlers who participated in a choice experiment which was only assessed at wave 3. This chapter used data on their behaviors in a new sharing task.

**Sample 3.** The sample consisted of 91 Chinese preschoolers ( $M = 48.54$  months,  $SD = 6.15$  months), recruited through 2 daycares in Shanghai. Most parents (80%) have either a university or professional degree. Preschoolers participated in the same three standardized, behavioral tasks (sharing, instrumental helping, and empathic helping) as mentioned above. In addition, 75 parents (mothers) filled in the questionnaire on their children's prosocial behaviors, parents' values, goals and socialization practices related to prosocial behaviors. This sample was used in **Chapter 3** (study 3) and **Chapter 4**.

**Sample 4.** The sample consisted of 37 Indian preschoolers ( $M = 34.71$  months,  $SD = 7.82$  months), recruited through 2 daycares in Delhi. All parents have either a university or professional degree. Preschoolers participated in two standardized, (prosocial) behavioral tasks (sharing and instrumental helping) as mentioned above. In addition, all parents (mothers) reported on their children's preschoolers' prosocial behaviors, parents' values, goals and socialization practices related to prosocial behaviors. This sample was used in **Chapter 4**.

### **Outline of this dissertation**

Figure 1 provides a schematic overview of the associations and concepts that were tested in each chapter. **For examining the developmental trajectories of prosocial behaviors (aim 1)**, we conducted a meta-analysis on the development of two prosocial behaviors (i.e., instrumental helping and sharing) from infancy to adolescence (**Chapter 2**), and a longitudinal study on the development of three prosocial behaviors (i.e., instrumental

helping, sharing and empathic helping) from early toddlerhood to the early preschool age using standardized behavioral measures (**Chapter 5**). **For examining the potential roles of social contextual factors (aim 2)**, we focused on three levels of social contextual factors and conducted empirical studies accordingly. Specifically, at the most distal level (*culture*), we conducted cross-sectional studies that examined the emotional benefits (i.e., increase of happiness after prosocial behaviors) as psychological mechanism in Dutch toddlers and young preschoolers, as well as young Chinese preschoolers (**Chapter 3**). Also, we conducted a cross-sectional study, in which we compared young preschoolers' prosocial behavior from three cultural samples (Dutch, Indian and Chinese), and tested whether parents' values, goals, and practices could explain any (potential) between- and within-culture differences in prosociality (**Chapter 4**). *On the intermediate level*, next to examining how parents' values, goals and practices related to young preschooler' prosocial behavior within each culture (i.e., using Dutch, Indian and Chinese sample, **Chapter 4**), we further examined in the longitudinal study how Dutch parents' goals and practices, as well as teachers' practices, related to the *development* of instrumental helping, sharing and empathic helping from early toddlerhood to the early preschool age (**Chapter 5**). *On the situational level*, we conducted experimental studies focusing on three situational factors. Specifically, we examined how resource availability affect young toddlers' instrumental helping, sharing and empathic helping (**Chapter 6**) and their happiness after these behaviors (**Chapter 3**); how a priming of affiliation may or may not lead to more instrumental helping and sharing in toddlers (**Chapter 7**); and how having choice may or may not play a role in young preschoolers' *subsequent* sharing behaviors (**Chapter 8**).



**Table 1.** Characteristics of the Samples Used in the Dissertation, Organized by Chapter and Related to Aims

Chapter	Sample N	Age of the participants	Measurement-Type	Behaviors	Design	Developmental trajectory (Aim 1)	Socialization processes (Aim 2)
2	297 samples, $N_{\text{mean}} = 28,238$	From 12-month to 18-year		Sharing Helping	Meta-analysis	From infancy through adolescence	
3	$N = 95$ (Dutch sample) $N = 91$ (Chinese sample)	21 months (Study 1, Dutch sample) 34 months (Study 2, Dutch sample) 48 months (Study 3, Chinese sample)	Observation of standardized behavioral assessments	Sharing Instrumental helping Empathic helping	Correlational Cross-sectional	Toddlerhood (study 1) Early preschool age (study 2 and 3)	Two cultural contexts • Dutch • Chinese
4	$N = 101$ (Dutch sample) $N = 37$ (Indian sample) $N = 91$ (Chinese sample)	34 months (Dutch sample) 34 months (Indian sample) 48 months (Chinese sample)	Observation of standardized behavioral assessments	Sharing Instrumental helping Empathic helping	Correlational Cross-sectional	Early preschool age	Three cultural contexts • Dutch • Indian • Chinese Family • Parents' Values • Parents' Goals • Parents' Practices
5	$N = 115$ (Dutch sample) $N = 105$ (Dutch sample) $N = 101$ (Dutch sample)	21 months (wave 1) 28 months (wave 2) 34 months (wave 3)	Observation of standardized behavioral assessments Questionnaires completed by parents and teachers	Sharing Instrumental helping Empathic helping	Correlational Longitudinal	From early toddlerhood to early preschool age	Family • Parents' Goals • Parents' Practices Daycare • Teachers' Practices
6	$N = 122$ (Dutch sample)	18 months 24 months	Observation of standardized behavioral assessments	Sharing Instrumental helping Empathic helping	Experimental	Toddlerhood	Number of resources
7	$N = 76$ (Dutch sample)	28 months	Observation of standardized behavioral assessments	Sharing Instrumental helping	Experimental	Toddlerhood	Affiliation
8	$N = 95$ (Dutch sample)	34 months	Observation of standardized behavioral assessments	Sharing	Experimental	Early preschool age	Having choice



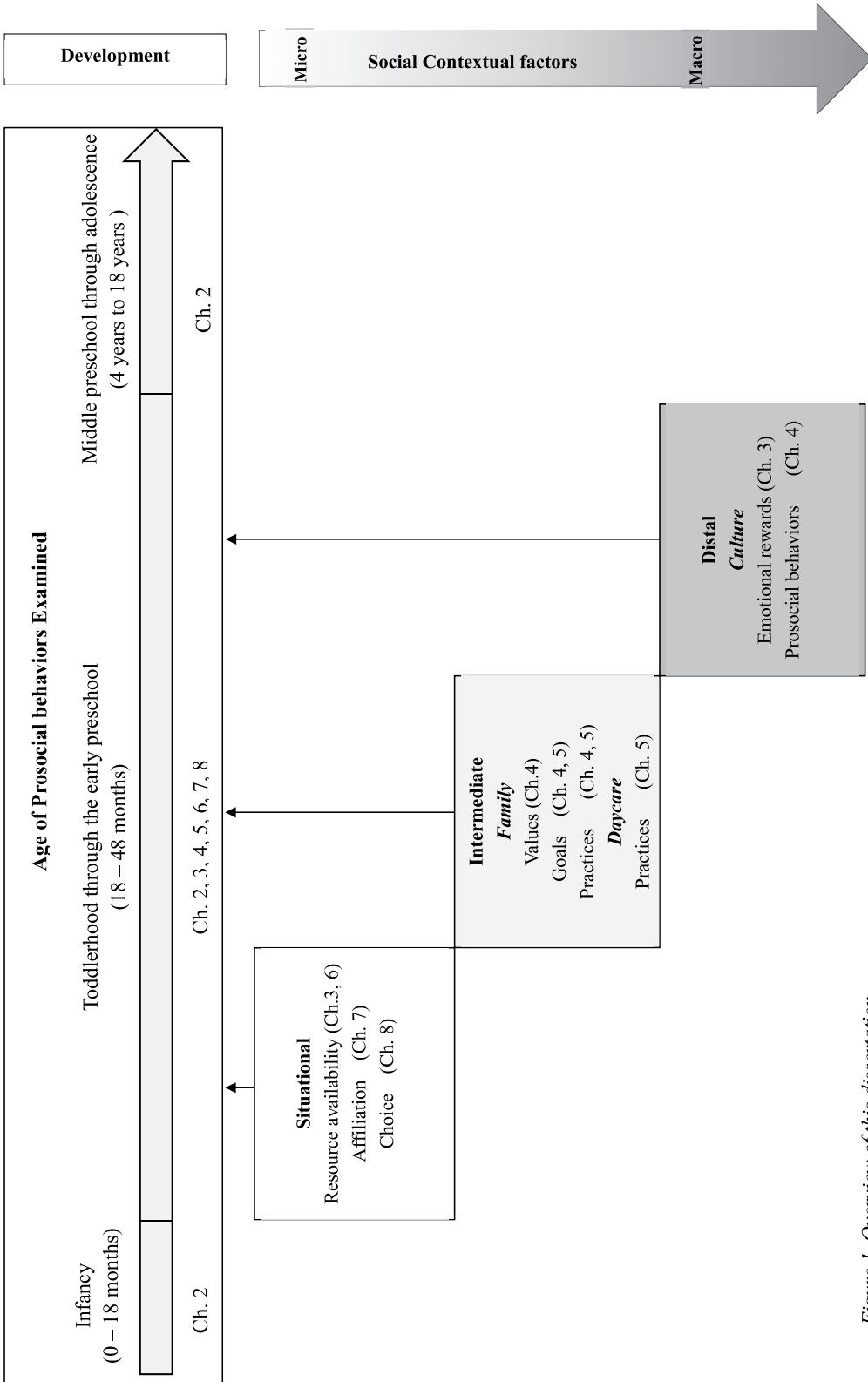


Figure 1. Overview of this dissertation.

## Chapter 2

### **A meta-analysis on age difference in helping and sharing behaviors under 18 years old**

Author note:

Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *A meta-analysis on age difference in helping and sharing behaviors under 18 years old*. Manuscript to be submitted for publication.

Y. Song and J. S. Dubas conceptualized the study, M. L. Broekhuizen gave advice and feedback. Y. Song did the main literature search. Y. Song coded and trained graduate students who coded the data. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### Abstract

The development of prosocial behavior has been of considerable research interest since the early 1970s, yet the developmental trajectories of these behaviors are still unclear. Some researchers propose that these behaviors increase in frequency and complexity from infancy to adolescence, while others suggest this is not the case, as children become more selective in their behaviors. Also, the past two decades have witnessed a resurgence on this topic, with a growing focus on the possible cognitive abilities and motivations that contribute to these developments, especially before age three. Thus, the current meta-analysis aimed at investigating the general development (age differences) in helping and sharing behaviors from infancy to adolescence and whether and how recipients' features (need, reciprocity, and sociability) moderate these (possible) age differences.

In total 174 articles on observational and experimental studies with at least two age groups under age 18 that examined helping and/or sharing behaviors were included. After aggregation we found 298 independent effect sizes ( $N = 28,238$ ). Results showed an increase of helping behaviors within infancy, from infancy to toddlerhood, from the preschool age to childhood, and within childhood, while no increases were found within toddlerhood and within the preschool age. The age differences from toddlerhood to the preschool age, from childhood to adolescence, and within adolescence were not reliable due to a lack of studies. For sharing, an increase was found from infancy to toddlerhood, and from the early preschool age through late childhood, while no increase was found from toddlerhood to the preschool age, or from childhood through adolescence. The age differences within infancy and within toddlerhood were not reliable due to a lack of studies. Within the preschool age and within childhood, individuals showed a steeper age difference in sharing toys, compared with sharing food. More studies are needed that not only focus on age differences but also on the mechanisms that underlie these developmental trajectories of prosocial behaviors.

*Keywords:* prosocial behavior, helping, sharing, developmental trajectories, meta-analysis

Although some studies suggest that primates could help and share under certain situations (e.g., De Waal, 1989; Warneken, Hare, Melis, Hanus, & Tomasello, 2007; Warneken & Tomasello, 2006, 2009a), prosocial behaviors are still recognized as exceptional abilities belonging almost exclusively to human beings. After more than two thousand years of philosophical discussions regarding the nature of prosocial behaviors, psychologists began to investigate this topic empirically in the past half century. Developmental psychologists have focused on the emergence and ontogeny of prosocial behavior and have examined these behaviors across the life span, with special attention to youth under 18 years (e.g., Handlon & Gross, 1959; Knafo & Plomin, 2006; Ongley, Nola, & Malti, 2014; Presbie & Kanareff, 1970).

One topic that has drawn great attention from researchers is the development of prosocial behaviors during infancy and beyond. Witnessing numerous empirical studies with inconsistent results, many narrative reviews have been conducted in an attempt to bring order to this literature (e.g., Baillargeon, Morisset, Keenan, Normand, Jeyaganth, Boivin, & Tremblay, 2011; Davidov, Vaish, Knafo-Noam, & Hastings, 2016; Dunfield, 2014; Eisenberg, Fabes, & Spinrad, 2006; Martin & Olson, 2015; Padilla-Walker & Carlo, 2014; Paulus, 2014a; Warneken & Tomasello, 2009b). Moreover, two meta-analyses have been conducted. The first comprehensive meta-analysis on the emergence and development of prosocial behaviors was conducted nearly 20 years ago (Eisenberg & Fabes, 1998). This study investigated the development of helping, sharing, and comforting from infancy through adolescence. Results showed a significant increase of helping when comparing younger to older infants (within 0- to 3-year-olds), preschoolers (3- to 6-year-olds) to children (6- to 12-year-olds), and younger to older children (within 6- to 12-year-olds), but no change comparing infants to preschoolers, younger to older preschoolers, or younger to older adolescents (12- to 18-year-olds). For sharing, increases were found from the preschool age through adolescence, but not in younger ages. Additionally, the recipient's identity (i.e., child or adult) moderated the increase of an aggregate of prosocial behaviors. Comparing preschoolers to children, younger to older children, and younger to older adolescents, preschoolers and children were more prosocial towards adults, while adolescents were more prosocial towards children. The second meta-analysis (Ibbotson, 2014) focused on the

dictator game as a measure of prosocial behavior (sharing). A positive relationship between age and sharing from the preschool age to young adulthood was found, indicating that as people age they increasingly share more.

These two meta-analyses provide initial insights into the developmental trajectories of prosocial behaviors before age 18, but the picture is still unclear, and many important questions remain. First, a resurgence of interest in the development of prosocial behavior has occurred (Davidov et al., 2016), covering a wide-range of prosocial behavior tasks, not just the dictator game. Second, with the further development of age-appropriate research designs, there has been a substantial increase in studies focusing on children younger than age three (for reviews, see Dunfield, 2014; Martin & Olson, 2015; Paulus, 2014b; Paulus & Moore, 2012), which is now regarded as the age at which the emergence and early development of helping and sharing occurs. However, as the previous meta-analysis by Eisenberg and Fabes (1998) categorized children before age 3 into one category (infants), there is a need to further examine age differences during this specific period. Third, recent studies have introduced new perspectives and possible mechanisms explaining age-related change, and that calls for examining more possible moderators in explaining the development of prosocial behaviors. For example, features of the recipients (e.g., degree of needs, possibility of reciprocity, and sociability of the recipient) have drawn great attention from researchers (for a review, see Martin & Olson, 2015). Overall, a new meta-analysis will be timely and useful for a better understanding of the emergence and development of prosocial behaviors: it could pinpoint when these behaviors first appear and outline the growth trajectory afterwards. In addition, these results could further aid in exploring whether the hypothesized mechanisms (e.g., certain social cognitions and motivations) seem plausible in explaining age differences in these behaviors.

Inspired by the previous meta-analyses (Eisenberg & Fabes, 1998; Ibbotson, 2014), and aimed at answering the questions mentioned above, the current meta-analysis focuses on the development of children's prosocial behavior from age 0 to 18, with a focus on the two earliest forms of prosocial behavior (helping and sharing). The following questions are investigated: (1) What are the (general) developmental trajectories of helping and sharing behaviors exhibited from infancy through adolescence, with a specific focus on the early ages

(0- to 3-year). (2) What features of the recipients moderate age differences in the prosocial behavior development (degree of needs, possibility of reciprocity, and sociability of the recipient)? For descriptive purposes we also report the average likelihood (percentage) of children who actually helped/shared in each age period.

### **Potential Mechanisms Behind the Changes with Age in Helping and Sharing**

A wide array of mechanisms have been proposed to affect the emergence and the development of prosocial behaviors. More importantly, it is highly possible that any single mechanism alone cannot explain the overall development of prosocial behaviors (Davidov et al., 2016). Considering that we mainly focus on the general development of helping and sharing through adolescence, we briefly introduce the two mechanisms that relate to this topic: abilities that are necessary for prosocial behaviors (i.e., cognition) and the willingness that actually drives these behaviors (i.e., motivation). Noteworthy, mechanisms driving development (and tasks that test them) do not always fall on one side of this dichotomy (cognition or motivation), and it is not realistic to discuss one without considering the effect of the other. However, to understand the influences of both cognitions and motivations, we discuss both mechanisms individually, in an attempt to disentangle how each mechanism should affect the age-related results. Table 1 provides a summary of our expectations for age differences based on the development of cognitive abilities and the (to-be-discussed) motivations.

**Table 1. General Development of Helping and Sharing: Expectations Based on the Development of Cognitive Abilities and Motivations**

	Younger Infants vs. Older Infants	Infants vs. Toddlers	Younger Toddlers vs. Older Toddlers	Toddlers vs. Preschoolers	Younger Preschoolers vs. Older Preschoolers	Preschoolers vs. Children	Younger Children vs. Older Children	Children vs. Adolescents	Younger Adolescents vs. Older Adolescents
<b>Cognitive abilities</b>									
<u>Understanding and identifying problems/solutions.</u>									
Expectations:	Helping: Emerge and increase Sharing: Has not emerged yet	Helping: Increase Sharing: Emerge and Increase	Helping: Increase No specific expectation	Both behaviors: Increase or stable	Increase or stable	Accelerated increase	Accelerated Increase	Increase	Increase
Main reason(s)	Helping: Capable of understanding goal and goal-directed actions Sharing: Capable of recognizing unfair distribution; Not capable of restoring fairness	Helping: Prerequisite abilities develop Sharing: Prerequisite cognitive abilities emerge and develop	Both behaviors: Prerequisite abilities develop	Theory of Mind (ToM) develop ToM relates to prosocial behavior		ToM continues to develop ToM relates to prosocial behavior	The association between Theory of Mind (ToM) and prosocial behavior is stronger in childhood than in preschool years	ToM continues to develop ToM relates to prosocial behavior	ToM continues to develop ToM relates to prosocial behavior
Key reference(s)	Dunfield, 2014	Dunfield, 2014	Dunfield, 2014	Carlo et al., 2010; Imuta et al., 2016	Carlo et al., 2010; Imuta et al., 2016	Moore & Underwood, 1982; Carlo et al., 2010; Imuta et al., 2016		Carlo et al., 2010;	Carlo et al., 2010;
<u>Moral reasoning.</u>									
Expectations	n.a.	n.a.	n.a.	n.a.	Increase or stable	Increase	Accelerated increase with altruistic motivation	Accelerated increase with altruistic motivation	Accelerated increase with altruistic motivation



Main reason(s)	Moral reasoning comes in, but it's unclear whether it affects <i>actual</i> behavior yet	Moral reasoning develops, and affects <i>actual</i> behaviors	Higher level moral reasoning develops from childhood to late adolescence
Key reference(s)	Kogut, 2012	Kogut, 2012	Carlo et al., 2003
<b>Motivations</b>			
<b>Perspective 1 - Altruistic:</b>			
Expectations	Increase, stable, or decrease	<b>Increase</b>	<b>Accelerated increase</b>
Main reason(s)	Altruistic motivation keeps driving prosocial behaviors Egoistic motivation leads to less, but Altruistic motivation leads to more prosocial behaviors	Altruistic and Egoistic motivations keep driving prosocial behaviors Egoistic motivation leads to less, but Altruistic motivation leads to more prosocial behaviors	Altruistic and Egoistic motivations keep driving prosocial behaviors Altruistic motivation is strengthened from childhood onwards Social norms are continuously strengthened from childhood to late adolescence
<b>Perspective 2 - Egoistic:</b>			
Expectations	<b>Increase</b>	Increase, stable, or decrease	<b>Accelerated increase</b>
Main reason(s)	Altruistic motivation comes in Egoistic motivation keeps driving prosocial behaviors	Altruistic and Egoistic motivations keep driving prosocial behaviors Egoistic motivation leads to less, but Altruistic motivation leads to more prosocial behaviors	Altruistic and Egoistic motivations keep driving prosocial behaviors Altruistic motivation is strengthened from childhood onwards Social norms are continuously strengthened from childhood to late adolescence
Key reference(s)	Eisenberg et al., 2016; Martin & Olsen, 2015	Eisenberg et al., 2016; Hay & Cook, 2007; Martin & Olsen, 2015	Eisenberg et al., 2016; Hay & Cook, 2007

\* Orange: Expecting an increase of prosocial behaviors; n.a. = not applicable.

### **Cognitions.**

***The early development of helping and sharing (0- to 3-year-olds).*** Based on a previous review by Dunfield (2014), cognitive abilities necessary for the emergence and development of prosocial behavior can be divided into two categories: (1) the ability to identify the problem, and (2) the ability to understand the reason for the problem. Here the problem refers to an unmet instrumental need (i.e., failing to complete a goal-directed behavior) for helping, or an unmet material desire (i.e., being unsuccessful in retrieving a particular resource) for sharing. The reasons can, of course, vary from situation to situation. Currently, most researchers agree that helping and sharing require different aspects of cognitive abilities, at least when emerging and during their early developments (Dunfield, 2014). Consequently, we introduce these behaviors separately for the early development of these behaviors.

***Helping.*** First, for identifying the problem, helping calls for the ability of representing other's instrumental needs. Infants develop the prerequisite abilities for the emergence of helping behavior between the end of the first year and the beginning of the second year. It has been shown, for example, that 9-month-olds could already interpret goal directed actions (e.g., "jumping over an obstacle", Csibra, Gergely, Bíró, Koós, & Brockbank, 1999). In addition, children could already make a difference between intentional and unintentional behaviors around 12-months of age (Behne, Carpenter & Tomasello, 2005). Secondly, representing the solutions, helping requires the ability to identify the actions that could be performed to complete the goal. For instance, infants could infer adults' intended act through failed goal-directed actions (e.g., Brandone & Wellman, 2009; Meltzoff, 1995). Based on this evidence, we expect to find an increase of helping within infancy, from infancy to toddlerhood, and within toddlerhood (Table 1).

***Sharing.*** First, for identifying the problem, children need to have the ability to understand another's unmet material desire and the fact that resources are unequally distributed. Research shows that children already have a sense of fairness before their second birthday. For example, one study showed that 19-month-olds looked significantly longer to an unequal condition than to an equal condition, implying that they knew the difference between equal and unequal distributions (Sloane, Baillargeon, & Premack, 2012). In addition, around this age, when asked which distributor they would like to have, toddlers had the tendency to choose the toy they observed acting fairly rather than unfairly, indicating they have a positive response towards fairness and a negative response to unfairness (Geraci & Surian, 2011). Second, representing the solutions, sharing asks for the ability to redistribute the resources,

including the ability to overcome children's own material desire of owning the resources. During the second year of life, children begin to share their own resources spontaneously (Brownell, Iesue, Nichols, & Svetlova, 2013; Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013). However, this behavior is not consistent and is affected by situational factors, such as the relationship between children and sharees (Brownell et al., 2013; Moore, 2009; Svetlova, Nichols, & Brownell, 2010), which highlight the interrelatedness with motivations, and how explicit others are in making their material desires known (Brownell et al., 2013). Nevertheless, overall, we expected an increase in sharing from infancy to toddlerhood. Because of the inconsistent results found within toddlerhood, no specific hypothesis was made about age differences within toddlerhood (Table 1).

***The development of helping and sharing (3- to 18-year-olds).*** As mentioned above for the emergence of prosocial behavior, cognitive abilities of understanding and identifying (1) others' problems, and (2) the solution to the problems are prerequisites of prosocial behaviors (e.g., Dunfield, 2014). In line with this structure, we first introduce abilities of mental understanding (i.e., Theory of Mind), then abilities of moral reasoning that are salient in the literature. Finally, we state our expectations for age differences in prosocial development.

*Theory of Mind.* Theory of Mind (ToM) refers to the ability to recognize others mental states, which includes their intentions, beliefs and thoughts, as well as the abilities to predict and understand other's behaviors and emotions based on these mental states (Dumontheil, Apperly, & Blakemore, 2010). Many studies support that these abilities increase during the preschool years (for a meta-analysis, see Wellman, Cross, & Watson, 2001), childhood (e.g., Fabes, Carlo, Kupanoff, & Laible, 1999; Moriguchi, Ohnishi, Mori, Matsuda, & Komaki, 2007), and adolescence (e.g., Van der Graaff, Branje, De Wied, Hawk, Van Lier, & Meeus, 2014; Vetter, Altgassen, Phillips, Mahy, & Kliegel, 2013).

In theory, a positive relationship between prosocial behavior and understanding others' mental states (e.g., Theory of Mind) has long been established (e.g., Carlo & Randall, 2002; Eisenberg & Mussen, 1989; Hay & Cook, 2007), and empirical evidence regarding this positive relationship has been found for preschoolers (e.g., Caputi, Lecce, Pagnin, & Banerjee, 2012; Denham, McKinley, Couchoud, & Holt, 1990), children (e.g., Eisenberg et al., 2006; Knight, Carlo, Basilio, & Jacobson, 2015), and adolescents (e.g., Güroğlu, Crone, & van den Bos, 2014; van den Bos, van Dijk, & Crone, 2012). More importantly, three meta-analyses on this relationship repeatedly demonstrate this general positive relationship (Carlo, Knight, McGinley, Goodvin, & Roesch, 2010; Imuta, Henry, Slaughter, Selcuk, & Ruffman,

2016; Underwood & Moore, 1982). However, the strength of this association varies for specific age groups, showing that it is stronger in childhood than in the preschool period (Imuta et al., 2016), or in childhood and adolescence (age 6-17) than during the preschool ages (Carlo et al., 2010). Furthermore, for the preschool years, Carlo et al. (2010) found no relationship between mental understanding and prosocial behavior, while Imuta et al. (2016) found a small but significant relationship. Also, Imuta et al. (2016) found that this relationship was significant for helping, but not for sharing, implying that these two behaviors might require different cognitive abilities. However, Imuta et al. (2016) argued that the weak relationships might stem from parents routinely enforcing the social norms of sharing with others, which eliminates the need for social insight to act as a trigger for sharing.

Thus, given that theoretically advancing mental understanding is expected to enhance prosocial development (Eisenberg, Cumberland, Guthrie, Murphy, Shepard, 2005), and, empirically, a positive relationship between prosocial behavior and mental understanding has been found, we expect that prosocial behaviors (both helping and sharing) develop from the preschool ages through late adolescence. Especially, given that the relationship between ToM and prosocial behavior is stronger within childhood than within the preschool period, we expect that, in comparison to the (possible) increase within the preschool age, the increase will be faster (i.e., a larger age effect) from preschool through childhood, compared to younger and older age groups (Table 1).

*Moral reasoning.* Moral reasoning is positively related to various types of prosocial behaviors (e.g., Carlo & Randall, 2002; Eisenberg, Zhou, & Koller, 2001; Stewart & McBride-Chang, 2010), although there might be a gap between moral reasoning abilities and prosocial behavior. That is, in the early development of moral reasoning, children might show an endorsement of rules when answering questions but a violation of these rules in action. For instance, during sharing tasks, children from 3-6 year-olds explicitly express that they should follow social norms (share equally with others), but they still choose selfishly (keep more for themselves and share less than half to another). It is not until 7- to 8-years of age that children could show consistency between knowing and doing (Kogut, 2012). Among children, lower levels of moral reasoning were positively related to prosocial behaviors of lower quality (e.g., public helping) and negatively to behaviors of higher quality (e.g., private helping, or helping in dire circumstances), while higher levels of moral reasoning were positively related to behaviors of higher quality (Carlo, Hausmann, Christiansen, & Randall, 2003). Based on these findings, an increase in prosocial behavior is expected (Table 1), especially from childhood to adolescence, on tasks that test a genuine altruistic motivation of prosocial

behaviors (e.g., anonymous, one-trial dictator game, House, Henrich, Brosnan, Sarah, Silk, & Joan, 2012).

**Motivations.** Cognitive abilities (e.g., recognizing other's needs and the way to fulfill these needs) provide the necessary basis for prosocial behavior, but it is motivations that actually trigger these behaviors (Eisenberg, Van Schyndel, & Spinrad, 2016). However, motivations for prosocial actions are diverse, unclear, and difficult to access (Eisenberg et al., 2016). In this study, we use the altruistic versus egoistic motivation dichotomy, which is based on the ultimate goal of prosocial behavior: increasing others' or one's own welfare, respectively (Batson, 2011; Eisenberg et al., 2016). It is noteworthy that both altruistic and egoistic motivations can drive prosocial behavior simultaneously (Batson, 2011), and that motivations do not always fall on one side of this dichotomy. Therefore, we mainly focus on how altruistic or egoistic motivations, in general, might affect the development of prosocial behaviors.

***The early development of helping and sharing (0- to 3 year-olds).*** There are debates about whether altruistic and egoistic motivations exist before age three, and how these motivations affect prosocial behaviors accordingly. Some researchers argue that before age three, only genuine, *altruistic* motivations drive prosocial behavior (Hepach, Vaish, & Tomasello, 2012, 2013, 2017; Warneken & Tomasello, 2009a). Infants and toddlers show a lack of concern of their own benefits when helping and sharing, and prosocial behaviors are, for example, not affected by possibilities of reciprocity (Sebastián-Enesco & Warneken, 2015), social relatedness to the recipients (Plötner, Over, Carpenter, & Tomasello, 2015), the presence of an adult (Warneken & Tomasello, 2013a), or by social rewards as praise (Warneken & Tomasello, 2008). Thus, it seems that a genuine concern for others can be detected by (at least) age two, and that this concern drives helping and sharing before age three. Accordingly, we expect an increase of helping and sharing from infancy to toddlerhood, and within toddlerhood. After age 3, this increase might slow down, stop, or even decrease, when egoistic motivations begin to influence prosocial behavior.

In contrast, other researchers propose that initial prosocial behaviors are only driven by *egoistic* motivations of interacting with other social members, without a preference for being prosocial or not. For instance, toddlers enjoy joining in with doing housework, even if they are actually not helping with it sometimes (Rheingold, 1982), and they help more after being mimicked, a symbol of enjoying good social interaction (Over & Carpenter, 2009; Cirelli, Wan, & Trainor, 2016). Accordingly, from infancy to late toddlerhood, we expect an increase of social behaviors (including prosocial behavior) during this period. In addition, we expect

this increase continues after age three, when altruistic motivations gradually develop out of this general inclination (Table 1).

In spite of the debates of whether and how altruistic or egoistic motivation drive prosocial behaviors in general, another research topic is to what degree these motivations (if existing before age three) can drive specifically helping and sharing. Although both altruistic motivations (e.g., seeing others' needs being fulfilled) and egoistic motivations (e.g., increasing one's own happiness) can drive both helping and sharing behavior, they may not drive both behaviors to the same degree. This is especially the case for altruistic motivations. In comparison to helping, sharing not only asks for a motivation of fulfilling others' unmet material desires (Dunfield, 2014), but also a willingness to overcome their own desires of monopolizing resources (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). This is supported by findings that toddlers are still reluctant to share, especially when sharing costs their own benefits (e.g., Eisenberg-Berg & Hand, 1979; Levitt, Weber, Clark, & McDonnell, 1985; McGuire, Manke, Eftekhari, & Dunn, 2000). Thus, it is highly possible that, at least when driven by altruistic motivations, sharing might occur less frequently than helping before age three, because altruistic motivations need to out win other motivations, such as monopolizing the materials (e.g., Dunfield, 2014).

***The development of helping and sharing (3- to 18-year-olds).*** During this age, both altruistic and egoistic motivations drive prosocial behaviors. Altruistic motivations have been found to drive prosocial behaviors during the preschool age. For example, 4-year-olds show a preference to share more resources with a poor rather than a rich recipient (Li, Spitzer & Olson, 2014), and by age 5, children only engaged in costly sharing (i.e., sharing their own resources) with a poor but not a rich recipient (Paulus, 2014a). More importantly, this motivation is strengthened from childhood onwards, when individuals are not only driven by specific needs on certain occasions *per se*, but also by abstract, generalized norms that apply to all occasions (e.g., Eisenberg et al., 2016).

During the same time, egoistic motivations (e.g., having and maintaining social relationships, for a review, see Eisenberg et al., 2016) also drive prosocial behavior (Eisenberg, Miller, Shell, McNalley, & Shea, 1991; Eisenberg, Carlo, Murphy, & van Court, 1995; Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005). However, egoistic motivations may lead to a decrease of prosocial behaviors both in the short term (e.g., Fabes, Fultz, Eisenberg, May-Plumlee, & Christopher, 1989) and long term in preschoolers (e.g., Asbury, Dunn, Pike, & Plomin, 2003; Deater-Deckard, Pike, Petrill, Cutting, Hughes, & O'Connor, 2001), children (e.g., Eisenberg, Wolchik, Goldberg, & Engel, 1992), and

adolescents (e.g., Bar-Tal, Nadler, & Blechman, 1980; Carlo, McGinley, Hayes, Batenhorst, & Wilkinson, 2007), although some experimental studies found that they can increase prosocial behaviors in the immediate context (e.g., Engelmann, Hermann, & Tomasello, 2012; Leimgruber, Shaw, Santos & Olson, 2012; McGinley, Opal, Richaud, & Mesurado, 2014; Sebastián-Enesco & Warneken, 2015).

Thus, given that both altruistic and egoistic motivations drive prosocial behavior from age 3 through 18, with altruistic motivations leading to an increase and egoistic motivations (in general) leading to a decrease of prosocial behaviors, also given that altruistic motivations can be strengthened from childhood through adolescence, we expect an increase in prosocial behaviors from (at least) the preschool age to childhood onwards, when the adherence to internalized social norms plays a role in motivating prosocial behavior. However, considering that both altruistic and egoistic motivations drive prosocial behaviors within the preschool age, and a lack of evidence of which kind of motivation might be stronger than the other, prosocial behavior within the preschool period can increase, decrease, or remain stable, depending on whether the altruistic motivation is stronger, weaker, or equal to egoistic motivation (Table 1).

### **Features of Recipients as Moderators of Age Differences**

In addition to the general development of helping and sharing from infancy to adolescence, the current meta-analysis focuses on whether three features of recipients (the recipients' need, the possibility of reciprocity, and the sociability of recipient) would moderate the age differences in the development of helping and sharing. Table 2 provides a summary of expectations of moderators.





Main reason(s) of making this expectation	Only <i>Egoistic</i> motivation (e.g., reciprocity or sociability) drives prosocial behaviors before the preschool age	Altruistic motivation (e.g., based on recipients' need comes in	Altruistic and Egoistic motivations keep driving prosocial behaviors	Egoistic and Altruistic motivation keep driving prosocial behaviors Social norms are kept being strengthened from childhood to late adolescence Social norms are kept being strengthened from childhood to late adolescence
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\*Orange: Expecting an increase of prosocial behaviors.

**The recipients' need.** In daily life, prosocial behaviors (e.g., sharing) often take place when there are multiple recipients (Fehr & Fischbacher, 2004), in which the recipients' need serves as an important clue in directing prosocial behaviors (Bekkers & Wiepking, 2011; Martin & Olsen, 2015). Theoretically, the applications of "helping/sharing those who are (more) in need" require cognitive abilities of distinguishing those high in need from those low in need. These abilities emerge in infancy, as infants can already recognize an unfair distribution between two recipients (e.g., Sloane et al., 2012). As aforementioned, if altruistic motivations (e.g., a genuine motivation of helping someone in need) alone drive prosocial behavior *before* age 3 (Motivation, perspective 1), then we expect that recipient's need matters from infancy to toddlerhood, and within toddlerhood (Table 2), namely, toddlers would show a stronger preference to a high than low in need recipient, compared with infants, as would older toddlers compared with younger toddlers. In contrast, if egoistic motivations alone drive prosocial behavior before age three, and intrinsic motivations begin to drive prosocial behaviors only after age three (Motivation, perspective 2), then we would expect that the recipient's need matters from toddlerhood to the preschool age, but not beforehand. This is because it is not until the preschool age that prosocial behaviors will be strengthened by intrinsic altruistic motivations. In addition, for older ages (after the preschool age), social norms like "helping the needy" plays an increasingly important role in children's reasons to help/share with others (Sabato & Kogut, 2018), and these norms can be internalized (Eisenberg et al., 2016). Accordingly, we expect that the recipient's need matters from childhood and onwards (Table 2). In the current meta-analysis we identified the need of recipient into two categories (i.e., high or low/unknown).

**The possibility of reciprocity.** Reciprocity is an important strategy that maintains cooperation (e.g., Axelrod & Hamilton, 1981; Bull & Rice, 1991), and is a safety mechanism that prevents individuals from being exploited (Warneken & Tomasello, 2013b). It refers not only to being prosocial to the recipient who has help/shared with the individual before, but also who has the potential to be prosocial to the individual in the future (Axelrod & Hamilton, 1981; Nowak, 2006; Trivers, 1971; Paulus & Moore, 2014). Based on this understanding of reciprocity, we propose that, in addition to the direct reciprocity (e.g., tit for tat strategy), the existing social relationships with the recipients (e.g., in-group or out group, friend/non-friend, like/dislike) also represent (potential) reciprocity with the recipient.

Theoretically, reciprocity requires cognitive abilities to discriminate between individuals based on past interactions (e.g., Dunfield & Kuhlmeier, 2010; Vaish, Hepach & Tomasello, 2018), and to estimate the possibilities for future cooperation (Sebastián-Enesco & Warneken,

2015). These abilities emerge before age three. For example, 7-month-olds can discriminate prosocial from antisocial recipients (Hamlin, Wynn, & Bloom, 2007), and toddlers prefer a recipient who has helped, or tried to help them before (Dunfield & Kuhlmeier, 2010; Vaish et al., 2018). The cognitive ability to identify potential future benefactors emerges later, during the preschool years (Sebastián-Enesco & Warneken, 2014). Besides cognitive abilities, reciprocity requires a selective motivation of being prosocial towards those who have or will benefit them (egoistic motivation). If altruistic motivations alone drive prosocial behavior before age three, and then egoistic motivations begin to drive prosocial behaviors after age three (perspective 1), then we would expect that reciprocity matters from toddlerhood during the preschool ages (when the egoistic motivation comes in), but not beforehand (Table 2). In other words, preschoolers show a stronger preference to a reciprocator than a non-reciprocator, compared with toddlers. This is because it is not until the preschool age egoistic motivation such as looking for reciprocity will drive individuals' prosocial behaviors. On the contrary, if egoistic motivation alone drives prosocial behavior before age three (perspective 2), then we expect that reciprocity matters from infancy to toddlerhood, and within toddlerhood. In addition, considering that reciprocity also represents a social norm (Eisenberg et al., 2016), we expect that reciprocity matters from childhood and onwards (Table 2). In the current study, we classified the relationship of recipient into four categories (i.e., family, friend, enemy, or stranger/neutral/unknown), and assumed that, the families or friends are considered to be reciprocators, whereas strangers or enemy are considered to be non-reciprocators.

**The sociability of recipient.** Benefiting a social member who is considered to be “good” is important for both the development of the whole society and the individual social members (Tomasello, 2009). Similar to reciprocity, sociability maintains cooperation and protects individuals from being harmed by non-social members (i.e., free-riders) (e.g., Van de Vondervoort, Aknin, Slevinsky & Hamlin, 2018; Baumard, André, & Sperber, 2013; Bull & Rice, 1991). Theoretically, being prosocial towards prosocial rather than non- or anti-social recipients requires the cognitive ability to distinguish prosocial from non-/anti-social recipients. As mentioned before, these abilities are first shown in infancy (e.g., Hamlin et al., 2007). Noteworthy, this ability emerges earlier than the emergence of prosocial behavior, which can be detected as early as in some 14-month-olds (e.g., Warneken & Tomasello, 2013a). Thus, individuals are capable of showing a preference towards prosocial recipients when prosocial behavior first emerges. More importantly, this preference requires a selective motivation of being prosocial towards the good rather than bad recipient accordingly. Similar

to the motivation of reciprocity, this selective motivation may represent a willingness to seek a good relationship for the helpes/sharees (i.e., egoistic motivation). Thus, similar to the expectations of reciprocity, if altruistic motivation alone drives prosocial behavior before age three (perspective 1), then we expect that sociability matters from toddlerhood to the preschool ages, but not beforehand. In other words, the preference towards a prosocial rather than non-prosocial recipient is stronger in preschoolers, compared with toddlers. If egoistic motivation alone drives prosocial behavior before age three (perspective 2), then we expect that sociability would matter from infancy to toddlerhood, and within toddlerhood. Furthermore, considering this preference might be regarded as a social norm, which can be internalized since childhood (Eisenberg et al., 2016), we expect that sociability matters from childhood and onwards (Table 2). In the current meta-analysis, we categorized the sociability of the recipient into three categories: prosocial, antisocial and neutral/unknown.

**Methodologically relevant characteristics.** Next to features of recipients, the current meta-analysis also includes two methodologically relevant characteristics as moderators: (1) the year of publication (categorized as before or after the year 2000), and (2) for sharing behavior, the object shared in the experiment (categorized as food, toys and other objects, or money). As mentioned previously, the last large meta-analysis on the age difference of prosocial behaviors was conducted nearly two decades ago (Eisenberg & Fabes, 1998), and a resurgence of studies have occurred since then (Davidov et al., 2016). In addition, many new methods and tasks have been developed experiments (e.g., out of reach task, Warneken & Tomasello, 2006). Therefore, studies published before or after the year 2000 could be a potential moderator of age differences due to methodological differences. Second, the type of objects to share may relate to how much children actually desire these objects. Including type of object shared as a potential moderator may help us to answer how the value of objects may affect sharing.

Finally, descriptive statistics in the previous meta-analysis showed that the effect sizes extracted from experimental studies were larger compared with those in observational studies (Eisenberg & Fabes, 1998), which stresses the importance of distinguishing between experimental and observational studies when comparing age group difference on prosocial behaviors. Therefore, we analyzed experimental and observational studies separately in the current meta-analysis.

### **Current Meta-Analysis**

The first aim of the current meta-analysis is to depict the general development of helping and sharing behavior from infancy through adolescence. To detect the developmental

trajectories for each behavior (i.e., helping and sharing), we divide this large age range into five age groups (i.e., infancy, toddlerhood, the preschool age, childhood, and adolescence), and separate analyses were conducted for helping and sharing and for examining age differences both between age groups (e.g., infancy vs. toddlerhood) and within certain age group (e.g., younger vs. older toddlers). Considering that we are interested in their actual behaviors rather than their inclinations of being prosocial, and based on findings that individuals show differences between self-report on what they would have done, and behavior of what they actually did (e.g., Kogut, 2012), here we only focus on experimental and observational studies, not questionnaire studies. Also, for descriptive purposes, we also report the mean likelihood (percentage) of children who helped/shared in the studies. The second aim of the current meta-analysis is to examine several possible moderator effects on the general development of prosocial behaviors, including three recipient's features (recipients' need, the possibility of reciprocity, and the sociability of the recipient) and two methodologically relevant characteristics (published before or after the year 2000, and the type of object(s) shared in the experiment).

## Method

### Search Method

We used three strategies for retrieving relevant studies. First of all, we searched the PsychInfo and Web of Science databases for all articles that were published (online or imprint) through January, 7, 2018. For PsychInfo, we used the following search terms: "*altruism OR bystander help OR donation OR helping behavior OR prosocial OR sharing*" for "prosocial behavior", "*100 (birth to 12 yrs) OR 200 (13 to 17 yrs)*" for "age", and "*peer-reviewed AND until January 7, 2018*" for "limit". For Web of Science, we used: "*altruism\* OR bystander help\* OR donation\* OR helping behavior\* OR prosocial behavior\* OR sharing\**" for "prosocial behavior"; "*infant\* OR toddler\* OR children\* OR preschool\* OR adolescence\**" for "age"; "*article, English, until 2018*" for "limit"; and "*Psychology OR Sport science OR Sociology OR Psychiatry OR Education Educational research OR Social work OR Behavior Sciences OR Social issues OR Cultural studies OR Family studies OR Ethnic studies OR Anthropology OR Life Sciences Biomedicine other topics OR Science Technology other topics OR Developmental Biology OR Social sciences other topics OR Communication*" for "Category". Second, we scrutinized the reference lists of three kinds of articles: two former meta-analyses on age difference in children's and adolescents' prosocial behavior (Fabes & Eisenberg, 1998; Ibbotson, 2014); several review articles about prosocial behaviors (Brownell, 2014; Carlo, 2014; Dunfield, 2015; Eisenberg et al., 2006; Hammond,

2014; Padilla-Walker & Carlo, 2014; Paulus, 2014; Warneken, & Tomasello, 2009a), and all publications included in our meta-analysis. Third, we checked all the publications from researchers who are well-published in this area (Celia Brownell, Gustavo Carlo, Nancy Eisenberg, Joan Grusec, Markus Paulus, Alex Shaw, and Felix Warneken).

### **Inclusion Criteria**

For the development of prosocial behaviors, we screened all identified articles based on the following inclusion criteria: (1) the dependent variable must be one of the target behaviors (sharing or helping behavior) rather than the inclination, evaluation or judgment of them; (2) the study empirically examined the target behaviors with at least two age groups which were 18 years or younger; If a study included both older and younger than 18 years old participants, then we included only the data from those 18 years and younger; (3) the participants belonged to a nonclinical population; (4) the results were reported on an individual level rather than group, class, daycare/school level; (5) the publication appeared in a peer-reviewed journal that was written in English, thus theses, magazine articles, books and any other clearly non-refereed source were excluded from the current data pool; (6) the articles were published online or in print on or before January 7, 2018. (7) the data was sufficient enough for calculating an effect size related to age differences in the target behaviors. For criteria 7, the corresponding author for articles published in the year 2000 or later that did not have enough information in the paper initially, was contacted via email requesting the needed information. These studies were excluded if not enough information was retrieved after six weeks, with two extra notifications.

### **Selecting the Studies**

For the development of prosocial behaviors, our initial database search resulted in 16,810 hits in PsychInfo and 21,838 hits in Web of Science. For PsychInfo, when only reading the titles, 1287 potentially relevant articles were selected for checking against the inclusion criteria. Several articles were excluded, because they did not examine the target behaviors ( $n = 553$ ), they did not have two age groups ( $n = 314$ ), they were not in English ( $n = 132$ ), the participants belonged to a clinical population ( $n = 44$ ), the participants were older than 18 years ( $n = 40$ ), or the full texts of articles were not available ( $n = 21$ ), leaving us with 183 articles. For Web of Science, after checking the duplicates with the PsychInfo search, as well as reading titles, abstracts and full texts, we identified five new articles. In addition to the database search (188 articles), we found 24 additional articles by searching reference lists of meta-analyses, review articles, publications already included in our meta-analysis, and publications from the earlier mentioned researchers. Of the 212 articles, 38 articles were

excluded because a lack of enough data for calculating effect sizes after requests to the corresponding author ( $n = 22$ ) or the dependent variable could not be included in any categories ( $n = 16$ ).

Thus, the final data base for the development of prosocial behaviors included 174 articles, divided into three categories: (1) articles that examined helping behaviors ( $n = 36$ ); (2) articles that examined sharing behaviors ( $n = 135$ ; note: 13 articles that have two kinds of dependent variables, one for helping, and one for sharing, were included both in helping and sharing categories); (3) articles that combined helping and sharing behaviors into one combined dependent variable ( $n = 17$ ; note: 1 article that has two kinds of dependent variables, one for helping, and one for combined, was included in both categories).

### Coding and Calculation of Effect Sizes

**Coding.** For all studies that were included, we coded reference information, study type (experimental or observational), design (cross-sectional or longitudinal), definition of target behavior (sharing and/or helping), sample characteristics for the whole group and per age group (age, gender, socioeconomic status), manipulations in the experiment (e.g., the experimenter accidentally dropped the toy or intentionally threw the toy, Dunfield et al., 2011), and categories of dependent variables (e.g., the likelihood that participants helped or shared, number of items shared, see Tables 3). In addition, following moderators were coded: (a) recipients' need, 1 = high, 2 = low/unknown; (b) reciprocity of recipient, 1 = family, 2 = friend, 3 = enemy, 4 = stranger/unknown; (c) sociability of recipient, 1 = prosocial, 2 = antisocial, 3 = neutral/unknown; (d) object they shared, 1 = food, 2 = toy and other objects, 3 = money. The first coder (first author) coded all articles and a second coder (a research master student) coded 32 (19%) articles. The reliabilities were from medium to high (for categorical variables, Cohen's Kappa's ranged from 0.82 to 1, for continuous variables, ICC's ranged from 0.73 to 1). Any disagreement between coders was discussed and reconciled.

**Effect Size.** Cohen's  $d$  was calculated for each age-group comparison (e.g., younger infants vs. older infants, infants vs. toddlers, younger toddlers vs. older toddlers, toddlers vs. preschoolers, etc., see Table 3). The age range for each age group is: 0 - 18 months for infants, 18 - 36 months for toddlers, 36 - 72 months/6 years for preschoolers, 6 - 12 years for children, and 12 - 18 years for adolescents. When computing the differences in helping and/or sharing between two age groups a positive effect size represents an increase with age, for example, older group shared more items, or more likely to share than the younger group, while a negative effect size represents a decrease in helping and/or sharing from younger to older age groups. Based on Lipsey and Wilson (2010), we first used means and standard

deviations in calculating Cohen's  $d$ . If this information was not available, we calculated Cohen's  $d$  based on other information such as the  $t$ -value,  $F$ -value, or  $Chi$ -square. If the author only reported that the age effect was non-significant with no exact results, an effect size of zero was assigned. Next, if the results were presented in a graph, we contacted the authors and requested the numerical statistical information.

**Development of helping.** Based on our search and inclusion criteria, we identified 36 articles (6 observational and 30 experimental articles). For the observation studies, we calculated effect sizes of the proportion/rate of helping out of all behaviors observed. For the experimental articles, we divided effect sizes into four subgroups based on the experimental design: (A) the likelihood that participants helped ( $n = 20$ ); (B) for those articles that used a sequence of clues for asking for help, we calculated how many steps the child needed before helping ( $n = 4$ ); (C) for those articles that measured how much time children helped in the experiment, we calculated the duration of helping ( $n = 8$ ); (D) for those articles that examined the number of objects picked up in the experiment, we calculated the number of items picked up ( $n = 4$ ). Six articles belong in two of the above categories. For meta-analysis A, we also report the average likelihood of participants helped drawn from these studies.

**Development of sharing.** Based on our search and inclusion criteria, we identified 135 articles (8 observational and 127 experimental articles). For the observation studies, we calculated effect sizes of the proportion/rate of sharing out of all behaviors observed. For the experimental articles, we further divided effect sizes into four subgroups based on the experimental design. Subgroups of effect sizes are: (A) the likelihood that participants shared ( $n = 39$ ); (B) for those articles that used a sequence of clues for asking for sharing, we calculated how many steps the child needed before sharing ( $n = 7$ ); (C) for those articles that measured how long children shared in the experiment, we calculated the duration of sharing ( $n = 5$ ); (D) for those articles that examined the number of objects given in the sharing tasks, we calculated the numbers of items shared ( $n = 92$ ). Twelve articles belong in two, and two articles belong to three of the above categories. Similar to helping, for meta-analysis A, we also report the average likelihood of participants helped drawn from these studies.

**Development of combined helping and sharing behaviors.** We identified 17 articles (all observation studies) that coded helping and sharing as one category. For these studies, we calculated effect sizes of the rate/proportion of helping and sharing behavior out of all behaviors observed.



**Table 3.** *Characteristics of Studies Included in the Meta-Analysis*

Study	Behavior	Type of studies	Dependent variable	Age in months per group <i>M (SD)</i> or age range		Age category per group		Number of participants per group		Effect size <i>d</i>	Variance
				Younger	Older	Younger	Older	Younger	Older		
Angerer et al., 2015	Sharing	Experiment	Likelihood that participant shared Items shared	84-96	120-132	4	4	260	264	0.60	.02
				108-120	120-132	4	4	270	276	0.15	.01
Barnett & Bryan, 1974	Sharing	Experiment	Items shared	96 (n.r)	132 (n.r)	4	4	10	10	2.00	.26
Bar-Tal & Nissim, 1984	Helping	Experiment	Helping duration	144-156	192-204	5	5	78	89	0.40	.02
				144-156	192-204	5	5	27	24	0.09	.16
Bar-Tal et al., 1980	Sharing	Experiment	Likelihood that participant helped Items shared	54-66	78-90	3	4	42	40	0.32	.05
				78-90	102-106	4	4	40	42	0.09	.05
Bar-Tal et al., 1982	Helping and Sharing	Observation	Rate of prosocial behaviors	Below 30	31-42	2	2	25	32	-0.12	.14
				31-42	43-54	2	3	32	43	-0.37	.15
Bar-Tal, 1982	Helping Sharing	Experiment	Likelihood that participant helped Likelihood that participant shared	43-54	55-65	3	3	32	24	0.27	.16
				54-66	78-90	3	4	48	48	0.61	.05
Baumard et al., 2012	Sharing	Experiment	Likelihood that participant shared	54-66	66-78	3	3	42	40	0.74	.15
				66-78	78-90	3	4	40	42	0.41	.07
Benenson et al., 2007	Sharing	Experiment	Likelihood that participant shared Items shared	120-132	132-144	4	4	36	36	0.29	.07
				42.7 (3.4)	54.2 (2.6)	3	3	33	42	0.11	.05
Berndt, 1981a	Helping	Experiment	Helping duration	48 (n.r)	72 (n.r)	3	3	120	120	0.11	.02
				72 (n.r)	108 (n.r)	3	4	120	120	0.22	.02
Berndt, 1981b	Sharing	Experiment	Sharing duration	81 (n.r)	116 (n.r)	4	4	38	48	0.55	.05
				81 (n.r)	116 (n.r)	4	4	38	48	0.00	.05
Blake et al., 2015	Sharing	Experiment	Helping duration Sharing duration	71 (n.r)	121 (n.r)	3	4	44	32	0.00	.05
				96 (n.r)	121 (n.r)	4	4	40	32	0.00	.06
Blake et al., 2015	Sharing	Experiment	Sharing duration Items shared	71 (n.r)	96 (n.r)	3	4	44	40	0.00	.05
				96 (n.r)	121 (n.r)	4	4	40	32	0.00	.06
				76-114	114-153	4	4	133	99	0.91	.02

Blake et al., 2016	Sharing	Experiment	Items shared (Indian sample)	47 (n.r)	71 (n.r)	3	3	17	17	0.44	.12
			(United States sample)	71 (n.r)	94 (n.r)	3	4	17	17	-0.29	.12
				54 (n.r)	71 (n.r)	3	3	18	18	-0.09	.11
Bregman et al., 1984	Sharing	Experiment	Items shared	71 (n.r)	95 (n.r)	3	4	18	19	0.09	.11
Brody et al., 1985	Helping and Sharing	Observation	Rate of prosocial behaviors	54-78	144 (n.r)	3	4	72	74	0.59	.03
Brody et al., 1986	Helping	Observation	Rate of helping	54-78	84-108	3	4	36	36	0.47	.06
Brownell et al., 2013a	Sharing	Experiment	Steps needed before sharing	54-78	84-108	3	4	24	24	0.00	.08
Brownell et al., 2009	Sharing	Experiment	Likelihood that participant shared	18 (0.5)	24.2 (0.62)	1	2	10	19	1.41	.19
			Sharing duration	18.5 (0.76)	25.1 (2.1)	1	2	14	14	1.16	.27
Brownell et al., 2013b	Sharing	Experiment	Likelihood that participant shared	18 (0.5)	24.2 (0.62)	1	2	26	25	0.73	.13
			Steps needed before sharing	18 (0.5)	24.2 (0.62)	1	2	26	25	1.45	.10
Bryan & Walbek, 1970	Sharing	Experiment	Items shared	108 (n.r)	120 (n.r)	4	4	96	72	0.00	.02
Bryant & Crockenberg, 1980	Helping	Observation	Rate of helping	95 (9.9)	125 (8.3)	4	4	50	50	0.83	.04
Bueno-Guerra et al., 2016	Sharing	Experiment	Likelihood that participant shared	78.72 (4.32)	125.88 (3.84)	4	4	129	46	0.85	.06
Burnett Heyes et al., 2015	Sharing	Experiment	Items shared	173.52 (3.12)	206.64 (3.12)	5	5	39	19	0.00	.10
Carlo et al., 1991	Helping	Experiment	Helping duration	68.7 (n.r)	96.4 (n.r)	3	4	49	40	-0.35	.12
Cauley & Tyler, 1989	Helping and Sharing	Observation	Rate of prosocial behaviors	60 (n.r)	72 (n.r)	3	3	13	39	0.00	.10
Chadha & Misra, 2006	Helping and Sharing	Observation	Rate of prosocial behaviors	60-84	86-120	3	4	60	59	0.18	.02
				86-120	132-156	4	4	59	48	-0.31	.02
				60-84	86-120	3	4	60	48	0.30	.02
Chai & He, 2017	Sharing	Experiment	Items shared	86-120	132-156	4	4	59	48	0.32	.02
Chapman et al., 1987	Helping	Experiment	Steps needed before helping	46.24 (3.35)	71.38 (3.77)	3	4	34	34	0.67	.09
				58.08 (4.8)	71.16 (3.36)	3	3	10	10	-0.27	.20
				58.08 (4.8)	142.68 (4.08)	3	4	10	10	1.48	.25
Cialdini & Kenrick, 1976	Sharing	Experiment	Items shared	94.68 (3.84)	142.68 (4.08)	4	4	10	10	0.27	.20
				84-108	132-156	4	4	53	33	0.95	.05
				84-108	192-216	4	5	48	14	0.59	.09
Collins & Getz, 1976	Helping	Experiment	Helping duration	106-132	146-172	4	4	8	4	0.00	.38
				106-132	182-204	4	5	8	8	0.00	.25

Dahl et al., 2013	Helping	Experiment	Items helped	146-172	182-204	5	5	4	8	0.00	.38
			Likelihood that participant helped	106-132	146-172	4	5	24	24	0.52	.09
				16.6-18.2	20.9-23.2	1	2	28	28	0.75	.14
				20.9-23.2	25.0-27.2	2	2	28	28	0.17	.10
Dahl et al., 2017	Helping	Experiment	Likelihood that participant helped	13-14.8	14.8-18	1	1	17	18	0.29	.16
de Guzman et al., 2008	Helping and Sharing	Observation	Rate of prosocial behaviors	36-60	72-120	3	4	21	26	0.65	.09
Dembo & McAuliffe, 1987	Helping	Observation	Rate of helping	120 (n.r)	132 (n.r)	4	5	40	40	0.80	.11
Demetriot & Hay, 2004	Helping and Sharing	Observation	Rate of prosocial behaviors	17.5 (1.8)	30.8 (2.1)	1	2	13	19	-0.08	.13
				25.1 (2)	30.8 (2.1)	2	2	17	19	-0.36	.11
Denham et al., 1991	Helping and Sharing	Observation	Rate of prosocial behaviors	24 (n.r)	60 (n.r)	2	3	41	41	-0.14	.05
Dixon & Hom Jr, 1984	Sharing	Experiment	Items shared	72 (n.r)	84 (n.r)	3	4	27	25	1.17	.09
Dlugokinski & Firestone, 1973	Sharing	Experiment	Items shared	132 (n.r)	168 (n.r)	4	5	60	88	0.00	.02
Dlugokinski & Firestone, 1974	Sharing	Experiment	Items shared	132 (n.r)	168 (n.r)	4	5	31	88	0.06	.02
Drummond et al., 2014	Helping	Experiment	Likelihood that participant helped	18.73 (n.r)	28.87 (n.r)	1	2	16	22	0.87	.19
			Steps needed before helping	18.73 (n.r)	28.87 (n.r)	1	2	16	22	0.95	.12
Dunfield & Kuhlmeier, 2013	Helping	Experiment	Likelihood that participant helped	24-35	36-47	2	3	32	31	0.38	.06
				36-47	48-59	3	3	31	32	-0.25	.06
				24-35	36-47	2	3	32	31	0.00	.06
				36-47	48-59	3	3	31	32	0.00	.06
Dunfield et al., 2011	Helping	Experiment	Likelihood that participant shared	17.48-19.02	23.54-24.49	1	2	24	24	0.39	.11
			Likelihood that participant helped	17.48-19.02	23.54-24.49	1	2	24	24	0.37	.10
Dunn & Munn, 1986	Sharing	Experiment	Likelihood that participant shared	18 (n.r)	24 (n.r)	1	2	43	43	0.00	.05
Edwards et al., 2015	Helping and Sharing	Observation	Rate of prosocial behaviors	17.79 (0.52)	29.77 (0.65)	1	2	256	230	0.42	.01
				29.77 (0.65)	41.75 (0.65)	2	3	230	210	-0.07	.01
Eisenberg et al., 1983	Sharing	Experiment	Items shared	40 (n.r)	55 (n.r)	3	3	30	45	0.00	.06
Eisenberg et al., 1992	Helping and Sharing	Observation	Rate of prosocial behaviors	19-27	26-34	2	2	20	20	-0.30	.26
Eisenberg-Berg & Geisheker, 1979	Sharing	Experiment	Items shared	106 (n.r)	119 (n.r)	4	4	84	82	0.31	.02
Eisenberg-Berg et al., 1981a	Sharing	Observation	Rate of sharing	36 (n.r)	54 (n.r)	2	3	17	31	0.00	.09
Eisenberg-Berg et al., 1981b	Sharing	Observation	Rate of sharing	35 (n.r)	53 (n.r)	2	3	30	28	0.00	.07
Eisenberg-Berg et al., 1979	Sharing	Experiment	Items shared	30-36	42-54	2	3	30	30	0.00	.07

Elliott & Vasta, 1970	Sharing	Experiment	Likelihood that participant shared	60 (n.r)	72 (n.r)	3	3	16	16	0.72	.17
	Sharing	Experiment	Items shared	72 (n.r)	84 (n.r)	3	4	16	16	0.64	.26
	Sharing	Experiment	Items shared	60 (n.r)	72 (n.r)	3	3	16	16	0.68	.13
	Sharing	Experiment	Items shared	72 (n.r)	84 (n.r)	3	4	16	16	0.35	.13
Enso et al., 2011	Sharing	Observation	Rate of sharing	28.32 (3.12)	41.4 (3.36)	2	3	125	125	0.05	.02
Evans et al., 2013	Sharing	Experiment	Likelihood that participant shared	48-60	108-132	3	4	81	91	0.33	.04
Fehr et al., 2008	Sharing	Experiment	Likelihood that participant shared	36-48	60-72	3	3	76	76	0.60	.12
	Sharing	Experiment	Likelihood that participant shared	60-72	72-84	3	4	76	77	0.59	.20
	Sharing	Experiment	Likelihood that participant shared	96-108	120-132	4	4	71	207	0.52	.09
	Sharing	Experiment	Likelihood that participant shared	120-132	168-180	4	5	207	132	-0.21	.04
	Sharing	Experiment	Items shared	156-168	168-180	5	5	172	132	0.31	.06
Froming et al., 1983	Sharing	Experiment	Items shared	72 (n.r)	132 (n.r)	3	4	28	29	0.66	.07
	Sharing	Experiment	Items shared	96 (n.r)	120 (n.r)	4	4	29	29	0.67	.07
	Sharing	Experiment	Items shared	76.8 (6)	100.8 (5.88)	4	4	18	18	0.31	.11
Froming et al., 1985	Sharing (Study 1)	Experiment	Items shared	73.44 (3.69)	95.16 (14.04)	4	4	42	59	0.55	.04
	Sharing (Study 2)	Experiment	Items shared	44.1 (3)	55.1 (2.5)	3	3	14	12	0.16	.16
Fujisawa et al., 2008	Sharing	Observation	Rate of sharing	43.4 (54.8)	54.8 (3.3)	3	3	16	16	0.15	.13
	Helping	Observation	Rate of helping	41 (2.67)	57.2 (1.59)	3	3	20	21	0.02	.10
Garon et al., 2011	Sharing	Experiment	Items shared	96 (n.r)	120 (n.r)	4	4	88	96	0.00	.02
Giannotta et al., 2011	Helping and Sharing	Observation	Rate of prosocial behaviors	120 (n.r)	144 (n.r)	4	5	96	66	0.00	.02
	Helping and Sharing	Observation	Rate of prosocial behaviors	27.13 (2.59)	32.8 (1.38)	2	2	50	55	0.00	.04
Grazzani et al., 2016	Helping	Experiment	Likelihood that participant helped	66 (n.r)	114 (n.r)	3	4	25	25	1.47	.23
Green & Schneider, 1974	Helping	Experiment	Likelihood that participant helped	90 (n.r)	114 (n.r)	4	4	25	25	0.90	.25
	Helping	Experiment	Likelihood that participant helped	114 (n.r)	162 (n.r)	4	5	25	25	-0.24	.32
	Helping	Experiment	Helping duration	66 (n.r)	114 (n.r)	3	4	25	25	0.00	.08
	Helping	Experiment	Helping duration	90 (n.r)	114 (n.r)	4	4	25	25	0.00	.08
	Helping	Experiment	Helping duration	114 (n.r)	162 (n.r)	4	5	25	25	0.00	.08
	Helping	Experiment	Helping duration	66 (n.r)	114 (n.r)	3	4	25	25	1.00	.10
	Helping	Experiment	Helping duration	90 (n.r)	114 (n.r)	4	4	25	25	0.94	.00
	Helping	Experiment	Helping duration	114 (n.r)	162 (n.r)	4	5	25	25	1.00	.10

Grusec & Redler, 1980	Sharing	Experiment	Items shared	Likelihood that participant shared	66 (n.r)	114 (n.r)	3	4	25	25	1.24	.24
Grusec & Skubiski, 1970	Sharing	Experiment	Items shared		90 (n.r)	114 (n.r)	4	4	25	25	0.42	.29
Gummerum et al., 2008	Sharing	Experiment	Items shared		114 (n.r)	162 (n.r)	4	5	25	25	0.00	.37
		Experiment	Items shared		62 (n.r)	104 (n.r)	3	4	48	48	0.00	.04
		Experiment	Items shared		108 (n.r)	132 (n.r)	4	4	30	50	0.39	.05
		Experiment	Items shared		104.4 (n.r)	138 (n.r)	4	4	39	45	0.20	.05
Gummerum et al., 2009	Sharing	Experiment	Items shared		138 (n.r)	169.2 (n.r)	4	5	141	48	-0.16	.04
Gummerum et al., 2010	Sharing	Experiment	Items shared		169.2 (n.r)	212.4 (n.r)	5	5	53	57	0.07	.04
		Experiment	Items shared		85.2 (8.4)	136.8 (6)	4	4	81	75	0.20	.03
		Experiment	Items shared		36 (n.r)	60 (n.r)	2	3	26	21	0.70	.09
		Experiment	Items shared		48 (n.r)	60 (n.r)	3	3	30	21	0.50	.08
Güroğlu et al., 2014	Sharing	Experiment	Likelihood that participant shared		111.24 (6.36)	142.68 (7.68)	4	4	31	29	0.00	.07
		Experiment	Likelihood that participant shared		111.24 (6.36)	215.4 (6.48)	4	5	31	27	-0.12	.07
		Experiment	Likelihood that participant shared		180.84 (6)	215.4 (6.48)	5	5	25	27	0.10	.08
Hamann et al., 2011	Sharing (Study 1)	Experiment	Likelihood that participant shared		32 (n.r)	44 (n.r)	2	3	24	24	0.00	.08
	Sharing (Study 2)	Experiment	Likelihood that participant shared		32 (n.r)	44 (n.r)	2	3	36	36	0.00	.06
Hao & Liu, 2016	Helping	Experiment	Likelihood that participant helped		108.96 (8.04)	168 (7.44)	4	5	48	45	0.00	.04
	Helping	Experiment	Items helped		108.96 (8.04)	168 (7.44)	4	5	48	45	0.00	.04
Hay et al., 1991	Sharing	Observation	Rate of sharing		10.2-14.0	23.2-26.1	1	2	48	48	0.00	.04
Hay et al., 1999	Sharing	Observation	Rate of sharing		17.6 (1.8)	24.5 (1.8)	1	2	20	19	-0.39	.10
		Experiment	Items shared		24.7 (2)	31.6 (2)	2	2	22	20	-0.02	.10
Hebert et al., 1969	Sharing	Experiment	Items shared		30.8 (2)	37.7 (2)	2	3	24	20	-0.20	.09
Hepach et al., 2017	Helping	Experiment	Likelihood that participant helped		86.04 (n.r)	116.04 (n.r)	4	4	18	18	0.00	.11
Hobbs & Spelke, 2015	Helping	Experiment	Likelihood that participant helped		18 (0.15)	30 (0.15)	1	2	48	48	0.32	.04
House et al., 2012	Sharing	Experiment	Likelihood that participant shared		13-15	23-25	1	2	18	18	1.43	.70
		Experiment	Likelihood that participant shared		51.96 (5.16)	71.04 (7.68)	3	3	27	38	-0.22	.06
Howard & Barnett, 1981	Sharing	Experiment	Items shared		71.04 (7.68)	92.28 (5.04)	3	4	38	27	-0.32	.06
Howes et al., 2008	Helping and Sharing	Observation	Rate of prosocial behaviors		64 (n.r)	85 (n.r)	3	4	86	75	0.47	.03
		Experiment	Rate of prosocial behaviors		14 (n.r)	36 (n.r)	1	2	88	88	0.33	.02
		Experiment	Rate of prosocial behaviors		24 (n.r)	36 (n.r)	2	2	88	88	0.00	.02

Hull & Reuter, 1977	Sharing	Experiment	Likelihood that participant shared	60 (n.r)	72 (n.r)	3	3	27	27	0.80	.13
				72 (n.r)	96 (n.r)	3	4	27	27	-0.04	.16
Iannotti, 1978	Sharing	Experiment	Items shared	84 (n.r)	120 (n.r)	4	4	27	27	0.33	.28
Israel & Brown, 1979	Sharing	Experiment	Likelihood that participant shared	71.6 (3.31)	109.5 (6.46)	3	4	30	30	0.00	.07
			Items shared	84-101	95-112	4	4	56	56	0.52	.07
Israel & Raskin, 1979	Sharing	Experiment	Items shared	84-101	95-112	4	4	56	56	0.00	.07
Israely & Guttman, 1983	Sharing	Experiment	Likelihood that participant shared	74-95	110-127	4	4	24	24	0.00	.08
Kanngiesser & Warneken, 2012	Sharing	Experiment	Items shared	108 (n.r)	132 (n.r)	4	4	60	60	2.15	.11
Kärntner et al., 2014	Helping	Experiment	Likelihood that participant helped	43.2 (n.r)	67.2 (n.r)	3	3	18	18	0.19	.11
Katz et al., 1976	Helping	Experiment	Likelihood that participant helped	15.06 (0.35)	16.64 (0.56)	1	1	39	39	0.10	.05
Keller et al., 2012	Sharing	Experiment	Items shared	60-72	108-120	3	4	40	40	1.76	.29
			Items shared	104.4 (n.r)	138 (n.r)	4	4	39	45	0.32	.05
			Items shared	104.4 (n.r)	212.4 (n.r)	4	5	23	57	0.24	.04
			Items shared	169.2 (n.r)	212.4 (n.r)	5	5	60	57	0.06	.04
Kenward & Dahl, 2011	Sharing	Experiment	Likelihood that participant shared	37.2 (0.7)	54.6 (0.8)	3	3	16	16	0.82	.15
Knight & Kagan, 1977	Sharing	Experiment	Items shared	132 (n.r)	144 (n.r)	4	4	48	48	0.00	.04
Kogut & Slovic, 2016	Sharing	Experiment	Items shared	43.2-67.2	68.4-75.6	3	3	15	15	0.87	.15
Kogut et al., 2016	Sharing	Experiment	Items shared	55.44 (7.08)	84.24 (5.4)	3	4	52	35	1.02	.05
			Items shared	72.12 (5.4)	84.24 (5.4)	4	4	52	35	0.19	.05
Kogut, 2012	Sharing	Experiment	Likelihood that participant shared	72 (n.r)	96 (n.r)	3	4	57	67	0.73	.50
			Items shared	96 (n.r)	120 (n.r)	4	4	67	58	0.22	.07
			Items shared	72 (n.r)	96 (n.r)	3	4	57	67	0.64	.03
			Items shared	96 (n.r)	120 (n.r)	4	4	67	58	0.02	.03
Köster et al., 2016	Helping	Experiment	Items helped	10.5 (0.8)	13.2 (1)	1	1	21	24	0.98	.10
Leahy, 1979	Sharing	Experiment	Items shared	84 (n.r)	132 (n.r)	4	4	33	33	0.00	.06
Leman et al., 2009	Sharing	Experiment	Items shared	123.6 (n.r)	142.8 (n.r)	4	4	69	60	0.01	.03
			Items shared	142.8 (n.r)	213.6 (n.r)	4	5	48	60	-4.5	.03
			Items shared	157.2 (n.r)	213.6 (n.r)	5	5	76	60	-2.6	.03
Levin & Bekerman-Greenberg, 1979	Sharing	Experiment	Likelihood that participant shared	60-72	108-120	3	4	20	20	1.21	.16



Li et al., 2013	Sharing	Experiment	Items shared	72-84	132-144	4	4	20	20	0.76	.16
Lipscomb et al., 1980	Sharing	Experiment	Items shared	77.88 (3.24)	113.76 (3.48)	4	4	30	30	0.00	.07
Lipscomb et al., 1982	Sharing	Experiment	Items shared	57.24 (n.r)	106.92 (n.r)	3	4	66	66	0.00	.03
Lipscomb et al., 1983	Sharing	Experiment	Items shared	62.88 (n.r)	134.28 (n.r)	3	4	7	7	0.50	.29
Lipscomb et al., 1985	Sharing	Experiment	Items shared	72 (n.r)	144 (n.r)	3	4	54	54	0.74	.08
Liss et al., 1983	Helping	Experiment	Helping duration	62.28 (n.r)	121.2 (n.r)	3	4	87	80	0.45	.02
Liszowski et al., 2006	Helping (Study 1)	Experiment	Likelihood that participant helped	67.2 (n.r)	90 (n.r)	3	4	40	40	0.51	.05
	Helping (Study 2)	Experiment	Likelihood that participant helped	90 (n.r)	115.2 (n.r)	4	4	40	40	0.41	.05
Liu et al., 2016	Sharing	Experiment	Likelihood that participant shared	12.1 (n.r)	18.2 (n.r)	1	1	25	28	0.57	.08
		Experiment	Likelihood that participant helped	12.15 (n.r)	18.15 (n.r)	1	1	16	16	1.69	.17
		Experiment	Likelihood that participant shared	57.24 (8.16)	87.36 (11.64)	3	4	54	55	1.02	.07
			Items shared	87.36 (11.64)	123.6 (11.04)	4	4	55	49	1.17	.36
				57.24 (8.16)	87.36 (11.64)	3	4	54	55	0.61	.04
				87.36 (11.64)	123.6 (11.04)	4	4	55	49	0.53	.04
Lourenço, 1993	Sharing	Experiment	Likelihood that participant shared	67 (n.r)	89 (n.r)	3	3	24	24	0.70	.12
				67 (n.r)	132 (n.r)	3	4	24	24	1.93	.23
Lu & Chang, 2016	Sharing	Experiment	Likelihood that participant shared	54.5 (3.4)	56.8 (3.3)	3	3	49	46	0.29	.05
				44 (2.4)	75.8 (1.8)	3	4	46	24	0.28	.09
Ma & Leung, 1992	Sharing	Experiment	Items shared	106.56 (5.4)	131.52 (9)	4	4	8	8	-0.03	.25
Malti et al., 2009	Sharing	Experiment	Items shared	85.2 (2.28)	97.2 (2.28)	4	4	160	160	0.20	.01
Malti et al., 2012	Sharing	Experiment	Items shared	84.96 (2.4)	110.04 (2.52)	4	4	160	139	0.11	.01
Malti et al., 2016a	Sharing	Experiment	Items shared	53.28 (3.24)	101.88 (2.88)	3	4	78	82	0.55	.03
Malti et al., 2016b	Sharing	Experiment	Items shared	73.2 (2.28)	110.16 (7.32)	4	4	175	141	0.29	.01
				110.16 (7.32)	146.16 (2.52)	4	5	45	136	-0.35	.01
McAuliffe & Dunham, 2017	Sharing	Experiment	Items shared	87.16 (5.14)	111.23 (7.34)	4	4	44	52	0.57	.04
McGuigan et al., 2016	Sharing	Experiment	Likelihood that participant shared	74 (4)	97 (7)	4	4	17	27	1.48	.51
Middlarsky & Bryan, 1967	Sharing	Experiment	Items shared	84 (n.r)	96 (n.r)	4	4	40	40	0.47	.05
Moore et al., 1973	Sharing	Experiment	Items shared	96 (n.r)	108 (n.r)	4	4	21	21	0.00	.10
Mosbacher et al., 1985	Sharing	Experiment	Items shared	71 (n.r)	119 (n.r)	3	4	42	42	0.46	.10
Olejnik, 1976	Sharing	Experiment	Items shared	68 (n.r)	92 (n.r)	3	4	40	40	0.00	.05

Ongley & Malti, 2014	Sharing	Experiment	Items shared	4	4	40	40	104 (n.r)	92 (n.r)	101.88 (2.88)	101.88 (2.88)	0.00	.05
Ongley et al., 2014	Sharing	Experiment	Items shared	3	4	78	82	150 (3.12)	53.28 (3.24)	101.88 (2.88)	101.88 (2.88)	0.78	.03
Padilla-Walker et al., 2012	Sharing	Experiment	Items shared	4	4	82	84	101.88 (2.88)	101.88 (2.88)	101.88 (2.88)	101.88 (2.88)	-0.37	.02
Pandey et al., 1987	Helping and Sharing	Observation	Rate of prosocial behaviors	3	4	78	82	160.08 (12.72)	148.08 (12.72)	160.08 (12.72)	160.08 (12.72)	0.85	.03
Paulus & Moore, 2014	Sharing	Experiment	Items shared	5	5	319	319	96-108	60-72	96-108	96-108	-0.14	.01
Paulus et al., 2013	Sharing	Experiment	Likelihood that participant shared	3	4	32	32	120-132	96-108	120-132	120-132	0.00	.06
Paulus, 2014	Sharing	Experiment	Steps needed before sharing	3	3	17	19	69.6 (5.8)	54.7 (3.5)	69.6 (5.8)	69.6 (5.8)	0.00	.11
Persson, 2005	Sharing	Experiment	Items shared	3	3	21	21	60 (n.r)	42 (n.r)	60 (n.r)	60 (n.r)	-0.07	.10
Pettygrove et al., 2013	Helping	Experiment	Likelihood that participant shared	3	3	17	17	65 (3.7)	42 (1.7)	65 (3.7)	65 (3.7)	0.00	.10
Pfötner et al., 2015	Helping and Sharing	Observation	Rate of prosocial behaviors	2	3	44	41	43.65 (5.7)	31.7 (5.6)	43.65 (5.7)	43.65 (5.7)	1.20	.28
Posid et al., 2015	Helping	Experiment	Steps needed before helping	3	3	41	37	55.6 (5.8)	43.65 (5.7)	55.6 (5.8)	55.6 (5.8)	1.15	.06
Presbie & Kanareff, 1970	Helping	Experiment	Steps needed before helping	3	4	16	16	86.76 (n.r)	44.28 (n.r)	86.76 (n.r)	86.76 (n.r)	0.68	.05
Rapp et al., 2017	Helping	Experiment	Likelihood that participant helped	4	4	16	16	141.6 (n.r)	86.76 (n.r)	141.6 (n.r)	141.6 (n.r)	-0.16	.13
Rheingold, 1982	Sharing	Experiment	Steps needed before sharing	2	2	30	33	31.6 (2.19)	20.53 (1.3)	31.6 (2.19)	31.6 (2.19)	0.66	.13
Rizzo & Killen, 2016	Sharing	Experiment	Items shared	2	2	30	33	31.6 (2.19)	20.53 (1.3)	31.6 (2.19)	31.6 (2.19)	1.12	.15
Rizzo et al., 2016	Helping	Experiment	Likelihood that participant helped	2	2	30	33	57-62	38-44	57-62	57-62	1.00	.04
Rochat et al., 2009	Helping	Experiment	Likelihood that participant shared	3	3	72	72	57-62	38-44	57-62	57-62	0.02	.06
	Sharing	Experiment	Items shared	3	3	72	72	69 (6.9)	46.47 (7.1)	69 (6.9)	69 (6.9)	0.31	.04
	Sharing	Experiment	Items shared	3	3	111	115	120.5 (9.9)	69 (6.9)	120.5 (9.9)	120.5 (9.9)	0.19	.03
	Sharing	Experiment	Items shared	3	4	115	69	120.5 (9.9)	69 (6.9)	120.5 (9.9)	120.5 (9.9)	-0.04	.02
	Sharing	Experiment	Items shared	4	4	106	69	120.5 (9.9)	94.6 (7)	120.5 (9.9)	120.5 (9.9)	0.29	.02
	Sharing	Experiment	Items shared	3	4	20	20	72-95	60-71	72-95	72-95	0.01	.02
	Sharing	Experiment	Items shared	3	4	48	48	66 (n.r)	44.76 (n.r)	66 (n.r)	66 (n.r)	0.00	.10
	Sharing	Experiment	Likelihood that participant helped	2	2	40	20	30.0-32.2	24.0-26.5	30.0-32.2	30.0-32.2	-0.41	.21
	Sharing	Experiment	Likelihood that participant helped	3	3	55	53	69.12 (n.r)	51.6 (n.r)	69.12 (n.r)	69.12 (n.r)	0.06	.13
	Sharing	Experiment	Items shared	3	4	53	25	93.84 (n.r)	69.12 (n.r)	93.84 (n.r)	93.84 (n.r)	0.91	.04
	Sharing	Experiment	Items shared	3	4	48	20	87.48 (9.84)	57 (9.24)	87.48 (9.84)	87.48 (9.84)	0.45	.06
	Sharing	Experiment	Likelihood that participant shared	3	3	98	104	63 (4.57)	40 (4.56)	63 (4.57)	63 (4.57)	0.52	.07
	Sharing	Experiment	Likelihood that participant shared	3	3	98	104	63 (4.57)	40 (4.56)	63 (4.57)	63 (4.57)	0.35	.02



Rushton & Wiener, 1975	Sharing	Experiment	Items shared	84 (n.r)	132 (n.r)	4	4	30	30	1.07	.08
Rushton, 1975	Sharing	Experiment	Items shared	108 (n.r)	120 (n.r)	4	4	28	28	0.00	.07
Scharpf et al., 2017	Sharing	Experiment	Likelihood that participant shared	59.3 (6.3)	84.4 (6.5)	3	4	16	15	0.00	.13
Sebastián-Enesco & Warneken, 2015	Sharing	Experiment	Items shared	42.97 (2.29)	65.62 (3.27)	3	3	18	18	0.09	.11
Severy & Davis, 1971	Helping and Sharing	Observation	Rate of prosocial behaviors	53.6 (6.3)	115.1 (10.1)	3	4	16	14	0.00	.13
Simmons & Zumpf, 1986	Sharing	Experiment	Likelihood that participant shared	48-60	72-84	3	4	20	18	0.70	.12
Skarin & Moely, 1976	Sharing	Experiment	Items shared	60-72	120-144	3	4	64	64	0.48	.03
				84-108	120-144	4	4	64	64	0.74	.03
Smith et al., 2013	Sharing	Experiment	Items shared	36-48	60-72	3	3	11	26	0.59	.13
				36-48	84-96	3	4	11	21	1.37	.17
Sommerville et al., 2013	Sharing	Experiment	Likelihood that participant shared	12.46 (n.r)	15.13 (n.r)	1	1	48	34	0.77	.07
			Sharing duration	12.46 (n.r)	15.13 (n.r)	1	1	48	34	-0.49	.05
Staub & Noerenberg, 1981	Sharing	Experiment	Items shared	108 (n.r)	120 (n.r)	4	4	33	33	0.71	.13
Stith & Connor, 1962	Helping	Observation	Rate of prosocial behaviors	38-46	64-75	3	3	11	23	0.37	.17
Svetlova et al., 2010	Helping	Experiment	Likelihood that participant helped	18.64 (0.48)	30.23 (0.68)	1	2	32	33	0.95	.07
			Likelihood that participant helped	18.64 (0.48)	30.23 (0.68)	1	2	32	33	1.95	.09
			Steps needed before helping	18.64 (0.48)	30.23 (0.68)	1	2	32	33	1.59	.94
Tabor & Shaffer, 1981	Sharing	Experiment	Steps needed before sharing	66 (n.r)	90 (n.r)	3	4	40	40	0.00	.05
	Helping	Experiment	Helping duration	90 (n.r)	114 (n.r)	4	4	40	40	0.00	.05
			Items shared	66 (n.r)	90 (n.r)	3	4	40	40	0.30	.05
	Sharing	Experiment	Items shared	90 (n.r)	114 (n.r)	4	4	40	40	0.28	.05
Thompson et al., 1997	Sharing	Experiment	Items shared	53 (4)	62 (2)	3	3	18	16	0.35	.12
Ulber et al., 2015	Sharing	Experiment	Items shared	18 (n.r)	24 (n.r)	1	2	24	24	0.00	.08
Vaish et al., 2016	Sharing	Experiment	Items shared	24 (1.27)	35.6 (1.05)	2	2	62	64	0.66	.03
Van Berkel et al., 2015	Sharing	Observation	Rate of sharing	36 (3.6)	48 (3.6)	2	3	302	302	0.27	.01
Van Hoorn et al., 2016	Sharing	Experiment	Items shared	155.16 (n.r)	192.96 (n.r)	5	5	76	30	-0.64	.07
Vegelsang & Tomasello, 2016	Sharing (Study 1)	Experiment	Items shared	38.75 (1.59)	62.43 (1.83)	3	3	72	72	0.00	.03
	Sharing (Study 2)	Experiment	Items shared	42.09 (2.91)	64 (3.05)	3	3	22	24	0.00	.09
Wallace & Hoving, 1979	Sharing	Experiment	Items shared	72-102	102-156	4	4	20	20	0.00	.10

Warneken & Tomasello, 2013b	Helping	Experiment	Items helped	30.2 (n.r)	42.5 (n.r)	2	3	36	36	0.28	.06
	Sharing	Experiment	Steps needed before sharing	30.2 (n.r)	42.5 (n.r)	2	3	36	36	0.00	.06
			Sharing duration	30.2 (n.r)	42.5 (n.r)	2	3	36	36	0.00	.06
			Items shared	30.2 (n.r)	42.5 (n.r)	2	3	36	36	-0.08	.06
Weissbrod, 1980	Sharing	Experiment	Items shared	96 (n.r)	132 (n.r)	4	4	52	52	0.00	.04
White & Burnam, 1975	Sharing	Experiment	Items shared	120.1 (6)	133 (6)	4	4	96	96	0.56	.04
White et al., 2014	Sharing	Observation	Rate of sharing	39.96 (3.96)	72.96 (3.96)	3	3	81	81	0.00	.02
Williams & Moore, 2016	Sharing	Experiment	Likelihood that participant shared	54.6 (n.r)	60.86 (n.r)	3	3	53	53	0.00	.03
Williams et al., 2014	Sharing	Experiment	Likelihood that participant shared	43.33 (n.r)	68.86 (n.r)	3	3	25	25	1.57	.10
Willis et al., 1977	Sharing	Experiment	Items shared	66-72	102-108	3	4	24	24	0.96	.19
Wilson et al., 1990	Sharing (Study 1)	Experiment	Items shared	60 (n.r)	72 (n.r)	3	3	40	40	0.00	.05
	Sharing (Study 2)	Experiment	Items shared	60 (n.r)	72 (n.r)	3	3	40	40	0.00	.05
Wu & Su, 2014	Sharing	Experiment	Likelihood that participant shared	28.86 (3.16)	39.49 (2.21)	2	3	25	25	0.00	.16
				39.49 (2.21)	47.3 (2.51)	3	3	25	24	1.17	.57
			Steps needed before sharing	28.86 (3.16)	39.49 (2.21)	2	3	25	25	0.05	.08
				39.49 (2.21)	47.3 (2.51)	3	3	25	24	0.94	.09
			Items shared	28.86 (3.16)	39.49 (2.21)	2	3	25	25	-0.07	.08
				39.49 (2.21)	47.3 (2.51)	3	3	25	24	0.30	.08
Wu & Su, 2015	Helping	Experiment	Likelihood that participant helped	42 (3.44)	48 (n.r)	3	3	23	41	0.72	.07
	Sharing	Experiment	Items shared	42 (3.44)	65 (3.1)	3	3	23	23	0.41	.09
	Sharing	Experiment	Likelihood that participant shared	41.18 (3.02)	64.4 (3.03)	3	3	51	88	0.74	.04
			Items shared	41.18 (3.02)	64.4 (3.03)	3	3	51	88	0.47	.03
Yarrow et al., 1976	Helping	Observation	Rate of helping	36 (n.r)	42 (n.r)	2	3	26	26	0.00	.08
				42 (n.r)	48 (n.r)	3	3	26	26	0.00	.08
Yu et al., 2016	Sharing	Experiment	Likelihood that participant shared	50.04 (2.76)	71.16 (3.48)	3	3	32	32	0.07	.08
				50.04 (2.76)	87.12 (2.64)	3	4	32	32	0.13	.08
Zhu et al., 2015	Sharing	Experiment	Likelihood that participant shared	87.12 (2.64)	109.44 (3.72)	4	4	32	26	0.51	.09
Zinsler & Varney, 1978	Sharing	Experiment	Items shared	30-42	66-78	2	3	157	164	0.59	.06
				84 (n.r)	132 (n.r)	4	4	60	60	1.06	.08

Zinser et al., 1975	Sharing	Experiment	Items shared	48 (n.r)	66 (n.r)	3	3	28	28	0.00	.07
Zinser et al., 1976a	Sharing	Experiment	Items shared	72 (n.r)	96 (n.r)	3	4	36	41	0.50	.05
Zinser et al., 1976b	Sharing	Experiment	Items shared	72 (n.r)	90 (n.r)	3	4	66	66	0.91	.07
Zinser et al., 1981	Sharing	Experiment	Items shared	66.96 (n.r)	127.08 (n.r)	3	4	53	44	0.68	.04
Zuffianò et al., 2015	Sharing	Experiment	Items shared	101.76 (n.r)	127.08 (n.r)	4	4	46	44	0.00	.04
				84 (n.r)	180 (n.r)	4	5	84	62	-0.13	.03

<sup>a</sup> Age category: 1 = Infancy; 2 = Toddlerhood, 3 = Preschool age, 4 = Childhood; 5 = Adolescence; <sup>b</sup> n.r = not reported.

## Data Analysis

**Individual Effect Sizes.** All the effect sizes were calculated via the website <http://cebcp.org/practical-meta-analysis-effect-size-calculator/>, developed by David B. Wilson (Ph.D). Following the requirement of independence of effect sizes, we used the following rules if multiple effect sizes could be drawn from one study. (A) For each age-group comparison, if multiple effect sizes could be calculated based on *one* dependent variable subgroup, then we opted for a conservative approach and selected only one of these comparisons in the meta-analysis (Lipsey & Wilson, 2001). For example, in Rheingold's study (1982), there were three pairs of age group comparisons (19.2 vs. 25.5, 19.2 vs. 31.1, and 25.5 vs. 31.1), which all belonged to the same category comparison, namely, toddler vs. toddler. Thus, we randomly chose one effect size for the analysis. (B) If an article reported multiple age-group comparisons (e.g., toddlers vs. preschoolers, and younger preschoolers vs. older preschoolers, Dunfield & Kuhlmeier, 2013) based on *one* dependent variable subgroup, we included all these age group comparisons using only one effect size per dependent variable. (C) If an article reported age-group comparisons based on *multiple* dependent variables, then we calculated these effect sizes and included them in their respective meta-analysis. For example, in Wu and Su (2013), both how many steps the child needed before sharing and the numbers of items shared in the experiment were used. In addition, for the general development of prosocial behavior, (D) If an article reported age difference comparison for both a control group condition and an experimental condition, especially, we used the results in the control group condition. If there was no control group, then we chose the effect sizes across all experimental conditions within each age group comparison. If the overall effect size was not available, then we randomly chose the effect size of one pair. In randomly choosing we used the website: <https://www.random.org/>.

The meta-analysis for mean effect size was conducted in three steps: First, employing a random effect model with a 95% confidence interval, we estimated the mean effect size per age group comparison. Second, the variations of the effect size distribution were examined by using a Q test. Third, for each age group comparison, a trim and fill analysis (Dubal, 2005; Duval & Tweedie, 2000) was conducted in order to detect any possible publication bias effect. All the meta-analyses were conducted with the meta-analysis package *metaphor* (version 1.9-9) in R (version 3.3.2). For each step, we used syntax available in the manual and a previous paper that used this package (Viechtbauer, 2010).

**Moderator Analysis.** If the mean effect size analysis revealed a heterogeneous distribution of mean effect sizes (Q test was significant), moderator analyses were conducted

by using a mixed effects model, aiming at helping to explain the heterogeneity in the model. We applied a “shifting units of analysis” approach (e.g., Cooper, 1998, Slagt, Dubas, Deković, & van Aken, 2016). That is, for each moderator per dependent variable (e.g., number of items shared) per group comparison (e.g., younger vs. older children), if the study reported results that belong to different categories (e.g., friend vs. stranger), then we choose these results instead of the effect size from the control or overall results. However, if there was more than one result within each category (e.g., friend), then we randomly choose one result. For example, in Rushton and Wiener’s paper (1975), they asked the children to share with either a friend or a stranger. In the overall meta-analysis we used the score across conditions for the age difference effect, however, for analyzing whether the relationship of the recipient moderates children’s sharing behavior, it would be less informative to choose the overall effect than to choose a specific condition that focused on sharing with friend or stranger. The moderator analyses were conducted using an ANOVA procedure, based on syntax in the metaphor package and steps described in Viechtbauer, (2010). The tested moderators were (a) recipient’s need, (b) the reciprocity of the recipient, (c) the sociability the recipient, (d) publication years, and (e) type of object shared.

## Results

### Descriptive Data

Table 3 summarizes the characteristics of the 298 effect sizes from the 174 articles included in the meta-analysis. For descriptive purposes, the percentage of children who helped or shared reported in these studies are also summarized in Table 4 and 5. In the following, for each behavior and each dependent variable, we present the results per age group comparison in two parts: In the first part we present the mean effect size analysis, the variations in the effect size analysis, and the publication bias test (Tables 6, 7 and 8). In part two we present the moderator analyses that were possible.

### Mean Effect Size Analysis on the General Development of Prosocial Behavior

Below we report the meta-analyses that included at least three effect sizes per age group comparison. Two effect sizes are considered to be insufficient for meta-analysis by several researchers (e.g., Borenstein, Hedges, Higgins, & Rothstein, 2011). Moreover, with only two effect sizes it’s not possible to conduct a trim and fill analysis. Nevertheless, the complete results (age-group comparisons with one or two effect sizes) are included in Tables 6, 7 and 8 as a source of reference.

**Table 4.** *The percentage of participants that helped across studies*

	Younger Infants VS. Older Infants	Infants VS. Toddlers	Younger Toddlers VS. Older Toddlers	Toddlers VS. Preschoolers	Younger Preschoolers VS. Older Preschoolers	Preschoolers VS. Children	Younger Children VS. Older Children	Children VS. Adolescents	Younger Adolescents VS. Older Adolescents
Percentage of participants that helped	42% vs. 50%	45% vs. 65% <sup>a</sup>	47% vs. 65%	n.a.	68% vs. 81% <sup>b</sup>	41% vs. 73%	92% vs. 100%	100% vs. 100% <sup>c</sup>	n.a.
	<b>Infants</b>		<b>Toddlers</b>		<b>Preschoolers</b>		<b>Children</b>		<b>Adolescents</b>
Overall Percentage <sup>d</sup>	46%		65%		63%		85%		100%
Overall Percentage <sup>e</sup>	46%		66%		68%		86%		100%

*Note:* n.a. = not applicable; <sup>a</sup> one comparison was not included here, because the authors only reported the age difference based on *Chi-square*, without reporting the actual frequency (Hepach et al., 2017); <sup>b</sup> one comparison was not included here, because the authors only reported that the age difference was not significant, without reporting the actual frequency (Dunfield & Kuhlmeier, 2013); <sup>c</sup> one comparison was not included here, because the authors only reported that the age difference was not significant, without reporting the actual frequency (Hao & Liu, 2016); <sup>d</sup> percentage calculated based on the *age group-comparisons included in the meta-analysis*; <sup>e</sup> percentage calculated from *all age groups reported in the studies, independent from whether we selected them for the current meta-analysis*.

**Table 5.** *The percentage of participants that shared across studies*

	Younger Infants VS. Older Infants	Infants VS. Toddlers	Younger Toddlers VS. Older Toddlers	Toddlers VS. Preschoolers	Younger Preschoolers VS. Older Preschoolers	Preschoolers VS. Children	Younger Children VS. Older Children	Children VS. Adolescents	Younger Adolescents VS. Older Adolescents
Percentage of participants that shared	33% vs. 67%	36% vs. 65%	n.a.	76% vs. 84% <sup>a</sup>	42% vs. 60% <sup>b</sup>	46% vs. 66%	58% vs. 76%	51% vs. 48%	n.a.
	<b>Infants</b>	<b>Toddlers</b>	<b>Toddlers</b>	<b>Preschoolers</b>	<b>Preschoolers</b>	<b>Children</b>	<b>Children</b>	<b>Adolescents</b>	
Overall Percentage <sup>d</sup>	42%	69%		52%		64%		32%	
Overall Percentage <sup>e</sup>	42%	78%		53%		64%		31%	

*Note:* n.a. = not applicable; <sup>a</sup> three comparisons were not included here, because the authors only reported that the age difference was not significant, without the actual frequency (three effect sizes drawn from two articles, Dunfield & Kuhlmeier, 2013; Hamann et al., 2011); <sup>b</sup> four comparisons were not included here, because the authors only reported that the age difference was not significant (Dunfield & Kuhlmeier, 2013; Houser et al., 2012), based on *Chi-square* value (Kenward & Dahl, 2011), or *F* value (Rochat et al., 2009), without reporting the actual frequency; <sup>c</sup> two comparisons were not included here, because the authors only reported that the age difference was not significant (Simmons & Zumpf, 1986), or based on *Chi-square* value without the actual frequency (Scharpf et al., 2017); <sup>d</sup> percentage calculated from *age group-comparisons included in meta-analysis*; <sup>e</sup> percentage calculated from *all age groups reported in the studies, independent from whether we selected them for the current meta-analysis*.

**Table 6.** Mean effect sizes (*d*) of the Development of Helping Behavior, from Infancy through Adolescence

Behavior & Dependent variables	Younger Infants (Mean = 12.76)		Infants (Mean = 17.72)		Younger Toddlers (Mean = 22.66)		Toddlers (Mean = 30.07)		Younger Preschoolers (Mean = 54.90)		Preschoolers (Mean = 64.26)		Younger Children (Mean = 94.31)		Children (Mean = 118.65)		Younger Adolescents (Mean = 154.4)							
	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>						
Observation																								
Experiment																								
A: The likelihood that participants helped	4	0.62 <sup>+</sup>	11.68 <sup>***</sup>	5.63	3	0.43	4.77	1	0.06	4	0.15	9.09 <sup>*</sup>	3	1.15 <sup>***</sup>	1	0.90	1	0.12	2	-0.03	0.16	1	0.12	
	4	0.62 <sup>+</sup>	11.68 <sup>***</sup>	14.63	3	0.43	4.77			4	0.15	9.09 <sup>*</sup>	5	0.61	15.67 <sup>**</sup>									
B: Steps needed before helping																								
										1	-0.27	--	2	0.62	7.03 <sup>**</sup>	2	0.51 <sup>+</sup>	0.47						
C: Help duration																								
										4	0.09	5.17	6	0.22 <sup>+</sup>	5.02	2	0	0	2	0.38 <sup>*</sup>	0.40			
										5	0.18	7.79	7	0.23 <sup>+</sup>	5.24									
D: Number of items picked up	1	0.98	--					1	0.28							2	0.22	2.11						

\* Blue: results drawn from two effect sizes, Green: results drawn from at least three effect sizes. Significant *d* values presented in **bold**; the mean = mean age (in months) for the group; for fill and trim test, results before filling in studies are shown in the upper and after filling in are shown in the lower line, the same results across lines indicates that 0 effect size is needed to be filled; -- = not applicable; for the steps in helping, a higher score represents fewer steps needed before helping.



**Table 7.** Mean effect sizes (*d*) of the Development of Sharing Behavior, from Infancy through Adolescence

Behavior & Dependent variables	Younger Infants (Mean = 12.30) VS. Older Infants (Mean = 16.08)		Infants (Mean = 17.59) VS. Toddlers (Mean = 24.93)		Younger Toddlers (Mean = 22.44) VS. Older Toddlers (Mean = 32.60)		Toddlers (Mean = 32.09) VS. Preschoolers (Mean = 46.91)		Younger Preschoolers (Mean = 46.78) VS. Older Preschoolers (Mean = 63.89)		Preschoolers (Mean = 64.47) VS. Children (Mean = 99.60)		Younger Children (Mean = 95.46) VS. Older Children (Mean = 122.70)		Children (Mean = 117.33) VS. Adolescents (Mean = 182.98)		Younger Adolescents (Mean = 166.73) VS. Older Adolescents (Mean = 203.91)							
	<i>k</i>	<i>d</i>	<i>Q</i>	<i>d</i>	<i>Q</i>	<i>k</i>	<i>d</i>	<i>Q</i>	<i>k</i>	<i>d</i>	<i>Q</i>	<i>k</i>	<i>d</i>	<i>Q</i>	<i>k</i>	<i>d</i>	<i>Q</i>	<i>k</i>	<i>d</i>					
Observation	2	-0.12	1.08	1	-0.02	--	5	0.12	3.87	2	0.02	0.14	8	<b>0.19**</b>	6.57									
Experiment	1	0.77	--	3	<b>0.64**</b>	1.75	5	0.14	4.37	19	<b>0.42**</b>	42.59*	5	0.14	4.52	15	<b>0.53**</b>	29.39**	14	<b>0.64**</b>	34.72**	3	-0.16	0.16
				4	<b>0.37*</b>	6.67	6	0.16	4.52	24	<b>0.28**</b>	70.06*	6	0.16	4.52	15	<b>0.53**</b>	29.39**	14	<b>0.64**</b>	34.72**	5	-0.21	0.50
A: The likelihood that participants shared	3	<b>1.45**</b>	0.03	1	0.75	--	2	0.02	0.02	2	0.43	5.51**	2	0.02	0.02	2	0.43	5.51**						
	4	<b>1.44**</b>	0.06																					
B: Step needed before sharing	1	-0.49	--	1	0	--	1	0	--				1	0	--									
C: Sharing duration	1	0.02	--	2	0.37	4.19*	4	0.11	5.02	23	<b>0.22**</b>	33.03*	4	0.11	5.02	27	<b>0.13*</b>	74.95**	46	<b>0.28**</b>	128.53**	9	0.03	29.81**
D: Number of items shared	1	0.02	--	2	0.37	4.19*	4	0.11	5.02	27	<b>0.13*</b>	59.15*	4	0.11	5.02	42	<b>0.42**</b>	98.06**	46	<b>0.28**</b>	128.53**	5	-0.14	6.44

\* Blue: results drawn from two effect sizes, Green: results drawn from at least three effect sizes. Significant *d* values presented in **bold**; the mean = mean age (in months) for the group; for fill and trim test, results before filling in studies are shown in the upper and after filling in are shown in the lower line, the same results across lines indicates that 0 effect size is needed to be filled; -- = not applicable; for the steps in sharing, as in the studies a higher score represents fewer steps needed before sharing.

**Table 8.** Mean effect sizes (*d*) of the development of Prosocial Behavior (Combined Sharing and Helping as One Category), from Infancy through Adolescence

Adolescence

Behavior & Dependent variables	Younger Infants (Mean = 16.82)		Younger Toddlers (Mean = 23.56)		Toddlers (Mean = 30.49)		Younger Preschoolers (Mean = 48.54)		Preschoolers (Mean = 59.9)		Younger Children (Mean = 102)		Children (Mean = 114)		Younger Adolescents (Mean = 148.08)									
	Older Infants	VS. Younger Infants	Older Toddlers	VS. Younger Toddlers	Older Preschoolers	VS. Younger Preschoolers	Older Preschoolers	VS. Younger Preschoolers	Older Children	VS. Younger Children	Older Children	VS. Younger Children	Older Children	VS. Younger Children	Older Adolescents	VS. Younger Adolescents								
	Q	d	Q	d	Q	d	Q	d	Q	d	Q	d	Q	d	Q	d								
Observation	4	<b>0.28**</b>	4.68	5	-0.06	1.31	4	0.16	25.64**	4	<b>0.38*</b>	3.14	4	<b>0.29*</b>	3.22	2	-0.16	2.30	1	0	---	1	-0.14	---
	5	<b>0.32***</b>	5.79	8	-0.01	2.94	5	0.30	31.06**	6	<b>0.60**</b>	9.08	5	<b>0.23*</b>	5.44									

\* Blue: results drawn from two effect sizes, Green: results drawn from at least three effect sizes. Significant *d* values presented in bold; the mean = mean age (in months) for the group; for fill and trim test, results before filling in studies are shown in the upper and after filling in are shown in the lower line, the same results across lines indicates that 0 effect size is needed to be filled, - -- = not applicable.

## The development of helping Behavior, from infancy to adolescence.

**Observational studies on helping behavior.** None of the age group comparisons contained three effect sizes or more (Table 6).

**Experimental studies on helping behavior.** For the experimental studies, dependent variables were divided into four subgroups: (A) the likelihood that participants helped; (B) the communicative steps needed before helping; (C) the duration of helping; (D) the number of items picked up in the experiment. For subgroup (A), there were enough effect sizes for five age-group comparisons. The younger versus older infants model showed a marginally significant mean effect size ( $d = 0.62, p = .06$ ) with a heterogeneous distribution of effect sizes ( $Q(df = 3) = 11.68, p = .00$ ), and the infants versus toddlers model showed a significant mean effect size ( $d = 0.64, p < .01$ ) with a homogeneous distribution ( $Q(df = 5) = 5.63, p = .34$ ). The trim and fill tests revealed that three effect sizes needed to be imputed for infants versus toddlers comparison, though the mean effect size remained significant after this imputation. These results indicate an increase of helping from younger to older infants, and from infants to toddlers. Furthermore, the younger versus older toddlers model yielded a non-significant mean effect size ( $d = 0.43, p = .18$ ) with a homogeneous distribution ( $Q(df = 2) = 4.77, p = .09$ ), and the younger versus older preschoolers model yielded a non-significant mean effect size ( $d = 0.15, p = .54$ ), with a heterogeneous distribution ( $Q(df = 3) = 9.09, p < .05$ ), indicating no age-related differences in helping between younger and older toddlers, and between younger and older preschoolers. However, the preschoolers versus children model showed a significant mean effect size ( $d = 1.15, p < 0.01$ ) with a heterogeneous distribution ( $Q(df = 2) = 5.82, p = .05$ ), indicating children are more likely to help than preschoolers. The trim and fill tests revealed that two effect sizes were needed to be imputed for this age-group comparison and the mean effect size was no longer significant after this imputation ( $d = 0.61, p = 0.16$ ). The actual percentage of participants helped for each age comparison, across all experimental designs, are shown in Table 4. On average, 46% of infants, 65% of toddlers, 63% of preschoolers, 85% of children and all adolescents helped in these studies. For subgroup (B), none of the age group comparisons contained three effect sizes or more. For subgroup (C), There were enough effect sizes for two age-group comparisons. The preschooler versus children model showed a non-significant mean effect size ( $d = 0.09, p = .61$ ), with a homogeneous distribution ( $Q(df = 3) = 5.17, p = .16$ ). The trim and fill tests revealed that one effect size needed to be imputed though the mean effect size remained non-significant after this imputation. The younger versus older children model showed a marginally significant mean effect size ( $d = 0.22, p = .08$ ) with a homogeneous

distribution on effect sizes ( $Q(df = 5) = 5.02, p = .41$ ). The trim and fill tests revealed that one effect size needed to be imputed for this comparison, for the mean effect size to no longer be significant ( $d = 0.23, p < .05$ ) after this imputation, indicating older children spent more time in helping compared with their younger peers. For subgroup (D), none of the age group comparisons contained three effect sizes or more.

Overall, we found an increase in the likelihood that participants helped within infancy, from infancy to toddlerhood, and from the preschool age to childhood, but the likelihood neither increase nor decrease within toddlerhood, or within the preschool age. Also, we found an increase of time engaged in helping within childhood, but the time neither increase nor decrease from the preschool age to childhood.

### **The development of sharing behavior, from infancy to adolescence.**

**Observation studies on sharing behavior.** There were enough effect sizes for toddlers versus preschoolers comparison, and results showed a non-significant mean effect size ( $d = 0.12, p = .20$ ) with a homogeneous distribution on effect sizes ( $Q(df = 4) = 3.87, p = .04$ ). However, the trim and fill test revealed that three effect sizes needed to be imputed for this comparison for mean effect size to be significant ( $d = 0.19, p < .05$ ) after this imputing (Table 7).

**Experimental studies on sharing behavior.** Based on experimental design, dependent variables were further divided into four subgroups (i.e., (A) the likelihood of children who shared; (B) the communicative steps needed before sharing; (C) the duration of sharing; (D) the number of items shared. For subgroup (A), there were enough studies for six age-group comparisons. The infants versus toddlers model showed a significant mean effect size ( $d = 0.64, p < .01$ ) with a homogeneous distribution on effect sizes ( $Q(df = 2) = 1.75, p = .41$ ), and the trim and fill tests revealed that one effect size needed to be imputed, though the mean effect size remained marginally significant after this imputation ( $d = 0.37, p = .09$ ). Thus, the result indicated toddlers are more likely to share than infants. Furthermore, the toddlers versus preschoolers model yielded a non-significant mean effect size ( $d = 0.14, p = .30$ ) with a homogeneous distribution ( $Q(df = 4) = 4.37, p = .35$ ), indicating no age-related differences between toddlers and preschoolers. The trim and fill tests revealed that one effect size needed to be imputed, though the mean effect size remained significant after this imputation. Moreover, the younger versus older preschoolers model showed a significant mean effect size ( $d = 0.42, p < .01$ ) with a heterogeneous distribution ( $Q(df = 18) = 42.59, p < .01$ ), and the trim and fill tests revealed that five effect sizes needed to be imputed, though the mean effect size remained significant after imputation; the preschoolers versus children

model showed a significant mean effect size ( $d = 0.53, p < .01$ ) with a heterogeneous distribution ( $Q(df = 14) = 29.39, p < .01$ ). The younger versus older children model also yielded a significant mean effect size ( $d = 0.64, p < .01$ ) with a heterogeneous distribution ( $Q(df = 13) = 34.72, p < .01$ ). Thus, there seems to be an increase in the likelihood of children engaged in sharing from the early preschool age through late childhood. However, the children versus adolescents model yielded a non-significant mean effect size ( $d = -0.16, p = .27$ ), with a homogeneous distribution ( $Q(df = 2) = 0.16, p = .92$ ), and the trim and fill tests revealed that two effect sizes needed to be imputed, though the mean effect size remained non-significant after imputation, indicating no age-related differences in likelihood of children shared between children and adolescence. The actual percentages of participants that shared for each age comparison, across all experimental designs, are shown in Table 5. On average, 42% of infants, 69% of toddlers, 52% of preschoolers, 64% of children and 32% of adolescents shared in these studies. For subgroup (B), there were enough effect sizes for the infants versus toddlers comparison, and results showed a significant mean effect size ( $d = 1.45, p < .01$ ) with a homogenous distribution ( $Q(df = 2) = 0.03, p = .98$ ). The trim and fill tests revealed that one effect size needed to be imputed, though the mean effect size remained significant after imputation, indicating toddlers need less communicative steps than infants.

For subgroup (C), none of the age group comparisons contained three studies or more. For subgroup (D), there were enough effect sizes for six age-group comparisons. The toddler versus preschoolers model yielded a non-significant mean effect size ( $d = 0.11, p = .51$ ) with a homogeneous distribution in effect sizes ( $Q(df = 3) = 5.02, p = .17$ ), indicating preschoolers and toddlers share similar amounts of items. The younger versus older preschoolers model yielded a significant mean effect size ( $d = 0.22, p < .01$ ) with a marginally heterogeneous distribution ( $Q(df = 22) = 33.03, p = .06$ ), and the trim and fill tested showed four effect sizes needed to be imputed, and the mean effect size was marginally significant ( $d = 0.13, p = .08$ ) after this imputation. Furthermore, the preschoolers versus children model yielded a significant mean effect size ( $d = 0.48, p < .01$ ) with a heterogeneous distribution ( $Q(df = 36) = 74.95, p < .01$ ), and the trim and fill tested showed five effect sizes needed to be imputed though the mean effect size remained significant after this imputation; the younger versus older children model yielded a significant mean effect size ( $d = 0.28, p < 0.01$ ) with a heterogeneous distribution ( $Q(df = 45) = 128.53, p < .01$ ). Thus, there seems to be an increase in the number of items shared from the early to late preschool age, and a clear increase from the late preschool age through late childhood. The children versus adolescents model yielded a non-significant mean effect size ( $d = 0.03, p = .80$ ) with a heterogeneous distribution ( $Q(df$

= 8) = 29.81,  $p < .01$ ); also, the younger versus older adolescents model yielded a non-significant mean effect size ( $d = -0.14$ ,  $p = 0.26$ ) with a homogeneous distribution ( $Q(df = 4) = 6.44$ ,  $p = .16$ ). Thus, the number of items shared neither increase or decrease from late childhood through late adolescence.

Overall, we found an increase in the likelihood that participants shared from infancy to toddlerhood, within the preschool age, from the preschool age to childhood, and within childhood, but the likelihood neither increase nor decrease from toddlerhood to the preschool age, or from childhood to adolescence. Additionally, we found the communicative steps needed before sharing decrease (represented as a positive effect size) from infancy to toddlerhood. Also, we found an increase of number of items shared within the preschool age, from the preschool age to childhood, within childhood, but the number of items neither increase nor decrease from toddlerhood to the preschool age, from childhood to adolescence, or within adolescence.

**Observational studies on the development of prosocial behavior (Combined helping and sharing).** Considering several observation studies coded helping and sharing into one category (e.g., prosocial behavior), we conducted meta-analyses on the observers' rate of helping and sharing behavior out of all behaviors observed. There were enough effect sizes for five age-group comparisons (Table 8). The infants versus toddlers model yielded a significant mean effect size ( $d = 0.28$ ,  $p < .01$ ) with a homogeneous distribution in effect sizes ( $Q(df = 3) = 4.68$ ,  $p = .19$ ), and the trim and fill test showed one effect size needed to be imputed, though the mean effect size remained significant after this imputation. Thus, an increase in helping and sharing was found from infancy to toddlerhood. The younger versus older toddlers model yielded a non-significant effect size ( $d = -0.06$ ,  $p = .58$ ) with a homogeneous distribution ( $Q(df = 4) = 1.31$ ,  $p = .85$ ), and the trim and fill test showed three effect sizes needed to be imputed, though the mean effect size remained non-significant after imputation; the toddlers versus preschoolers model yielded non-significant effect size ( $d = 0.16$ ,  $p = .63$ ) with a heterogeneous distribution ( $Q(df = 3) = 25.64$ ,  $p < .01$ ), and the trim and fill test showed one effect size needed to be imputed, though the mean effect size remained non-significant after imputation. Thus, there seems to be no increase in observed helping and sharing from early toddlerhood through the preschool age. The younger versus older preschoolers model yielded a significant effect size ( $d = 0.38$ ,  $p < .05$ ) with a homogeneous distribution ( $Q(df = 3) = 3.14$ ,  $p = .37$ ), and the trim and fill test showed two effect sizes needed to be imputed, though the mean effect size remained significant after imputation. Moreover, the preschoolers versus children model yielded a significant effect size

( $d = 0.29, p < .05$ ) with a homogeneous distribution ( $Q(df = 3) = 3.22, p = .35$ ), and the trim and fill test showed one effect size needed to be imputed, though the mean effect size remained significant after imputation. Thus, an increase of helping and sharing was observed from the early preschool age through childhood. Overall, we found an increase of helping and sharing from infancy to toddlerhood, and from the early preschool age through childhood, with no increase from early toddlerhood through the preschool age.

### Moderator Analysis

For each moderator analysis, subject to the number of effect sizes (at least three effect sizes per level, and at least two levels of a certain moderator) and the criteria for heterogeneity (a significant result in  $Q$  test), no moderator analyses were applicable for the development of helping behaviors, or combined helping and sharing behaviors as one category. As for sharing behaviors, five moderators were initially included but an insufficient number of studies were available for the category, the sociability of the recipient, leaving four moderators being analyzed (1) the recipients' need; (2) the reciprocity of the recipient; (3) the publication year of the study and (4) the object shared in the experiment.

**The recipients' need.** No moderator effect was found for the three age-group comparisons for which there were sufficient effect sizes. For the *likelihood that participants shared in the experiment*, the recipients' need did not moderate the age difference in sharing from preschoolers to children,  $QM(1) = 0.01, p = .99$ . For the *numbers of items shared* in the experiment, the results showed that recipients' need did not moderate the increase from younger to older preschoolers,  $QM(1) = 1.78, p = .18$ ; from preschoolers to children,  $QM(1) = 0.08, p = .77$ , nor from younger to older children,  $QM(1) = 0.01, p = .92$ .

**The reciprocity of the recipient.** No moderator effect was found for the one age-group comparison that could be analyzed. That is, for the *likelihood that participants shared* in the experiment, the relationship with the recipient (friend vs. stranger/unknown) did not moderate the increase in sharing from preschoolers to children,  $QM(1) = 2.48, p = .11$ .

**Publication year.** For one out of the six age-groups comparisons we found a moderator effect for publication year. That is, for the *likelihood that participants shared*, the publication year moderated the increase from preschoolers to children,  $QM(1) = 5.81, p = .01$ , showing that the increase is significantly slower for studies published after the year 2000 than for studies published before the year 2000 ( $b = -0.53, p < .05$ ). No moderation effect was found from younger to older preschoolers ( $QM(1) = 2.98, p = .08$ ), and from younger to older children ( $QM(1) = 0.13, p = .72$ ). For the *numbers of items shared* in the experiment, publication year did not moderate the increase from younger to older preschoolers ( $QM(1) =$

0.69,  $p = .41$ ), from preschoolers to children ( $QM(1) = 0.32, p = .70$ ), nor from younger to older children ( $QM(1) = 0.65, p = .42$ ).

**The object shared in the experiment.** For two out of six age-group comparisons we found a moderating effect for the object shared in the experiment. For *the likelihood that participants shared* in the experiment, the object shared (food vs. toy and other objects vs. money) moderated the increase from younger to older children,  $QM(2) = 9.73, p < .01$ . This effect shows that the increase is significantly faster when comparing sharing toys with food ( $b = 0.73, p < .05$ ), whereas no difference in increase was found when comparing sharing food with money ( $b = 0.00, p = .99$ ). For *the numbers of items shared* in the experiment, the object shared (food vs. toy and other objects) moderated the increase from younger to older preschoolers,  $QM(1) = 3.88, p < .05$ , showing that compared with sharing food, the increase is significantly faster when sharing toys ( $b = 0.24, p < .05$ ). For *the likelihood that participants shared* in the experiment, the object shared (food vs. toy and other objects) did not moderate the increase from younger to older preschoolers,  $QM(1) = 0.01, p = .91$ , or from preschoolers to children,  $QM(1) = 1.50, p = .22$ . For *the numbers of items shared* in the experiment, object shared (food vs. toy and other objects vs. money) did not moderate the increase from preschoolers to children,  $QM(2) = 0.95, p = .62$ , or the increase from younger to older children,  $QM(2) = 1.65, p = .43$ .

## Discussion

Prosocial behavior asks for (at least) two kinds of prerequisites: Social-cognitive abilities that warrant individuals to be prosocial (e.g., mental states understanding) and motivations (e.g., altruistic and egoistic motivations) that actually trigger this prosocial potential into real actions (i.e., the willingness to be prosocial). In line with these two prerequisites and the theoretical dynamic interaction between them, the current meta-analysis focused on the development of two distinct prosocial behaviors, helping and sharing. Below we first report whether and how our results for each behavior are in line with theoretical explanations that are based on underlying social-cognitive abilities and motivations. In doing so, we also point out the gaps between existing theories and studies, and discuss further directions to examine age differences at certain age periods. We next discuss the potential moderators that were tested in the current meta-analysis, how these results speak to the prosocial mechanisms, and what future studies can focus on when further examining these potential mechanisms.

### The General Development of Prosocial Behaviors

#### Helping.



***The early development of helping (until late toddlerhood).*** The results from the current meta-analysis show that older infants were more likely to help than younger infants, and toddlers did more so than infants. All included helping tasks were designed based on an “out-of-reach” task that was developed by Warneken and Tomasello (2006), in which the participants witnessed a recipient reaching out for, but failing to grasp an object that was within the participants’ reach (but out of the recipient’s reach). Helping was identified when participants handed the target object to the recipient (except for Liszkowski, Carpenter, Striano, & Tomasello, 2012, in which the toddler only needed to point to, rather than to hand over the needed object). Accordingly, these tasks tested individuals’ cognitive abilities in understanding of, and intervening on very basic goals (Dunfield & Kuhlmeier, 2013). Also, most studies likely limited the motivations for helping to be altruistic only. All except one study (Dahl, Schuck, & Campos, 2013) presented toddlers with an unknown recipient with no other information (e.g., reciprocity), thus participants’ behaviors were likely not triggered by egoistic motivations such as reciprocity or establishing a good relationship with prosocial recipients. Across these two age comparisons, on average 46% of infants and 65% of toddlers actually helped in the experiment.

While there was no significant difference between older and younger toddlers in how likely they engaged in helping, a medium effect size was found. There are two possible theoretical explanations for this. First and methodologically, only three effect sizes were included in this comparison, and thus the result might not be sensitive enough to detect (potential) significant age differences (Borenstein et al., 2011). After all, the descriptive information shows that on average 47% of younger toddlers, and 65% of older toddlers helped, similar to the descriptive results in younger age-comparisons (within infancy, and from infancy to toddlerhood). Second, it may be related to different motivations tested among these studies (motivation to help a stranger; Pettygrove, Hammond, Karahuta, Waugh & Brownell, 2013; to help a prosocial or antisocial recipient; Dahl et al., 2013; and to help parents, Rheingold, 1982). However, if that was the case, then we would have found a heterogeneous distribution of effect sizes, which was not found here. Relatedly, it could be that egoistic motivations only begin to drive helping behaviors during late toddlerhood, and are insufficiently developed to result in age differences between younger and older toddlers. Limited by the number of effect sizes, we could not test this explanations directly. Nevertheless, one study tested this possibility by asking toddlers to help either an antisocial or prosocial experimenter (Dahl et al., 2013), and found that 26-month-olds, rather than 22-month-olds, were more likely to first help a prosocial than antisocial recipient, while there

was no difference between these age groups on the likelihood of helping when combining the helping towards both prosocial and antisocial recipient. Thus, further research is needed to investigate when egoistic motivations emerge for helping.

Overall, studies examining the early development of helping showed a high consistency in task settings. The “out-of-reach-task” has been widely used, and is accepted as an age appropriate experimental task to detect young children’s abilities of detecting others’ unfulfilled goals and understanding goal directed actions. Nevertheless, for now most studies have not varied the possible motivations for helping, leaving it difficult to examine whether egoistic motivations might already affect the development of helping before age three. Accordingly, future studies could, for example, examine whether young children are becoming increasingly more likely to help familiar peers than unfamiliar ones.

***The development of helping beyond toddlerhood.*** Younger and older preschoolers were equally likely to engage in helping, and the effect size is small. There are (at least) two explanations for this result. First, the cognitive tasks might be too simple to detect any age differences. Half (two out of four) of the studies used the “out-of-reach” task with no manipulation of motivations, with the ability requested for these tasks mainly developed before age two (Dunfield, 2014). This is also supported by descriptive information that most of the participants, on average 68% younger and 81% older preschoolers, actually helped during these experiments. Second and methodologically, the inconsistencies in motivations tested also make age-related change difficult to detect. The two studies that did manipulate motivations manipulated egoistic ones by asking the participant to help either a prosocial or neutral recipient (Lötner et al., 2015), or to overcome a desire of playing (Rapp, Engelmann, Herrmann & Tomasello, 2017). This explanation is supported by the heterogeneous effect size distribution.

Children were more likely to engage in helping than preschoolers, though they spent the same amount of time in helping. This is not likely related to the development of cognitive abilities (Theory of Mind). After all, all studies employed relatively simple tasks (e.g., resorting cards, Katz, Katz & Cohen, 1976; Bar-Tal, 1982; or picking up pencils, Green & Schneider, 1974), which should be similarly challenging to preschoolers and children. A more plausible explanation is that many motivations for helping increase across these years, and in most studies at least two motivations could have been at work. For example, in Katz, Katz and Cohen’s study (1976), the motivation to help might be affected by both the recipients’ relationship to the participant (i.e., either from the same, or a different racial group) and the recipients’ needs (i.e., either physically handicapped or not), and in Bar-Tal’s

study (1982), the motivation might be affected by rewards (a material prize, a social praise, an undefined reward, or no rewards). Noteworthy is that even though the distributions of effect sizes are heterogeneous, results still showed a general increase of helping. This suggests that, across different experimental settings, children are more inclined or willing to help compared to preschoolers (descriptive information showed that overall 73% children, but only 41% preschoolers actually helped in these tasks). However, the limited number of studies makes it impossible to test the manipulation of these motivations as moderators in the current meta-analysis.

An increase in persistence to help was found within childhood, as older children spent more time in helping, compared with younger children. Considering that persistence might also reflect a stronger motivation, this result also supports the idea that the motivation to help continues to increase as children mature.

In summary, studies on the development of helping showed some variations in the cognitive abilities and motivation examined. Nevertheless, future studies could follow-up by focusing more on possible motivations underlying helping behaviors. It is hypothesized that during the preschool age, motivation becomes more selective (e.g., Martin & Olsen, 2015). Thus, future studies should address how the effect of altruistic and egoistic motivations develop across age and under what social circumstances. For instance, how the development of helping changes towards an unknown recipient, or a good friend. In addition, compared with the number of studies before age three, there is a lack of experimental studies on helping among the preschool age and school age children and adolescents. Particularly, several periods (e.g., toddlers to preschoolers, younger to older children, younger to older adolescents) have not been thoroughly investigated yet and could not be tested in this meta-analysis.

**Sharing.** Sharing is recognized as a more complex prosocial behavior than helping. In order to share, individuals not only need a general, altruistic motivation, but also need to overcome their own egoistic motivation of monopolizing resources. This additional complexity contributes to the fact that, at least before childhood, sharing occurs much less frequently compared to helping (e.g., Dunfield et al., 2011; Grusec, 1991), and follows a different developmental trajectory.

***The early development of sharing (until late toddlerhood).*** An increase of sharing was found from infancy to toddlerhood. Toddlers are more likely to share than infants, and they need less communicative steps before sharing. For the cognitive abilities of sharing, this can be explained by the development of recognizing an unfair distribution

(representing the problem) and restoring fairness. However, a closer look at the studies shows that the unfairness is very clear to participants, as all studies emphasize unfairness through either creating a large difference between two parties (e.g., giving participants 4 – 6 objects whereas 0 to the recipient; Brownell et al., 2013). Especially, all studies manipulated the level of cognitive support participants needed before they restored fairness, by either manipulating how the recipient asked for sharing (explicitly or implicitly, Brownell et al., 2009), or by using a series of progressively more explicit cues to stimulate sharing (Dunfield et al., 2011; Pettygrove et al., 2013). The result that toddlers need less communicative steps before sharing confirms our arguments that it is the ability to restore rather than to recognize unfairness. On average, infants shared after the experimenter asked for sharing gesturally (e.g., reaching out for the object), but before the E requested the specific object explicitly and verbally (e.g., can I have [a certain object]? ). In comparison, toddlers shared more readily, namely after the experimenter stated the situation (e.g., I don't have [object]) and before the E asked for sharing gesturally. As for the motivation of sharing, the increase may related to an increase of altruistic motivation of fulfilling others' unmet materials needs. By presenting toddlers with an unknown recipient with no other information, all studies included in our meta-analysis likely limited egoistic motivations that might affect sharing at this age, such as looking for reciprocity. Taken together, studies in this age period clearly showed an increase of sharing behaviors (both in likelihood and steps needed before sharing), which is most likely explained by the socio-cognitive ability to restore a fair distribution between the recipient and the participant.

Overall, in examining the early development of sharing, research mainly focuses on infants' and toddlers' capabilities of restoring unfairness, and indeed these capabilities are crucial to the development of sharing during this age. Consistent with the development of these behaviors, on average 42% infants and 69% toddlers actually shared in studies included in current meta-analysis. Nonetheless, restoring unfairness alone may be insufficient (although necessary) for sharing. Especially, more studies are needed that examine the motivations of sharing, especially within toddlerhood, when both altruistic and egoistic motivations (may) begin to co-drive sharing behaviors.

***The development of sharing beyond toddlerhood.*** No age difference was found from toddlerhood to the preschool age. Intuitively, this contradicts the evidence that there is rapid growth of sharing-related cognitive abilities during the preschool period. For example, perspective taking, a hallmark of Theory of Mind (ToM), grows remarkably between 3 and 4.5 years of age (Wellman et al., 2001). In addition, the results for observational studies show

an increase of sharing within this age period after adjusting for publication bias, though this increase is still small ( $d = 0.20$ ). It is also possible that the correlation between ToM and prosocial behavior (including sharing) is unstable during this period. Thus, although preschoolers are becoming increasingly more cognitively capable of sharing, they may not have applied these abilities to sharing behavior yet. This is supported by previous meta-analytic results that showed a non-significant ( $r = 0.01$ , Carlo et al., 2010), or significant but weak ( $r = 0.17$ , Imuta et al., 2016) relationship between ToM and prosocial behaviors among 2- to 6-year-olds. Another, more plausible explanation is that there is a lack of cognitive scaffolding in the sharing tasks used at this age. Only one study employed a series of more explicit communicative steps in asking for sharing, and indeed on average 80% of toddlers and 92% preschoolers shared in this study (Wu & Su, 2014). However, other studies either used implicit communicative steps that might be difficult for toddlers and preschoolers to identify others' need for sharing (Dunfield & Kuhlmeier, 2013), or did not use the communicative steps at all (e.g., Hamann, Warneken, Greenberg, & Tomasello, 2011; Zhu, Guan, & Li, 2015). Simply letting participants distribute resources without any or very few explanations of recipients' inner statuses might be too challenging at this age. Although the percentage of children per age group who actually shared in those tasks was not reported (Dunfield & Kuhlmeier, 2013; Hamann et al, 2011), in other studies comparing younger and preschoolers using similar tasks, on average 42% of younger and 60% of older preschoolers shared. Thus, it is highly likely that toddlers' likelihood of sharing is similar, or even lower compared with younger preschoolers. Also, this low likelihood may be indicative of a floor effect, which makes it hard to find age difference accordingly.

An increase of sharing was found within the preschool age, showing that older preschoolers are more likely to share, and share more items compared to younger preschoolers. Two explanations are possible. First, a further increase of relevant cognitive abilities (e.g., ToM; Jenkins & Astington, 2000; Wellman et al., 2001; Wimmer & Perner, 1983; Yagmurlu, Berument, & Celimli, 2005) make preschoolers more capable of sharing. This indicates that although toddlers and young preschoolers may have difficulty in understanding others' inner states (e.g., ToM), preschoolers are becoming more and more skillful in understanding others and acting accordingly. The second explanation is that intrinsic motivation has a stronger effect in driving prosocial behaviors during this age than egoistic motivations. Indeed, most studies (32 out of 36) asked participants to share from their own resources (costly sharing), indicating that participants were willing to overcome (at least some of) their desire to monopolize resources.

An increase was also found from the preschool age to childhood, and within childhood. In comparison to the small effect size found within the preschool years, the medium effect size found in these analyses suggest a *faster* increase of sharing from the preschool age to childhood and within childhood. Indeed, descriptive information showed while on average only half of preschoolers shared, over 60% of children shared in the experiments. There are at least three explanations for this faster development. First, researchers suggest that the relationship between ToM and prosocial behavior is stronger within childhood than within the preschool age (e.g., Imuta et al., 2016). Second, the development of moral reasoning could lead to more sharing with unknown recipients, especially considering that most of the studies included in the current meta-analysis examined sharing with a stranger. Third, altruistic motivations may have stronger effects on prosocial behavior in the included studies, compared with egoistic motivations. After all, most studies in these age-group comparisons examined costly sharing.

No age-difference was found from childhood to adolescence, or within adolescence. Most studies in these age-group comparisons asked participants to share with a stranger, at a cost to themselves, thus, these results mainly reflect a genuine prosocial motivation (endorsements of fairness that out wins a motivation of being selfish) that does not change with age during this period. However, though no age difference was found, the egoistic motivation imbedded in social contexts may affect the actual prosocial behaviors. For example, the likelihood shared varied among studies (from 10% to 100% for adolescents). This large variation may relate to the development of parochialism during this period, which leads to a consistent low likelihood of sharing with strangers (Fehr et al., 2013). Also, egoistic motivations such as reciprocity may play a role, as adolescents are more likely to share with friends than anonymous peers (Güroğlu et al., 2014). Limited by the number of studies, we could not test any moderators. Nevertheless, it is important for further research to examine the interaction between egoistic and genuine prosocial motivations during these periods.

Overall, two experimental paradigms have been used to examine sharing in children older than age three. In the first paradigm, experimental tasks based on the dictator game have been used (e.g., Malti, Gummerum, Ongley, Chaparro, Nola, & Bae, 2016), in which the participant was given a chance to share a windfall with an unknown and un-shown recipient who had none and the recipient had no option but accept the offer. This task is especially useful for testing a genuine, altruistic motivation, because not sharing does not have any negative influence on the sharee (Malti et al., 2016), likely eliminating most, if not all egotist

motivations, such as reciprocity, avoiding punishment, or obtaining approval from the recipient. In the second paradigm, tasks were based on a costly sharing game, in which participants could choose from either an egalitarian option or an option that favors her/himself (e.g., 1,1 vs. 2,0, McGuigan, Fisher, & Glasgow, 2016). This task is mainly used to test the mechanism related to fairness, and/or overcoming one's own desire for the objects shared, because at least one option is to share fairly. Nevertheless, contrary to the consistent and heavy focus on examining how sharing changes based on altruistic motivations and/or cognitive abilities with age, relatively few studies have focused on how motivations (e.g., building/maintain good relationship with recipients) affect the development of sharing. Future studies should address this issue by focusing more on how egoistic motivations under different social contexts affect the development of sharing. For instance, in addition to a single-trial dictator game, researchers can also employ multi-trials game in which the 'recipient' can punish participants' unfair sharing.

**Observational studies on the development of prosocial behavior.** Similar to the findings in experimental studies, for observational studies using a combined measure of helping and sharing, we found an increase in prosocial behavior from infancy to toddlerhood, but no increase was found during toddlerhood, nor from toddlerhood to the preschool age. Then again there was increase with age within the preschool age and from the preschool age to childhood. This is remarkable given that there are some differences between experimental and observational studies. For example, in most observational studies participants' interaction was observed with a familiar peer (e.g., best friend, classmates in daycare). Compared to the aforementioned experimental studies in which they are interacting with adults who (sometimes) even use a series of clues in scaffolding participants' prosocial behavior, the interaction with peers is more cognitively challenging, as peers are less able to scaffold participants' cognitive understanding (Howes, Wishard Guerra, & Zucker, 2008). Moreover, the rate of prosocial behaviors can be restrained by the opportunities to be prosocial. Since the preschool age and onwards, most studies observed participants in classrooms or daycare centers (e.g., Bar-Tal, Raviv, & Goldberg, 1982; Grazzani, Ornaghi, Agliati, & Brazzelli, 2016; Persson, 2005), where other social members (e.g., classmates, teachers) can help/share, even before the participant can notice the need. Nevertheless, the similar findings between observational and experimental studies again support our explanations made in discussing results of experimental studies.

**Summary of the development of prosocial behaviors.** For helping, results are in general similar to the previous meta-analysis of Eisenberg and Fabes (1998). Both meta-

analyses found an increase before age three, from the preschool age to childhood, and within childhood, but not within the preschool age, from childhood to adolescence, or within adolescence. Moreover and different from Eisenberg and Fabes (1998), the current meta-analysis further categorized age 0 – 3 into two categories, infancy (0 – 18 months) and toddlerhood (18 – 36 months), and found an increase from early infancy to early toddlerhood, but not within toddlerhood. Thus, it is clear that helping develops fast before toddlerhood, resulting from a rapid growth of cognitive abilities such as goal understanding. However, more studies are needed to detect the mechanisms involved from toddlerhood onwards, especially why no increases with age are found within toddlerhood and the preschool age, but rapid development occurs again from the late preschool age to childhood.

For sharing, the current meta-analysis did not find a steady increase from infancy through adolescence, while Eisenberg and Fabes (1998) found an increase from the preschool age and onwards (Eisenberg & Fabes, 1998), and Ibbotson (2014) found a linear increase from age 3 to 18 for studies using dictator games. Instead, sharing increased from infancy into toddlerhood, but seem to suspend from increasing toddlerhood to the preschool age. An increase occurred again from the preschool age through childhood, with another suspension of change from childhood through adolescence. There are three possible explanations for these divergent findings. First, next to including more recent studies, Eisenberg and Fabes (1998) combined observational, experimental, and self-report studies in their analyses, whereas Ibbotson (2014) focused exclusively on experimental studies of dictator games. Thus, the results may differ accordingly. Second, in Ibbotson's meta-analysis (2014), the conclusion was based on a basic linear regression analysis between age and sharing from age 3 - 18, in which age was employed as a continuous variable. Instead, in the current meta-analysis we used several age-group comparisons. Thus, our meta-analysis can better detect how sharing develops between and within specific age groups. Third, from the preschool age through childhood, prosocial behaviors may become increasingly discriminative and selective (i.e., preferring a particular recipient), and this selectivity may be influenced by social contextual factors, such as social norms of reciprocity and responsibility (Hay & Cook, 2007). Nevertheless, this last explanation needs to be examined in future research. For example, whether and how recipient features would moderate the age differences of prosocial behaviors.

### **Moderator Analysis**

In addition to detecting the general development of helping and sharing, we also focused on four potential moderators (two recipient features and two methodologically relevant



characteristics) that might account for some of the variability of age differences in prosocial behavior. Below we discuss the results for the age-group comparisons for which we could investigate these moderators. We also planned to include sociability of the recipient as a potential moderator, however, due to a lack of variation in this feature among the included studies it was not possible to test this in the current meta-analysis.

### **Recipient's features.**

***The recipients' need.*** We found that the recipient's need did not moderate the increase of sharing from the preschool age throughout late childhood. These results challenge the idea that beginning in childhood, a genuine altruistic motivation of sharing is strengthened over the years through the internalization of the social norms. Several potential explanations may clarify these unanticipated findings. First, it is possible that both preschoolers and children already follow the rule of "share more with a poor over a rich recipient", thus it does not moderate an *age difference* in sharing anymore. However, a recent study (Malti, Gummerum, Ongley, Chaparro, Nola, & Bae, 2016) challenges this explanation, as they found age differences in sharing towards a needy recipient, but no age difference towards a non-needy recipient when comparing two age groups (i.e., 4- and 8-year-olds) (Malti et al., 2016). A second, and methodological explanation is that in most studies the recipient is *either* high *or* low in need, which could obscure the possible moderator effect. Only a few, recent studies have directly tested the possible moderation effect of the recipient's needs across different ages (Kogut et al., 2016; Malti et al., 2016; Paulus, 2014a). Third, the presence of individual differences among participants may wash out age effects. For example, Kogut, Slovic and Västfjäll (2016) found that independent of age, preschoolers and children with higher Theory of Mind showed an increase of sharing towards those in higher need, compared with their peers with lower Theory of Mind understanding.

***The reciprocity of the recipient.*** We also found that the reciprocity of the recipient did not moderate the increase of sharing from the preschool years to childhood. Intuitively, this result directly challenges the perspective that during this period sharing is increasingly dependent on reciprocity (e.g., Hay & Cook, 2007; House, Henrich, Sarnecka, & Silk, 2013). However, in all studies except one the recipient is *either* a friend (reciprocator) *or* a stranger (non-reciprocator), and this might have weakened the moderator effect. Indeed, the study that directly compared 3-, 4-, 5- and 6-year-olds' sharing towards recipients with different probability of reciprocity (i.e., kin, friend, and stranger) found that from age 5 to age 6, there was an increase of sharing towards kin and friends, but not strangers, whereas 3-4 year-olds shared indiscriminately among the three kinds of recipients (Liu & Chang, 2016). In addition,

though it was statistically acceptable, only three effect sizes were calculated based on sharing towards friends while 14 effect sizes were calculated based on sharing towards strangers. This imbalance between the two categories, and the relatively few studies on friends, indicates that the current results should be interpreted with extra caution and that more research is needed.

**Summary.** Contrary to our expectations, neither the recipient's need nor reciprocity moderated any age differences in sharing. However, it is noteworthy that the current moderator analyses are limited by (at least) two practical issues. First, a general lack of studies on the development of helping and/or sharing. A moderator analysis requires at least three effect sizes per level, and at least two levels per moderator (e.g., low and high in need), thus at least six effect sizes in total, which was not the case for several age-group comparisons. Second, there was a lack of variation in recipients' features across studies. Thus, three lines of studies are needed. First, more studies on helping are needed across all age groups, so on sharing within toddlerhood and adolescence. Second, more studies that focus on the recipient's features are needed in order to investigate underlying egoistic or altruistic motivations. Accordingly, studies with multiple age-groups can examine participants' sharing with rich/poor recipient (recipient's need), friend/non-friend, or in-/out-groupers (reciprocity of the recipient), and prosocial/ non-prosocial recipients (sociability of the recipient). Third, studies that have focused on these recipients' features should not only examine when these features affect prosocial behavior, but also whether these features matter across different ages. Each feature mentioned here has been examined within an age period, but surprisingly, only a few recent studies have focused on detecting their effects on *age differences* in prosocial behaviors (e.g., Liu & Chang, 2016; Malti et al., 2016; Sebastián-Enesco & Warneken, 2014).

**Methodologically relevant characteristics.** We also investigated the moderation effect of methodologically relevant characteristics. First, we found stronger age differences between the preschool age and childhood on the likelihood to share for studies published before the year 2000 in comparison to studies after 2000. This might reflect the transition of the field in the past two decades. First, the transition from focusing on  $p$  values only to focusing on various statistical indices (e.g.,  $\eta_p^2$ ) allowed researchers to report, and publish more nuanced age differences. Indeed, all studies before the year 2000 use  $p$  value as their main index whereas studies after 2000 studies also report other indices (e.g., effect size). Second, after the year 2000, the field have become more welcoming to studies with small,

even null significant results. The value of null results have drawn great attention (e.g., Ferguson & Heene, 2012). In response, studies reporting small, or non-significant results are easier to be published nowadays, compared with years before the year 2000. Nevertheless, publication year did not moderate any other age-group comparison tested.

For the objects shared we found that within the preschool age, there was an increase in the likelihood to share when sharing toys, but no increase when sharing food. Later, within childhood, there was an increase in the number of toys shared, but no increase when sharing food or money. Two studies suggest that this moderator effect might be related to the value of objects shared, as preschoolers and children are more likely to share, and shared more with low value than high value objects (e.g., Blake & Rand, 2010; Posid et al., 2015). However, without clear information on whether children value food more than toys, we cannot test this explanation directly. Thus, more studies on sharing behavior should take the object shared, and the perceived value of objects into consideration.

### **Strengths and Limitations**

The current meta-analysis has several strengths. First, we provide a comprehensive and systematic summary of the general developmental trajectories of helping and sharing from infancy through adolescence. Several narrative reviews (e.g., Davidov et al., 2016) and two meta-analyses have focused on the development of prosocial behavior before adulthood (Eisenberg & Fabes, 1998; Ibbotson, 2014), however, with this meta-analysis we went a step further by conducting meta-analytic analyses of all observational and experimental studies on this topic to date, with special attention to the ontogeny of these behaviors from early infancy through late toddlerhood. Moreover, in contrast to Eisenberg and Fabes (1998), we focused exclusively on observational and experimental studies rather than self-report studies, thus capturing the development of objective prosocial behaviors.

Despite these overarching strengths, three limitations should be noted. First, although the total number of studies included in the meta-analysis is large, the number of studies in several age-group comparison models is not sufficient (i.e., less than three effect sizes) for conducting a meta-analysis (e.g., within toddlerhood, and within adolescence). Thus, there is some missing information on the developmental trajectories in the current meta-analysis. Future studies should focus more on these age groups. Second, the current meta-analysis failed to examine the underlying mechanisms (e.g., the development of egoistic motivations) of these trajectories. Limited by a lack of variations on recipients' features, we could not test the potential moderator effect of recipients' features across most age groups. Third, most studies included in the current meta-analysis are cross-sectional, thus we cannot tease apart

the individual differences from the age differences in current meta-analysis, making our analyses conservative. Accordingly, longitudinal studies that examine individuals' actual prosocial behaviors across different age periods are needed.

### **Conclusion**

For the general development of helping and sharing from infancy through adolescence, the current meta-analysis reveals that helping develops earlier than sharing. Moreover, helping develops during infancy, and from infancy to toddlerhood. This increase stops, however, from early toddlerhood through the late preschool age. Then helping increases again from the preschool age through late childhood. Finally, helping behaviors do not increase anymore after childhood. In comparison, sharing develops from infancy to toddlerhood, and then seems suspend from toddlerhood to the preschool age. Later it develops again from the preschool age through late childhood, and stops its increasing after childhood. These results imply that the development of cognitive abilities in understanding others' needs contributes to the increase of prosocial behaviors from infancy through late childhood, but it is still unclear how cognitive abilities may contribute to prosocial development after childhood. For motivations, the current findings suggest that altruistic motivations drive prosocial behavior from infancy and onwards, but it is unclear when and how egoistic motivations drive prosocial behaviors. To further test the underlining mechanisms, possible moderators were examined, though we did not find support for either recipient's need or reciprocity. The current meta-analysis emphasizes the urgent need for more observational and experimental studies on both the general developmental trajectories and the mechanisms underlying prosocial behaviors. We are one step further in unravelling what are the developmental trajectories of *actual* prosocial behaviors before age 18.

## Chapter 3

### **Happy little benefactor: Prosocial behaviors promote happiness in young children from two cultures**

Author note:

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Y. Song conceptualized the study, J. S. Dubas and M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data, J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### **Abstract**

Evidence that young children display more happiness when sharing than receiving treats supports that humans, by nature, are prosocial. However, whether this “warm glow” is also found for other prosocial behaviors (instrumental helping and empathic helping) and/or in different cultures is still unclear. Dutch (studies 1 and 2) and Chinese (study 3) young children participated in a sharing task, followed by instrumental helping and empathic helping tasks in which they were praised (thanked) if they helped. Consistent results were found across three studies, showing that (1) participants displayed more happiness after giving than receiving treats; (2) toddlers displayed more happiness after instrumental helping than initially interacting with the experimenter; and (3) toddlers’ happiness remained the same after positive social interactions. Taken together, these results indicate that independent from cultures, both sharing and instrumental helping are emotionally rewarding, supporting an evolutionary origin of these behaviors.

*Keywords:* altruism, prosocial behaviors, happiness, toddlers and preschoolers, warm glow

Sacrificing one's own resources to support others, even strangers, is an exceptional human ability that has puzzled researchers for many years. While essential for establishing large-scale social cooperation in early human groups (e.g., Darwin, 1871; Ebstein, Israel, Chew, Zhong, & Knafo, 2010; Wilson, 1975) and maintaining large organizations in the modern world (Fehr & Fischbacher, 2003; Wilson, 1975), the question is what benefits are there, if any, for the individual who is sacrificing? While theories such as kin selection (Hamilton, 1964) or reciprocal altruism (Trivers, 1971) focus on the potential, long term rewards that sharing or cooperation may bring (Aknin, Broesch, Hamlin, & Vondervoort, 2015), a growing body of studies shows that the prosocial behavior itself might also be emotionally beneficial for an individual, suggesting additional short term rewards (for a review, see Aknin, Van de Vondervoort, & Hamlin, 2018). For adults, prosocial behaviors (e.g., spending money on others) have been found to lead to an increase in happiness in both western and non-western cultures and across diverse socio-economic contexts (e.g., Aknin et al., 2013; Aknin et al., 2015; Aknin, Norton, & Dunn, 2009; Dunn, Aknin, & Norton, 2008). Based on these findings, these emotional rewards have been proposed as an evolved psychological mechanism that sustains prosocial behaviors even when it costs individual resources (e.g., Aknin et al., 2013).

This “positive feedback loop” (Aknin et al., 2018, page 55) also has drawn great attention from researchers studying young children. While many studies have focused on how (positive) emotion arousal serves as a precursor to toddlers' and young preschoolers' prosocial behaviors (e.g., Cowell, Calma-Birling, & Decety, 2018; Hepach, 2017; Miller, 2018), another line of research has focused on whether and in which social context positive emotions result from prosocial behaviors. Two studies directly explored the relationship between prosocial behaviors and happiness in young children by rating children's happiness after sharing. The first study, conducted in Vancouver, Canada, showed that 22-month-olds were rated as happier when they shared treats rather than when they received treats, and happier under a costly sharing condition, (i.e., when they shared from their own resources) rather than under a non-costly sharing condition ( i.e., shared from other resources) (Aknin, Hamlin, & Dunn, 2012). These findings were replicated by the same research group among 2- to 5-year-olds in a remote, small rural village on Tanna Island, Vanuatu (Aknin et al., 2015). Based on these two studies, Aknin and her colleagues (Aknin et al., 2012; Aknin et al., 2015) propose that the relation between sharing and happiness already exists when sharing first emerges, and that this immediate emotional reward of sharing is a proximate mechanism that facilitates prosocial behavior despite its costs. Nevertheless, before firm conclusions

about this mechanism can be drawn, more studies are needed to replicate these effects in different samples and cultures. Therefore, the first aim of the current study was to replicate and extend these findings by examining whether these results are also found among young children (i.e., toddlers and young preschoolers) in different cultures (i.e., the Netherlands and China). If the emotional reward of generosity is a universal and robust psychological mechanism, both Dutch and Chinese toddlers and younger preschoolers should express more happiness after sharing rather than receiving treats, and also after costly sharing compared with non-costly sharing.

Next to replicating these findings, our second aim is to examine whether the number of resources available when sharing affects the degree of happiness shown. Young children are sensitive to resource availability and adjust their sharing based on it. For example, they are more likely to share after receiving more resources (Posid, Fazio, & Cordes, 2015). The question, however, is whether the degree of happiness when sharing is also affected by resource availability. Among adults, the link between sharing and happiness is robust and generally not affected by resource availability (e.g., Aknin et al., 2008, 2013), yet it is still unknown whether the link is independent from resource availability in toddlerhood, when sharing first emerges.

There are reasons to think that resource availability might influence the link between sharing and happiness in toddlers. In order to share, children need to overcome their own desire for material resources (Dunfield, 2014). This consideration of their own material needs might be especially important under costly sharing, namely, when children need to give up their own resources. Indeed, previous studies support that happiness is higher after costly sharing (i.e., sharing treats from their own resources) than non-costly sharing (i.e., sharing treats from a common pool). However, in these studies children received a large and fixed number of resources (8 treats), making the cost relatively low (Aknin et al., 2015; Aknin et al., 2012). It is not known whether the link also remains under poorer conditions. Considering that toddlers can already discriminate a small set of objects (the numbers “one” to “four”) from a larger set of objects (more than four) (Le Corre, & Carey, 2007; Sarnecka, & Gelman, 2004; Xu, 2003), the current study used the same experimental design as Aknin’s studies (2013; 2015), though varied the number of resources (2, 4, or 8 treats). This study examined the resource effect by two sets of comparisons for the three resource conditions separately: (1) happiness differences following receiving treats and sharing treats, and (2) between costly sharing and non-costly sharing. For the first set of comparisons, if the happiness after sharing is higher than receiving in all resource conditions, then this result would support that sharing



behavior itself leads to a higher level of happiness, irrespective of the number of resources. If happiness after sharing is higher than receiving in the resource rich condition (8 treats) only, then this would support the idea that children's own material needs need to be met as a prerequisite for being happy after sharing. Similarly, for the second set of comparisons, if happiness after costly sharing is higher than non-costly sharing in all resource conditions, then this result would support the idea that the emotional benefits of sharing is robust despite its costs. If happiness after costly sharing is higher than non-costly sharing in the resource rich condition (8 treats) only, then this result would support that children's own material needs need to be met (i.e., having many resources) as a prerequisite for the happiness after costly sharing.

The third aim of this study was to examine whether the emotional rewards of sharing also apply to other prosocial behaviors. Besides sharing, at least two other kinds of prosocial behaviors- instrumental helping and empathic helping- also emerge during toddlerhood (e.g., Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Dunfield & Kuhlmeier, 2013; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Svetlova, Nichols, & Brownell, 2011). Using body posture as a measurement of positive emotion, a recent study found that 2-year-olds show positive emotions after they helped an experimenter achieve her goal (Hepach, Vaish, & Tomasello, 2017), suggesting helping others also leads to an increase of positive emotions. However, in this study helping is a byproduct of the play situations rather than an intentional behavior, as children have no chance to decide whether they want to help the experimenter; on the contrary, they just happen to find the object that the experimenter needs during the session. Thus, it is still unclear whether and how these emotions change when they actually want to and succeed in helping others. Hence, more studies are needed to directly examine the emotions when children initially intend and succeed in helping others (Hepach et al., 2017). Moreover, the link between empathic helping and happiness has not been investigated. In the current study we use facial expression to measure happiness, and we expected that if the emotional rewards of prosocial behaviors are ingrained in human nature, then most kinds of prosocial behavior should lead to an increase of happiness, not only sharing.

An alternative explanation for the increase of happiness is that it is the positive social interactions or positive feedback (such as being thanked) after prosocial behaviors, but not prosocial behaviors themselves, that promotes happiness. Thus, the fourth aim of the current study is trying to further test this alternative explanation. In Aknin's studies, the child was not thanked after the sharing task (Aknin et al., 2012; 2015). We replicated Aknin's methods for

the sharing task, but in the helping and empathic helping tasks the child was thanked after being prosocial. Therefore, the current study evaluated toddler's happiness immediately after they performed instrumental helping or empathic helping behaviors, and after being thanked for this behavior. If happiness is a result of the prosocial behaviors themselves, then happiness after being thanked would not be higher than the happiness after they helped, but before they heard "thank you". If happiness is a result from the social rewards/interactions after the prosocial behaviors, then happiness after being thanked would be higher than before they heard "thank you".

### **Current Study**

The overarching goal of the current set of studies is to examine the link between prosocial behaviors and happiness for toddlers and young preschoolers. Specifically, we extend prior research by (1) replicating previous studies in two different cultures; (2) exploring whether and how resource availability would play a role in this (potential) relationship; (3) examining whether this positive relationship also exists for other prosocial behaviors (instrumental helping and empathic helping); and (4) examining an alternative explanation for the role of positive social interactions. For these purposes, we used a series of tasks to test Dutch toddlers' (study 1), Dutch preschoolers' (study 2) and Chinese preschoolers' (study 3) prosocial behaviors and observe their happiness accordingly.

## **Study 1**

### **Methods**

#### **Participants**

Children were mainly recruited through daycares in several urban areas across the Netherlands, with nine participants recruited from posters in the university and word of mouth. After the daycare agreed to participate, the researchers sent active consent forms to the parents who had a toddler between 16 and 27 months of age. Parents were given a brief explanation of the tasks and told that the experiment would be conducted at the daycare center by two experimenters. In total, 122 toddlers were initially tested, with the majority being Dutch (95.9%), and coming from middle to upper middle-class families. Thirty-one toddlers did not show any of the targeted behaviors (sharing, instrumental helping, and empathic helping) in the experiment, leaving it impossible to measure their happiness while doing these behaviors. Thus, in total 91 toddlers (51 boys, age ranged from 16 - 27 months,  $M_{age} = 21.57$  months,  $SD = 3.20$  months) were included in the current study. The study was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences, Utrecht University. Informed written consent was obtained from all parents before the experiment.

Given that previous studies had 20 children per sample (Aknin et al., 2012; 2015), and the power analyses indicated a sample size of 55 is enough for detecting the power at a 0.8 level, current sample size should be sufficient in detecting any (possible) associations between happiness and prosocial behaviors.

### **General Procedure**

The experiment was conducted in the child's daycare (e.g., separate room or a separate corner of a larger room) by a main experimenter (E) and an assistant experimenter (AE). Both the E and AE arrived at the daycare at least 20 minutes before the testing and helped the teacher in arranging some classroom activities, so that the child could become familiar with the experimenters. Once the child felt comfortable with the experimenters, he or she was invited to do the experiment. During the experiment, both the child and the E were videotaped. Neither the teachers nor parents were present during the testing, except for three cases where the children were too fussy to leave the teacher. In addition, the nine children that were recruited through posters and word of mouth were tested in child's daycare ( $n = 1$ ), university lab ( $n = 1$ ) or families' home ( $n = 7$ ). Parents were not present in the room during testing except for three cases where parents remained quiet and did not interact with the child. Each child completed a sharing, instrumental helping and empathic helping task, with the sharing task always coming first, following by the instrumental helping and empathic helping tasks in counterbalanced order. The session lasted approximately ten minutes.

### **Sharing (Based on Aknin, Hamlin, & Dunn, 2012)**

*Warm up phase.* The child got familiar with both the treats and the receiving/giving actions during the warm up phase. Each child met four stuffed animals (in order: mouse, rabbit, cat and panda) with their bowls in front of them, and were told that all animals "love to eat the treats". Next, the E gave the child a bowl. Then the E gave each animal a treat, and the animal "ate" the treat by making eating sounds like "Yummm" and pushing the treat through a false bottom. After that, the E gave the child one treat, and asked the child whether he/she would like to eat the treat. In the next step, the E gave the child an extra bowl with five treats, and asked the child to share the treats with the four animals. The animal "ate" the treat when given. If, and only if the child hesitated in sharing, the experimenter prompted him/her step by step (see Aknin et al., 2012 for detailed information). If the child shared with the animals, or if he/she refused to share after two rounds of prompts, the experimenter put the animals (including their bowls) away, took away any remaining treats in the child's bowl, and then moved to the formal test.

*Test phase.* The children were divided into three conditions (8, 4 or 2 treats they

received in the test phase), balanced according to age and gender. The test included the following phases: (a) Meeting the monkey: The E introduced a new stuffed animal (Monkey) who also loves the treats, and encouraged but not forced the child to interact with the monkey (e.g., petting or touching). The E stressed that “now both you and the Monkey have no treats”, indicating to the child that the treats are a limited resource. (b) Receiving treats: The E “found” 2, 4, or 8 treats (depending on the condition), showed these treats to the child and put them in the child’s bowl while saying “Look, I found 2/4/8 treats, and I am giving them all to you”; (c) The E found one more treat and gave this treat to the Monkey; (d) The E found one more treat and asked the child to give this treat to the Monkey; (e) The E acted as if she could not find treats anymore, then asked the child to give one treat from his/her own bowl to the monkey. Phases (c) to (e) were performed in a counterbalanced order within each treat condition. Sharing behavior was identified if the child gave any treats from his/her own bowl to the Monkey in phase e.

### **Instrumental Helping and Empathic Helping (based on Svetlova, Nichols, & Brownell, 2011)**

In the instrumental helping task, the E wrapped five blocks one-by-one by using napkins that were placed on the table (one napkin within the reach of the child but not the E, and four within the reach of the E but not the child). After the E was out of the four napkins, she asked the child to hand her the final napkin by using eight sequential prompts (see Svetlova et al., 2011, for detailed information), and each prompt was present for 5-7 s. Once the child helped, the experimenter stopped providing prompts and took the napkin. After at least 3 seconds since the child helped, they said “thank you”, but did not give any other praise or rewards. Instrumental helping was identified if the child handed the napkin to the E before or directly after the last cue.

In the empathic helping task, the E showed the child a blanket, folded it around her shoulders, and stated “it makes me warm”. In this way, the link between the blanket and warmth was made explicit. Then the E put the blanket within the reach of the child while she was finding a toy bear, and let the child play with the bear. After 60 seconds, the E suddenly felt cold and shuddered, and prompted the child to hand the blanket to the E (similar prompts and time for each prompt as in the helping task). Once the child helping the E by giving or pushing the blanket to her, the E stopped providing prompts and took the blanket. After at least 3 seconds since the child helped, they said “thank you”, but did not give any other praise or rewards. Empathic helping was identified if the child handed the blanket to the E before or directly after the last cue.

## Coding Procedure

Two coders who were blind to the experimental hypotheses coded the children's behavior (how many treats the child shared in phase e, and how many cues the child needed before instrumental/ empathic helping). Intra-Class Correlations (ICC) were high, with a mean of 0.91 in coding behaviors (ICC<sub>number shared</sub> = 0.98, ICC<sub>steps before instrumental helping</sub> = 0.98, and ICC<sub>steps before empathic helping</sub> = 0.77). The videos in which the children showed sharing, instrumental helping or empathic helping were given to new coders who only coded happiness using the same coding procedures as Aknin et al., 2012.

*Happiness coding for children.* We used the same rating scales as previous studies (Aknin et al., 2012, 2015). In total five coders who were blind to the experimental hypotheses and the behavior coding rated the children's happiness by using a 7-point scale (*1 = not happy at all, 4 = neutral, and 7 = very happy*). For sharing, they coded the child's happiness during phases (a) to (e). For instrumental helping and empathic helping, they coded the following three phases: (a) when the child watched the E wrapping the blocks (instrumental helping task)/showing the blanket (empathic helping task), prior to when the child was prompted to help; (b) when the child helped the E, but before the E said "thank you" (this phase lasted about 2 or 3 seconds); (3) after the E said "thank you" (this phase lasted about 2 or 3 seconds). The ICC for children's happiness across coders was high, ranging from .85 to 1.00 for sharing, from .71 to .83 for instrumental helping and from .80 to .90 for empathic helping. Eighty-seven percent of the cases were coded by three coders, and the rest (13%) were coded by two coders. The happiness ratings represent the mean value across the coders.

*Happiness coding for the E (and the Monkey they used).* Although all Es were blind to the experimental hypotheses and were trained to remain neutral during the experiment, another two raters coded the E's/monkey's "reaction" (combined happiness and enthusiasm) during the tasks (sharing, instrumental helping and empathic helping) in the same phases mentioned above for the children's happiness rating, using the same 7-point scale (*1 = not happy/enthusiastic at all, 4 = neutral, and 7 = very happy/enthusiastic*). The two coders' absolute agreement was high, ranging from 79.5% to 100% across all coding phases with a mean of 90.1%. The ICC could not be calculated, because the means of the coded values ranged from 3.99 to 4.17, and the *SD*'s from 0 to 0.46 on a 7-point scale. These results indicate that both the E and monkey showed a consistent, neutral emotion during the experiment which unlikely affects the child's happiness. Thus, in the following analysis we excluded these ratings as covariates.

## Results and Discussion

## Sharing

In total 73 participants shared one or more treats with the Monkey and being coded for their happiness. Nine children's happiness could not be coded in one of the phases as their faces moved out of the camera frame and was excluded pairwise for analysis.

Two-tailed paired samples t-tests showed that, compared with receiving the treats from the experimenter ( $Mean_b = 4.24$ ,  $SD = 0.43$ , see Figure 1a), the participants expressed more happiness after they shared the treat from their own bowl ( $Mean_e = 4.67$ ,  $SD = 0.53$ ),  $t(70) = 3.08$ ,  $p < .01$ , Cohen's  $d$  effect size ( $d$ ) = 0.85, and after they shared the treat from the common pool ( $Mean_d = 4.44$ ,  $SD = 0.46$ ,  $t(71) = 6.71$ ,  $p < .01$ ,  $d = 0.40$ ). In addition, there was significant difference between phase e and phase d,  $t(71) = 4.97$ ,  $p < .01$ ,  $d = 0.46$ . reflecting that across all conditions, children did show a higher level of happiness after costly sharing compared with non-costly sharing. For the effect of the number of resources, a one-way ANOVA test was conducted for phase b to phase e, separately. Results showed no difference in children's happiness among the different treat conditions,  $p_s > .07$ .

In order to test whether we replicated the previous studies, we analyzed data for 8-treat condition only ( $n = 29$ ). Two-tailed paired samples t-tests showed that, compared with receiving the treats from the experimenter (phase b,  $Mean_b = 4.41$ ,  $SD = 0.53$ , see Figure 2a), the participants expressed more happiness after they shared the treat from their own bowl (phase e,  $Mean_e = 4.80$ ,  $SD = 0.48$ ),  $t(28) = 3.83$ ,  $p < .01$ ,  $d = 0.77$ , but not after they shared the treat from the common pool (phase d,  $Mean_d = 4.51$ ,  $SD = 0.52$ ),  $t(28) = 1.05$ ,  $p = .30$ ,  $d = 0.19$ ). In addition, the participant expressed more happiness in phase e than in phase d,  $t(28) = 3.74$ ,  $p < .001$ ,  $d = 0.58$ , reflecting a higher level of happiness in a costly, compared with a non-costly sharing condition. Thus, we found the same pattern as previous studies. That is, sharing leads to an increase of happiness, and costly sharing leads to more increase of happiness compared with non-costly sharing.

## Instrumental Helping and Empathic Helping

In total 87 participants engaged in instrumental helping and 66 participants engaged in empathic helping. Twelve children's happiness could not be coded in one of the phases in the instrumental or empathic helping task, as their faces moved out of the camera frame or was blocked by the blanket.

For instrumental helping, two-tailed paired samples t-tests showed that compared with watching the experimenter wrapping the block (phase a,  $Mean_a = 4.15$ ,  $SD = 0.36$ , see Figure 3a), the participants expressed more happiness after helping (phase b,  $Mean_b = 4.32$ ,  $SD = 0.48$ ),  $t(86) = 3.01$ ,  $p < .01$ ,  $d = 0.40$ , and after being thanked (phase c,  $Mean_c = 4.27$ ,  $SD =$

0.47),  $t(86) = 2.24, p < .01, d = 0.29$ . However, happiness did not differ before and after they heard “thank you”,  $t(86) = 1.37, p = .17, d = 0.10$ . For empathic helping, compared to witnessing the experimenter showing the blanket (phase a,  $Mean_a = 4.34, SD = 0.64$ , see Figure 4a), the participants showed the same level of happiness after empathic helping (phase b,  $Mean_b = 4.39, SD = 0.55, t(65) = 0.66, p = .52, d = 0.08$ ), and after being thanked (phase c,  $Mean_c = 4.31, SD = 0.45, t(64) = 0.28, p = .77, d = 0.14$ ). In addition, happiness ratings did not differ before and after they heard “thank you”,  $t(64) = 1.56, p = .12, d = 0.16$ .

Thus, similar to previous studies, in study 1 we found sharing leads to a higher level of happiness after sharing, and higher levels of happiness in costly than non-costly sharing. Also, we replicated the main findings in previous studies for 8-treat condition. In addition, the increased of happiness after costly sharing did not differ based on number of treats received, implying the number of resources may not affect the link between sharing and happiness. Moreover, we found instrumental helping but not empathic helping to lead to higher levels of happiness.

**Table 1.** Means and SDs of the Happiness on Each Phase in Sharing Task Per Resource Condition

Study 1	2-treat condition (n = 23)		4-treat condition (n = 21)		8-treat condition (n = 29)		Across all conditions (n = 73)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Meet the monkey	4.60	0.82	4.65	0.58	4.60	0.82	4.65	0.58
Receiving treats	4.18	0.32	4.14	0.33	4.18	0.32	4.14	0.33
Experimenter gives	4.43	0.55	4.31	0.43	4.43	0.55	4.31	0.43
Non-costly sharing	4.33	0.42	4.45	0.41	4.33	0.42	4.45	0.41
Costly sharing	4.47	0.52	4.71	0.57	4.47	0.52	4.71	0.57
Study 2	2-treat condition (n = 20)		4-treat condition (n = 27)		8-treat condition (n = 32)		Across all conditions (n = 79)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Meet the monkey	4.88	1.01	4.69	0.62	4.94	0.75	4.83	0.79
Receiving treats	4.46	0.80	4.38	0.50	4.46	0.51	4.43	0.59
Experimenter gives	4.34	0.85	4.47	0.66	4.51	0.62	4.45	0.70
Non-costly sharing	4.70	0.78	4.73	0.78	4.93	0.79	4.80	0.78
Costly sharing	4.63	0.76	4.89	0.74	4.75	0.70	4.76	0.72
Study 3	2-treat condition (n = 29)		4-treat condition (n = 30)		8-treat condition (n = 29)		Across all conditions (n = 88)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Meet the monkey	4.74	0.78	4.80	0.58	4.72	0.63	4.75	0.66
Receiving treats	4.21	0.43	4.35	0.60	4.15	0.35	4.24	0.48
Experimenter gives	4.42	0.65	4.40	0.55	4.30	0.61	4.37	0.60
Non-costly sharing	4.69	0.72	4.54	0.59	4.57	0.63	4.60	0.65
Costly sharing	4.69	0.74	4.63	0.81	4.72	0.58	4.68	0.71



**Table 2.** Means and SDs of the Happiness on Each Phase in Instrumental Helping and Empathic Helping

Study 1	Instrumental helping (n = 87)		Empathic helping (n = 66)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Experimenter shows napkin/blanket	4.15	0.36	4.15	0.36
Child helps Experimenter	4.32	0.48	4.32	0.48
Child hears “thank you”	4.27	0.47	4.27	0.47
Study 2	Instrumental helping (n = 84)		Empathic helping (n = 80)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Experimenter shows napkin/blanket	4.15	0.40	4.46	0.74
Child helps Experimenter	4.61	0.64	4.68	0.70
Child hears “thank you”	4.51	0.64	4.66	0.70
Study 3	Instrumental helping (n = 84)		Empathic helping (n = 83)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Experimenter shows napkin/blanket	4.26	0.46	4.63	0.84
Child helps Experimenter	4.41	0.64	4.59	0.77
Child hears “thank you”	4.38	0.57	4.61	0.72

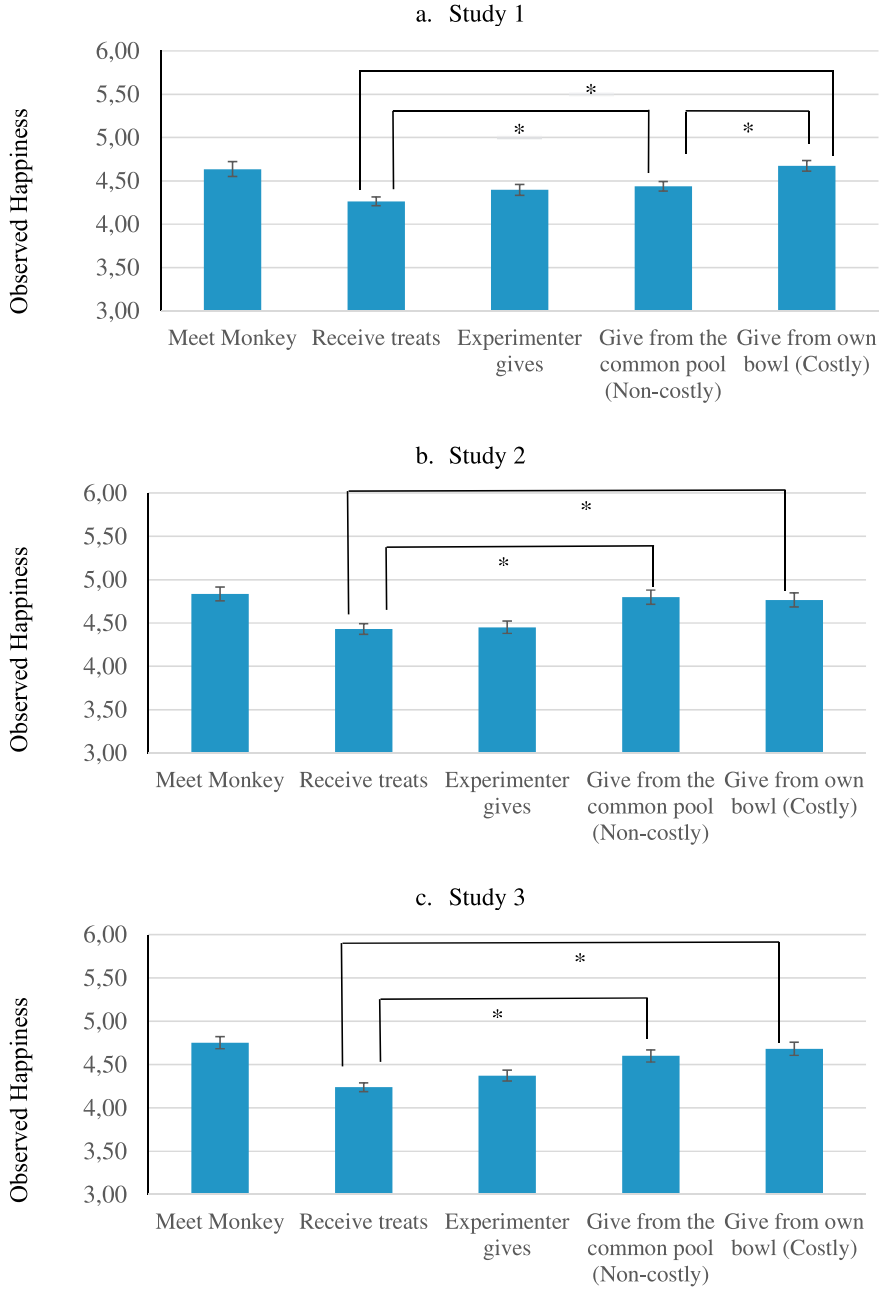


Figure 1. Observed happiness across the five phases in the sharing task, aggregated all treat conditions. Error bars display standard error of the mean. \*  $p < .05$

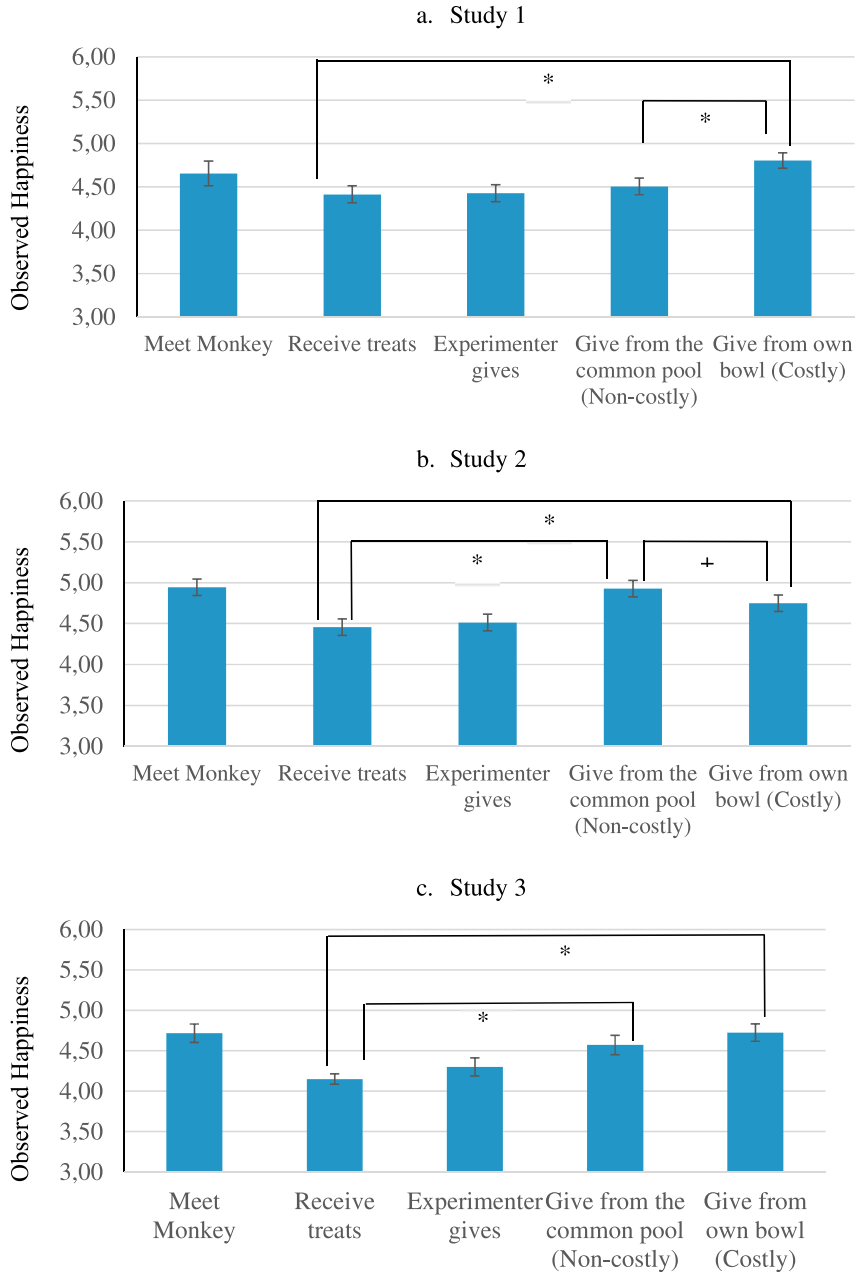


Figure 2. Observed happiness across the five phases in the sharing task, 8-treat condition.

Error bars display standard error of the mean. \*  $p < .05$ , +  $p < .06$

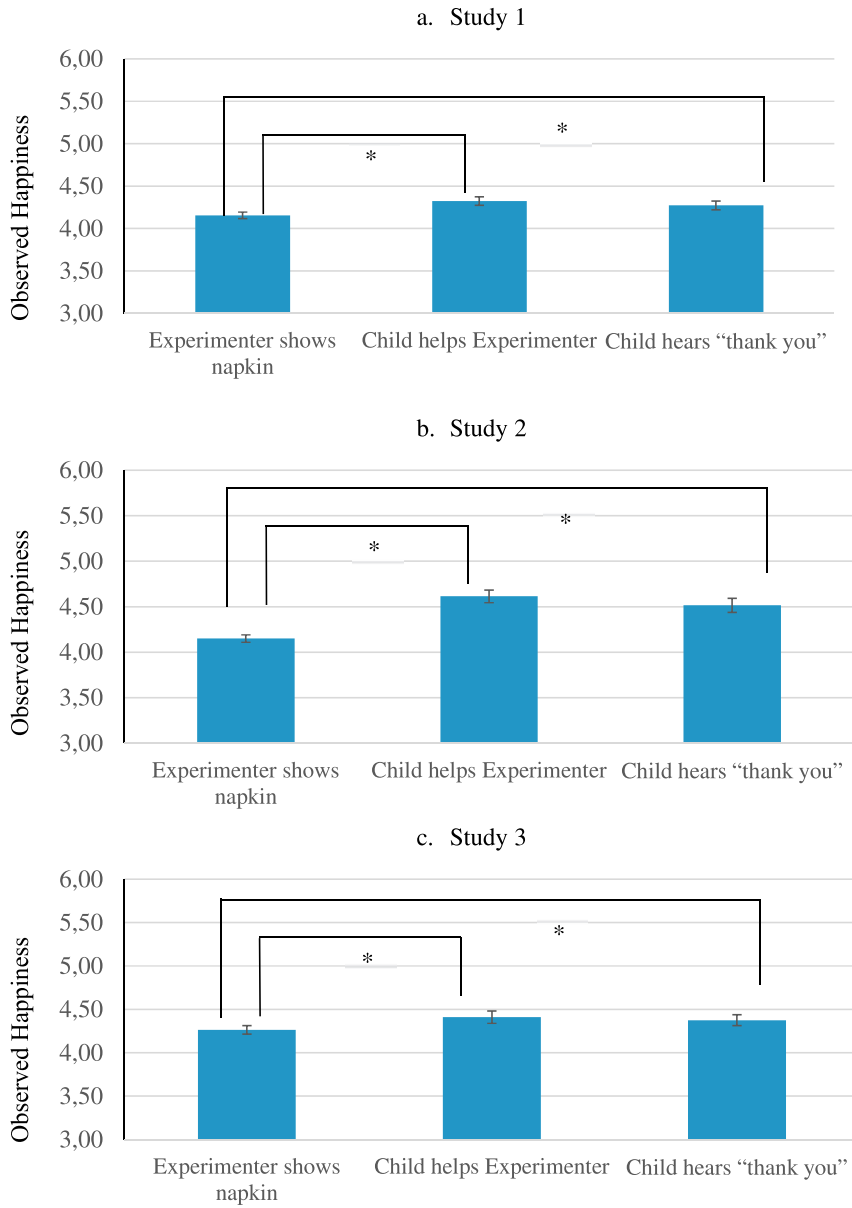


Figure 3. Observed happiness across the three phases in the instrumental helping task. Error bars display standard error of the mean. \*  $p < .05$

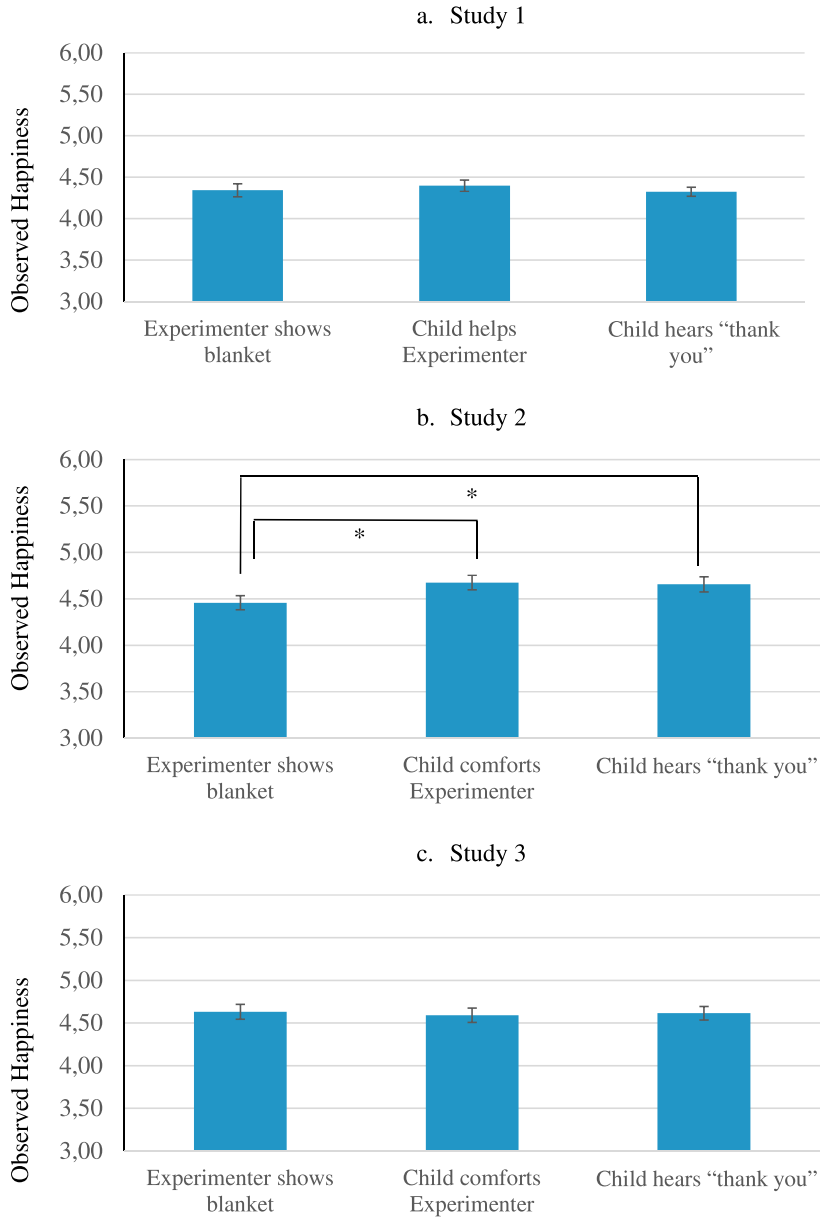


Figure 4. Observed happiness across the three phases in the comforting task k. Error bars display standard error of the mean. \*  $p < .05$ .

## Study 2

### Methods

#### Participants

One hundred and one of the participants in study 1 were tested again roughly 1 year later. In total 98 participants ( $M_{age} = 33.99$  months,  $SD = 3.96$  months, 53 boys) at least shared or helped once in the experiment, and thus were included in the current study.

#### General Procedure

The procedure was the same as in study 1.

#### Coding procedure

The coding procedure largely followed that of study 1, except for two changes. First, two coders rated children's happiness, including one coder (coder A) who rated all of the videos, and another coder (coder B) who rated 63% of the videos; the happiness ratings represent the mean value across the two coders for the 63% of the video, or the coding from coder A alone. The reliability between coders over the different phases was high (on average,  $ICC = 0.74$ ). Second, we did not code E and monkey's happiness, because in study 1 we already found that both the E and monkey showed a consistent, neutral emotion during the experiment which unlikely affects the child's happiness.

### Results and Discussion

#### Sharing

In total 79 of 101 participants shared one or more treats with the Monkey. Twelve children's happiness could not be coded in one of the phases in the sharing task, as their faces moved out of the camera frame. Compared with receiving the treats from the experimenter ( $Mean_b = 4.45$ ,  $SD = 0.60$ , see Figure 1b), the participants expressed more happiness after they shared the treat from their own bowl ( $Mean_c = 4.78$ ,  $SD = 0.73$ ),  $t(75) = 3.50$ ,  $p < .01$ ,  $d = 0.49$ , and after they shared the treat from the common pool ( $Mean_d = 4.81$ ,  $SD = 0.78$ ),  $t(76) = 4.73$ ,  $p < .01$ ,  $d = 0.52$ . However, there was no significant difference between phase e and phase d,  $t(77) = -1.67$ ,  $p = .11$ ,  $d = 0.04$ , indicated that across all conditions, children did not show a higher level of happiness after costly sharing compared with non-costly sharing. For the effect of the number of resources, a one-way ANOVA test was conducted for phase b to phase e, separately. Results showed no difference in children's happiness among the different treat conditions,  $p_s > .36$ .

For 8-treat-condition (see Table 1, 2), we found that, compared with receiving treats from the experimenter (phase b,  $Mean_b = 4.48$ ,  $SD = 0.51$ ), participants expressed more happiness after they shared a treat from their own bowl (phase e,  $Mean_e = 4.77$ ,  $SD = 0.69$ ),

see Figure 2b),  $t(30) = 2.01, p < .05, d = 0.50$ , and after they shared a treat from the common pool (phase d,  $Mean_d = 4.96, SD = 0.79$ ),  $t(32) = 3.82, p < .01, d = 0.72$ . In addition, the participant tended to express less happiness in phase e than in phase d,  $t(20) = -1.99, p = .056, d = 0.26$ , reflecting a lower level of happiness in a costly, compared with a non-costly sharing condition.

### Instrumental Helping and Empathic Helping

In total 84 participants engaged in instrumental helping and 81 participants engaged in empathic helping. However, 12 children's happiness could not be coded in one of the phases in instrumental helping, or empathic helping task, as their faces moved out of the camera frame or was blocked by the blanket.

For instrumental helping, compared with watching the experimenter wrapping the block (phase a,  $Mean_a = 4.18, SD = 0.35$ , see Figure 3b), the participants expressed more happiness after helping (phase b,  $Mean_b = 4.61, SD = 0.64$ ),  $t(78) = 3.35, p < .01, d = 0.83$ , and after being thanked (phase c,  $Mean_c = 4.51, SD = 0.64$ ),  $t(78) = 2.45, p < .01, d = 0.64$ . However, happiness did not differ before and after they heard "thank you",  $t(78) = 1.56, p = .12, d = 0.16$ . For empathic helping, compared to witnessing the experimenter showing the blanket (phase a,  $Mean_a = 4.45, SD = 0.75$ , see Figure 4b), the participants showed higher level of happiness after empathic helping (phase b,  $Mean_b = 4.66, SD = 0.71$ ),  $t(78) = 2.21, p < .05, d = 0.28$ , and after being thanked (phase c,  $Mean_c = 4.66, SD = 0.70$ ),  $t(72) = 2.05, p < .05, d = 0.29$ . In addition, happiness ratings did not differ before and after they heard "thank you",  $t(74) = 0.10, p = .92, d = 0.00$ .

Thus, similar to study 1 and previous studies, we found that preschoolers exhibited more happiness after sharing than receiving treats. However, different from previous studies, we did not find difference between costly and non-costly sharing, even in the 8-treat condition, and there was a trend that preschoolers were less happier in costly than non-costly sharing. For instrumental helping, we found similar results in terms of happiness as in study 1. For empathic helping, different from study 1, children showed higher levels of happiness after helping the experimenter.

Overall, both study 1 and study 2 found sharing and helping leads to a higher level of happiness, further supporting the idea that prosocial behaviors are emotionally rewarding. Nevertheless, inconsistent results were found when comparing costly and non-costly sharing, and for empathic helping. Moreover, these studies focus on a Western culture. In order to further test the universality of the links between prosocial behaviors and happiness, in study 3 we examined these relationships in a different culture.

### Study 3

Participants were recruited from two daycares in Shanghai, China. The recruitment procedure was the same as in study 1. In total 91 Chinese preschoolers ( $M = 48.54$  months,  $SD = 6.15$  months, 43 boys) were tested, with the majority coming from middle to upper middle-class families. All of them at least shared or helped once in the experiment.

#### General Procedure

The procedure was same as in study 1 and 2.

#### Coding Procedure

The procedure was same as in study 2, except that two coders (same coders as for study 2) rated all children's happiness, and the happiness ratings represent the mean value across the two coders. The reliability between coders over the different phases was high (on average,  $ICC = 0.85$ ).

### Results

#### Sharing

In total 88 preschoolers shared in the experiment. Five children's happiness could not be coded in one of the phases in sharing task, as their faces moved out of the camera frame.

Compared with receiving the treats from the experimenter ( $Mean_b = 4.24$ ,  $SD = 0.47$ , see Figure 1c), the participants expressed more happiness after they shared the treat from their own bowl ( $Mean_e = 4.68$ ,  $SD = 0.71$ ),  $t(86) = 6.38$ ,  $p < .01$ ,  $d = 0.73$ , and after they shared the treat from the common pool ( $Mean_d = 4.60$ ,  $SD = 0.65$ ),  $t(83) = 6.72$ ,  $p < .01$ ,  $d = 0.63$ . However, there was no significant difference between phase e and phase d,  $t(83) = 1.87$ ,  $p = .65$ ,  $d = 0.12$ . For the effect of the number of resources, a one-way ANOVA test was conducted for phase b to phase e, separately, and found no difference in children's happiness among the different treat conditions,  $p_s > .26$ .

For 8-treat condition, compared with receiving the treats from the experimenter (phase b,  $Mean_b = 4.15$ ,  $SD = 0.35$ , see Figure 2c), the participants expressed more happiness after they shared the treat from their own bowl (phase e,  $Mean_e = 4.72$ ,  $SD = 0.58$ ),  $t(28) = 5.98$ ,  $p < .01$ ,  $d = 1.19$ , and after they shared the treat from the common pool (phase d,  $Mean_d = 4.57$ ,  $SD = 0.63$ ),  $t(27) = 4.60$ ,  $p < .01$ ,  $d = 0.82$ . However, the participant expressed similar level of happiness in phase e and phase d,  $t(27) = 1.43$ ,  $p = .17$ ,  $d = 0.25$ , with an effect size that is smaller than those in previous studies ( $d = 0.46$  and  $0.30$ ; Aknin et al., 2012; Aknin et al., 2015, respectively) and study 1 and study 2.

#### Instrumental and Empathic Helping

In total 84 participants engaged in instrumental helping and 83 participants engaged in



empathic helping. Two children's happiness could not be coded in one of the phases in instrumental helping, or empathic helping task, as their faces moved out of the camera frame or was blocked by the blanket.

For instrumental helping, compared with watching the experimenter wrapping the block (phase a,  $Mean_a = 4.27$ ,  $SD = 0.47$ , see Figure 3c), the participants expressed more happiness after helping (phase b,  $Mean_b = 4.41$ ,  $SD = 0.64$ ),  $t(82) = 2.00$ ,  $p < .05$ ,  $d = 0.25$ , but similar levels of happiness after being thanked (phase c,  $Mean_c = 4.38$ ,  $SD = 0.57$ ),  $t(83) = 1.68$ ,  $p = .97$ ,  $d = 0.21$ . In addition, happiness did not differ before and after they heard "thank you",  $t(82) = 0.88$ ,  $p = .38$ ,  $d = 0.05$ . The analysis for empathic helping showed that compared to witnessing the experimenter showing the blanket (phase a,  $Mean_a = 4.63$ ,  $SD = 0.84$ , see Figure 4c), the participants showed the same level of happiness after empathic helping (phase b,  $Mean_b = 4.59$ ,  $SD = 0.76$ ),  $t(81) = 0.58$ ,  $p = .57$ ,  $d = 0.05$ , and after being thanked (phase c,  $Mean_c = 4.59$ ,  $SD = 0.71$ ),  $t(82) = 0.48$ ,  $p = .63$ ,  $d = 0.05$ . In addition, happiness ratings did not differ before and after they heard "thank you",  $t(81) = -1.73$ ,  $p = .86$ ,  $d = -0.04$ . Thus, similar to the patterns found in Dutch culture, again we found that Chinese preschoolers showed higher level of happiness after sharing than receiving treats. In addition, no difference was found between costly and non-costly sharing. Moreover, higher levels of happiness were found after instrumental helping, but not empathic helping, and this happiness was not affected by a rewarding social interaction (praise) with the experimenter.

### General Discussion

The current study aimed to (1) replicate previous studies about the emotional rewards of sharing in toddlers; (2) examine whether the emotional rewards are affected by the number of resources available before sharing; (3) explore the possible emotional rewards of instrumental helping and empathic helping and (4) detect the possible role of positive social interactions by comparing toddlers' happiness before and after being socially rewarded. Overall, these four aims help to explore whether toddlers experience prosocial behavior to be emotionally rewarding. In general, results revealed that toddlers are happier when having just shared or helped and this happiness does not depend on the number of resources the child had or whether the child was thanked for the behavior.

Results on sharing in the 8-treat condition are partly consistent with the two previous studies in North America and a remote, non-Western area (Aknin et al., 2012; 2015). Young children in the Netherlands and China were happier after sharing treats with a monkey compared to receiving treats, supporting that the warm glow of sharing can also be detected in Dutch and Chinese cultures. However, only toddlers in the Netherlands, but not

preschoolers in either the Netherlands or in China, were happier during costly sharing (sharing from their own resources) than non-costly sharing (sharing from the common pool), leaving it unclear whether children are happier after sacrificing their own benefits when sharing with others. One may argue that the increase of happiness occurred just because they simply did what the experimenter asked them to do; however, being compliant cannot explain why children's happiness is higher in the costly sharing condition compared with the non-costly one, as all the instructions and the sharing behaviors were the same, except that the ownership of the resource was different between the two conditions.

Regarding the second aim, after aggregating 2-, 4- and 8-treat conditions, the happiness after sharing treats is still higher than receiving treats in both the Dutch and Chinese samples, supporting the idea that sharing behavior leads to an increase of happiness. These findings further support the idea that the warm glow of giving is a universal feature, as sharing behavior itself has a positive effect on happiness in young ages, regardless of resource availability. Future studies need to focus on happiness after costly sharing and tease apart the effect of children's own desire for the resources in relation to the emotional rewards of sharing. To do this, researchers can manipulate both the quality (e.g., the number of resources) and the quantity (e.g., the preference of resources) of the materials used in the experiment.

Regarding the third aim, it was found that happiness also increased after instrumental helping behavior, supporting the idea that the internal emotional reward of acting prosocially is not a sharing-specific mechanism, but exists in different kinds of prosocial behaviors. For empathic helping, findings were less consistent. Only Dutch preschoolers showed an increase of happiness after empathic helping, but for the Dutch toddlers or Chinese preschoolers, no increase in happiness was detected after empathic helping. Several explanations are possible for the non-significant increase of happiness after empathic helping. First, the children might have felt "interrupted" in their play with the bear, thereby having to switch their attention from the toy to the experimenter, while in the other tasks the child was already focused on the activity of the experimenter. Second, the absence of higher levels of happiness might also be related to the distress expressed by the experimenter. Already 2-year-olds can show sympathetic arousal after observing a stranger in distress (Hepach et al., 2012). It may take longer for the child's positive emotions to kick in after observing the experimenter's distress. In addition, different explanations may relate to study 1 and 3, respectively. For Dutch toddlers (study 1), this task might be cognitively challenging with too many inferential steps (Warneken & Tomasello, 2014), that perhaps overrides any emotional response to the task.

During the task, they need to notice the experimenter's feeling (cold) and her need (to keep warm), recall the relationship between the blanket and warmth, and hand over the right object (the blanket, not the bear). Another explanation for Chinese preschoolers (study 3) might be that they are regulating their own emotions in order to not show happiness in front of a distressed person (Vaish, Carpenter, & Tomasello, 2009). However, more research on cultural differences in emotional regulation and happiness after empathic helping behaviors are needed before any conclusions can be drawn.

Regarding the fourth aim, we found that toddlers' happiness remained the same after being thanked in both the instrumental helping and empathic helping tasks in both cultures, suggesting that happiness is the likely result from prosocial behaviors, and not the subsequent positive social interaction with the experimenter (i.e., being thanked). Otherwise, children would have shown a higher level of happiness after being thanked. Thus, the findings that an increase of happiness occurs after sharing and instrumental helping, aligns with previous research that speaks to the intrinsic motivation of prosocial behaviors. For example, toddlers showed greater internal arousal after witnessing strangers' needs being fulfilled even though they were unable to help the stranger (Hepach, Vaish, Grossmann, Tomasello, 2016), indicating they have a genuine concern for others' needs. In addition, toddlers helped when there is no possibility for future rewards (Hepach, Haberl, Lambert, & Tomasello, 2017), and their helping behaviors are not affected, or even undermined by social enforcement (Warneken & Tomasello, 2008).

The current study has some limitations that should be considered in future research. First, we only examined toddlers' and young preschoolers' prosocial behaviors with strangers, though in daily life they most often interact with people who are familiar to them. Studies among adults showed that the link between prosocial spending and happiness is stronger when sharing with familiar rather than stranger recipients (Aknin, Sandstrom, Dunn, & Norton, 2011). Future studies should examine whether the familiarity of the recipient (e.g., friends vs. strangers) affects the emotional rewards of prosocial behaviors during toddlerhood. Second, different indices have been developed in measuring child's positive emotions, such as pride (e.g., using upper-body posture; Hepach et al., 2017). Further studies could use different measurements of positive emotions after performing prosocial behaviors, which could help to better understand the "warm glow" of prosocial behaviors. Third, in the current study we used "thank you" as an index of social rewards. It is commonly used in daily activities when praising children after prosocial behaviors, however, whether this kind of praise is strong enough for making a difference in the level of happiness needs further

exploration. Fourth, in current study we asked the children to behave prosocially. Thus, happiness might result from compliance to adults. Although it is almost impossible to rule out this explanation based on the current experimental design, the differences in happiness between costly and non-costly sharing suggest that compliance in and of itself cannot fully explain the increase of happiness. After all, in both conditions, they are complying to experimenters' requests, it is just the ownership of the treats that differed. In addition, a series of studies have shown that, due to their limited cognitive abilities, toddlers and younger preschoolers need (at least) some prompts in conducting prosocial behaviors, such as telling them others' material desires, guiding them in how to share/help, or even asking directly (Brownell, Svetlova, & Nichols, 2009; Dunfield et al., 2011; 2014). Moreover, it is still unclear whether compliance will lead to a higher level of happiness. Actually, based on self-determination theory (SDT), compliance with others will not lead to an increase of happiness (Ryan & Deci, 2000). Indeed, a recent study found that only autonomous, but not obliged sharing lead to an increase of happiness in preschoolers (Wu, Zhang, Guo, & Gros-Louis, 2017). Overall, the current study only aimed at detecting the universality of the emotional rewards *after* prosocial behaviors, but not why they behave prosocially in the first place.

In conclusion, the current study adds more evidence supporting the universality of emotional rewards of prosocial behaviors by demonstrating that both Dutch and Chinese young children exhibited more happiness after sharing with and helping a stranger. Furthermore, social contextual factors such as resource availability and positive social interactions seems to have no influence on the increase of happiness. However, it seems that not all kinds of prosocial behaviors are emotional rewarding, as we found inconsistent results for empathic helping. Moreover, we replicated the difference in happiness between costly and no-costly in 8-treat condition for sharing in toddlers (study 1), but not in preschoolers (study 2 and 3). Thus, future work can further examine at what age, and how this warm glow occurs under different conditions and various forms of prosocial behaviors.

## Chapter 4

### **Prosocial behavior in young preschoolers: A cross-cultural study across the Netherlands, India, and China**

Author note:

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Y. Song and J. S. Dubas conceptualized the study, M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data in the Netherlands and China. S. Malhotra oversaw data collection and coding in India. Y. Wang and B. B. Chen helped collect data in China. J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. All other co-authors provided feedback on the analyses and manuscript.

### **Abstract**

This study compared the prosocial behaviors of 101 Dutch, 37 Indian and 89 Chinese preschoolers and examined whether parental values, goals, and practices could explain any (potential) between- and within-culture differences in prosociality. Preschoolers' prosocial behaviors were observed in behavior assessments and reported by their parents. Parents reported on their values, socialization goals for children, and practices related to prosocial behaviors. Results showed no cultural difference in prosocial behaviors. However, Indian and Chinese parents rated self-enhancement values as more important, emphasized relational goals more, and used prosocial-related socialization practices more often than Dutch parents. Furthermore, across cultures parents' socialization practices were positively associated with observed empathic helping, reported empathy and prosocial behaviors, and parents' self-enhancement values were negatively related to reported prosocial behaviors. Within-culture analyses revealed slightly different patterns, indicating that although no cultural differences exist in prosocial behaviors, their relationships with parents' values, goals and practices differs across cultures.

*Keywords:* prosocial behaviors, preschoolers, socialization, cross-cultural psychology

Young children exhibit different types of prosocial behaviors (e.g., helping and sharing, for reviews, see Dunfield, 2014; Warneken & Tomasello, 2009), which can be refined by socialization factors such as parental instruction or the internalization of norms (Warneken, 2016). Specifically, on reaching the preschool age, children begin to internalize cultural norms and orientations (Schuhmacher & Kärtner, 2015), suggesting that the cultural context could already play a role in young preschoolers' prosocial behaviors. Nevertheless, to date only a handful of studies have used standardized behavioral assessments to examine cultural differences in prosocial behaviors (Kärtner, 2018). Thus, the current study aimed to further examine the role of cultural contexts in understanding individual and cultural difference in prosocial behaviors at the young preschool age by using both standardized behavioral assessments and parent-reports. In doing so, we first compared preschoolers' prosocial behaviors (e.g., instrumental helping, sharing and empathic helping) across three cultures (Dutch, Indian, and Chinese), and then examined whether socio-cultural factors (i.e., parental values, goals and socialization practices related to prosocial behaviors) can help in explaining any (potential) between- and within-culture differences.

### **Cultural Differences on Prosocial Behaviors**

Researchers emphasize the importance of the individualism-collectivism (I-C) spectrum in framing and explaining between-cultural differences on (prosocial) behaviors (Carlo, Roesch, Knight, & Koller, 2011). This spectrum places cultures along a continuum, based on the extent to which each culture promotes certain values (de Guzman, Do, & Kok, 2014). While individualistic cultures (e.g., Western Europe) tend to place more value on independence and autonomy, collectivistic cultures (e.g., Asian) tend to place more value on interdependence and relatedness (Triandis, 2001). Accordingly, children from more collectivistic societies are likely to exhibit prosocial behaviors more often than those from individualistic societies (Eisenberg, Fabes, & Spinrad, 2006). However, empirical evidence is inconsistent regarding whether there are visible cultural differences at early ages. Supporting the aforementioned proposal (Eisenberg et al., 2006), Indian toddlers showed more instrumental help than their peers from Germany (Giner Torrens & Kärtner, 2017). Also, 3- and 5-year-olds from traditional societies showed less self-interest (more fairness) than their peers in modern settings in sharing (Rochat et al., 2009). However, other researchers found no differences on prosocial behaviors between children from individualistic and collectivistic cultures. For instance, Indian and German toddlers showed similar levels of prosocial responses to others' emotional distress (Kärtner, Keller & Chaudhary, 2010). Furthermore, preschoolers from small-scale rural villages of a non-western culture (Tanna, Vanuatu)

showed similar helping levels as their peers from urban, industrialized cities of a western culture (Boston, United States) (Aime, Broesch, Aknin, & Warneken, 2017).

The inconsistent findings imply that the over-simplification of classifying societies as either individualistic *or* collectivistic may not be sufficient enough in explaining the (potential) cultural influence on prosocial behaviors. Specifically, nowadays a coexistence of individualism and collectivism may be reflected at both between- and within-cultural levels (Tamis-LeMonda, Way, Hughes, Kalman & Niwa, 2008). Along with the rapid changing of societies (e.g., progressing urbanization, globalization and technological advancements) in the past 50 years, the chasm *between cultures* has shrunken, with elements of individualism seeping into some societies that have long been described as collectivistic (Tamis-LeMonda et al., 2008). This has been found in both Indian (Sinha & Tripathi, 1994) and Chinese societies (Lu, 1998; Tamis-LeMonda et al., 2008). Thus, these cultures may gradually become more individualistic. Nevertheless, the Chinese culture is still recognized as less individualistic than the Indian, and the Indian culture is recognized as less individualistic than the Dutch culture (<https://www.hofstede-insights.com/product/compare-countries/>).

In addition, values and goals present in one culture are not simply absent in the other, there are differences only in terms of which values and goals are *prioritized* in relation to the others. Thus, although Indian (Sinha & Tripathi, 1994) and Chinese cultures (e.g., Lu, 1998), are gradually becoming more individualistic, both individualistic values (e.g., independence and autonomy) and collectivistic values (e.g., interdependence and relatedness) are now recognized as important. The co-existence is also reflected on parents' goals for their children, as they may endorse both autonomous and relational goals (Tamis-LeMonda et al., 2008). Furthermore, as cultures gradually shift in which values they endorse, individuals within a culture vary in terms of which values they embrace, especially in heterogeneous countries like Indian and China (Roccas & Sagiv, 2010). Accordingly, the individualism-collectivism spectrum may not be sufficient to speak to the *within-culture differences* (Schwartz, 1990; Hofstede, Garibaldi de Hilal, Malvezzi, Tanure, & Vinken, 2010). Instead, how cultures and individuals within a culture differ on both types of value (collectivistic and individualistic) as well as both types of goals (autonomy and relatedness) need to be taken into account when trying to understand between-and within cultural differences.

### **Parents' values, goals, and practices, and their influence on prosocial behavior**

**Values.** Parents are core conduits for perpetuating systems of cultural priorities, and they transmit their personal and socio-cultural values to the child (Kagitcibasi, 1996). Values are the core, situation-pervasive ideas and beliefs of an individual or society (Verkasalo,



Lönqvist, Lipsanen, & Helkama, 2009) that have crucial impact on behaviors, including parenting (Bornstein, 2012; Roccas & Sagiv, 2010). The current study focused on self-enhancement and self-transcendence values (Schwartz, 1973; 2006), which, according to Schwartz's value theory, relate to prosocial behavior most frequently (Schwartz, 2006). Self-enhancement values emphasize personal success, status and dominance in the society, while self-transcendence values stress the welfare of others (Schwartz, 2006). Empirical research on adolescents and adults showed that self-transcendence values are positively associated, while self-enhancement values are negatively associated with prosocial behaviors (for a review, see Schwartz, 2010). However, it is less clear whether and how parents' values may relate to their children's prosocial behaviors at early ages (Eisenberg, Wolchik, Goldberg & Engel, 1992).

**Goals.** The goals parents set for their children can reflect parents' values (e.g., Darling & Steinberg, 1993; Luster, Rhoades, & Haas, 1989). The current study focused on parents' autonomous and relational socialization goals that speak to the central differences between collectivistic and individualistic cultures (Tamis-LeMonda, et al., 2008). For instance, compared with German mothers, Indian mothers emphasized relational socialization goals more often (Giner Torrés & Kärtner, 2017; Kärtner et al., 2010). In addition, the relationship between parents' goals and prosocial behaviors might be culture specific. That is, young children's prosocial behaviors might be cultivated by different goals, depending on the culture children reside in (Giner Torrés & Kärtner, 2017; Kärtner, 2018; Kärtner et al., 2010). However, the empirical evidence for this claim is limited. Only one study directly examined the relationships between parental goals and young children's (19-month-olds') prosocial behaviors in different cultures (German and Indian), and found a positive association between relational goals and toddlers' prosociality across cultures, but not within each culture (Kärtner et al., 2010). Also, in this study no association was found between autonomous goals and toddlers' prosociality, either across or within cultures.

**Socialization practices.** Furthermore, values and goals may not directly influence young children's prosocial behaviors, but rather affect them indirectly, through different parents' practices that prompt prosocial behaviors (Kärtner, 2018). Both the practices used, and the relationships between practices and prosocial behaviors might be culture-dependent. For instance, Indian mothers, compared with German mothers, praised less, and used more punitive practices in socializing children's prosocial behavior (Giner Torrés & Kärtner, 2017). In addition, punitive practices were negatively related to helping in the German sample, but positively related in the Indian sample (Giner Torrés & Kärtner, 2017). Overall,

more studies are needed to further understand the relationship between parents' values, goals and practices and their children's observed prosocial behaviors in different cultures.

### **Current Study**

The current study aimed to examine (1) potential between-cultural differences on prosocial behaviors at the early preschool years, and (2) whether parents' values, goals, and practices related to prosocial behaviors differ would help in explaining the (potential) between- and within-cultural difference on prosocial behaviors. For these aims, we focused on young preschoolers, and age where children begin to incorporate cultural norms in their behaviors (Schuhmacher & Kärtner, 2015). In addition, we focused on three cultures (i.e., Dutch, Indian and Chinese) in which the value systems vary among each other. Specifically, the Dutch culture is recognized as most individualistic, and Chinese as least individualistic, with Indian in between (<https://www.hofstede-insights.com/product/compare-countries/>). Also, Indian and Chinese cultures are now regarded as having a co-existence of individualistic and collectivistic values. Moreover, young preschoolers' prosocial behaviors were examined through standardized behavioral assessments on preschoolers' sharing, instrumental helping, and empathic helping, and through parent-reports on preschoolers' empathy and prosocial behaviors. In this way, we gathered information about preschoolers' prosocial behaviors in a new setting with a stranger (experimenter), as well as in their daily activities. Furthermore, parents' values, goals, practices related to prosocial behaviors were examined through parent-reports.

In light of the literature reviewed, we expected that, if cultural differences exist, then preschoolers from less individualistic/more collectivistic cultures would exhibit more prosocial behaviors than their peers from more individualistic cultures/less collectivistic cultures. Specifically, if the classification by Hofstede et al. (<https://www.hofstede-insights.com/product/compare-countries/>) holds, we expect that in the current samples, Chinese preschoolers would show more prosocial behaviors than Indian preschoolers, who in turn would show more prosocial behaviors than Dutch preschoolers. Also, parents from the less individualistic/more collectivistic cultures would deem self-transcendence values as more important, self-enhancement values as less important, have higher relational goals and lower autonomous goals for their children, and use more practices related to prosocial behaviors, compared to parents from more individualistic/less collectivistic cultures. In addition, as values, goals and practices are symbolic of cultural and individual differences, they would explain (in part) the differences in preschoolers' prosocial behavior, both on a between- and within-cultural level. Specifically, self-transcendence values, relational goals

and socialization practices would be positively related to, while self-enhancement values and autonomous goals would be negatively related to preschoolers' prosocial behaviors.

### Method

The Dutch participants were 101 young preschoolers ( $M = 34.11$  months,  $SD = 3.94$  months, 55 boys) who participated in the last wave of a 3-wave longitudinal study concerning prosocial development from early toddlerhood to early preschool age. Their parents reported on their children's prosocial behaviors (all waves), parents' own values (Wave 1 & 3), socialization goals and the practices related to prosocial behaviors (all waves), with on average 30.53% of missing values across all parental measurements across all waves. Across all waves parental data was missing at random,  $p = 1.00$ , and was imputed by using an expectation-maximization algorithm (Dempster, Laird, & Rubin, 1977). The Indian participants were 37 preschoolers ( $M = 34.71$  months,  $SD = 7.82$  months, 15 boys), recruited through 2 daycares in Delhi. All parents filled in the parent-report. The Chinese participants were 89 preschoolers ( $M = 48.54$  months,  $SD = 6.15$  months, 44 boys), recruited through 2 daycares in Shanghai. In addition, 75 parents filled in the parent-report. All three samples belonged to middle to upper class, educated backgrounds, with 83%, 100% and 80% of parents having either a university or professional degree for the Dutch, Indian, and Chinese samples, respectively. More than 90% of the parents were mothers for all three samples. This research was approved by the Ethics committee of the Faculty of Social and Behavioral Sciences, Utrecht University. Informed written consent was obtained from all the parents of the children who participated in this study.

### Procedure

All experiments were conducted by a main experimenter and an assistant experimenter at the participants' daycare, either in a single play room or a semi-closed off area, and were videotaped. Neither teachers nor parents were present during the testing. Preschoolers in the Chinese and Dutch samples participated in three tasks (sharing, instrumental helping and empathic helping) with the sharing task first, followed by the instrumental and empathic helping tasks in counterbalanced order. Indian preschoolers participated in two tasks (in order: sharing and instrumental helping). Parental questionnaires (i.e., parent-report on preschoolers' prosocial behaviors, parental values, goals and socialization practices related to prosocial behaviors) were translated to Dutch/Chinese and back-translated for the parents in the Netherlands/China, and the original English versions were used in the Indian sample. All questionnaires were distributed to and returned by consenting parents through daycare teachers.

## Preschoolers' Prosocial Behaviors

### Observed prosocial behaviors.

**Sharing.** The sharing task (based on Aknin, Hamlin, & Dunn, 2012) was conducted in all three samples. After a warm-up in which the experimenter showed how to share treats with four stuffed animals, in the test phase the experimenter (a) introduced a monkey who had an empty bowl. Then the experimenter (b) found and gave eight, four, or two treats (for Dutch and Chinese sample), or either eight or two treats (for Indian sample) to the child. Next, three phases were conducted, counterbalanced across participants. These phases included (c) the experimenter found a treat and gave it to the monkey, (d) the experimenter found another treat and asked the child to give it to the monkey, and (e) the experimenter asked the child to share a treat with the monkey out of his/her own bowl. If the child ate the treat, or shared spontaneously before phase (e), then the experimenter replaced the treat to make sure they had a fixed number of resources when asked to share. The number of treats the child shared out of their own bowl, and how many treats they received in total in the task were coded. Then the coding was transformed into two dependent variables used in the current study. First, the *likelihood that preschooler shared* (whether the preschooler shared in the experiment; 0 = did not share, 1 = shared); Second, the *total proportion of treats shared* (i.e., number of treats shared/ total number of treats received) by the child during the experiment.

**Instrumental helping.** The instrumental helping task (based on Svetlova, Nichols, & Brownell, 2010) was conducted in all three samples. The experimenter showed five blocks which each needed to be wrapped in a napkin, and wrapped four blocks successfully and ran out of napkins. The child could help by handing the experimenter a napkin which was put within their reach but beyond the experimenter's. A set of eight cues were given to alert the child to the experimenter's need of a napkin (see supplementary materials, Table 1), ranging from facial/bodily/vocal expression of the need to a specific verbal request. The responses were coded from zero to eight, with a lower score indicating the use of more cues until the child helped. This coding was transformed into two dependent variables, first, the *likelihood of instrumental helping* (whether the preschooler helped or not, 0 = did not help, 1 = helped); Second, the *steps needed before instrumental helping*, with a higher score representing a higher level of helping (0 = did not help, 8 = helped after the first clue).

**Empathic helping.** The empathic helping task (based on Svetlova, et al., 2010) was conducted only in the Dutch and Chinese samples. The experimenter showed a blanket and stated "it makes me warm". Then the experimenter put the blanket in the reach of the

participant but not experimenter. Next, the experimenter gave the participant a distractor (toy bear) to play with. During playing the experimenter suddenly felt cold. The child could help by handing the blanket. Similar to instrumental helping, a set of eight cues were given. Empathic helping was coded and then transformed into two dependent variables, in a similar manner as instrumental helping. We did not conduct this task in India because it was summer and the temperature was 30 °C with no air conditioning in the building, compromising the face validity of the task.

**Inter-rater reliability for coding.** For each sample, two independent research assistants who were blind to the research questions coded the videos (one coded all videos and another coded 20%). The inter-rater agreement (ICC) was high in all three samples with an average of 0.96 in the Indian sample, 0.91 in the Dutch and 0.98 in Chinese sample.

**Parent-report on prosocial behaviors.** Parents completed the empathy and prosocial peer interaction subscales of the Infant-Toddler Social and Emotional Assessment scale (ITSEA; Briggs-Gowan & Carter, 1998). The empathy subscale contained 7 items (e.g., Tries to make you feel better when you're upset), and the prosocial peer interaction subscale contained 5 items (e.g., Takes turns when playing with others). Parents reported how often they observed their children conducting these behaviors from 0 (rarely), 1 (sometimes) to 2 (often), with an additional response alternative N (Never seen in that situation). The reliability is moderate to high in the current samples (see Table 1a).

### **Measurements on Parents' Values, Goals and Practices Related to Prosocial Behaviors**

**Values.** Parents completed the self-enhancement and self-transcendence subscales of the 21-item Portraits Value Questionnaire (PVQ; Schwartz, Melech, Lehmann, Burgess, Harris, & Owens, 2001). The Self-enhancement subscale contained 4 items (e.g., "Being very successful is important to her. She likes to impress other people), and the Self-transcendence subscales comprise 5 items (e.g., It's very important to her to help the people around her. She wants to care for their well-being). The questionnaire consists of portraits or statements about a person and the parents reported the degree to which the portrait describes them on a 6-point Likert scale, ranging from 1 ("very much like me") to 6 ("not like me at all")<sup>1</sup>. These

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<sup>1</sup> Twenty-one questionnaires given out to a school in India had a typing error in the values scale, wherein response category 5, "not like me" was labelled the same as category 2, that is "like me." No significant differences ( $p > .05$ ) were found in the endorsement of any of the

portraits implicitly indicate the importance of the value associated with each statement, therefore originally a lower score means the value is more important. The scales were recoded in the reverse direction for analyses, with higher scores indicating that the value is more important to the participants. The reliability of self-enhancement and self-transcendence in the present studies was found to be low to moderate (see Table 1a), however, low internal consistency was also found in previous studies (e.g., Schwartz, 2003), and should not be an issue because the items are supposed to tap different values, and even different concepts within the same value (Schwartz, 2003).

**Goals.** Parents' goals were measured by the Socialization Goals Questionnaire (Kärtner et al., 2010), which consisted of two subscales. The autonomous subscale contained 4 items (i.e., during the first 3 years of life, children should develop: self-confidence; assertiveness; a sense of self-esteem; a sense of self). The relational socialization goals subscale contained 5 items (i.e., learn to help others; care for the well-being of others; cheer up others, learn to obey parents; learn to obey older persons). Parents reported how important these goals are for them on a 6-point Likert scale, ranging from 1 (not important at all) to 6 (extremely important). The reliability of the parent-reports was found to be high in all samples (Table 1a).

**Socialization practices.** Socialization practices related to prosocial behavior were measured using an adapted version of the Prosocial Behavior Questionnaire (Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015). The original questionnaire only contained 12 items for helping behaviors (e.g., Thank my child when s/he helps me or someone else). Based on these items, 9 items were developed for sharing (e.g., Thank my child when s/he shares with me or someone else). Parents reported on how often they use certain practices with their own child on a 6-point Likert scale, ranging from 1 ("Never") to 6 ("A lot"). The reliability of the parent-reports was found to be high in all samples (Table 1a).

## Results

### Analysis plan

Preliminary analyses were conducted to examine the effect of age and gender on young preschoolers' prosocial behaviors (observed: sharing, instrumental helping, empathic helping; parental-reported: empathy and prosocial behaviors); The effect of number of resources, and the order in sharing tasks (for counterbalancing phase c to e, in total 6 possible

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six response categories between the questionnaires with and without the typing error, and therefore, all were retained for analyses.

orders) on observed sharing behavior, and the order in helping tasks (for counterbalancing instrumental helping and empathic helping) on observed instrumental helping and empathic helping behaviors.

Three main sets of analyses were conducted as follows. First, to examine the potential between-cultural differences on prosocial behaviors, for *observed* behaviors, we used Chi-square analyses for the likelihood of sharing/instrumental helping/empathic helping (i.e., whether preschoolers engaged in sharing/instrumental helping/empathic helping or not), and used one-way, between-subject ANOVA (or ANCOVA if preliminary analyses showed any age, gender or methodological effects tested in the preliminary analyses) for the proportion of items shared, the steps needed before instrumental helping, and before empathic helping. For *parental-reported* behaviors, we used one-way, between-subject ANOVA (or ANCOVA if needed).

Second, we examined cultural differences on parents' values, goals, and practices. The *between-cultural difference* was examined by one-way, between-subject ANOVA on each type of values (i.e., self-enhancement and self-transcendence values), goals (autonomous and relational goals) and practices (helping, sharing, and combined) separately. The *within-cultural difference* on values and goals was examined by T-tests. Specifically, within each sample, we examined whether parent-ratings of self-enhancement values differed from their ratings of self-transcendence values, and whether ratings of autonomous goals differed from relational goals.

Third, to examine whether parents' values, goals, and practices can explain the (potential) between- and within- cultural difference on prosocial behaviors, we used regression analyses, including binominal logistic regression analyses for categorical variables (i.e., *observation*: likelihood of sharing/instrumental helping/empathic helping), and hierarchical multiple regression analyses for continuous variables (i.e., *observation*: proportion of items shared, steps needed before instrumental helping/ empathic helping; *parent-reported*: empathy and prosocial behaviors). Regression analyses were performed for each prosocial behavior separately. For each behavior, in order to examine the *general relationship across cultures*, we combined all three samples and put culture in step 1 (two dummy variables with the Chinese culture being the reference group, namely, culture 1: 0 = Indian and Chinese culture, 1 = Dutch culture; Culture 2: 0 = Dutch and Chinese culture, 1 = Indian culture), and all parental measures (values, goals, and practices) in step 2. In addition, to examine whether culture moderated the relationship between parental values/goals/practices and their children's prosocial behaviors, we further put culture by

parental measure interactions in step 3. Moreover, in order to examine *relationship within each culture*, we re-analyzed the data per sample by putting all parental measures in the regression at once.

### **Preliminary Analysis**

We found a significant effect of age on the steps needed before observed empathic helping, parent-report of empathy, and parent-report of prosocial behaviors,  $p_s < .01$ . Also, we found a significant gender effect on parent-report of prosocial behaviors,  $p < .01$ . Thus we controlled for these variables when analyzing the respective prosocial behavior. We found no effect for the number of resources, the order in sharing tasks, and the order in the helping tasks,  $p_s > .14$ . Thus, these variables were excluded from subsequent analyses.

### **Cross-Cultural Differences in Young Preschoolers' Prosocial Behavior**

**Observed prosocial behaviors.** Descriptive information is provided in Table 1b. There was no cultural difference on the likelihood of sharing,  $\chi^2(2, N = 229) = 3.55, p = .17$ , instrumental helping,  $\chi^2(2, N = 229) = 1.80, p = .41$ , or empathic helping,  $\chi^2(1, N = 192) = 2.42, p = .12$ . In addition, there was no cultural difference on the proportion of treats shared<sup>2</sup>,  $F(2, 225) = 1.41, p = .25$ , or steps needed before instrumental helping,  $F(2, 218) = 2.57, p = .08$ . Also, after controlling for age, no cultural difference was found on steps needed before empathic helping,  $F(1, 188) = 1.40, p = .24$ , and the effect of age was not significant,  $p = .21$ .

**Parent-reported prosocial behaviors, empathy and prosocial behaviors.** Descriptive information is provided in Table 1a. For *empathy*, after controlling for age, there was no cultural difference,  $F(2, 207) = 1.49, p = .30$ , and the effect of age was not significant,  $p = .14$ . For *prosocial behaviors*, after controlling for age and gender, there was a cultural difference,  $F(2, 207) = 3.67, p < .05$ , and the effects of age and gender were significant,  $p_s < .01$ , suggesting a positive link between age and parent-rated prosocial behavior, and girls being rated as more prosocial than boys. Post-hoc analyses (using Bonferroni corrections) showed that Dutch preschoolers were rated as more prosocial than Chinese preschoolers,  $p < .05$ , with no differences found between Dutch and Indian, or Indian and Chinese preschoolers. Further analyses showed this cultural difference to remain significant when only controlling for age,  $F(2, 207) = 3.23, p < .05$ , but was no longer significant when only controlling for gender,  $F(2, 207) = 1.05, p = .35$ . In addition, without controlling for age and gender, no cultural differences were found,  $F(2, 209) = 0.85, p = .43$ .

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<sup>2</sup> For sharing behavior, the conclusions remained the same when only including the 2- and 8-treat condition.



**Table 1a.** Descriptive Information for Parent Reports on Children's Prosocial Behaviors, Parental Values, Goals and Practices

	Overall ( <i>n</i> = 209)	Dutch ( <i>n</i> = 100)	Indian ( <i>n</i> = 32)	China ( <i>n</i> = 77)
Preschoolers' empathy				
Reliability	.66	.63	.57	.70
<i>M</i>	1.52	1.54	1.51	1.49
<i>SD</i>	0.31	0.24	0.33	0.37
Preschoolers' prosocial behaviors				
Reliability	.75	.51	.77	.87
<i>M</i>	1.44	1.44	1.36	1.48
<i>SD</i>	0.42	0.32	0.50	0.49
Parents' values				
Self-enhancement				
Reliability	.69	.71	.72	.50
<i>M</i>	3.41	3.01	3.77	3.76
<i>SD</i>	0.86	0.70	1.04	0.76
Parents' values				
Self-transcendence				
Reliability	.67	.49	.63	.72
<i>M</i>	4.68	4.52	5.23	4.65
<i>SD</i>	0.66	0.49	0.58	0.76
Parents' goals				
Autonomous goals				
Reliability	.82	.78	.76	.86
<i>M</i>	5.06	5.09	4.98	5.06
<i>SD</i>	0.73	0.55	0.82	0.88
Parents' goals				
Relational goals				
Reliability	.76	.68	.91	.83
<i>M</i>	4.50	4.44	4.99	4.39
<i>SD</i>	0.79	0.63	0.94	0.84
Parents' practices				
Practice of sharing				
Reliability	.88	.84	.85	.89
<i>M</i>	4.42	4.08	4.90	4.66
<i>SD</i>	0.83	0.63	0.81	0.89
Parents' practices				
Practice of helping				
Reliability	.83	.84	.79	.87
<i>M</i>	4.34	4.21	4.43	4.48
<i>SD</i>	0.69	0.56	0.73	0.80
Parents' practices				
Practice (overall)				
Reliability	.91	.90	.89	.92
<i>M</i>	4.37	4.14	4.64	4.56
<i>SD</i>	0.70	0.56	0.71	0.77

**Table 1b.** *Descriptive Information for Preschooler's Observed Prosocial Behaviors*

Behavior	Dependent variable	Culture		
		Dutch ( <i>n</i> = 101)	Indian ( <i>n</i> = 37)	Chinese ( <i>n</i> = 91)
Sharing	Percentage who shared	90%	97%	96%
	Proportion of treats shared <i>M</i> ( <i>SD</i> )	0.49 (0.36)	0.62 (0.38)	0.55 (0.43)
Instrumental helping	Percentage who helped	97%	96%	93%
	Steps needed before help <i>M</i> ( <i>SD</i> )	5.46 (2.53)	6.14 (2.80)	6.29 (2.49)
Empathic helping	Percentage who helped	85%	---	92%
	Steps needed before help <i>M</i> ( <i>SD</i> )	3.45 (2.41)	---	4.90 (2.59)

Note: --- = not applicable.

### Cultural Differences in Parents' Values, Goals, and Socialization Practices Related to Prosocial Behavior

**Values.** For *between-cultural differences*, there was a cultural difference on self-enhancement values,  $F(2, 209) = 24.13, p < .01$ . Post-hoc analyses showed that both Indian and Chinese parents rated self-enhancement values as more important than Dutch parents,  $p_s < .01$ , with no differences between Indian and Chinese parents,  $p = 1.00$ . Also, there was a cultural difference on self-transcendence values,  $F(2, 209) = 16.03, p < .01$ . Post-hoc analyses showed that Indian parents rated self-transcendence values as more important than both Dutch and Chinese parents,  $p_s < .01$ , with no differences between Dutch and Chinese parents,  $p = .45$ . In addition, for *within-cultural difference*, within each sample, parents rated self-transcendence values as more important than self-enhancement values, Dutch,  $t(200) = 17.66, p < .01$ ; Indian,  $t(62) = 6.90, p < .01$ ; and Chinese,  $t(152) = 7.29, p < .01$ <sup>3</sup>.

<sup>3</sup> We also conducted a 3 (cultures, Dutch, Indian and Chinese) by 2 (type of value, self-enhancement and self-transcendence) ANOVA, and found a main effect of culture,  $F(2, 420) = 33.16, p < .01$ , the type of value,  $F(1, 420) = 276.45, p < .01$ , and an interaction effect between culture and type of values,  $F(1, 420) = 8.91, p < .01$ .

**Goals.** For *between-cultural differences*, there was no cultural difference on autonomous goals,  $F(2, 209) = 0.28, p = .78$ . However, there was a cultural difference on relational goals,  $F(2, 209) = 7.83, p < .01$ . Post-hoc analyses showed that Indian parents endorsed relational goals for their children more than Dutch and Chinese parents,  $p_s < .01$ , with no difference between Dutch and Chinese parents,  $p = 1.00$ . In addition, for *within-cultural difference*, Dutch and Chinese parents endorsed autonomous goals more than relational goals, Dutch,  $t(200) = 7.78, p < .01$ ; Chinese,  $t(152) = 4.82, p < .01$ . There was no difference for Indian parents,  $t(62) = -0.43, p = .97$ <sup>4</sup>.

**Socialization practices.** For *practices related to sharing*, there was a cultural difference,  $F(2, 211) = 20.26, p < 0.01$ . Post-hoc analyses showed that both Chinese and Indian parents used practices related to sharing more often than Dutch parents,  $p_s < .01$ . No difference was found between Chinese and Indian parents,  $p = .40$ . In addition, for *practices related to helping*, there was a cultural difference,  $F(2, 211) = 3.73, p < .05$ . Post-hoc analyses showed that Chinese parents used practices related to helping more often than Dutch parents,  $p < .01$ . No difference was found between Indian and Chinese, or Indian and Dutch parents,  $p_s > .33$ . Additionally, we combined the practices related to helping and sharing ( $r = .72, p < .01$ ) for assessing the relation between parents' practices and the parent-reported prosocial behaviors. For this *combined measure*, there was a cultural difference,  $F(2, 211) = 11.12, p < 0.01$ . Post-hoc analyses showed that both Chinese and Indian parents used practices more often than Dutch parents.  $p_s < .01$ . There was no difference between Chinese and Indian parents,  $p = 1.00$ .

### Parents' Values, Goals, and Socialization Practices Related to Prosocial Behaviors, and Young Preschoolers' Prosocial Behaviors

**All sample combined.** Results for the bivariate correlation analyses are available in supplementary materials, Table 2. Results for the regression analyses are as follows.

*Observed prosocial behaviors.* Because most of the preschoolers (ranging from 85% to 97% across behaviors and cultural samples) exhibited these aimed behaviors, it was

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<sup>4</sup> We also conducted a 3 (culture, Dutch, Indian and Chinese) by 2 (type of goals, autonomous and relational) ANOVA, and found a main effect of culture,  $F(2, 420) = 3.01, p = .05$ , the type of goals,  $F(1, 420) = 28.34, p < .01$ , and an interaction effect between culture and type of goals,  $F(1, 420) = 5.41, p < .01$ .

not informative to examine the relationships between categorical variables (likelihood of these behaviors) and parents' values, goals, and practices (Vittinghoff & McCulloch, 2007). Accordingly, we only used the continuous variables as dependent variables (Table 2a). For *sharing*, in step 2 no significant relationship was found between any parental measures (on parental values/goals/practice) and sharing,  $p_s > .07$ . For *instrumental helping*, in step 2 no significant relationship was found,  $p_s > .50$ . However, for *empathic helping*, in step 2 parents' socialization practices was significant,  $\beta = 0.17, p < .05$ . That is, the more often parents used socialization practices related to helping behavior, the less communicative steps their children needed before empathic helping.

*Parent-reported prosocial behaviors.* As mentioned before we used overall socialization practices in the analyses (Table 2b). For *empathy*, in Step 2 both relational goals and parents' practices were significant predictors,  $\beta = 0.18, p < .05$  and  $\beta = 0.29, p < .01$ , respectively. That is, parents who reported relational goals as more important for their children, or who used parents' practices related to prosocial behavior more often, have children who showed higher levels of empathy. For *prosocial behaviors* (Table 2b), in step 2 self-enhancement values and parents' practices were significant,  $\beta = -0.16, p < .05$ , and  $\beta = 0.17, p < .05$ , respectively. That is, parents who reported higher level of self-enhancement values, have children who showed lower levels of prosocial behavior, and parent who used parents' practices related to prosocial behavior more often, have children who showed higher levels of prosocial behavior.

*Culture as a moderator to the general relationships found.* We further examined whether culture moderated each of the relationships between parents' values/goals/practices and their children's prosocial behaviors. Considering the sample sizes, for each moderator analysis we only included one interaction term at a time. Culture did not moderate any general relationships. In addition, the moderator analyses were conducted again by only including the Dutch and Chinese samples, because the sample sizes were larger and more comparable. For *parent-reported empathy*, in step 3 the interaction term "*culture by practice*" was significant,  $\beta = -1.01, p < .05$ , indicating that the relationship between parents' practices and empathy is much stronger in the Chinese sample than in Dutch sample. For *parent-reported prosocial behavior*, in step 3 the interaction term "*culture by self-enhancement values*" was significant,  $\beta = .28, p < .05$ , showing that the association between self-enhancement values and reported prosocial behavior is stronger in the Chinese sample than in the Dutch sample.

**Within-sample analyses.** Results for bivariate correlation analyses within Dutch, Indian and Chinese culture are shown in supplementary materials, Table 3a, b, and c, respectively. Results for the regression analyses are as follows.

**Observed prosocial behaviors.** For every observed prosocial behavior, no significant relationship between parents' values/goals/practice and behavior was found in any cultures,  $p_s > .07$  (Table 2a).

**Parent-reported prosocial behaviors.** Again we used overall socialization practices in the analyses (Table 2b). In the Dutch sample, for *empathy*, the relational goals were significant,  $\beta = 0.32, p < .01$ . For *prosocial behavior*, the relational goals and parents' practices were significant,  $\beta = -0.32, p < .01$ , and  $\beta = 0.46, p < .01$ , respectively. That is, Dutch parents who reported relational goals as more important for their children, have children showed higher levels of empathy, and lower level of prosocial behaviors. Also, Dutch parents who reported using parents' practices related to prosocial behavior more often, have children who show higher levels of prosocial behaviors. In the Chinese sample, for *empathy*, parents' practices were significant,  $\beta = 0.40, p < .01$ . For *prosocial behavior*, the self-enhancement values were significant,  $\beta = -0.30, p < .05$ . That is, Chinese parents who used practices related to prosocial behaviors more often, have children who showed higher levels of empathy. In addition, Chinese parents who reported higher level of self-enhancement values, have children who showed lower levels of prosocial behavior. In the Indian sample, no significant relationship was found for *empathy*,  $p_s > .34$ , or for *prosocial behaviors*,  $p_s > .09$ .

**Table 2a.** Regressions for Relationships Between Parental Measurements and the Proportion of Treats Shared, Steps needed before Instrumental Helping, and Empathic Helping

Sample/ Predictors	Sharing					Instrumental helping					Empathic helping <sup>a</sup>				
	B	SE	$\beta$	p	$\Delta R^2$	B	SE	$\beta$	p	$\Delta R^2$	B	SE	$\beta$	p	$\Delta R^2$
<b>Overall</b>															
Step 1*					.01					.03					.08
Chinese and Indian vs. Dutch	-0.06	.06	-.08	.30		-0.89	.39	-.17	.03		-0.81	.70	-.16	.25	
Chinese and Dutch vs. Indian	0.01	.08	.01	.95		-0.16	.53	-.02	.77						
Step 2					.03					.01					.03
Chinese and Indian vs. Dutch	-0.02	.07	-.02	.79		-1.02	.60	-.20	.02		-0.53	.76	-.10	.48	
Chinese and Dutch vs. Indian	-0.02	.09	-.02	.85		-0.00	.59	-.00	.99						
Self-enhancement	0.07	.04	.15	.07		-0.16	.24	-.05	.50		0.08	.27	.02	.78	
Self-transcendence	0.00	.05	.01	.95		-0.12	.32	-.03	.71		-0.07	.34	-.02	.83	
Autonomous goals	0.04	.04	.07	.42		0.16	.29	.05	.58		-0.11	.31	-.03	.71	
Relational goals	0.04	.04	.07	.43		-0.12	.28	-.04	.68		0.02	.31	.01	.95	
Practices <sup>b</sup>	-0.00	.04	-.01	.94		-0.01	.30	-.00	.97		0.65	.32	.17	.04	
<b>Dutch</b>					.04					.05					.06
Self-enhancement	0.06	.05	.12	.26		0.30	.39	.09	.43		0.14	.36	.04	.69	
Self-transcendence	0.02	.08	.03	.78		-0.62	.54	-.12	.25		0.56	.51	.11	.27	
Autonomous goals	0.08	.07	.12	.27		0.97	.52	.22	.07		-0.30	.49	-.07	.54	
Relational goals	0.07	.07	.12	.31		0.03	.46	.01	.95		-0.13	.43	-.03	.76	
Practices <sup>b</sup>	-0.05	.07	-.08	.49		-0.34	.57	-.07	.56		0.77	.50	.18	.13	
<b>Indian</b>					.15					.08					---
Self-enhancement	0.06	.07	.16	.43		-0.50	.54	-.19	.37		---	---	---	---	
Self-transcendence	-0.00	.13	-.01	.97		-0.58	.95	-.12	.55		---	---	---	---	
Autonomous goals	0.06	.11	.13	.61		0.49	.83	.15	.56		---	---	---	---	
Relational goals	0.12	.12	.29	.32		-0.34	.75	-.12	.66		---	---	---	---	
Practices <sup>b</sup>	-0.12	.10	-.25	.27		-0.09	.75	-.03	.90		---	---	---	---	
<b>Chinese</b>					.04					.03					.05
Self-enhancement	0.09	.08	.14	.28		-0.29	.42	-.09	.49		0.01	.46	.00	.99	
Self-transcendence	-0.02	.08	-.03	.82		0.37	.44	.11	.40		-0.57	.48	-.17	.24	
Autonomous goals	-0.01	.08	-.03	.86		-0.47	.42	-.17	.26		0.03	.45	.01	.94	
Relational goals	0.02	.08	.04	.82		0.10	.44	.04	.82		0.13	.47	.04	.78	
Practices <sup>b</sup>	0.05	.07	.11	.44		0.13	.41	.04	.77		0.68	.45	.21	.14	

Note: \*Additional analyses were conducted by using Dutch culture as reference group, and no cultural difference between Chinese and Dutch culture.

<sup>a</sup> results are controlling for age, and age is not significant in any analyses,  $p_s > .18$ .

<sup>b</sup> socialization practices related to sharing was used in the regression analyses for sharing task, and socialization practices related to helping was used in the regression analyses for instrumental and empathic helping task.

**Table 2b.** Regressions for Relationships Between the Parental Measurements and Parent Report on Prosocial Behaviors

Sample/ Predictors	Empathy				Prosocial Behavior <sup>a</sup>					
	B	SE	$\beta$	p	$\Delta R^2$	B	SE	$\beta$	P	$\Delta R^2$
<b>Overall</b>										
Step 1 <sup>*</sup>					.02					.13
Chinese and Indian vs. Dutch	.12	.08	.19	.13		.25	.10	.30	.01	
Chinese and Dutch vs. Indian	.09	.09	.14	.31		.15	.12	.13	.19	
Age	.01	.00	.17	.14		.02	.01	.39	.00	
Step 2					.20					.04
Chinese and Indian vs. Dutch	.15	.07	.24	.04		.25	.10	.30	.02	
Chinese and Dutch vs. Indian	.01	.08	.01	.86		.15	.12	.17	.21	
Age	.01	.00	.16	.14		<b>.02</b>	<b>.01</b>	<b>.40</b>	<b>.00</b>	
<b>Self-enhancement</b>	-.02	.03	-.07	.35		<b>-.08</b>	<b>.04</b>	<b>-.16</b>	<b>.03</b>	
Self-transcendence	.04	.03	.09	.23		.03	.05	.05	.50	
Autonomous goals	.03	.03	.06	.40		-.01	.05	-.01	.87	
<b>Relational goals</b>	<b>.07</b>	<b>.03</b>	<b>.18</b>	<b>.02</b>		-.02	.04	-.04	.64	
<b>Practices (overall)</b>	<b>.13</b>	<b>.03</b>	<b>.29</b>	<b>.00</b>		.10	.05	.17	.03	
<b>Dutch</b>					.22					.25
	.01	.01	.16	.09		.02	.01	.23	.01	
Self-enhancement	-.05	.03	-.15	.12		-.00	.04	-.00	.99	
Self-transcendence	.02	.05	.03	.74		.12	.06	.19	.05	
Autonomous goals	.04	.04	.08	.40		-.07	.06	-.12	.23	
<b>Relational goals</b>	<b>.12</b>	<b>.04</b>	<b>.32</b>	<b>.00</b>		<b>-.16</b>	<b>.05</b>	<b>-.32</b>	<b>.00</b>	
<b>Practices (overall)</b>	<b>.03</b>	<b>.05</b>	<b>.06</b>	<b>.58</b>		<b>.26</b>	<b>.06</b>	<b>.46</b>	<b>.00</b>	
<b>Indian</b>					.16					.50
Age	.01	.01	.21	.35		.03	.01	.46	.01	
Self-enhancement	.02	.07	.07	.73		-.04	.08	-.09	.57	
Self-transcendence	.02	.12	.03	.88		.01	.15	.01	.96	
Autonomous goals	.01	.10	.04	.89		.22	.12	.36	.09	
Relational goals	.00	.09	.01	.96		-.00	.11	-.00	.98	
Practices (overall)	.11	.11	.23	.34		-.14	.13	-.20	.31	
<b>Chinese</b>					.30					.21
Age	.00	.01	.02	.89		.02	.01	.30	.01	
<b>Self-enhancement</b>	-.05	.06	-.09	.42		<b>-.21</b>	<b>.08</b>	<b>-.30</b>	<b>.01</b>	
Self-transcendence	.03	.06	.06	.64		.08	.09	.12	.41	
Autonomous goals	.03	.06	.08	.56		-.07	.08	-.13	.36	
Relational goals	.09	.06	.21	.11		.03	.09	.05	.71	
<b>Practices (overall)</b>	<b>.19</b>	<b>.06</b>	<b>.40</b>	<b>.00</b>		.10	.08	.15	.25	

Note: <sup>\*</sup> Additional analyses were conducted by using Dutch culture as reference group, and no cultural difference was found.

<sup>a</sup> results are controlling for gender, and gender is significant in all analyses,  $p_s < .01$ .

## Discussion

The aim of the current study was to compare the prosocial behaviors of young preschoolers from India, China and the Netherlands and to examine whether socio-cultural factors (parental values, goals and socialization practices related to prosocial behaviors) can help in explaining any (potential) between- and within-cultural differences.

### Preschoolers' Prosocial Behaviors Across Different Cultural Contexts

We did not find any cross-cultural differences on any preschoolers' observed prosocial behaviors (i.e., sharing, instrumental helping, and empathic helping), or parent-rated empathy. Although we found that after controlling for age and gender, parent-rated prosocial behavior was higher in the Dutch sample than in the Chinese sample, this cultural difference was a by-product of the gender effect. In the current study, Chinese sample parents rated girls as more prosocial than boys, whereas the Dutch sample parents did not rate boys and girls differently. Moreover, the Chinese sample included fewer boys ( $n_{\text{boy}} = 40$ ) than the Dutch sample ( $n_{\text{boy}} = 50$ ). Also, the cultural effect was no longer significant after controlling for gender alone. Thus, in general, we found no cultural differences on preschoolers' prosocial behaviors. These findings are in line with previous studies that showed a lack of cultural differences on prosocial behaviors in toddlers (e.g., Aime et al., 2017, Kärtner et al., 2010). Nevertheless, similarities in prosocial behaviors across cultures are not sufficient to draw conclusions on the possible role (or a lack thereof) of social factors on the function and meaning of these prosocial behaviors (e.g., Kärtner, et al., 2010). Next, we focused on two related issues. First, were there any co-existences of individualistic and collectivistic values in the current samples; Second, did parents' values, goals, and socialization practices explain individual difference in prosocial behaviors, both between and within cultures.

### Co-existence of Individualism and Collectivism on Parents' Values and Goals

**Values.** When comparing *across samples*, we found parents in the Indian sample to rate self-transcendence values (e.g., welfare of others) as more important than parents in the Dutch and Chinese sample. Also, in our samples, Indian and Chinese parents rated self-enhancement values (e.g., dominance in the society) as more important than the Dutch parents. These findings were directly in contrast to our expectations. Given that the Chinese culture has been found to be lower in individualism than the Indian culture, which in turn is lower than in the Dutch culture (<https://www.hofstede-insights.com/product/compare-countries/>), we expected that Chinese parents would rate self-enhancement values as *less* important than Indian and Dutch parents in our samples. These findings, however, further speak to the ongoing shifts toward more individualistic characteristics (e.g., personal success,



autonomy) in both Indian (e.g., Sinha & Tripathi, 1994), and Chinese cultures (e.g., Lu, 1998). In addition, *within each sample*, we found that parents all endorse self-transcendence values as more important than self-enhancement values. This finding has two implications. First, in Chinese and Indian cultures, the endorsement of individuality does not mean a discouragement of more collectivistic values (Chen, Wang, & Liu, 2012). Indeed, parents still prioritized the collectivist values (e.g., self-transcendence) compared with individualistic values (e.g., self-enhancement). Second, there might be a reverse shift (i.e., from individualistic to collectivistic) in the Dutch culture. However, this implication is only based on a sample of 100 Dutch parents, and more studies are needed to further investigate this potential trend.

**Goals.** We found that when comparing *across samples*, there was no cultural difference in autonomous socialization goals, but there were differences on relational socialization goals, with Indian parents emphasizing relational goals more than Dutch and Chinese parents. Thus, in the current samples, the lack of cultural differences in the endorsement of autonomous goals may also reflect the shifts towards individualistic values in Chinese and Indian cultures. In addition, when comparing *within each sample*, we found Chinese and Dutch parents emphasized autonomous goals more than relational goals, but Indian parents emphasized both goals at a similar level. Combined with the findings on values, there seems to be a discrepancy between parents' own values and the goals they set for their children in the Dutch and Chinese sample. We would expect that, because Dutch and Chinese parents emphasized self-transcendence more than self-enhancement values, they would also regard relational as more important than autonomous goals for their children. It is plausible that the goals parents set for their children are influenced by, but not totally consistent with their own values, and that other aspects of the social contexts or media play a role (Bornstein, 2012). After all, these goals should refer to qualities or values that parents aspire for their *children* to have, not necessarily qualities in themselves.

### **The Relationships between Parents' Values, Goals, and Practices related to Prosocial Behaviors, and Preschoolers' Prosocial Behaviors**

**Values.** In general we found parents' self-enhancement values were negatively related to parent reports on preschoolers' prosocial behaviors. This negative relationship was found previously in older children and adolescents (for a review, see Schwartz, 2010), and the current study found the relationship may already exist at younger ages, that is, young preschoolers' prosocial behavior may also be related to their parents' values. The pursuit of personal success and social dominance may justify overlooking the welfare of others

(Schwartz, 1973), and parents who emphasize self-enhancement values might raise their child as more dominant and less prosocial towards others. Additionally, culture moderated this association, and the analysis within each culture showed this association to be significant in the Chinese sample. In addition to the explanation just mentioned, this negative relationship may also result from the incongruence between personal values and values endorsed in the Chinese society. First, self-enhancement values are incongruent with the traditional Chinese value system (e.g., Confucianism), which emphasizes that individuals should suppress their own desires for the well-being of whole society (Chen et al., 2012). Second, and more importantly, self-enhancement values are incongruent with the main values endorsed in the current Chinese culture; that is, we found Chinese parents to still emphasize self-transcendence values (including well-being of whole society) more than self-enhancement values. The negative relationship in the current Chinese sample further implies that, in the Chinese parents, the shift towards more individualistic values (as seen through their stronger emphasis on self-enhancement values than Dutch parents) might do more harm than good on their children's prosocial behaviors. Nevertheless, experimental studies are needed to examine this potential causal relationship.

**Goals.** In general we found a positive relationship between parents' relational goals and parent-reported empathy, and culture did not moderate this association. This result is partially congruent with previous findings on the association between relational goals and toddlers' prosociality in both German and Indian cultures (Kärtner et al., 2010). Relatedness goals focus on building good interpersonal connections, for which empathy is one of the prerequisites. Additionally, we found that within the Dutch sample, relational goals were negatively related to parent-reported prosocial behaviors. It is plausible that, for preschoolers who are less prosocial, their parents emphasize relational goals more because they want their children to become more prosocial. The current study cannot test this explanation and longitudinal research is needed to examine whether this is the case.

**Parental socialization practices.** We found a general association between parents' practices in the family and preschoolers' observed empathic helping with the experimenter, and parent-reports of preschoolers' empathy. Previous results did not find an association between parents' practices at home and children's observed helping behaviors on standardized laboratory tasks (Gross et al., 2015). However, in that study the results were drawn from five independent experiments in which the researchers used slightly different tasks to observe the same prosocial behavior. Accordingly, the differences in measures might conceal relationships between parents' practices and observed behavior. In comparison, the

current study only used one task per behavior. The current findings further support that parents' practices may already contribute to their children's prosocial behaviors at early ages, and suggest that preschoolers may transfer what they learned from their parents into their behaviors with a stranger (i.e., experimenter). Additionally, culture moderated the relationship between practices and parent-reported empathy. The analysis within each culture showed the relationship between practices and empathy to only be significant in the Chinese sample, suggesting the role of practices can be cultural specific. It is noteworthy that the current measure on parents' practices is based on a scale originally developed on a western culture (Gross et al., 2015), thus it may capture socialization practices used more in Dutch, in comparison to Indian or Chinese samples, making these results even more surprising. As noted in the introduction, Indian parents use more punitive practices than German parents on prosocial behavior (Giner Torrés & Kärtner, 2017), but our measure of practices only focused on positive practices (e.g., praise). Also, shame, or other practices related to Confucianism may be relevant for Chinese children (Luo, Tamis-LeMonda, & Song, 2013). Thus, more studies are needed that use more comprehensive measurements that capture practices in different cultures.

### **Limitations**

There are several limitations that should be addressed. First, we only found the relationships between parents' values/goals and young preschoolers' prosocial behaviors by *parent-report*, rather than by *observation*. Thus, these relationships may be biased by shared method variance. Nevertheless, it is also plausible that 3- and 4-year-olds are too young to transfer their parents' values and goals into their prosocial behaviors (Grusec & Goodnow, 1994), especially in a new environment towards a stranger in the absence of their parents. Second, the Indian sample size was relatively small, making the associations between parents' and preschoolers' prosocial behaviors less detectable. However, the sample size was comparable with previous studies on this topic (e.g., Giner Torrés & Kärtner, 2017). Third, the Chinese participants (preschoolers) were somewhat older than the Dutch and Indian participants. This was mainly due to practical reasons, as Chinese daycares only enroll children who are 3 years and older, beginning in September each year. Age was not correlated with most of the measures in the current study, and if it was, we controlled for it in the analyses. Thus, it is reasonable to believe that, at least for the current study, the conclusions were not significantly affected by these age differences.

### **Conclusions**

Despite these limitations, the current study contributes to the knowledge of whether and how the cultural context plays a role in understanding the individual difference in young preschoolers' prosocial behaviors. We found that parents from three cultures (i.e., Dutch, Indian, and Chinese) are indeed distinct from each other, but the differences go beyond the traditional individualism-collectivism spectrum. Actually, there is a co-existence of individualism and collectivism in parents' values and the goals parents have for their children. In addition, both general and cultural-specific relationships were found between parents' values/goals/practices and their children's prosocial behaviors, suggesting social contexts already play roles on these behaviors at young preschool age. Nevertheless, we did not find any cultural differences in the degree to which young preschoolers are prosocial. Thus, it seems that the culture-specific patterns that foster prosocial behavior may serve the same function across cultures, that is, to raise a prosocial kid, and young preschoolers may be more alike in their prosocial behavior than different.

**Supplementary materials, Table 1.** *Task Description of Instrumental Helping and Empathic Helping*

Coding as	Type of steps:	Instrumental Helping	Empathic Helping
8	1. facial/bodily expression	Look at the blocks and around, hands up, puzzled	Embracing self and shivering, vocalizing ("brrr!")
7	2. naming action/internal state	"I can't wrap anymore!"	"I am cold!"
6	3. expressing need	"I need something to wrap with"	"I need something to make me warm"
5	4. naming object	"Napkins!"	"My blanket!"
4	5. alternating gaze b/w object and child	Look at napkins on the desk, and the child	Look at blanket / child
3	6. gesture	Reaching/begging gesture (open hand) toward napkins	Reaching/begging gesture toward blanket
2	7. general instruction	"Can you help me?"	"Can you help me?"
1	8. specific instruction	"Can you give me more napkins?"	"Can you give me the blanket?"
0 (did not help at all)			

Supplementary materials, Table 2. Correlations among Variables, across Cultures

Overall	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	1.00															
2. Gender	.09	1.00														
3. The likelihood of sharing	.05	-.02	1.00													
4. Proportion of treats Shared	.01	.07	.29**	1.00												
5. The likelihood of instrumental helping	-.06	.13	.23**	-.03	1.00											
6. Steps needed before instrumental helping	.09	-.02	.20**	.06	.50**	1.00										
7. The likelihood of empathic helping	.13	.09	.25**	.12	.38**	.29**	1.00									
8. Steps needed before empathic helping	.27**	.13	.21**	.16	.24**	.38**	.58**	1.00								
9. Empathy	.02	.05	-.09	.10	.01	.08	.01	.17*	1.00							
10. Prosocial behaviors	.20**	.27**	.03	.09	.12	.08	.13	.15*	.23**	1.00						
11. Self-enhancement	.26**	.07	.06	.15*	-.04	-.01	.14	.14	-.04	-.10	1.00					
12. Self-transcendence	-.08	-.07	.01	.05	-.03	-.02	-.04	.01	.15*	-.02	.14*	1.00				
13. Autonomous goals	-.00	.03	.10	.09	.04	.01	-.06	.01	.25**	.05	-.05	.26**	1.00			
14. Relational goals	-.04	.05	.05	.12	.00	-.02	-.03	.04	.31**	.01	.16*	.36**	.45**	1.00		
15. Practices (sharing)	.17*	-.05	.08	.08	-.06	.06	.05	.22**	.32**	.07	.26**	.30**	.25**	.37**	1.00	
16. Practices (helping)	.17*	.03	-.02	.12	-.06	.05	.04	.21**	.34**	.15*	.16*	.23**	.32**	.34**	.72**	1.00
17. Practices (overall)	.19**	-.01	.04	.11	-.06	.06	.05	.22**	.35**	.12	.22**	.28**	.31**	.38**	.92**	.93**

Note: \* =  $p < .05$ . \*\* =  $p < .01$ .

Supplementary materials, Table 3a. Correlations among Variables, Dutch Culture

Dutch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	1.00															
2. Gender	-.01	1.00														
3. The likelihood of sharing	-.04	-.06	1.00													
4. Proportion of treats Shared	-.09	.02	.44**	1.00												
5. The likelihood of instrumental helping	.05	.16	.15	-.02	1.00											
6. Steps needed before instrumental helping	.16	-.11	.17	.06	.40**	1.00										
7. The likelihood of empathic helping	.11	.10	.16	.09	.26*	.16	1.00									
8. Steps needed before empathic helping	.14	.06	.20*	.15	.18	.32**	.60**	1.00								
9. Empathy	.22*	.00	-.11	.01	-.01	.07	.10	.16	1.00							
10. Prosocial behaviors	.20*	.15	.03	.09	-.07	.02	.13	.16	.03	1.00						
11. Self-enhancement	-.11	.09	.08	.10	.16	.04	.15	.03	-.17	-.00	1.00					
12. Self-transcendence	-.07	.15	-.09	.08	-.13	-.10	.04	.10	.09	.12	.00	1.00				
13. Autonomous goals	.11	-.06	.10	.11	-.04	.16	-.02	.02	.22*	-.00	-.21*	.11	1.00			
14. Relational goals	.08	-.13	.04	.12	-.05	.00	.07	.06	.38**	-.11	.03	.21*	.22*	1.00		
15. Practices (sharing)	.06	-.20*	.10	-.00	-.17	-.03	.09	.16	.35**	.24*	-.00	-.06	.22*	.47**	1.00	
16. Practices (helping)	.03	-.07	.08	.10	-.18	-.01	.04	.15	.13	.25*	-.04	.11	.37**	.40**	.79**	1.00
17. Practices (overall)	.04	-.14	.11	.07	-.19	-.01	.06	.17	.24*	.27**	-.02	.03	.32**	.45**	.94**	.95**

Note: \* =  $p < .05$ . \*\* =  $p < .01$ .

Supplementary materials, Table 3b. Correlations among Variables, Indian Culture

Indian	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	1.00															
2. Gender	.08	1.00														
3. The likelihood of sharing	.19	-.14	1.00													
4. Proportion of treats Shared	.13	.38*	-.17	1.00												
5. The likelihood of instrumental helping	-.18	.20	-.03	-.06	1.00											
6. Steps needed before instrumental helping	-.24	.00	-.11	-.02	.37*	1.00										
7. The likelihood of empathic helping	---	---	---	---	---	---	1.00									
8. Steps needed before empathic helping	---	---	---	---	---	---	---	1.00								
9. Empathy	.31	.02	-.18	.17	-.04	-.03	---	---	1.00							
10. Prosocial behaviors	.28	.54**	-.09	.28	.36*	.01	---	---	.31	1.00						
11. Self-enhancement	.09	.04	-.17	.18	-.22	-.21	---	---	.12	-.07	1.00					
12. Self-transcendence	.02	-.32	.01	.02	.07	-.10	---	---	.09	-.07	-.15	1.00				
13. Autonomous goals	-.19	.18	.11	.23	.44*	.07	---	---	.06	.32	-.12	.21	1.00			
14. Relational goals	.03	.13	-.08	.26	.23	-.10	---	---	.16	.19	.16	.27	.61**	1.00		
15. Practices (sharing)	.32	.13	.20	-.06	.33	.06	---	---	.26	.08	.05	.22	.21	.54**	1.00	
16. Practices (helping)	.41*	.29	-.02	.10	.31	-.08	---	---	.36*	.28	.17	.20	.27	.28	.68**	1.00
17. Practices (overall)	.40*	.23	.09	.03	.35	-.01	---	---	.35	.20	.13	.23	.26	.43*	.90**	.93**

Note: \* =  $p < .05$ . \*\* =  $p < .01$ . --- = not applicable



Supplementary materials, Table 3c. Correlations among Variables, Chinese Culture

China	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	1.00															
2. Gender	.22*	1.00														
3. The likelihood of sharing	-.12	.07	1.00													
4. Proportion of treats Shared	-.01	-.02	.24*	1.00												
5. The likelihood of instrumental helping	.07	.10	.45**	-.04	1.00											
6. Steps needed before instrumental helping	.03	.06	.35**	.06	.68**	1.00										
7. The likelihood of empathic helping	.05	.05	.41**	.14	.59**	.45**	1.00									
8. Steps needed before empathic helping	.07	.17	.19	.14	.35**	.39**	.55**	1.00								
9. Empathy	-.05	.11	-.04	.14	.02	.16	-.07	.21	1.00							
10. Prosocial behaviors	.28*	.27*	.09	.04	.19	.17	.14	.14	.32**	1.00						
11. Self-enhancement	.08	.01	.00	.13	-.08	-.16	.04	-.00	.02	-.23*	1.00					
12. Self-transcendence	-.21	-.26*	.07	.01	-.01	.01	-.16	-.13	.23*	-.03	.18	1.00				
13. Autonomous goals	-.00	.06	.15	.04	-.01	-.11	-.12	.02	.33**	-.02	.15	.41**	1.00			
14. Relational goals	.08	.17	.09	.06	-.05	-.03	-.16	.05	.36**	.06	.24*	.37**	.58**	1.00		
15. Practices (sharing)	-.23*	-.08	-.11	.12	-.07	.01	-.05	.11	.42**	-.00	.23*	.37**	.36**	.20	1.00	
16. Practices (helping)	-.08	-.02	-.21	.12	-.05	.08	.02	.17	.48**	.04	.15	.28*	.34**	.35**	.71**	1.00
17. Practices (overall)	-.16	-.05	-.18	.13	-.07	.05	-.02	.15	.49**	.02	.20	.34**	.37**	.30**	.91**	.94**

Note: \* =  $p < .05$ . \*\* =  $p < .01$



## Chapter 5

### **A three-wave study on the development of prosocial behaviors across toddlerhood:**

#### **The role of socialization**

Author note:

Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *A three-wave study on the development of prosocial behaviors across toddlerhood: The role of socialization*. Manuscript submitted for publication.

Y. Song and J. S. Dubas conceptualized the study, M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data, J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### Abstract

This 3-wave longitudinal study investigated the developmental trajectories of instrumental helping, sharing and empathic helping across toddlerhood, and examined how socialization processes (i.e., parents' socialization goals, parents' and teachers' practices related to prosocial behaviors) contribute to these developments. Participants were 115 Dutch toddlers (wave 1,  $M = 21.82$ ,  $SD = 3.60$ ), their parents, and daycare teachers, who were followed 6 months and 12 months later. At each wave, toddlers' prosocial behaviors were observed through three laboratory tasks, and socialization processes were examined through parents' and teachers' self-report. From wave 1 to wave 3, toddlers were increasingly likely to engage in each of the prosocial behaviors. At each wave they shared roughly half of their resources. Parents' autonomous goals when toddlers were 22 and 28 months related to toddlers' sharing at 34 months, and parents' obedience goals when toddlers were 28 months related to toddlers' instrumental helping at 34 months. Longitudinally, there was no relationship between parents' and teachers' socialization practices and toddlers' observed prosocial behaviors. Overall, this study confirms the developmental trajectories proposed in cross-sectional studies, finds that a proportional-sharing strategy existed in toddlerhood, and adds evidence to the role of socialization processes on prosocial behavior development during toddlerhood.

*Keywords:* prosocial behaviors, toddlers, socialization processes, development, longitudinal study

Major developmental changes in prosocial behaviors occur during toddlerhood (e.g., Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015; Hay, 1979; Svetlova, Nichols, & Brownell, 2010). Using standardized laboratory measures (e.g., out of reach tasks, Warneken & Tomasello, 2006), several cross-sectional studies with multiple age groups have shed light on age differences in mainly three types of prosocial behaviors (instrumental helping, sharing, and empathic helping) by identifying general time tables for development (e.g., Dunfield & Kuhlmeier, 2013; Svetlova et al., 2010). Nevertheless, wide-ranging individual differences within and between (age) groups could obscure how these behaviors develop. Thus, longitudinal studies are needed to control for these possible confounds by following the same children over time. Moreover, longitudinal studies are also needed to examine whether, and if yes, what processes (e.g., type of parents' goals and practices), when (e.g., at what age) and how (e.g., in which direction) socialization processes would contribute to the early development of prosocial behaviors (for reviews, see Brownell et al., 2016; Dahl, 2018). Accordingly, the current 3-wave longitudinal study examines (1) the developmental trajectory of three aforementioned prosocial behaviors across toddlerhood, and (2) the potential role of socialization processes (parents' socialization goals and parents' and teachers' practices relate to prosocial behaviors) in these developments.

### **Trajectories of Sharing, Instrumental Helping, and Empathic Helping, Evidence From Laboratory Measures**

Previous cross-sectional, laboratory studies on age differences in prosocial behaviors found that the developmental trajectories for instrumental helping, sharing, and empathic helping were different from each other (for a review, see Dunfield, 2014). Specifically, instrumental helping seems to develop from (at least) 14 months onwards, but from around 18 months, the increase mainly reflects on how readily (i.e., fewer communicative steps needed before helping), rather than the likelihood of helping (i.e., whether they helped or not). The likelihood of helping was higher for 16-month-olds compared to 14-month-olds (Sommerville, Schmidt, Yun, & Burns, 2013), but no differences were found between 18- and 24-month-olds (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Hammond & Carpendale, 2015), between 17-, 22-, and 26-month-olds (Dahl, Schuck, & Campos, 2013), or between 24-, 36- and 48-month-olds (Dunfield & Kuhlmeier, 2011). Additionally, compared with 18-month-olds, 30-month-olds needed less communicative clues before helping (Svetlova et al., 2010). For sharing, the likelihood to share seems to develop across toddlerhood, when sufficient communicative support is provided. When there were no verbal requests for object(s), no differences in the likelihood of sharing were found between 18- and 24-month-

olds (Dunfield et al., 2011), between 18- and 25-month-olds (Vaish, Carpenter, & Tomasello, 2009), and between 24-, 36- and 48-month-olds (Dunfield & Kuhlmeier, 2011). However, when there was a verbal request (e.g., I want a [object], Brownell et al., 2009), 25-month-olds were more likely to share than 18-month-olds (Brownell et al., 2009). Additionally, 24-month-olds, compared with 18-month-olds, needed less communicative clues before they shared (Brownell et al., 2013; Svetlova et al., 2010). Empathic helping seems to increase throughout toddlerhood. Age differences in the likelihood of empathic helping between 24-, 36-, and 48-month-olds were found, with older children helping more than younger children (Dunfield & Kuhlmeier, 2011). Also, 30-month-olds, compared with 18-month-olds, need fewer communicative clues before helping (Svetlova et al., 2010).

Building on these cross-sectional, laboratory studies, the current 3-wave longitudinal study examines the development of each type of prosocial behavior (i.e., instrumental helping, sharing, and empathic helping) in early toddlerhood (22 months, wave 1), mid-toddlerhood (28 months, wave 2) and the early preschool age (34 months, wave 3). For instrumental helping and empathic helping, the current tasks were based on previous studies (e.g., Svetlova et al., 2010) and we used both the likelihood of helping (i.e., whether they helped or not) and the number of communicative steps needed before helping as dependent measures. Based on previous findings, across the three waves, we expected no increase in the likelihood of instrumental helping, but an increase for the likelihood of empathic helping. Also, across time we expected toddlers to need fewer communicative cues before instrumental and empathic helping.

Different from the helping tasks, for sharing we used a task that asked for sharing explicitly (Aknin, Hamlin, & Dunn, 2012), given that at this age communicative support might be crucial to perform this behavior. Accordingly, we could not test how many communicative steps are needed before sharing. Instead, we used the likelihood of sharing (i.e., whether they shared or not) and the proportion of items shared as dependent measures. We expected an increase on the likelihood of sharing across the three waves. However, we made no predictions about how they could chose to share their resources (whether they shared certain proportion of items received) because this is the first study to focus on this among toddlers. Only two studies have focused on this topic in preschoolers, in which they found that 3- to 6-year-olds shared about 40% to 60% items they received, and there was no age difference on the proportion of items shared (Blake & Rand, 2010; Posid, Fazio, Cordes, 2015). Thus, we aimed to delineate the proportion of items shared during toddlerhood.

### **Contributors of the Development of Prosocial Behaviors**

Recently, socialization processes have received increasingly more attention when examining the early development of prosocial behaviors (for reviews, see Brownell et al., 2016; Dahl, 2018). Socialization is a function of “beliefs, goals, and values” (Gross et al., 2015), during which adults transmit their goals to children through parents’ practices (Grusec, & Kuczynski, 1980). The current study focused on two aspects of socialization processes: parents’ goals and socialization practices. Moreover, for socialization practices, we also examined the role of daycare teachers as a second socializing agent.

**Parents’ socializations on toddlers’ prosocial behaviors: Goals and Practices.** For socialization goals, the current study focused on parents’ goals of autonomous, obedient, and prosocial behaviors, which have drawn attention in previous research on toddler’s prosocial behaviors (Kärtner, Keller, & Chaudhary, 2010). Among three goals, researchers only found a significant cross-sectional association between mothers’ goals of obedience and 19-month-olds’ helping, but not for autonomous or prosocial behavior goals (Kärtner et al., 2010). Nevertheless, these goals may contribute to the development of prosocial behaviors at later ages, when children are more capable of internalizing parents’ rules (Grusec & Hastings, 2014). Thus, the current study examined whether parents’ goals at the previous wave(s) were related to individual differences in toddlers’ prosocial development 6 and 12 months later, controlling for children’s initial levels of prosocial behavior.

For socialization practices, the current study focused on parents’ practices related to prosocial behaviors, and, when (e.g., at what age) and how (e.g., in which direction) these practices would associate with toddlers’ prosocial behaviors. Although most studies have concentrated on specific parents’ practices, such as parents’ encouragement/praise (e.g., Dahl, 2015), providing opportunities to help (e.g., Hammond & Carpendale, 2015; Hammond, Al-Jbouri, Edwards, & Feltham, 2017), and talking about emotions (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013), parents may use more than one kind of practice in supporting prosocial behaviors. Some researchers indeed focused on how parents’ *combined* practices relate to toddlers’ prosocial behaviors. Using a questionnaire that measured parents’ general socialization practices related to helping (including cognitive support, praise, encouragement, and social reward), a positive relationship between these practices and toddlers’ parent-reported prosocial behavior was found, but not for toddlers’ observed prosocial behaviors (Gross et al., 2015). However, these findings were drawn from five independent experiments and the researchers used slightly different prosocial tasks to observe prosocial behaviors. These differences in measures might conceal relationships between parents’ practices and observed prosocial behaviors. Therefore, the current study used the a

similar measure of general socialization practices to examine whether these practices were related to individual difference in toddlers' prosocial behavior across the three waves.

Regarding the age at which these relationships occur, previous studies mainly focused on helping, which emerges around age one (Hammond et al., 2017; Warneken & Tomasello, 2007). One longitudinal study found that the relationship between parents' encouragement/praise and helping was positive at 13 to 15 months of age but negative one year later (Dahl, 2015). A more recent study also found that this relationship is positive for 12- to 15-month-olds, but no longer significant for 15- to 18-month-olds (Dahl, Satlof-Bedrick, Hammond, Drummond, Waugh, & Brownell 2017). These findings support the social-interactive view, which states that associations could be positive at younger ages (i.e., around the emergence of the behavior, when toddlers' abilities are still rudimentary), and non-existent or negative at older ages when they have the capacity to act prosocially on their own (Dahl, 2015; Dahl et al., 2017). The current 3-wave longitudinal study aimed to further test this social-interactive view two ways. First, based on their age at wave 1, we divided participants into two age groups (older/ younger than 24 months) and examined the relationships between practices and prosocial behaviors within wave 1. Second, for the younger age group (younger than 24 months at wave 1), we examined these the relationships between practices at wave 1 and prosocial behaviors at wave 2 (i.e., 6 months later). Given that instrumental helping emerges around age one and our toddlers were older than that at the first wave, we did not expect positive relationship between parents' practices and instrumental helping. Instead, we expect either no associations, or negative ones. However, given that sharing and empathic helping emerges around age two (Dunfield, 2014), we expect that the relationship between parenting practices related to sharing/helping and toddlers' sharing/empathic helping would be positive for the younger group at wave 1, but either non-existent or negative at wave 2. In addition, the relationships would be non-existent or negative for the older group at wave 1.

Regarding the direction of these (potential) relationships, parents' practices can be the antecedent and/or the consequence of prosocial behaviors (e.g., Grusec, & Kuczynski, 1980). For example, for the negative relationship between encouragement/praise and helping around age two (Dahl, 2015), it is possible that parents' encouragement/praise leads to a decrease in prosocial behaviors in the long term, similar to findings in preschoolers (e.g., Asbury, Dunn, Pike, & Plomin, 2003). It is also plausible that the toddlers who are less prosocial need more parents' encouragement and praise (Dahl, 2015). In the current 3-wave longitudinal study, we compared four cross-lagged models for each relationship between practices and specific



prosocial behavior (i.e., non-association, only from prosocial behaviors to practices, only from practices to prosocial behaviors, or both) to test bidirectionality of these (potential) relationships.

**Teacher's socializations of toddlers' prosocial behaviors.** In addition to parents, socialization agents outside families are also important. For instance, attending daycares has been found to be important in the development of prosocial behavior at preschool age (e.g., Eisenberg, Cameron, Tyron & Dodez, 1981; Kienbaum, 2001; Schuhmacher, Collard, & Kärtner, 2017), as daycare teachers provide a context for prosocial interactions to develop within classrooms through their practices (Eisenberg et al., 1981; Kienbaum, 2001). Accordingly, the current study tracked daycare teachers' socialization practices related to prosocial behaviors to examine how this related to the development of toddler's prosocial behaviors.

## Methods

### Participants

At wave 1, 115 toddlers (range = 16 to 33 months,  $M = 21.82$ ,  $SD = 3.60$ , 61 boys) participated in the standardized assessments of prosocial behaviors. In addition, 98 parent reports and 111 teacher reports (from 47 teachers) were collected. At wave 2, 105 toddlers (range = 21 to 42 months,  $M = 28.19$ ,  $SD = 4.05$ , 55 boys) participated again, with 80 parent reports and 86 teacher reports (from 41 teachers) being collected. At wave 3, 101 preschoolers (range: 28 to 48 months,  $M = 34.09$ ,  $SD = 3.98$ , 56 boys) participated with 70 parent reports and 68 teacher reports (from 37 teachers) being collected. Missing data of parent and teacher report did not differ by participants' gender,  $p_s > .12$ , or age,  $p_s > .21$ . Additionally, sample attrition effects were tested by comparing two adjacent waves, and no differences were found, Little's MCAR test,  $p_s > .12$ . Missing data were handled through the use of Full Information Maximum Likelihood (FIML) Estimation in Mplus and listwise in SPSS. Participants mainly came from middle-class backgrounds; 26.64% of families earned between €45,000 and €75,000 annually, 31.9% had incomes between €75,000, and €105,000, and 20% had incomes over €105,000. The majority of the parents identified as Ethnic Dutch (94.7% mothers, 91.6% fathers). Most parents (82.1% mothers, 72.6% fathers) had a Bachelor's degree or higher.

### Procedure

Participants were recruited through daycares in several urban areas across the Netherlands. Informed written consent was obtained from the daycare manager (to conduct the child assessments), daycare teachers, and parents of the children who participated in this

study. The study was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences, Utrecht University.

At each wave, a main experimenter (E) and an assistant experimenter (AE) conducted the prosocial behavior assessments at the child's daycare. Neither teachers nor parents were present during the testing except for three cases in wave 1 where the children were too fussy to leave the teacher. Before the individual session, experimenters joined the classroom for about 15 minutes, so that the toddlers would be more familiar with them. During the assessment, the child was asked to complete three tasks: first the sharing task, followed by the instrumental and empathic helping tasks in counterbalanced order across participants. For every participant, the order for instrumental and empathic helping task was the same across all waves. At each wave, in total the three tasks lasted approximately 10 minutes and was videotaped.

Parents' and teachers' questionnaires were in English originally, and translated into Dutch and then back translated by two researchers fluent in both languages. Questionnaires were distributed to and returned through daycare teachers. At each wave, parents completed questionnaires rating their goals and socialization practices related to prosocial behaviors, and teachers completed questionnaires rating their socialization practices related to prosocial behaviors.

### **Toddlers' Prosocial Behaviors**

**Sharing.** This task was based on experiments on 2- to 5-year-olds by Aknin et al., (2012). After a warm-up phase in which the toddlers learned how to share, the formal test began when E (a) introduced a monkey (with its own bowl) and stressed that neither they, nor the monkey had any treats. Then E (b) found eight, four, or two treats and gave them all to the child. For every participant, the number of treats received in this phase was the same across all waves. After that, three phases were conducted, counterbalanced across participants, including (c) E found a treat and gave it to the monkey, (d) E found another treat and asked the child to give it to the monkey, and (e) E asked the child to share a treat with the monkey out of his/her own bowl. If the child ate the treats, or shared spontaneously before phase (e), then E refilled the treats to make sure that children have a fixed number of treats (i.e., resources) when asked to share. During the formal test, the number of treats the child shared out of their own bowl, and the number of treats received in total, were also coded. The coding was then transformed into two dependent variables: (1) whether the toddler shared in the experiment (i.e., likelihood of sharing; 0 = did not share, 1 = shared), and (2) the total proportion of treats shared (i.e., number of treats shared/ total number of treats received) by

the child.

**Instrumental helping.** This task was based on experiments on 18- to 30-month-olds by Svetlova et al., (2010). The E had five blocks which each needed to be wrapped in a napkin. Four blocks were wrapped successfully, but E ran out of napkins to wrap the final block. The child could help by handing E a napkin which was within reach but beyond the reach of E. A set of eight cues were given to alert the child to E's need for a napkin (see online materials, Table 1), ranging from facial/bodily/vocal expression of the need to finally a specific verbal request. The responses were coded from zero to eight, with a lower score indicating the use of more cues until the child helped, and was then transformed into two dependent variables used in current study, including (1) whether the toddler helped or not (i.e., likelihood of instrumental helping; 0 = did not help, 1 = helped), and (2) the steps needed before instrumental helping (0 = did not help, 8 = helped after the first clue).

**Empathic helping.** This task was based on experiments with 18- to 30-month-olds by Svetlova et al., (2010). The E showed a blanket and stated "it makes me warm". Then E put the blanket in reach of the child but not of E. Next, E gave the child a distractor (toy bear) to play with. During the play session E suddenly felt cold. The child could help by handing E the blanket. Similar to instrumental helping, a set of eight cues were given to alert the child to E's need of the blanket. Similar to instrumental helping, scores were transformed into two dependent variables: Whether the toddler helped or not and the steps needed before empathic helping.

**Inter-rater-reliability for coding.** For each wave, two independent research assistants who were blind to the research questions coded the videos (At wave 1, one coded all videos and another coded 20%; at wave 2, one coded all and another coded 30%; at wave 3, one coded all and another coded 40%. The interrater agreement was high in all three waves, Intra-Class Correlations (ICC) ranged from 0.98 to 0.99 for sharing, 0.98 to 0.99 for instrumental helping, and 0.77 to 0.99 for empathic helping.

### **Measurements on Parents' Goals and Practices related to Prosocial Behaviors**

**Parent goals.** Parents completed the Socialization Goals Questionnaire (Kärtner et al., 2010), which measured three goals, including autonomous (4 items, i.e., during the first 3 years of life, children should develop: self-confidence; assertiveness; a sense of self-esteem; a sense of self), prosocial behavior (3 items, i.e., learn to help others; care for the well-being of others, cheer up others) and obedience (2 items, i.e., learn to obey parents; learn to obey older persons). Parents reported how important they think these goals are for their child(ren) on a 6-point Likert scale, ranging from 1 (not important at all) to 6 (extremely important). The

reliability of the parent-reports are moderate to high, ranging from 0.79 to 0.81 for autonomous, 0.74 to 0.86 for prosocial behavior, and 0.64 to 0.79 for obedience goals.

**Parent socialization practices.** Socialization practices related to prosocial behavior were measured using an adapted version of the Prosocial Behavior Questionnaire (Gross et al., 2015; Svetlova & Brownell, 2007). The original questionnaire contained 12 items for helping behaviors (e.g., Thank my child when s/he helps me or someone else). Based on these items, 9 items were developed for sharing (e.g., Thank my child when s/he share with me or someone else). Parents reported on how often they use certain practices with their own child on a 6-point Likert scale, ranging from 1 (“Never”) to 6 (“A lot”). The reliability was found to be high in all waves, ranging from 0.78 to 0.84 for helping, and 0.79 to 0.83 for sharing.

### **Measurements on Teachers’ Practices related to Prosocial Behaviors.**

**Teacher socialization practices.** As with parents, teachers’ socialization practices related to prosocial behavior were measured using an adapted version of the Prosocial Behavior Questionnaire (Gross et al., 2015; Svetlova & Brownell, 2007), though only at wave 1 and wave 3. Teachers reported on how often they use certain practices in the class on a 6-point Likert scale, ranging from 1 (“Never”) to 6 (“A lot”). The reliability of the teacher-reports was found to be moderate to high in all waves, ranging from 0.75 to 0.91 for helping, and from 0.69 to 0.89 for sharing.

## **Results**

Descriptive information is in Table 1. The preliminary analyses were conducted in SPSS 24 (IBM Corp. Released 2016). Age was positively related to toddlers’ prosocial behaviors on all measures at wave 1,  $p_s < .05$  (online materials, Table 2), related to two helping behaviors (i.e., steps needed before instrumental helping and the likelihood of empathic helping) at wave 2,  $p_s < .05$ , but not to any prosocial measures at wave 3,  $p_s > .07$ . Additionally, age was not related to any parents’ or teacher measures at any waves,  $p_s > .06$ . Moreover, we only found gender differences for teachers’ practices related to helping at wave 1,  $t(107) = 2.11, p < .05$ , showing that teacher reported practices occurred more frequently for boys than for girls. No gender difference were detected for any other teacher measures, or on toddler and parents’ measures,  $p_s > .06$ .

**Table 1.** Descriptive Information for Toddlers' Prosocial Behaviors, Parents' Goals and Practices, and Teachers' Practices

Variables	Assessment point			Scale Range
	Wave 1 (N = 115)	Wave 2 (N = 110)	Wave 3 (N = 100)	
<b>Toddlers' Age</b>	21.83 (3.60)	28.19 (4.06)	34.12 (3.97)	
<b>Toddlers' prosocial behaviors</b>				
Sharing, likelihood of sharing	60.6%	83.7%	90.8%	0% - 100%
Sharing, proportion of items shared	0.43 (0.43)	0.51 (0.38)	0.50 (0.36)	0 - 1
Instrumental helping, likelihood of helping	80.9%	87.8%	96.7%	0% - 100%
Instrumental helping, steps needed before helping	3.75 (2.88)	5.07 (2.94)	5.43 (2.50)	0 - 8
Empathic helping, likelihood of helping	55.8%	68.6%	85.1%	0% - 100%
Empathic helping, steps needed before helping	1.45 (1.86)	2.24 (2.28)	3.45 (2.41)	0 - 8
<b>Parents' measures</b>				
Goals, autonomous	5.12 (0.66)	5.04 (0.68)	5.11 (0.64)	0 - 6
Goals, prosocial behaviors	4.20 (0.96)	4.29 (0.91)	4.27 (0.81)	0 - 6
Goals, obedience	4.57 (0.75)	4.66 (0.72)	4.60 (0.80)	0 - 6
Practices, related to helping	4.01 (0.68)	4.10 (0.56)	4.19 (0.59)	0 - 6
Practices, related to sharing	3.74 (0.73)	3.79 (0.64)	4.04 (0.65)	0 - 6
<b>Teachers' measures</b>				
Practices, related to helping	4.45 (0.51)	4.50 (0.56)	4.39 (0.72)	0 - 6
Practices, related to sharing	4.19 (0.62)	4.16 (0.66)	4.29 (0.76)	0 - 6

### Research question 1: Trajectories of Sharing, Instrumental Helping, and Empathic Helping

We first used linear growth models (in Mplus 8.1, Muthén & Muthén, 1998-2017) to test whether each of the prosocial behaviors (instrumental helping, sharing, and empathic helping) develops linearly. For each behavior, we tested the categorical and continuous variables in separate models. In each model, we used toddlers' age at wave 1 to estimate both the intercept and the slope, in order to test whether the development of each behavior would differ based on toddler's age at the first wave (Figure 1). Second, if the development was not linear, we used univariate repeated measures ANOVAs (in Mplus 8.1) to test the development across waves.

**Instrumental helping.** For whether the toddler helped or not, the linear growth model showed good model fit,  $\chi^2(2) = 1.55, p = .46, CFI = 1.00, RMSEA = 0.00$ , with a non-significant intercept, mean = 0.00,  $p = 1.00$ , and a significant slope, mean = 0.71,  $p < .05$ , indicating that the likelihood of instrumental helping increase linearly across the three waves.

Additionally, age had no significant effect on the intercept,  $b = -0.05$ ,  $p = .99$ , or the slope,  $b = 3.07$ ,  $p = .53$ . For the number of steps toddlers needed before helping, the linear growth model did not fit, indicating a non-linear development. Thus univariate repeated measures ANOVAs were conducted and results showed an increase between wave 1 and wave 2,  $Wald(1) = 12.69$ ,  $p < 0.01$ , but not between wave 2 to wave 3,  $Wald(1) = 1.12$ ,  $p = 0.29$ , indicating that toddlers need less communicative support from wave 1 to wave 2, but not after wave 2.

**Sharing.** For the whether the toddler shared or not, the linear growth model showed good model fit,  $\chi^2(2) = 2.92$ ,  $p = .23$ ,  $CFI = 0.95$ ,  $RMSEA = 0.06$ , with a non-significant intercept, mean = 0.00,  $p = 1.00$ , and a significant slope, mean = 0.82,  $p < .05$ , indicating that the likelihood of sharing increase linearly across the three waves. Age had no significant effect on the intercept,  $b = 0.74$ ,  $p = .30$ , or the slope,  $b = -0.43$ ,  $p = .74$ . For the proportion of items shared, the linear growth model did not fit, indicating a non-linear development. The univariate repeated measures ANOVAs showed no difference between wave 1 and wave 2,  $Wald(1) = 2.30$ ,  $p = 0.13$ ; or between wave 2 to wave 3,  $Wald(1) = 0.07$ ,  $p = 0.80$ , indicating no significant changes on the proportion of items shared across the three waves.

**Empathic helping.** For whether the toddler helped or not, the linear growth model showed again good model fit,  $\chi^2(2) = 1.60$ ,  $p = .45$ ,  $CFI = 1.00$ ,  $RMSEA = 0.00$ , with a non-significant intercept, mean = 0.000,  $p = 1.00$ , and a significant slope, mean = 0.44,  $p < .01$ , indicating that the likelihood of empathic helping increase linearly across the three waves. Age had no significant effect on the intercept,  $b = 2.46$ ,  $p = .86$ , or the slope,  $b = -0.16$ ,  $p = .99$ . For how many steps toddlers needed before helping, the linear growth model again did not fit, indicating a non-linear development. The univariate repeated measures ANOVAs showed an increase between wave 1 and wave 2,  $Wald(1) = 8.92$ ,  $p < .01$ , and between wave 2 to wave 3,  $Wald(1) = 19.72$ ,  $p < .01$ , indicating toddlers need less communicative support from wave 1 to wave 3, and the increase seems to accelerate from wave 2 to wave 3, compared with from wave 1 to wave 2.

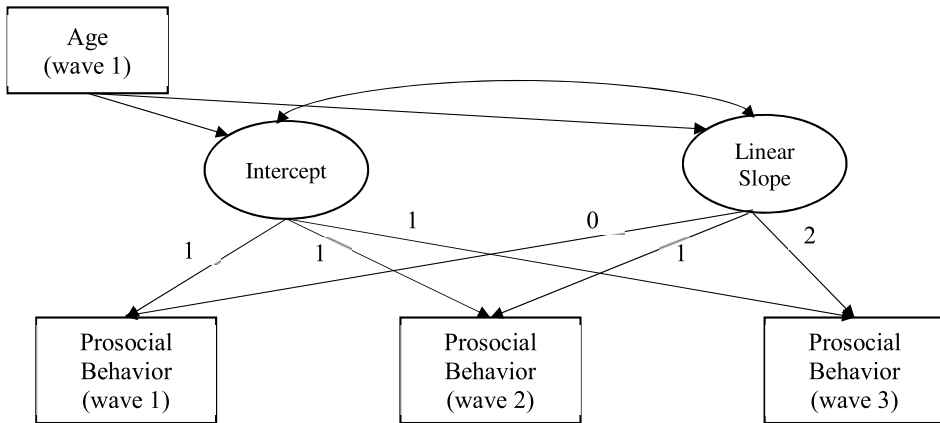


Figure 1. The linear growth models used for analyzing the increase of prosocial behaviors from wave 1 to wave 3.

## Research question 2: Role of Socialization in Prosocial Behaviors

### Parents.

**Do parents' goals relate to toddlers' prosocial behaviors?** The regression analyses (in SPSS 24.0) showed that, after controlling for children's initial levels of prosocial behaviors at wave 1, parents' goals at wave 1 did not relate to any of the assessed prosocial behaviors at wave 2 ( $p_s > .16$ ). However, parents' autonomous goals at wave 1 positively related to toddlers' likelihood of sharing at wave 3, after controlling for toddler's likelihood of sharing at wave 1 (bi-nominal logistic regression,  $B = 1.21$ ,  $SE = .57$ ,  $Wald = 4.56$ ,  $p < .05$ ), indicating that the more parents emphasize autonomous goals, the more likely toddlers' shared 12 months later. No significant relationship was found for the proportion of sharing, or measures of instrumental or empathic helping at wave 3,  $p_s > .23$ . In addition, after controlling for children's levels of prosocial behaviors at wave 2, parents' autonomous goals at wave 2 positively related to toddlers' likelihood of sharing at wave 3 (bi-nominal logistic regression,  $B = 2.61$ ,  $SE = 1.17$ ,  $Wald = 4.96$ ,  $p < .05$ ), indicating that the more parent emphasize autonomous goals, the more likely toddlers' shared 6 months later. Also, parents' obedience goals at wave 2 were negatively related to the steps needed before instrumental helping (linear regression,  $B = -1.05$ ,  $p < .05$ ), indicating that the more parent emphasize obedience, the more steps toddlers needed before instrumental helping 6 month later. No significant relationship was found for empathic helping,  $p_s > .26$ . Noteworthy, all analyses

were also conducted after controlling for toddlers' age at previous wave, and the conclusions remained the same.

***When do parents' practices relate to toddlers' prosocial behaviors?*** To investigate the relationship between parents' practices and toddlers' prosocial behaviors before and after 24 months of age, we divided participants into two groups based on their age in wave 1 (group 1: age  $\leq$  24 months, and age 2: age  $>$  24 months). At wave 1, we found a positive relationship between parents' socialization practices related to helping and the steps needed before empathic helping for group 1,  $r = .29, p < .05$ , but not for group 2,  $r = -.15, p = .30$ . For neither group, no significant relationship was found between parents' socialization practices and toddlers' wave 1 sharing, or instrumental helping,  $p_s > .06$ . Additionally, for group 1, regression analyses showed that after controlling for toddler's prosocial behavior at wave 1, parents' practices at wave 1 were not related to toddlers' prosocial behaviors at wave 2 ( $p_s > .10$ ). Thus, the current findings indicated a positive relationship between parents' practices related to helping and empathic helping before 24 months of age, but not later.

***What is the direction between parents' practices and toddlers' prosocial behaviors?*** We examined the (potential) bi-directional relationship between parents' practices and each kind of prosocial behavior separately using two kinds of analyses, including Cross-Lagged Panel Model analyses (CLPM, e.g., Cole & Maxwell, 2003; Kenny & Harackiewicz, 1979), and random intercepts cross-lagged panel models analyses (RI-CLPM, Hamaker, Kuiper, & Grasman, 2015). The CLPM analyses are widely used, and the most typical modeling in developmental research to assess bi-directional time-lagged relations (e.g., Hamaker et al., 2015). As an extension, the RI-CLPM model further separates the variance at within-person level from between-person level (Hamaker et al., 2015). Thus, if a significant relationship between parents' practices and toddlers' prosocial behaviors is found in CLPM models, we can further test the protentional reciprocal associations *within* individuals in RI-CLPM models (Hamaker et al., 2015). For each behavior and in each kind of analysis, we compared four models (baseline, practice to behavior, behavior to practice, and the full model). In each model, we included toddlers' age at wave 1. Also, we included parents' socialization goals at wave 1 to test whether parents' practices would mediate any relationship between parents' goals and toddler's prosocial behaviors one year later (Figure 2a for CLPM and Figure 3a for RI-CLPM models).

Results for the CLPM models (in Table 2a) showed that, for each prosocial behavior, the baseline model showed good model fit and did not significantly differ from other more complex models ( $p_{\Delta\chi^2} > .05$ ). Thus, the baseline model with no relationship between parents'

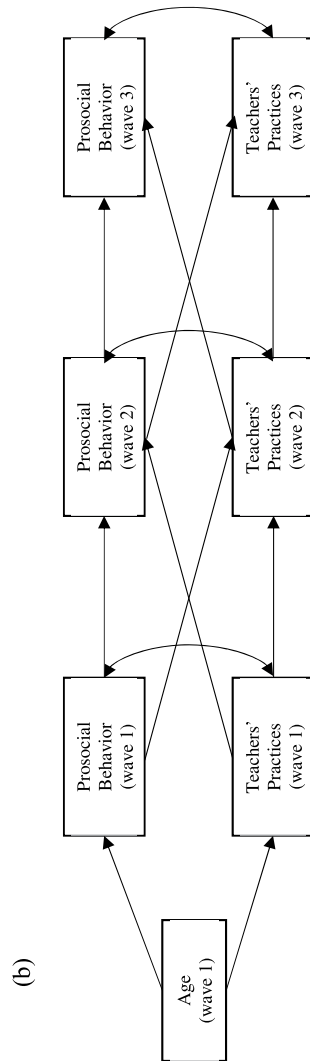
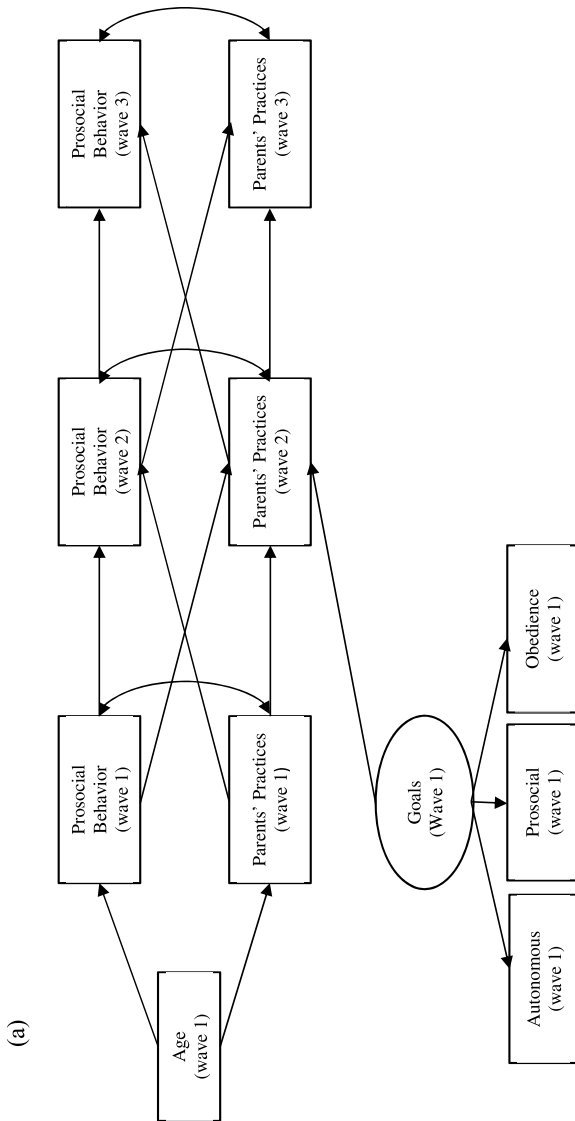


practices and prosocial behavior was chosen as the final model. These results indicated that across waves, there were no significant relationships between parents' practices and toddlers observed prosocial behaviors in the standardized behavior assessments and the other way around. Additionally, the results for the RI-CLPM models (Online materials, Table 3a) confirm the findings of the CLPM models.

### **Teachers.**

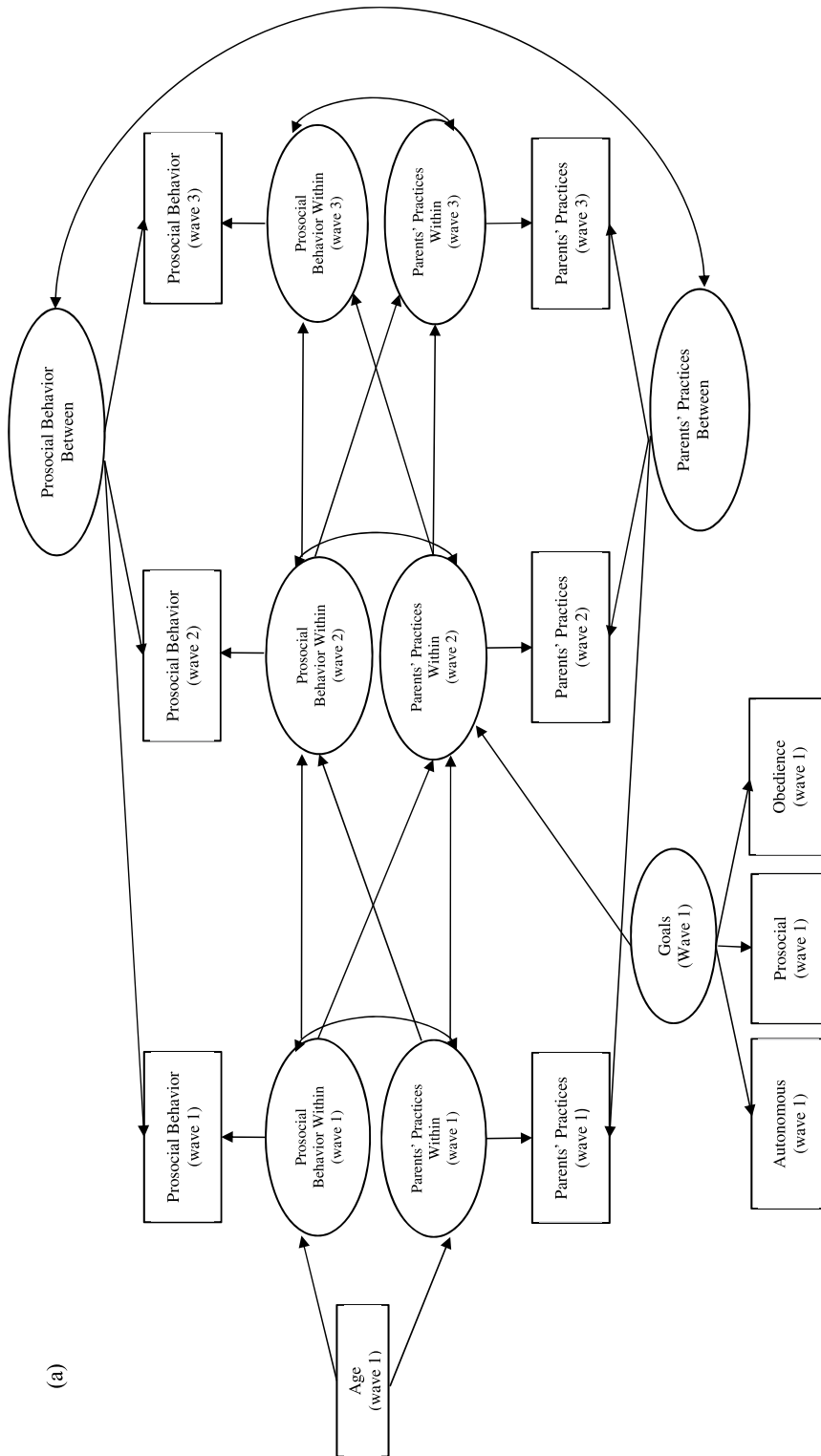
***Do teachers' practices relate to toddlers' prosocial behaviors?*** Again, we divided participants into two groups based on their age at wave 1 (in SPSS 24.0). At wave 1, for either age group, no significant relationship was found between teacher practices and any toddlers' prosocial behaviors,  $p_s > .36$ . Additionally, for group 1, regression analyses revealed that after controlling for toddler's prosocial behavior at wave 1, teachers' practices at wave 1 were not significantly related to toddlers' instrumental helping, or sharing at wave 2,  $p_s > .17$ , but marginally significantly related to empathic helping,  $B = -1.12, p = .05$ . This indicates that, the more teacher exhibited socialization practices related to helping at wave 1, the more steps toddlers needed before they empathically helped at wave 2.

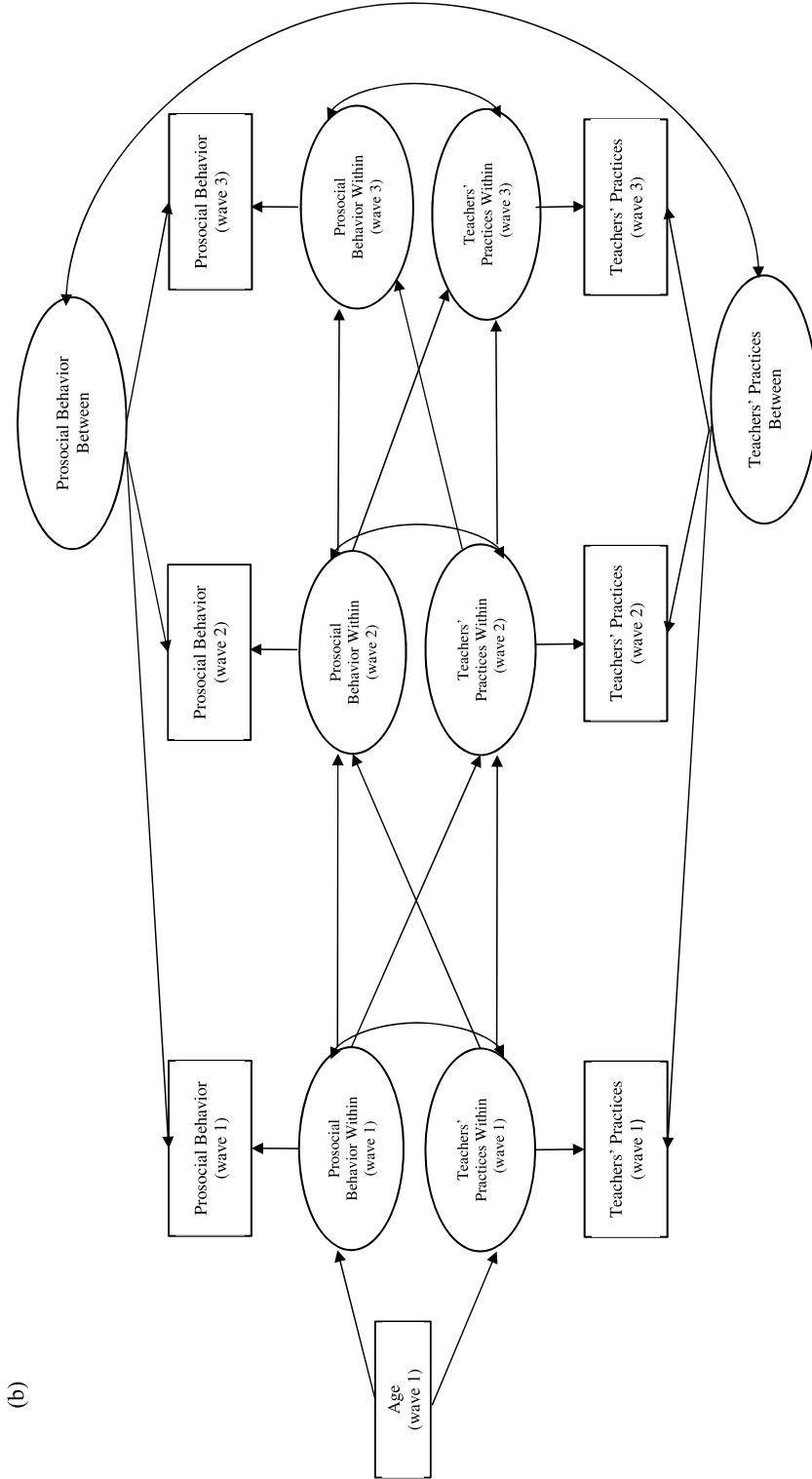
***What is the direction between teachers' practices and toddlers' prosocial behaviors?*** Again, we used both CLPM models and RI-CLPM models and we controlled for toddlers' age at wave 1 (Figure 2b for CLPM and Figure 3b for RI-CLPM models). Results for the CLPM models (in Table 2b) showed that most of the baseline models showed good model fit, and more importantly, most of the baseline models did not significantly differ from other more complex models ( $p_{\Delta\chi^2} > .05$ ). Only for steps needed before instrumental helping, the CLPM model indicated that the practice to behavior model showed a better model fit than the baseline model,  $p_{\Delta\chi^2} < .05$ . Specifically, teachers' practice at wave 2 positively related to toddlers instrumental helping at wave 3,  $B = 0.23, p < .05$ . However, results for the RI-CLPM models (online materials, Table 3b) showed no significant difference between the baseline and practice to behavior model,  $p_{\Delta\chi^2} < .05$ , and the relationship between teachers' practice and toddlers' instrumental helping was no-longer significant,  $p = .94$ . Thus, although the CLPM model found a significant relationship, this only represented some between-person differences (e.g., different teachers rated the same child across waves), but no relationship was found at the within-person level (e.g., for every participant, the difference on his or her own instrumental helping between wave 2 and wave 3, was not predicted by teachers' practices he or she received six months earlier). Overall, the current results showed no significant relationship between teachers' practices and toddler's prosocial behaviors.



*Figure 2.* The Cross-Lagged Panel Model analyses (CLPM) models used for analyzing relationships between prosocial behaviors and practices.

Note: Autoregressive pathways are displayed as the pathways within constructs over time (e.g., prosocial behavior at wave 1 to prosocial behavior at wave 2). Cross-lagged pathways are displayed as the pathways between constructs over time, including two directions (e.g., prosocial to practice, prosocial behavior at W1 to parents' practices at wave 2; practice to prosocial behaviors, practices at wave 1 to prosocial behavior at wave 2). Control variables (toddlers age at wave 1) were regressed on both practices and behaviors at wave 1. The baseline model only included autoregressive pathways, but not cross-lagged pathways; The practice to behavior model included autoregressive pathways, and cross-lagged pathways from practices to behaviors; The behavior to practice model included autoregressive pathways, and cross-lagged pathways from behaviors to practices; The full model included autoregressive pathways and all cross-lagged pathways.





*Figure 3.* The random intercepts cross-lagged panel models (RI-CLPM) models used for analyzing relationships between prosocial behaviors and practices.

Note: Two random intercepts (prosocial behavior between and practices between) reflected between-person differences. Within-person cross-lagged pathways were reflected by autoregressive paths between the within-person latent factors of prosocial behavior and practices across waves, including two directions (e.g., prosocial to practice, latent variable, prosocial behavior within at wave 1 to latent variable, parents' practices within at wave 2; practice to prosocial behaviors, latent variable, practices within at wave 1 to latent variable, prosocial behavior within at wave 2). Control variables (toddlers age at wave 1) were regressed on both practices and behaviors at wave 1. The baseline model only included autoregressive pathways; The practice to behavior model included autoregressive pathways, and cross-lagged pathways from practices to behaviors; The behavior to practice model included autoregressive pathways, and cross-lagged pathways from behaviors to practices; The full model included autoregressive pathways and all cross-lagged pathways.

**Table 2a.** CLPM-Model Comparisons for the Relationship between Parents' Goals, Practices, and Toddlers' Prosocial Behaviors across Three Waves

	Baseline model					Practice to behavior model					Behavior to practice model					Full model				
	$\chi^2$	<i>p</i>	RMSEA	CFI	$\chi^2$	<i>p</i>	RMSEA	CFI	$\chi^2$	<i>p</i>	RMSEA	CFI	$\chi^2$	<i>p</i>	RMSEA	CFI	$\chi^2$	<i>p</i>	RMSEA	CFI
Instrumental helping, likelihood	<b>23.70</b>	<b>0.70</b>	<b>0.00</b>	<b>1.00</b>	23.39	0.66	0.00	1.00	22.59	0.66	0.00	1.00	22.34	0.62	0.00	1.00				
Instrumental helping, Steps needed	<b>31.65</b>	<b>0.29</b>	<b>0.03</b>	<b>0.98</b>	30.70	0.28	0.04	0.98	30.97	0.23	0.04	0.97	30.17	0.22	0.04	0.97				
Sharing, likelihood	<b>31.31</b>	<b>0.35</b>	<b>0.02</b>	<b>0.98</b>	26.78	0.53	0.00	1.00	30.96	0.27	0.04	0.97	26.66	0.43	0.02	0.99				
Sharing, Proportion	<b>28.70</b>	<b>0.48</b>	<b>0.00</b>	<b>1.00</b>	28.98	0.43	0.02	0.99	28.34	0.39	0.02	0.99	28.32	0.34	0.03	0.98				
Empathic helping, likelihood	<b>37.03</b>	<b>0.12</b>	<b>0.05</b>	<b>0.91</b>	39.45	0.06	0.06	0.88	36.68	0.08	0.06	0.90	39.40	0.03	0.07	0.86				
Empathic helping, Steps needed	<b>35.64</b>	<b>0.15</b>	<b>0.05</b>	<b>0.95</b>	33.05	0.20	0.04	0.96	35.43	0.10	0.06	0.94	32.73	0.14	0.05	0.95				

\*bold represents the final models we selected

Table 2b. *CLPM-Model Comparisons for the Relationship between Teachers' Practices and Toddlers' Prosocial Behaviors across Three Waves*

	Baseline model					Practice to behavior model					Behavior to practice model					Full model				
	$\chi^2$	<i>p</i>	RMSEA	CFI		$\chi^2$	<i>p</i>	RMSEA	CFI		$\chi^2$	<i>p</i>	RMSEA	CFI		$\chi^2$	<i>p</i>	RMSEA	CFI	
Instrumental helping, likelihood	<b>9.99</b>	<b>0.62</b>	<b>0.00</b>	<b>1.00</b>		7.82	0.65	0.00	1.00		9.30	0.50	0.00	1.00		7.17	0.52	0.00	1.00	
Instrumental helping, Steps needed <sup>a</sup>	13.35	0.10	0.08	0.84		<b>6.13</b>	<b>0.40</b>	<b>0.01</b>	<b>0.99</b>		11.77	0.6	0.09	0.83		4.92	0.30	0.05	0.97	
Sharing, likelihood	<b>5.33</b>	<b>0.94</b>	<b>0.00</b>	<b>1.00</b>		3.49	0.97	0.00	1.00		4.66	0.91	0.00	1.00		2.85	0.94	0.00	1.00	
Sharing, Proportion	<b>7.10</b>	<b>0.85</b>	<b>0.00</b>	<b>1.00</b>		6.94	0.73	0.00	1.00		4.64	0.91	0.00	1.00		4.48	0.81	0.00	1.00	
Empathic helping, likelihood	<b>15.22</b>	<b>0.23</b>	<b>0.05</b>	<b>0.83</b>		13.64	0.19	0.06	0.81		15.41	0.12	0.07	0.72		13.90	0.08	0.08	0.70	
Empathic helping, Steps needed	<b>24.09</b>	<b>0.02</b>	<b>0.09</b>	<b>0.52</b>		23.84	0.01	0.10	0.45		23.97	0.01	0.11	0.45		23.72	0.00	0.13	0.38	

<sup>a</sup>bold represents the final models we selected

<sup>a</sup> we did not controlled for age in these four models, otherwise the model did not converge



## Discussion

The current 3-wave longitudinal study examined (1) the developmental trajectories of instrumental helping, sharing and empathic helping during toddlerhood; and (2) how socialization processes (i.e., parents' socialization goals, and parents' and teachers' practices relate to prosocial behaviors) may play a role in the development of these prosocial behaviors.

### Trajectories of Sharing, Instrumental Helping, and Empathic Helping

**Instrumental helping.** We found that the likelihood of instrumental helping increased across the three waves (i.e., 22, 28, and 34 month), and the steps needed before instrumental helping only increased from wave 1 to wave 2. Though cross-sectional studies found that after age two, the vast majority of children engaged in instrumental helping at a consistent, high rate (Dunfield & Kuhlmeier, 2013), and this behavior was stable (i.e., not increase) after age two (e.g., Dahl et al., 2013; Dunfield et al., 2011; Hammond & Carpendale, 2015), the current longitudinal findings showed that the likelihood of helping continued to increase beyond the second birthday. This suggests that, even though this behavior seems stable on a between-person level, the increase of instrumental helping continues on a within-person level. Additionally, results on the communicative steps needed before instrumental helping showed that toddlers needed less steps from wave 1 to 2, but not from wave 2 to 3, indicating that the increase in likelihood after age 2 may not be related to the development of understanding communicative clues. Thus, more studies are needed on other mechanisms that could explain the further development of instrumental helping.

**Sharing.** Consistent with previous studies (e.g., Brownell et al., 2013), we found the likelihood of sharing increased across the three waves. In addition, we found that toddlers shared roughly half of their resources at all waves. These findings support the idea that these toddlers use a proportional-based strategy, and more importantly, share roughly half, which so far has only been found in 3- to 4-year-olds (Blake & Rand, 2010; Posid et al., 2015). However, studies in preschoolers (Blake & Rand, 2010; Posid et al., 2015) asked participants to divide resources between themselves and an anonymous, non-shown recipient, whereas in the current study we directly asked participants to share face-to-face with a recipient. Thus, the current participants might feel more obligated to follow the "half-split" rule in front of the recipient. More studies are needed to further examine whether toddlers still share half when the recipient is not shown. Noteworthy, although we explicitly asked for sharing, we did not ask them to share equally in the current study. Thus, requesting itself is not sufficient to

explain why they tend to share about half of their resources.

**Empathic helping.** Consistent with literature (Dunfield, 2014; Svetlova et al., 2010) we found that the likelihood of empathic helping increased across three waves, and toddlers also needed less steps before empathic helping across three waves. Nevertheless, compared with a previous study using similar tasks (Svetlova et al., 2010), the current sample needed more communicative support before empathic helping. Specifically, previous studies showed on average 30-month-olds helped after the experimenter made a general request (i.e., step 3, “I need something to make me feel warm”, Svetlova et al., 2010), whereas the current study showed that 30-month-olds helped after the experimenter requested the specific object (i.e., step 5, alternating gaze between the object and the child). This may be related to the number of trials used in the test situation, with the previous study using three, and the current study using only one trial. Thus, participants in Svetlova et al.’s study (2010) may be more skilled in empathic helping because of training effects.

Next to providing more evidence on the developmental trajectories of prosocial behaviors, the current findings also add evidence on the multidimensionality of early prosocial behaviors (e.g., Padilla-Walker & Carlo, 2014). In line with the proposal that instrumental helping emerges and develops first, followed by sharing and empathic helping (Dunfield, 2014), in the current study, most of the participants (> 80%) engaged in instrumental helping at the first wave, while only half of them engaged in sharing or empathic helping by then. Additionally, the current study found that although all three behaviors showed an increase during toddlerhood and early preschool age, they developed at different rates. The mean slope in the latent growth models indicate that sharing (mean = 0.82) develops quicker than instrumental helping (mean = 0.71), which in turn develops quicker than empathic helping (mean = 0.44).

### **The Role of Socialization Processes in Prosocial Behaviors**

**Parents’ goals.** We found that the more parents empathized autonomy, the more likely their toddlers shared 6 and 12 months later. These results indicate that socializing a sense of autonomy (e.g., self-confidence and assertiveness) might be especially important for sharing. In the current study, we explicitly told the toddlers that “these treats are yours”, and then we asked them to share. It is plausible that toddlers whose parents strengthened the autonomous are more able to represent themselves as independent agents, who have the “right” to divide their possessions as they will. In addition, in order to share, toddlers need to overcome their own desires for the materials (Dunfield, 2014). Thus, toddlers of parents who value autonomy (including assertiveness) in their children, are likely to be more assertive (or

less hesitant) in sharing.

Additionally, we found that the more parents empathized obedience, the more communicative clues their toddlers needed (shown as a negative relationship) before instrumental helping. This finding seems to directly contradict the results of Kärtner et al. (2010), that found that obedience goals were positively related to 19-month-olds' prosocial behaviors. However, this inconsistency may be evidence for the social-interactive view (Dahl, 2015), whereby which social interactions may only contribute to infants' prosocial behaviors when their abilities are still rudimentary (Dahl, 2015; Hammond et al., 2017). Although previous studies supporting this view focused on parents' practices, not goals, here we propose the relationship between obedience goals and prosocial behaviors may depend on age. Specifically, in the study by Kärtner et al. (2010), the tested behavior (comforting) likely just emerged (Dunfield, 2014). Thus, at that age, taking orders from the parents may help to learn how to comfort others. In contrast, in the current study, instrumental helping emerges earlier than the age we tested. Thus, toddlers whose parents value obedience may be more hesitant to help, until they are sure that the experimenters indeed need help.

**Parents' and teachers' socialization practices.** We found a positive relationship between parents' socialization practices and the steps needed before empathic helping before age two, but not afterwards. In addition, although we found no difference between teachers' practices and toddler's empathic helping before age two, the relationship was marginally negative after age two. Again, these findings support that the relationship between practices and prosocial behaviors change as children mature (Dahl, 2015). However, longitudinally (i.e., from wave 1 to wave 3), we found no relationships between parents'/teachers' practices and toddlers' observed prosocial behaviors. There are several potential explanations for these null findings. First, it is possible that the age of the children in the current study may be too old to capture possible socialization effects. Second, it is possible that toddlers' observed prosocial behaviors are still influenced by socialization processes during the age we tested, but the current measurement is not sensitive enough to detect them. Age was not related to the parents', or teachers' measures, either within- or between-waves. These results imply that, although toddlers' prosocial behaviors develop during this period, parents and teachers do not seem to adjust, or be aware that they adjust their practices as toddlers' mature. Third, most previous studies measured parenting practices in more detail, such as observing how parents interact with their toddlers (e.g., Brownell et al., 2013), or by asking parents to describe their parenting (e.g., Dahl, 2015). In comparison, the current study only measured the frequency of the used practices. It could be that not the

frequency (quantity), but the how (quality) that matters for eliciting toddlers' observed prosocial behaviors (Brownell et al., 2013). Accordingly, further studies are needed to further observe what, and how often parent use practices related to prosocial behaviors in daily life.

### **Conclusion**

Overall, the current findings confirm though refine the developmental trajectories proposed in previous cross-sectional studies; extend previous findings in proportional-sharing strategy into toddlerhood; add more evidence to the multidimensionality of prosocial behaviors; further support the social interactive view of prosocial behavior development at early ages; and call for more detailed examination on how specific types of socialization processes may relate to the development of prosocial behaviors, especially before age two. Based on these findings, we are one step closer in revealing how prosocial behavior develops during toddlerhood.

## Chapter 6

### **The early development of prosocial behavior: Does the number of resources matter?**

Author note:

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Y. Song and J. S. Dubas conceptualized the study, M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data, J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### Abstract

To examine whether and how the number of resources available affects toddlers' prosocial behaviors, 18-month-olds ( $n = 62$ ) and 24-month-olds ( $n = 60$ ) participated in a sharing task, in which they received 8, 4 or 2 treats (resource condition) for sharing, and then participated in instrumental helping and empathic helping tasks. Twenty-four-month-olds were more likely to engage in sharing, instrumental helping, and empathic helping compared with 18-month-olds. Additionally, both 18-month-olds and 24-month-olds were more likely to share, shared more in number but not in proportion in the resource rich (8 treats) than poor (4 or 2 treats) conditions. In addition, children tended to be more likely to engage in empathic helping in the resource rich than poor conditions. No resource effect was found for instrumental helping. Thus, having an abundance of resources seems to stimulate the likelihood of performing at least some prosocial behaviors.

*Keywords:* prosocial behaviors, toddler, resource

The past two decades have witnessed a resurgence of research on the early development of prosocial behavior. Most researchers agree that during the second year of life infants' abilities to help (both instrumental and empathic helping), and share with others show dramatic increases (Brownell, 2013), yet the underlying mechanisms and conditions that foster or hinder these developments are still not fully understood (Posid, Fazio, & Cordes, 2015). In the present study we focus on a contextual factor (the number of resources available to the child) and whether this impacts sharing and other subsequent prosocial behaviors (instrumental helping and empathic helping). Studies on resource availability in adults have shown inconsistent results, as some studies find adults are more selfish (sharing less) in a resource rich than poor condition (e.g., Chang, Lin, Horng, & Wang, 2014; Johansson-Stenman, Mahmud, & Martinsson, 2008), while others find no difference in sharing between resource rich and poor conditions (e.g., Cameron, 1999). More importantly, sharing emerges during toddlerhood (e.g., Paulus, 2014), so the findings in adults may not apply to young children. Following this line of research in adults in economics and philanthropy (e.g., see Johnson & Mislin, 2011 for a meta-analysis), in the current study we explore why people are generous at an early age.

To our knowledge, only one study directly examined whether resource availability affects infants' and toddlers' sharing by observing triads of children interacting in a resource rich (6 toys) and a resource poor environment (2 toys) (Hay, Caplan, Castle, & Stimson, 1991). Two-year-olds were more likely than one-year-olds to spontaneously share a toy with a peer when resources were scarce, while no age differences in spontaneous sharing occurred when resources were rich (Hay et al., 1991). In the same study, however, 2-year-olds were less likely to share a toy in response to peers demands for a toy compared to one-year-olds, particularly when toys were scarce. These results suggest that sometime in the second year of life children may become sensitive to resource availability and may develop a strategy for sharing resources.

As noted by Brownell, Iesue, Nichols, and Svetlova, (2013), naturalistic observation studies of sharing are useful for deriving a preliminary developmental picture of other-oriented sharing. However, the lack of a standard protocol for how sharing is elicited makes it difficult to know *whether* and *how* the number of resources affects toddlers' sharing behavior. To our knowledge, there are no studies that have systematically varied the number of resources available for sharing to children younger than 3 years, when they just begin to (for a review, Dunfield, 2014), but sometimes are still reluctant to share (Levitt, Weber, Clark, & McDonnell, 1985). Research shows that even young children demonstrate numerical

cognition, suggesting that they can recognize the number of resources. Six-month-olds can distinguish four objects from eight objects, but not distinguish two objects from 4 objects (Xu, 2003). Later, 3-year-olds are cognitively capable in distinguishing small sets (the quantities from number “one” to “four”) from large sets of objects (quantities greater than four) (Le Corre & Carey, 2007; Sarnecka & Gelman). Thus, infants and toddlers are cognitively capable in identifying poor or rich resource conditions. More importantly, the understanding of number may allow toddlers to recognize the cost involved in sharing based on the number of resources available. Considering that sharing involves overcoming their own desire for keeping resources for themselves (e.g., Brownell et al., 2009; Dunfield, 2014), and this desire for resources is more likely to be satisfied in a resource rich than poor conditions, it is possible that infants and toddlers are more likely/willingly to share when the resources are rich than poor. The present study is designed to address this question by comparing 18- and 24-month-olds’ likelihood of sharing under different resource availability (2, 4, or 8 resources) conditions. Considering 2 belongs to small sets, 8 belongs to large sets, and 4 falls on the boundary of small and large sets of objects, here we used 2, 4, and 8 number of items in representing poor and rich resource conditions.

In addition, it is unclear whether resource availability matters for *how* infants and toddlers share. In a recent experimental study, using an adapted version of the Dictator Game, Posid, Fazio, and Cordes (2015) systematically varied the number of resources belonging to participants to examine whether quantity affected 3- to 8-year-olds’ sharing. They gave participants either 12 or 30 stickers, and asked them to share with either one or two anonymous recipients. Results showed that even 3- to 4-year-olds shared more after receiving 30 stickers compared to 12 stickers (Posid et al., 2015), suggesting they varied their sharing based on how many they had. Additionally, although 6-year-olds were more likely to share (i.e., the percentage of children who shared) than 3-year-olds, the proportion of stickers they shared was the same for both 3 and 6-year-olds; it was only after age 6 that the proportion of stickers shared increased (Posid et al., 2015). These results suggest that children as young as 3 years may already be using a proportion-based heuristic in deciding the number of objects to share and that the quantity shared was affected positively by the quantity of resources received (Posid et al., 2015). Interestingly, another study found that 4-year-olds evaluated those who shared 6 out of 12 stickers as nicer than those who shared 3 out of 4 (McCrink, Bloom, & Santos, 2010). This suggests that, at least in judging other’s prosocial behavior, young children focus more on the absolute number of resources shared (i.e., a number-based strategy), rather than the proportion they shared (McCrink et al, 2010). As previous studies



focused on preschoolers, it is unclear whether toddlers employ a proportion-based or number-based strategy in sharing. The current study aimed to address this lacuna through varying the number of resources available. If toddlers share a constant number of resources, regardless of the number they receive (e.g., share 1 out of 2, and 1 out of 4), a number-based strategy would be supported, whereas if they share a certain proportion of resources (e.g., share 1 out of 2 or 2 out of 4), then a proportion-based strategy would be supported.

In addition to examining the possible resource effect on sharing, we also examined whether the number of resources children have in the sharing task subsequently affects two other prosocial behaviors: instrumental helping and empathic helping. Instrumental helping appears to emerge shortly after the first birthday, and increases rapidly before 18 months (Dunfield, 2014). In comparison, empathic helping, which is based on other-oriented concern (Svetlova, Nichols, & Brownell, 2010), emerges later with increases occurring throughout toddlerhood and the preschool years (Dunfield, 2014; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). The difference in the age of emergence and early development of these behaviors implies that the underlying mechanisms or the role of contextual factors may be different. From this perspective, resource availability in sharing should not affect helping subsequently.

Nevertheless, recent studies have shown that some contextual factors can affect different prosocial behaviors. For instance, parents' general socialization practices (such as talking about emotions; Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013) or age appropriate encouragement of prosocial behavior in general (Gross, Drummond, Satlof-Bedrick, Waugh, Svetlova, & Brownell, 2015; Pettygrove, Hammond, Karahuta, Waugh, & Brownell, 2013) were positively associated with both instrumental helping and empathic helping albeit the size of the association varies across prosocial behaviors and the age of the child. For example, mother's scaffolding was only positively related to spontaneous instrumental helping for 18-month-olds, and to spontaneous empathic helping for 30-month-olds (Pettygrove et al., 2013). Taken together, these results suggest that despite (possible) different mechanisms underlying these prosocial behaviors, certain contextual factors can play a role in *stimulating* these behaviors. The current study investigated specifically whether having more resources in a sharing task might positively influence toddlers' likelihood of instrumental helping and empathic helping.

One potential mechanism behind why having more resources could lead to increased likelihood of subsequent prosocial behaviors is based on self-perception theory (e.g., Eisenberg, Cialdini, McCreath, & Shell, 1987; Lepper, Greene, & Nisbett, 1973). Based on

these perspectives, individuals are likely to act in congruence with their past actions because of a desire to stay self-consistent (Eisenberg et al., 1987). For instance, Chernyak, Trieu, and Kushnir (2017) found that for 3- to 4- year-olds, the more generously they shared initially (e.g., shared 50% rather than 25% of their resources), the more likely they were to share generously (i.e., share 2 or 3 out of 3 stickers) in a subsequent task. Thus, engaging in sharing behaviors led to more sharing subsequently. Following the same logic, any previous act of sharing is likely to increase the propensity to act prosocially in subsequent instrumental and empathic helping tasks. We propose here that if the number of resources available increases the likelihood to share, children in the resource rich sharing condition would also be more likely to help in the subsequent tasks (i.e., the foot-in-the-door effect).

Alternatively, resource availability in sharing might affect helping subsequently in an opposite direction. Children who share may feel “licensed” to not help in subsequent tasks (e.g., Merritt, Effron, & Monin, 2010; Miller & Effron, 2010), because their initial sharing behavior has fulfilled their needs of being moral, and given credits for immoral behaviors subsequently. The “moral licensed” effect has drawn great attention in adulthood, yet little is known about whether young children have a sense of moral license (Tasimi & Young, 2016). Considering that both sharing behavior and the concept of self-perception emerges during the second year of age (Lewis & Ramsay, 2014), here we explore whether the foot-in-the-door or the moral-license effect is detectable in two-year-olds. We do not expect or suggest that 2 – year-olds have a mature or complete understanding of the concept of a moral self or moral license, rather results could suggest rudimentary forms of these effects.

### **Current Study**

The current study examined whether the contextual factor of being resource rich or poor (i.e., number of resources) would affect 18- and 24-month-olds’ prosocial behavior (sharing, instrumental helping and empathic helping). First, we examined whether the number of resources available would affect sharing behavior (aim 1) using the sharing task designed by Aknin and her colleagues (Aknin, Hamlin, & Dunn, 2012) for 2-year-olds, but varying the number of resources available to children to share. In the original task children received a large amount (8) of treats and then were asked to share one of their treats with a puppet (Monkey) who had none (Aknin et al., 2012). In the present study we used a between-subjects design and assigned children to either a 2-, 4- or an 8-treat condition, and then asked children to share one of their treats. We address this question by looking at (1), *whether* the children share (aim 1a), and (2) *how* the children share (proportion-or number-based strategy) (aim 1b). The decision to share is based on the cognitive ability to recognize and the

willingness to rectify another's unmet material needs, often by having to overcome one's own material desire for the object to be shared (Dunfield, 2014). We propose that if resources were rich the cost of sharing one object is relatively low and therefore children would be more likely to share in the resource rich condition (8 treats) compared to the resource poor conditions (2 or 4 treats). In addition, due to cognitive maturation (e.g., Dunfield, 2014), we expected that compared with the 18-month-olds, 24-month-olds would be more likely to share and share more resources. However, no specific hypotheses were made regarding the resource effect on the number, or proportion of items shared.

Second, we examined whether the number of resources in the sharing task would affect prosocial behavior on subsequent instrumental helping and empathic helping tasks (aim 2), using tasks designed for this specific age (Svetlova et al., 2010). Firstly, in line with the measurements of sharing, we examined whether the children engaged in instrumental/empathic helping. Next we investigated (1) the direct resource effect on the likelihood helping (aim 2a), and (2) the possible mechanism (foot-in-the-door or moral license effect) that could explain this resource effect (aim 2b). Being rich in resources availability might serve as a contextual factor that stimulates prosocial behaviors (i.e., instrumental and empathic helping). Additionally, based on foot-in-the-door effect, it is reasonable to expect that children who shared previously would be more likely to engage in helping subsequently. Alternatively, based on moral license effect, it is also possible that children who had shared before would engage less in helping subsequently. In addition, as the understanding of tasks might affect performance on the tasks, the analyses were conducted with and without language development as a control variable.

## Methods

### Participants

Participants were 62 18-month-olds (range: 16 to 22 months,  $M = 18.53$  months,  $SD = 2.02$  months, 30 boys) and 60 24-month-olds (range: 23 to 28 months,  $M = 24.40$  months,  $SD = 1.15$  months, 35 boys). For these children, 56.6% were first born and came from families with an average of two children ( $M = 1.72$ ,  $SD = 0.59$ ). About 8.5 % of the families had a household income of € 45,000 or less, 26.64 % of families fell between €45,000 and €75,000, 31.9 % had incomes between €75,000 and €105,000, and 20% had incomes over €105,000. The majority of the parents identified as Ethnic Dutch (94.7% mothers, 91.6% fathers). Most mothers and fathers were college-educated; 38.9% of mothers and 33.7% of fathers had a Bachelor's degree, and 43.2% of mothers and 38.9% of fathers completed a Master's degree or higher. Children were mainly recruited through daycares in several urban areas across the

Netherlands, with nine participants recruited through posters in the university and word of mouth. This research was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences, Utrecht University. Informed written consent was obtained from all the parents of the children who participated in this study. Data from seven participants were not complete because the camera stopped recording ( $n = 4$ , two for the sharing task, and two for both the instrumental helping and empathic helping tasks) or children were not able to complete the task due to being upset ( $n = 3$ , all for the instrumental helping task). Only missing data points are excluded from the analyses.

### **General Procedure**

A main experimenter (E) conducted the tasks, with the help of an assistant experimenter (AE). Experiments mainly took place at the daycare (> 90%), either in a single play room or in a semi-closed off area (e.g., a corner of a big playroom) and were videotaped with two cameras, one for the participant and one for the main experimenter. The E and AE joined the class and helped the teacher for at least 30 minutes before the first session, so the children would be more familiar with them. Teachers or parents were not present during the testing except for three cases where the children were too fussy to leave the teacher. In these cases, the child sat on the teacher's lap while being tested. In addition, the nine children that were recruited through posters and word of mouth were tested in child's daycare ( $n = 1$ ), university lab ( $n = 1$ ) or families' home ( $n = 7$ ). Parents were not present in the room during testing except for three cases where parents remained quiet and did not interact with the child.

The experimental procedure consisted of three tasks: a sharing, instrumental helping and empathic helping task. The sharing task always came first, followed by the instrumental and empathic helping tasks in counterbalanced order. The whole session lasted approximately 9 minutes. Experimenters accompanied the participant back to the classroom after finishing the tasks.

**Sharing Task.** The sharing task was based on Aknin et al. (2012) and consisted of two phases (warm-up and test phase). In the warm-up phase the participant interacted with four stuffed animals in order to get familiar with the used treats as well as the receiving/giving actions. In the test phase the participant received either two, four or eight treats and then was asked to share a treat with a new stuffed animal (Monkey). Participants were divided into three conditions, depending on how many treats they received in the test phase (2, 4 or 8 treats), balanced according to age and gender.

In the warm-up phase, E first introduced four stuffed animals (in order: mouse, rabbit, cat and panda, with their own bowl in front of them) to the child, and emphasized that all

animals “like the treats”. Then E gave the participant a bowl. Next, each animal and the child received a treat from E, and the animal “ate” the treat immediately once they got the treat by making a “Yummm” noise and pushing the treat through a false bottom. The participant was allowed, but not forced to eat the given treat. After that, E gave five treats to the participant and encouraged him/her to give each animal a treat (put in animal’s bowl), and eat one himself/herself. If the child hesitated in sharing, E prompted him/her using the following steps with 3-5 seconds in between: (a) Pointed to the action (pointed at treat in bowl to animals’ bowl); (b) Picked up the treat and waited for the child to take the treat; (c) Picked up the treat and gave it to the child; (d) Told the child that mom approved this; (e) modeled treat giving again. If the child shared with the animals, or if he/she refused to share after two rounds of prompts, E put the animals (including their bowls) away, took away any remaining treats in the participant’s bowl, and then moved to the test phase. During this phase, 50% of 18-month-olds, and 18.3% of 24-month-olds did not share.

In the test phase, E introduced a new animal (Monkey) to the child and encouraged the child to interact with it (pet the monkey). Next, E put a bowl (Monkey’s bowl) in front of the monkey and emphasized that neither the participant nor the monkey had any treats: “*Both you and Monkey have no treats now*”. Then E gave the child either 2, 4 or 8 treats (same type of treats as in warm-up phase), based on the assigned condition. Next, E performed action a, b, and c in counterbalanced order: (a) found one more treat, gave it to the Monkey “*I found one more treat, now I am giving this to the Monkey*”; (b) found one more treat, asked the participant to give it to the Monkey “*I found one more treat, will you give this to the Monkey?*”, and (c) acted as if she/he could not find treats anymore, then asked the participant to give one treat *from his/her own bowl* to the monkey “*I do not see any more treats. Do you want to give one of your treats to Monkey?*”. For each action, the E waited 5 seconds with no further prompts in sharing. Once the monkey received treats, it “ate” the treats immediately. During the test phase, E refilled the participants’ bowl if he/she ate treats, or shared before action (c). This happened in 51.2%, 23.07%, and 12.5% of the participants in the 2-, 4- and 8-treat condition respectively, and the average number of treats refilled was 1.61, 0.56 and 0.28 in the respective conditions. Thus before the instruction of (c), the child always had 2, 4 or 8 treats (based on condition) in his/her bowl. Sharing was coded as the total number of items shared; that is, the number of treats the participant shared *from his/her own bowl* in the whole test phase.

**Instrumental Helping.** The instrumental helping task was based on the study of Svetlova et al. (2010). In this task E put five colorful Lego blocks one by one on the table.

Next, E put five napkins (one within the reach of the participant but not of E, and four within the reach of E but not the child). Then E wrapped the blocks one by one until he/she was out of the four napkins. Then E asked the participant to hand the final napkin to E using the following step by step prompts, with 5 to 7 second in between: In the first two steps, E expressed a subjective state (first facially and then vocally), in steps 3 to 8, E expressed the need more specifically in referring to the napkin (see online materials, Table 1). Instrumental helping was coded on a scale of 0 to 8 depending on how many communicative steps they needed before instrumental helping (a higher score indicates that they needed fewer steps, see online materials, Table 1).

**Empathic Helping.** The empathic helping task was also based on the study of Svetlova et al. (2010). In this task, E showed a blanket, folded it around his/her shoulders and stated “it makes me warm”, so the child knew the link between the blanket and warmth. Next, E put the blanket in the reach of the participant but not E. Then E gave the participant a distractor (toy bear) to play with. After about 60 seconds, E suddenly felt cold and shuddered, and prompted the child to hand the blanket to E step by step (see online materials, Table 1). Empathic helping was coded in a similar manner as instrumental helping.

### **Language Development**

For examining whether language development affected toddler’s behavior in the experiment, mothers were asked to fill in the short version of the MacArthur Communicative Development Inventory, Dutch version (Fenson, Pethick, Renda, Cox, Dale, & Reznick, 2000; Zink & Lejaegere, 2002), which has high reliability and good validity (Oosterling et al., 2010), and widely used in measuring the early development of language (Brownell et al., 2013). This questionnaire includes 112 words, and the mother evaluate whether their children can understand and say every word accordingly. In total, we collected data from 80 participants (37 in younger group,  $M = 18.40$  months,  $SD = 1.77$  months; 43 in older group,  $M = 24.37$  months,  $SD = 1.09$ ).

### **Inter-rater-reliability for Coding**

The videos of sharing, instrumental helping and empathic helping were coded by two research assistants who were blind to the hypotheses. Intra-Class Correlations (ICC) with absolute agreement calculated on 8% of the data showed high inter-observer reliability: ICC number shared = 0.98, ICC steps before instrumental helping = 0.98, and ICC steps before empathic helping = 0.77. For the analyses concerning whether the participant engaged in sharing, instrumental helping, or empathic helping in the experiment, three new categorical dependent variables were created based on the coded variables described above. To create the new variable, “whether

they engaged in sharing or not”, we recoded “number of items shared” as “0” when 0 items were shared in the experiment, and as “1”, when more than 0 items were shared in the experiment. To create the new variable, “whether they engaged in instrumental/empathic helping or not”, we recoded “steps before instrumental/empathic helping” as value 0 (did not help) = 0, other values (ranged from 1 – 8) = 1.

## Results

To address the resource effect on both 18- and 24-month-olds’ sharing (aim 1), we examined the resource effect on (aim 1a) the willingness to share (i.e., *whether* the children engaged in sharing in the study) and (aim 1b) the possible sharing strategy (proportion-based or number-based) they employed, the *how*. To address whether and how resources in sharing affect two subsequent prosocial behaviors (aim 2), we examined (aim 2a) the resource effect on the willingness to perform these behaviors (whether the children engaged in instrumental helping/empathic helping in the study), and (aim 2b) whether the child’s subsequent prosocial behavior was affected by initial sharing behavior. No gender, household income or main order effect (the order of action a, b, c in the sharing task, or the order of the instrumental helping and empathic helping task) was found on any of the dependent variables. Therefore, the subsequent analyses were collapsed across gender, household income and order. There was a resource effect on the number of treats refilled,  $F(2, 119) = 10.57, p < .01$ , and a Least Significant Difference (LSD) test showed that toddlers in the 2-treat condition received more refills than those in 4- and 8- treat conditions ( $p_s < .01$ ). Thus, the number of refilled treats was used as a control variable in the analyses.

### Aim 1, Possible Resource Effect on 18- and 24-olds’ Sharing Behaviors

To analyze the resource effect on the willingness to share (aim 1a), a binary logistic regression was conducted, in which whether they engaged in sharing (0 = did not share, 1 = shared) was used as dependent variable, age group (0 = 18-month-olds, 1 = 24-month-olds) and resource condition as independent variables, and the number of treats refilled as a control variable. Results showed a significant effect of age group,  $B = 1.01, SE = 0.41, Wald = 6.15, p < .05$ , indicating that older toddlers were more likely to share than younger toddlers. Although the number of resources only showed a marginally significant effect,  $Wald = 5.21, p = .07$ , comparisons between conditions revealed that toddlers in the 8-treat condition shared more often than those in the 2-treat,  $B = 1.01, SE = 0.54, Wald = 3.50, p = .061$  and 4-treat,  $B = 1.01, SE = 0.51, Wald = 4.49, p = .03$ , conditions. The effect of refilling was not significant in this equation ( $p = .12$ ). Furthermore, after including age by resource interaction terms in the analyses, no significant age by resource interaction effect was found ( $p = .62$ ), and models

did not significantly improve (for Omnibus Tests of Model Coefficients, step,  $p = .60$ ). Thus, we dropped the interaction terms in the final equation. In sum, results show that the 24-month-olds shared more often than 18-month-olds, and both 18- and 24-month-olds tended to be more likely to share after they received 8 treats, compared to 2 or 4 treats (see Table 2 for descriptive information of the percentage of children who shared).

To analyze the possible sharing strategy employed by 18- and 24-month-olds (i.e., whether they used a number or proportion-based strategy; aim 1b), a two-way between subject ANCOVA was conducted on the number and proportion of treats they shared (see Table 3). For the number of treats shared, there was a significant effect of age,  $F(1, 120) = 12.28, p < .01, \eta_p^2 = .10$ , showing 24-month-olds shared more treats compared with 18-month-olds. There was also an effect of the number of resources,  $F(2, 120) = 13.01, p < .01, \eta_p^2 = .19$ , showing children shared more in resource rich than poor conditions. Additionally, there was an age by number of resources interaction effect,  $F(2, 120) = 4.63, p < .05, \eta_p^2 = .08$ . Bonferroni-adjusted pairwise tests demonstrated that 24-month-olds shared more treats in the 8-treat condition compared with other groups ( $p_s < .05$ ). The effect of refilling yielded a significant effect,  $F(1, 120) = 22.22, p < .01, \eta_p^2 = .16$ , with toddlers who experienced refilling sharing more treats. For the proportion of treats toddlers shared in the experiment, there was only a main effect of age,  $F(1, 120) = 11.07, p < .01, \eta_p^2 = .09$ , with 24-month-olds sharing a higher proportion of treats (on average 58% of the resources) than 18-month-olds (on average 33% of the resources) but no number of resources effect nor age by resource effect ( $p_s > .31$ ). The effect of refilling yielded a marginally significant effect,  $F(1, 120) = 3.09, p = .08, \eta_p^2 = .03$ . These results revealed that although toddlers shared more in terms of the absolute number of treats when they received 8 treats, compared to 4 or 2 treats, the proportion of shared treats remained the same regardless of how many treats they received. Thus, a proportional rather than number-based strategy was supported (see Table 3). In addition, 24-month-olds shared both a higher number and proportion of treats than 18-month-olds. Thus, a proportional based sharing strategy was found in current study.

**Table 1.** *Logistic Regression of Age and Treat Condition Differences in How Often Children Performed Prosocial Behaviors*



	Engaged in Sharing or not ( <i>n</i> = 120)				Engaged in Instrumental Helping or not ( <i>n</i> = 117)				Engaged in Empathic Helping or not ( <i>n</i> = 120)			
	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>p</i>
Age	1.01	0.41	6.15	.01	1.07	0.50	4.57	.03	0.98	0.39	6.30	.01
Treats			5.21	.07			1.98	.37			5.11	.08
2 vs. 8 treats	1.01	0.54	3.50	.06	0.39	0.66	0.36	.55	1.00	0.52	3.69	.06
4 vs. 8 treats	1.01	0.51	4.49	.03	0.81	0.58	1.93	.16	0.98	0.48	4.07	.04
4 vs. 2 treats	0.07	0.50	0.02	.90	0.39	0.66	0.36	.55	0.02	0.49	0.01	.97
Treats refilled	0.24	0.15	2.75	.12	0.14	0.18	0.59	.44	0.10	0.14	0.48	.49

\* In 2 vs. 8 treats, and 4 vs. 8 treats, 8-treat is a baseline. In 4 vs. 2 treats, 2-treat is a baseline.

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**Table 2.** *The Percentage of Children Who Engaged in Prosocial Behaviors*

Resource Condition	Toddlers who engaged in Sharing				Toddlers who engaged in Instrumental Helping				Toddlers who engaged in Empathic Helping			
	18-month-olds		24-month-olds		18-month-olds		24-month-olds		18-month-olds		24-month-olds	
	<i>n</i>	<i>Obs. p</i>	<i>n</i>	<i>Obs. p</i>	<i>n</i>	<i>Obs. p</i>	<i>n</i>	<i>Obs. p</i>	<i>n</i>	<i>Obs. p</i>	<i>n</i>	<i>Obs. p</i>
Across all conditions	62	.53	58	.74	59	.71	58	.88	60	.43	60	.65
2 treats	21	.52	20	.70	19	.74	19	.89	19	.37	20	.60
4 treats	20	.45	19	.63	20	.60	20	.85	20	.40	20	.50
8 treats	21	.62	19	.89	20	.80	19	.89	21	.52	20	.85

\* Obs. P = Observed proportion.

**Table 3.** *Descriptive Statistics for Number and Proportion of Treats Shared*

Resource condition	Age group	The number of treats shared		The proportion of treats shared	
		Mean	(SD)	Mean	(SD)
Across all conditions	18 months	1.85	(2.55)	33.39	(40.03)
	24 months	3.24	(2.88)	57.82	(42.64)
2 treats	18 months	1.71	(2.37)	40.48	(43.96)
	24 months	2.10	(1.88)	56.52	(43.21)
4 treats	18 months	1.70	(2.41)	35.00	(43.98)
	24 months	2.42	(2.14)	52.11	(43.89)
8 treats	18 months	2.14	(2.92)	24.76	(31.39)
	24 months	5.26	(3.38)	64.91	(42.09)

\* The experimenter refilled the treats if the child ate or shared before asking.

### **Aim 2, Resource Effect on Subsequent Instrumental and Empathic Helping Behavior**

To examine the resource effect on the willingness to engage in instrumental and empathic helping behaviors (aim 2a), Binary logistic regressions were conducted (0 = did not help, 1 = helped) (see Table 1). For instrumental helping, only an age effect was found,  $B = 1.07$ ,  $SE = 0.50$ ,  $Wald = 4.57$ ,  $p = .03$ , indicating that older toddlers were more likely to engage in instrumental helping than younger toddlers. For empathic helping, there was also a significant effect of age,  $B = 0.98$ ,  $SE = 0.39$ ,  $Wald = 6.30$ ,  $p = .01$ , indicating that older toddlers were more likely to engage in empathic helping than younger toddlers. In addition, there was a marginally significant effect for number of resources,  $Wald = 5.11$ ,  $p = .08$ . Toddlers in the 8-treat condition were more likely to engage in empathic helping than those in the 2-treat condition,  $B = 1.00$ ,  $SE = 0.52$ ,  $Wald = 3.69$ ,  $p = .055$ , and 4-treat condition,  $B = 0.98$ ,  $SE = 0.48$ ,  $Wald = 4.07$ ,  $p = .044$ . The effect of refilling was not significant for any of the behaviors ( $p_s > .10$ ). Furthermore, after including age by resource interaction, the models did not significantly improve (for Omnibus Tests of Model Coefficients, step,  $p_s > .53$ ) and the interaction effect was not significant ( $p_s > .53$ ). Thus, we dropped the interaction term in the final equations. In sum, results show that the 24-month-olds performed instrumental and empathic helping more often than 18-month-olds. Moreover, in both younger and older age

groups, toddlers tend to be more likely to engage in empathic helping after receiving 8 treats compared to 2 or 4 treats (see Table 2 for descriptive information of the percentage of children who engaged in instrumental/empathic helping per condition).

In order to test whether the child's subsequent instrumental and empathic helping behavior is affected by previous sharing behaviors (aim 2b), we divided children into two groups based on their behavior in sharing (0 = did not share, 1 = shared). When aggregating the three resource conditions, a significant difference was found for subsequent instrumental helping,  $\chi^2(1) = 22.61, p < .01$ , and empathic helping,  $\chi^2(1) = 12.81, p < .01$ , indicating that toddlers were more likely to perform these behaviors after sharing (please see Table 2 in the online materials, for more information). When examining the treat conditions more closely, children were more likely to engage in instrumental helping if they shared in the 4- and 8-treat conditions, and they were more likely to engage in empathic helping if they shared in the 8-treat condition. Thus, the resource availability and the act of sharing affect both subsequent instrumental and empathic helping.

### Supplemental Analyses

Two sets of supplemental analyses were conducted. First, to examine whether language understanding might account for the age-differences in toddlers' prosocial behaviors during the tasks, supplemental analyses were conducted with toddler's language ability as a control variable. Results show that language was not significant in all analyses ( $p_s > .08$ ). Please see online materials (Table 3 and 4) for more information.

Second, because as categorical coding (e.g., 0 = did not share, 1 = shared) conceals the difference between requested and spontaneous prosocial behavior, we further recoded the data into three ordinal variables. For sharing, we recoded the variables into 0 = did not share, 1 = requested sharing (i.e., share any number of treats from their own bowl after the action c, namely experimenter said "*I do not see any more treats. Do you want to give one of your treats to Monkey*"), and 2 = spontaneous sharing (shared before action c). For instrumental and empathic helping, we recoded the variables into 0 = did not help, 1 = helped upon request (i.e., value 1 to 5 in "steps before instrumental/empathic helping"), and 2 = helped spontaneously (i.e., value 6 to 8 in "steps before instrumental/empathic helping"). Ordinal regression was conducted for each behavior, including age group and resource conditions as independent variables, and the number of refilled treats as the control variable. The results of these analyses show the same pattern as the analyses with the dichotomous variables. Please see online materials for detailed information.

### Discussion

Many studies have examined how prosocial behaviors (sharing, instrumental helping and empathic helping) develop during toddlerhood (e.g., (Brownell, Iesue, Nichols, & Svetlova, 2013; Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011; Paulus et al., 2015). However, whether and how contextual factors play a role in the early development of prosocial behaviors is still not clear. One specific contextual factor, the number of resources available, has been found to stimulate sharing behaviors in 3-year olds during a sharing task (Posid et al., 2015). By systematically varying the number of resources, the current study examined whether and how this contextual factor affects three types of prosocial behaviors (sharing, instrumental helping and empathic helping) in 18- and 24-month-olds.

### **Resource Effects on Sharing**

Although 24-month-olds were more likely to share than 18-month-olds, both groups tend to be more likely to share after they received 8, instead of 4 treats or 2 treats. These results reveal that during the second year, the general inclination to share may be affected by being resource rich or poor. These effects might relate to the motivation behind sharing: a motivation to overcome one's own material desires (Dunfield, 2014). For toddlers this is easier to do in a resource rich condition, as they will have more items left if they decide to share. This is also consistent with other studies that showed children to be more engaged in sharing when the cost is relatively low (e.g., Blake & Rand, 2010). Our results are in direct contrast to what Hay and her colleagues (Hay et al., 1991) found on the likelihood of sharing toys. However, the resource quantity in their study (6 or 2 toys for 3 children) may not be large enough to trigger the difference we found here. This might also be related to toddler's understanding of numbers: before age three, children can recognize an *exact* numerical meaning of a small set of objects (from number "one" to "four"), and an *approximate* meaning (e.g., a lot) of a larger set of objects (numbers after four) (Le Corre & Carey, 2007; Sarnecka & Gelman, 2004; Xu, 2003). Based on these findings, in our study, children in the 2- and 4-treat condition may recognize that they have a small amount of treats, and probably may also realize that the amount will be smaller when they share, while children in the 8-treat condition perhaps only realize they have a lot, which is likely to remain being a lot after sharing. Additionally, our results may also be related to the ownership. Previous studies have found that toddlers were more inclined to share if the objects belonged to themselves compared with the whole group (e.g., Eisenberg-Berg, Haake, Hand, & Sadalla, 1979). In Hay's study (1991) the toys were for a group of three children, but in the current study all the treats were for the participant only. Accordingly, our participants might feel more autonomous in sharing. Future work may explore these explanations, for example, by using

more variations in the number of resources, and by examining whether the concept of “rich” is also related to the ownership or the type of resources (e.g., toys) used in sharing tasks.

The number of resources also affected the amount of sharing. Toddlers shared more in absolute number when they received more, but the proportion of resources shared did not vary as a function of the number of resources. Rather than a number-based strategy, these results support a proportion-based sharing strategy, which has been found in 3-year-olds’ sharing behaviors (Blake & Rand, 2010; Posid et al., 2015). This strategy might be derived from an intuition of proportion (e.g., “*slightly less than half*”, page 13, Posid et al., 2015). That is, previous studies found that during 18 and 24 months of age, children already know some concepts of proportion, especially “half” (Posid et al., 2015), and probably could also apply these concepts in sharing. Twenty-four-month-olds shared approximately 60% of their treats, which is in line with the proportion found for 3-years-olds (Blake & Rand, 2010). This result implies that by 2 years, children already employ a 50% sharing strategy. It should be noted that in the previous studies children were only told, not requested, to divide resources between themselves and a peer who was never shown in the study (Blake & Rand, 2010; Posid et al., 2015). In our study children were directly requested to share with a face to face recipient, thus direct comparability with previous studies is limited. As for the younger age group (18-month-olds), they shared around 35% of their treats, and this proportion was consistent across the different resource conditions. Thus, although 18-month-olds shared relatively less, they still have a certain proportion in sharing regardless of the number of resources that are available to them. Thus, our data suggest that even 18-month-olds use a proportion-based strategy, and that 24-month-olds already share around 50% when using this proportion-based strategy.

### **Resource Effect on Instrumental helping and Empathic helping**

Older toddlers were more likely to engage in instrumental and empathic helping, compared with younger toddlers. In addition, empathic helping seems to be affected by the number or resources received in sharing. There was no resource effect on instrumental helping. The likelihood of empathic helping was higher in the resource rich (8 treats) condition, compared with the other two conditions. Additionally, children in the resource rich condition were more likely to share, and those who shared in a previous task were more likely to engage in instrumental and empathic helping in the subsequent tasks. These findings support the self-perception theory and the foot-in-the-door-effect (e.g., Eisenberg et al., 1987; Lepper et al., 1973), instead of a moral licensing effect (e.g., Effron, & Monin, 2010). As self-perception theory proposes, children have an inclination to keep a consistent self-concept

(a prosocial self-concept in our study). Thus, in order to maintain this self-image, the child engaged in more prosocial behaviors in the subsequent tasks. The foot-in-the-door effect has been detected in preschoolers on sharing behavior (Chernyak et al., 2017). The current study went one step further by showing that previous sharing may also boost the likelihood of engaging in other kinds of prosocial behavior. In comparison, a moral-license effect, or even the inclination for it, may be too cognitively challenging during this age: although toddlers may have a sense of moral intuition (Hamlin, Wynn, & Bloom, 2007), they may still lack a moral identity (Kochanska, 2002) and/or a lack of concept of moral credit that links their good/bad behaviors with their moral identity (Chernyak, Trieu, & Kushnir, 2017). This makes it difficult to calculate and balance their own moral behaviors across time. Another reason for the absence of a moral license effect is that studies in adults reveal that the foot-in-the-door and moral license effect are situation dependent (see Mullen & Monin, 2016, for a review). It is also possible that the current experimental design is more likely to trigger foot-in-the-door rather than moral licensing effect because of the demand characteristics of the task involves acting prosocially towards a face-to-face target rather than an absent (anonymous) receiver. Thus, future studies might further detect when the moral license effect emerges and under which condition it occurs.

There are at least two other possible explanations related to why being resource rich might affect subsequent helping behaviors. Although we did not investigate whether children were actually happier after receiving 8 treats instead of 2 or 4 treats, it is possible that the more treats children received, the happier they were because of the windfall. Children have been found to share more under a positive (happy) mood compared to a bad mood (Moore, Underwood, & Rosenhan, 1973; Underwood, Froming, & Moore, 1977). Thus, a good mood after receiving a great deal of treats might have motivated children to be more kind in the subsequent helping and empathic helping tasks. From this perspective, future studies could directly measure children's happiness when children receiving treats, whether happiness varies as a function of the number of treats received, and whether happiness affects their prosocial behaviors afterwards.

This result might also relate to a positive social interaction between the experimenter and the toddler during these tasks. Eighteen-month-olds already showed reciprocity in sharing and helping with peers (Fujisawa, Kutsukake, & Hasegawa, 2008; Hay, Castle, Davies, Demetriou, & Stimson, 1999), parents (Clark & McDonnell, 1985), and strange adults (Barragan & Dweck, 2014). Thus, a cooperative, joint social interaction might lead to a higher likelihood of being prosocial in return. In the current study, the experimenter gave the

toddlers some treats in the very beginning of the experiment, before the toddlers had any chance of being prosocial. Thus, children in the resource rich condition (8 treats) might view this as a symbol of kindness towards them, and in return, they would also comply with the experimenter in the subsequent tasks. However, other researchers propose that this kind of social interaction would not affect toddlers' prosocial behavior, as it is not until 3 years of age that children would share and help more with a person who shared with, or helped them previously (Warneken & Tomasello, 2013). For a closer examination of this explanation, future research could manipulate the possibility of reciprocity directly and see if children younger than 3 years would share, instrumental and empathic help more when the possibility of reciprocity is higher.

### **Limitations and Future Directions**

The current study has some limitations that should be considered in future research. First, in the sharing task the experimenter asked the child whether they want to share and also in the helping tasks the experimenter used a series of communicative clues (including directly ask for help at last clue) to trigger toddlers' helping. Thus, it is possible that the occurrence of these behaviors represents toddlers' compliance to these requests instead of their prosociality. Considering that the current study did not focus on the difference between spontaneous and requested prosocial behaviors, we cannot rule out the fact that these tasks might reflect compliance rather than prosociality per se. Nevertheless, a supplemental analysis showed that conclusions remained the same when we differentiated between spontaneous and requested prosocial behaviors. Second, our study only used one trial to test each of the prosocial behaviors. Although it is not the only one-trial design in testing toddlers' prosocial behavior (Dunfield et al., 2011), nowadays most studies use multiple trials for one behavior and their data are aggregated over trials (e.g., Brownell et al., 2013; Brownell, Svetlova, & Nichols, 2009; Dunfield & Kuhlmeier, 2013). This makes it difficult to directly compare our results with previous ones. Nevertheless, current findings are consistent with previous studies with respect to the age difference in sharing, instrumental helping and empathic helping. More importantly, the current study focuses on the resource effects on prosocial behaviors. From this perspective, a multiple-trial design might lead to undesired effects (practice, for example) which could weaken the effects of the manipulation at the beginning of the experiment. Thus, for the purpose of the current study, the one-trial per-behavior design seems most appropriate. Third, although we found that toddlers showed a higher likelihood of performing prosocial behaviors in the resource rich condition, the concept of "rich" needs further clarification, both in terms of the number of resources, and the type of resources. Currently we found a higher

rate of prosocial behaviors in the 8-treat condition, however, whether 8 is the lowest boundary that triggers subsequent prosocial behaviors is not clear. More studies are needed for a detailed investigation of how many resources and what kind of resources (varied in type and ownership) would be sufficient and what the mechanism is for enhancing prosocial behaviors. Fourth, in the current study toddlers might be more generous as they received treats as windfalls. Children are more likely to give away objects if they did not earn it first (Staub, & Noerenberg, 1981). Thus, further studies can address this issue by giving treats as either windfalls or rewards for their behaviors, and seeing how a sense of deservingness would affect their sharing behaviors.

### **Conclusion**

The current study reveals that even for toddlers the number of resources matter for their sharing, and empathic helping behaviors. We found for sharing that toddlers are more likely to share when they have more, and apply a proportion-based strategy when deciding how many to share. In addition, we found that toddlers having more resources to share might help in accelerating the likelihood of empathic helping, but not instrumental helping. In addition, children who engaged in prosocial behavior were more likely to behave prosocially subsequently, suggesting that a foot-in-the-door effect already plays a role in prosocial behaviors by age 2. Taken together, these findings are one of the first experimental findings to confirm that even among toddlers the number of resources influences the early development of prosocial behaviors. More studies are needed to tease apart the mechanisms underlying this effect.



**Online materials, Table 1.** *Task Description of Instrumental Helping and Empathic Helping task*

Coding as	Type of steps:	Instrumental Helping task	Empathic Helping task
8	1. facial/bodily expression	Look at the blocks and around, hands up, puzzled	Embracing self and shivering, vocalizing (“brrr!”)
7	2. naming action/internal state	“I can’t wrap anymore!”	“I am cold!”
6	3. expressing need	“I need something to wrap with”	“I need something to make me warm”
5	4. naming object	“Napkins!”	“My blanket!”
4	5. alternating gaze b/w object and child	Look at napkins on the desk, and the child	Look at blanket / child
3	6. gesture	Reaching/begging gesture (open hand) toward napkins	Reaching/begging gesture toward blanket
2	7. general instruction	“Can you help me?”	“Can you help me?”
1	8. specific instruction	“Can you give me more napkins?”	“Can you give me the blanket?”
0 (did not engage in instrumental/empathic helping at all)			

**Online materials, Table 2.** *Chi-square Test for the Instrumental and Empathic Helping Behaviors, Based on Whether They Shared Before*

		Did not share	Shared	$\chi^2$	$p$			Did not share	Share d	$\chi^2$	$p$
		$n$	$n$					$n$	$n$		
		Instrumental Helping				Empathic Helping					
Across all conditions	Did not help	19	5	22.61	.00	Did not help	29	25	12.81	.00	
	Helped	24	67			Helped	14	50			
2 treats	Did not help	4	3	1.12	.29	Did not help	10	10	2.31	.13	
	Helped	11	20			Helped	5	14			
4 treats	Did not help	10	1	12.35	.00	Did not help	12	9	2.21	.14	
	Helped	8	20			Helped	6	12			
8 treats	Did not help	5	1	11.95	.00	Did not help	7	6	8.55	.00	
	Helped	5	27			Helped	3	24			

Online materials, Supplemental analyses 1, language as control variable

To examine whether language understanding might account for the age-differences in toddlers' prosocial behaviors during the tasks, supplemental analyses were conducted with toddler's language ability as a control variable. Mothers were asked to fill in the short version of the MacArthur Communicative Development Inventory, Dutch version. In total, we collected data from 80 participants (37 in younger group,  $M = 18.40$  months,  $SD = 1.77$  months; 43 in older group,  $M = 24.37$  months,  $SD = 1.09$ ).

Before accounting for the possible language effects, all the analyses mentioned in the "analysis" part in the manuscript were conducted again with those 80 cases, to see whether there were any difference between the sample with 80 mother reports and the whole sample (122 cases). Only missing data points are excluded from the analyses ( $n = 2$  for sharing,  $n = 4$  for instrumental helping and  $n = 1$  for empathic helping). Generally, all the conclusions remained the same (for details, please see Online materials, Table. 2, 3), but the age effect on "whether they engaged in instrumental helping or not" was no longer significant. Next, the analyses were conducted with language ability as a control variable. Results showed that, the age effect was significant for sharing and instrumental helping behavior, but not for empathic helping ( $p_{\text{before control}} = .01$ ;  $p_{\text{after control}} = .18$ ). The age effect for how readily toddlers performed instrumental helping and sharing remained significant (i.e., for how many they shared, what proportion they shared, and steps needed before instrumental helping), and the number of resources effect remained significant for how many they shared. As a control variable, language itself was not significant in all analyses ( $p_s > .08$ ).

**Online materials, Table 3.** *Logistic Regression of Age and Treat Condition Differences in How Often Children Performed Prosocial Behaviors, without/with Language Understanding as Control Variable*

Engaged in Sharing or not												
	Before controlling (n = 120)				Before controlling (n = 78)				After controlling (n = 78)			
	B	SE	Wald	p	B	SE	Wald	p	B	SE	Wald	p
Age	1.01	0.41	6.15	.01	1.63	0.55	8.96	.00	1.38	0.64	4.67	.03
Treats			5.21	.07			3.24	.20			3.18	.20
2 vs. 8 treats	1.01	0.54	3.50	.06	1.15	0.70	2.68	.10	1.12	0.71	2.54	.11
4 vs.8 treats	1.01	0.51	4.49	.03	0.87	0.62	1.99	.16	0.88	0.62	2.04	.15
4 vs.2 treats	0.07	0.50	0.02	.90	-0.28	0.70	0.16	.69	-0.24	0.70	0.11	.74
Control: treats re-filled	0.24	0.15	2.75	.12	0.10	0.19	0.30	.59	0.10	0.19	0.31	.58
Control: language	---	---	---	---	---	---	---	---	0.01	0.01	0.55	.46
Engaged in Instrumental Helping or not												
	Before controlling (n = 117)				Before controlling (n = 76)				After controlling (n = 76)			
	B	SE	Wald	p	B	SE	Wald	p	B	SE	Wald	p
Age	1.07	0.50	4.57	.03	1.16	0.74	2.49	.11	1.96	0.95	4.25	.04
Treats			1.98	.37			1.16	.60			0.99	.61
2 vs. 8 treats	0.39	0.66	0.36	.55	0.74	1.18	0.40	.53	0.67	1.20	0.32	.57
4 vs.8 treats	0.81	0.58	1.93	.16	-0.46	0.72	0.41	.58	-0.45	0.74	0.37	.54
4 vs.2 treats	0.39	0.66	0.36	.55	1.20	1.18	1.04	.33	1.12	1.19	0.88	.35
Control: treats re-filled	0.14	0.18	0.59	.44	0.25	0.32	0.60	.42	0.27	0.33	0.65	.42
Control: language	---	---	---	---	---	---	---	---	-0.02	0.02	1.83	.18
Engaged in Empathic Helping or not												
	Before controlling (n = 120)				Before controlling (n = 79)				After controlling (n = 79)			
	B	SE	Wald	p	B	SE	Wald	p	B	SE	Wald	p
Age	0.98	0.39	6.30	.01	1.08	0.50	4.72	.03	0.78	0.59	1.77	.18
Treats			5.11	.08			2.19	.33			2.33	.31
2 vs. 8 treats	1.00	0.52	3.69	.06	0.50	0.66	0.57	.45	0.46	0.66	0.48	.49
4 vs.8 treats	0.98	0.48	4.07	.04	0.84	0.57	2.18	.14	0.88	0.58	2.33	.13
4 vs.2 treats	0.02	0.49	0.01	.97	0.35	0.66	0.28	.60	0.43	0.67	0.40	.53
Control: treats re-filled	0.10	0.14	0.48	.49	0.04	0.17	0.06	.81	-0.04	0.17	0.05	.82
Control: language	---	---	---	---	---	---	---	---	0.01	0.01	0.81	.37

\* In 2 vs. 8 treats, and 4 vs. 8 treats, 8-treat condition is a baseline. In 4 vs. 2 treats, 2-treat is a baseline.

**Online materials, Table 4.** ANOVA of Age and Treat Condition Differences in How Readily Children Performed Prosocial Behaviors, without/with Language Understanding as Control Variable

	Sharing (The number of treats shared)								
	Before controlling			Before controlling			After controlling		
	<i>F</i>	<i>p</i>	$\eta_p^2$	<i>F</i>	<i>p</i>	$\eta_p^2$	<i>F</i>	<i>p</i>	$\eta_p^2$
Age	12.28	.00	.10	6.89	.01	.09	4.97	.03	.07
Treats	13.01	.00	.19	6.42	.00	.15	6.33	.00	.15
Age by treats	4.63	.01	.08	1.09	.34	.03	1.03	.36	.03
Control: treats re- filled	22.22	.00	.16	7.75	.01	.10	7.60	.01	.10
Control: language	---	---	---	---	---	---	0.01	.91	.00
	Sharing (The proportion of treats shared)								
	Before controlling			Before controlling			After controlling		
	<i>F</i>	<i>p</i>	$\eta_p^2$	<i>F</i>	<i>p</i>	$\eta_p^2$	<i>F</i>	<i>p</i>	$\eta_p^2$
Age	11.07	.00	.09	9.78	.00	.12	5.61	.02	.07
Treats	0.01	.94	.00	0.01	.99	.00	0.01	.99	.00
Age by treats	1.22	.30	.02	0.09	.91	.00	0.11	.89	.00
Control: treats re- filled	3.09	.08	.03	0.39	.54	.01	0.40	.53	.01
Control: language	---	---	---	---	---	---	0.14	.71	.00

Note. --- = not applicable

Online materials, Supplemental analyses 2, ordinal regression

Considering that categorical coding (e.g., 0 = did not share, 1 = shared) may conceal the difference between requested and spontaneous prosocial behaviors, we recoded data as follows: For sharing, 0 = did not share, 1 = requested sharing (i.e., shared any number of treats from their own bowl after the action c, namely experimenter said “I do not see any more treats. Do you want to give one of your treats to Monkey), and 2 = spontaneous sharing (shared before action c). For instrumental and empathic helping, 0 = did not help, 1 = helped upon request (i.e., value 1 to 5 in “steps before instrumental/empathic helping”), and 2 = helped spontaneously (i.e., value 6 to 8 in “steps before instrumental/empathic helping”). Ordinal regression was conducted for each behavior, including age group and resource conditions as independent variables, and the number of refilled treats as the control variable.

For sharing, we found a significant effect of age,  $B = 1.06$ ,  $SE = 0.36$ ,  $Wald = 8.63$ ,  $p < .01$ , indicating 24-month-olds were more readily share compared with 18-month-olds. We also found a significant effect of resource,  $B = 0.98/1.03$ ,  $SE = 0.47/0.44$ ,  $Wald = 4.40/5.44$ ,  $p < .05/05$ , for 2 vs. 8, and 4 vs. 8 comparisons, indicating that both 18- and 24-month-olds were more readily share after receiving 8 treats, compared with receiving 2, or 4 treats. For instrumental helping, we only found a significant age effect,  $B = 1.09$ ,  $SE = 0.37$ ,  $Wald = 8.68$ ,  $p < .01$ , indicating 24-month-olds were more readily engage in instrumental helping compared with 18-month-olds. For empathic helping, we found a significant age effect,  $B = 0.82$ ,  $SE = 0.38$ ,  $Wald = 4.77$ ,  $p < .05$ , indicating 24-month-olds were more readily engage in this behavior compared with 18-month-olds. In addition, a marginally significant resource effect was found,  $B = 0.92/0.85$ ,  $SE = 0.49/0.46$ ,  $Wald = 3.47/3.42$ ,  $p = .063/065$ , for 2 vs. 8, and 4 vs. 8 comparisons, implying that both 18- and 24-month-olds tend to be more readily engage in empathic helping after receiving 8 treats, compared with receiving 2, or 4 treats.

## Chapter 7

### **Priming with affiliation increases 28-month-olds' sharing, but not instrumental helping**

Author note:

Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *Priming with affiliation increases 28-month-olds' sharing, but not instrumental helping*. Manuscript submitted for publication.

Y. Song conceptualized the study. J. S. Dubas and M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data, J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### **Abstract**

Aimed to examine whether a prime of affiliation would lead to more instrumental helping and sharing in 28-month-olds, 82 toddlers were randomly assigned to one of the four priming conditions (affiliative, individualistic, no primes, and social-but-non-affiliative). Affiliation increased 28-month-olds' sharing, but not instrumental helping. Specifically, toddlers were more likely to share after priming with affiliation than with individuality, and more likely to share and shared more quickly after priming with affiliation than social-but-non-affiliation. These results indicate that affiliation priming can induce prosocial behaviors in young children, and further implies that the affiliation effects vary based on the type of prosocial behaviors and the developmental level of the child performing these behaviors.

*Keywords:* affiliation, toddlers, instrumental helping, sharing, prosocial behaviors



How affiliation plays a role in the emergence and early development of prosocial behaviors has been a rising topic in recent years (e.g., Carpenter, Uebel, & Tomasello, 2013; Cirelli, Einarson, & Trainor, 2014; Over & Carpenter, 2009). Specifically, a study by Over and Carpenter (2009) showed that 18-month-olds' instrumental helping (e.g., picking up an out-of-reach object for the experimenter) increased after priming with affiliation, suggesting that the relationship between social affiliation to the group and prosocial behaviors is so fundamental that it can be autonomic and implicit, and seen even in the young children (Over & Carpenter, 2009). Building on Over and Carpenter (2009), the current study examined the effect of affiliation in older toddlers' instrumental helping and sharing behaviors, in order to further test whether this relationship can be extended to different types of prosocial behaviors and different age ranges.

Next to the study of Over and Carpenter (2009), several other studies have examined the affiliation effect on instrumental helping, manipulating affiliation through different ways. Specifically, 14-month-olds showed increased instrumental helping towards experimenters who moved in synchrony with them previously (Cirelli et al., 2014), 18-month-olds showed increased instrumental helping after being mimicked previously (Carpenter et al., 2013), and 25-month-olds also showed increased instrumental helping towards an experimenter who interacted with them (i.e., interactional play, study 1 and 2, Barragan & Dweck, 2014). Overall, these studies showed that affiliation leads to more prosocial behaviors in children in and around the second year of life, and results suggest that affiliation is a potent trigger for prosociality. However, results from a study on young preschoolers (Warneken & Tomasello, 2013) showed that the effect of affiliation on instrumental helping may depend on age. Specifically, 30-month-olds and 42-month-olds played a game with a puppet (operated by experimenter). In the beginning of the game, the puppet either helped, or did not help the children, and then these children were given opportunities to help the puppet. Results showed that independent from whether the puppet had helped them previously or not, most of the 30-month-olds and 42-month-olds helped the puppet (Warneken & Tomasello, 2013). It is plausible that after age two, most children consistently engage in instrumental helping (Dunfield & Kuhlmeier, 2013), and affiliation may no longer play a role in triggering this behavior. The current study further tested whether affiliation affects instrumental helping after age two by using priming as the manipulation of affiliation. In the way, we can directly compare whether Over and Carpenter's (2009) results also apply to older children.

In comparison to the studies on instrumental helping, fewer studies have focused on the affiliation effect on sharing, another prosocial behavior that emerges during toddlerhood

(e.g., Dunfield, 2014). More importantly, instrumental helping and sharing are not related to each other (e.g., Dunfield & Kuhlmeier, 2013). Thus, examining the potential role of affiliation on sharing may extend our understanding of whether affiliation plays a role for prosocial behaviors. Specifically, it can speak to whether the affiliation effect is behavior specific (i.e., only matters for instrumental helping), or more general (i.e., matters for different types of prosocial behaviors). To date, research on this topic has mainly tested young preschoolers, but not toddlers. By directly manipulating affiliation, two studies found that 4-year-olds showed increased sharing towards an experimenter who interacted with them (i.e., interactional play, study 3 and 4, Barragan & Dweck, 2014). In addition, indirect evidence comes from Warneken and Tomasello's (2013) study, in which both 30- and 42-month-olds were also given opportunities to share with a puppet that had shared or not shared with them previously. Results showed that 42-month-olds shared more when the puppet had shared with them while 30-month-olds's sharing was not affected by the puppets' previous behavior, implying that affiliation may not matter until 3.5 years of age. However, this study did not test affiliation directly. Instead, a more complex concept, reciprocity, was tested, which requires children to take costs and benefits of the exchange into account (Warneken, 2015). Thus, even though reciprocity did not affect 30-month-olds' sharing, it does not mean that the interaction itself (i.e., affiliation) did not affect their sharing. Studies that directly manipulate affiliation (rather than reciprocity) are needed in testing the role of affiliation on sharing behavior in toddlers. If the relationships between affiliation and prosocial behaviors are fundamental (Over & Carpenter, 2009), then we would expect that affiliation also affects toddlers' sharing, particularly when this behavior is first emerging.

### **Current Study**

The current study aimed to examine the potential role of affiliation on two prosocial behaviors (instrumental helping and sharing) in toddlers (i.e., 28 months). We employed priming of affiliation similar to the task used in Over and Carpenter's study (2009), one of the simplest ways to trigger a sense of affiliation. That is, the current study used photographs which contained familiar household objects (i.e., pen) in the foreground and primes in the backgrounds (please see Figure 1 for the example photo in each condition). Specifically, toddlers were primed by one of the following four conditions: (a) The face-to-face condition (a prime of affiliation, two dolls standing and facing each other in close proximity), (b) The alone condition (prime of individuality, one doll standing by itself), (c) The baseline/control condition (no priming, two blocks placed in the background), (d) The back-to-back condition (priming of social-but-non-affiliation clues, the same two dolls as in the face-to-face

condition but standing and facing in opposite directions). If toddlers show more prosocial behaviors in condition (a) than (b), then we could conclude that a prime of affiliation leads to more prosocial behavior than a prime of individuality; If toddlers show more prosocial behaviors in condition (a) than (c), then we could conclude that a prime of affiliation leads to more prosocial behavior than a neutral prime; If toddlers show more prosocial behaviors in condition (a) than (d), then we could conclude that a prime of affiliation leads to more prosocial behavior than a prime of a social but non-affiliative nature.

To assess toddlers' prosocial behaviors, the current study employed the same instrumental helping task used in Over and Carpenter (2009). For sharing behavior, we used a task introduced by Dunfield and colleagues (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011) and has been used in 2-year-olds. Based on previous findings that affiliation increases instrumental helping (Over & Carpenter, 2009), it is expected that toddlers primed with affiliation would show more instrumental helping and sharing, compared with toddlers primed in the other three conditions.

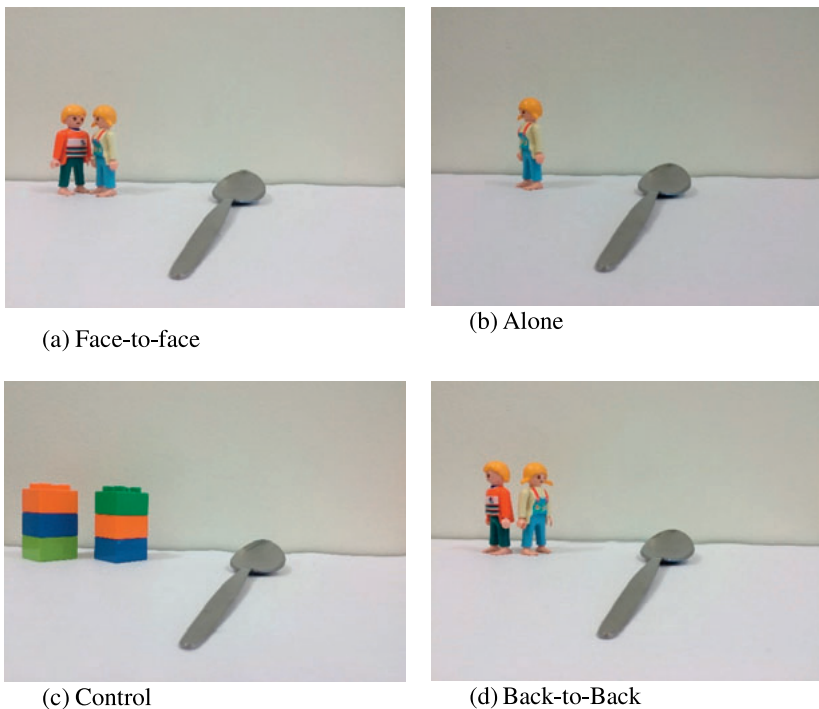
### Method

Participants were 82 Dutch toddlers ( $M = 27.74$  months,  $SD = 3.81$  months, 41 boys) recruited from 20 daycares across the country. Most of the participants came from middle-class families, with 70.1% of the families having a household income of € 45,000 or higher. The majority of the parents identified as Ethnic Dutch (94% mothers, 88.1% fathers) and were college-educated (80.6% of mothers and 70.1% of fathers having a Bachelor's degree or higher). This research was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences, Utrecht University. Informed written consent was obtained from the parents of the children who participated in this study.

### Materials for priming task

Similar to Over and Carpenter's study (2009), we made four sets of photographs. Each set included eight color photographs (210mm×297mm) that contained a familiar household object (e.g., a pen, spoon, or vase) in the foreground and a prime at the background. The eight foreground objects were identical in the four conditions, and were presented in the same order for all participants. According to each condition, the background differed, containing primes as follows (please see Figure 1 for the example photo in each condition). (a) In the affiliation prime condition (face-to-face condition), each prime consisted of two Playmobile dolls standing and facing each other in close proximity. (b) In the individuality prime condition (alone condition), each prime consisted of only one Playmobile doll standing by itself. (c) In the non-priming condition (baseline/control

condition), each prime consisted of two small Lego blocks roughly the same size as the dolls. (d) In social-but-non-affiliation condition (back-to-back condition), each prime consisted of two Playmobile dolls (same dolls as in the face-to-face condition) standing and facing in opposite directions (the same proportion of the dolls' facial features was visible in the face-to-face and back-to-back conditions). In each condition, the primes appeared to the right of the foreground object in half the photographs and to the left in another half of the photographs.



*Figure 1.* Sample priming photographs from four conditions.

## Procedure

**General procedure.** Each experiment was conducted by two experimenters (a main experimenter, E, and an assistant experimenter, AE, at the toddler's daycare, either in a separate play room or in a semi-closed off area (e.g., a separated corner of a big playroom). Participants were randomly assigned to one of the four priming conditions before the experiment. During the experiment, they were primed first, and completed the instrumental helping task second, and the sharing task third. All experiments were videotaped and two

coders coded toddlers' helping and sharing behaviors. All the experimenters and coders were blind to the research questions, and E's were blinded to the priming condition the toddler was assigned to; the AE showed the photographs.

**Priming (based on Over & Carpenter, 2009).** According to the assigned condition, AE showed eight photographs to the toddler. For each photograph, AE named the foreground object, defined its color, and introduced its function following a predefined script, completely ignoring the prime (e.g., This is a spoon. The color of this is silver. You can eat with it). The E was reading and turned away from the interactions between AE and the toddler, and not aware of the condition that the child was assigned to. After showing the photographs, AE asked the toddler to play with E. Then AE turned away from the interactions and started reading.

**Instrumental helping (based on Over & Carpenter, 2009).** After AE had shown the pictures, E took 6 pens and came to the child. The E dropped the pens "accidentally" (for example, by walking against the chair) within the child's reach but out of E's each. Following the same procedures described in the previous study (Over & Carpenter, 2009), E prompted the toddler's helping step by step (see Table 1). The task ended after the toddler helped or until 40 seconds had passed.

**Sharing (based on Dunfield et al., 2011).** After the helping task, AE turned to the toddler and said it was snack time. Then AE took out two bowls, one with 4 treats and one empty. Then AE gave the empty bowl to E. The E showed the empty bowl to the toddler and said "Look what I have." Then AE gave the toddler the bowl with 4 treats in it. Similar to instrumental helping (and a slight adaptation from Dunfield et al., 2011) a set of four cues were given (Table 1). The task ended after the toddler shared or until the 40 seconds had passed.

### Coding

Two coders (one coded 62 videos, and the other 30 videos, with an overlap of 10 cases) coded in which steps the toddler helped/ shared in the task on a 0 (did not help/share) to 4 (helped/shared in the first 10 second) scale (Table 1), with a higher score representing a higher level of helping/sharing. The Intra-Class Correlations (ICC) with absolute agreement were high,  $ICC_{\text{instrumental helping}} = 0.98$  and  $ICC_{\text{sharing}} = 0.98$ . In addition, for each behavior, the coding was additionally transformed into a second dependent variable, the likelihood of instrumental helping/sharing (whether the toddler helped/shared in the experiment, 0 = did not help/share, 1 = helped/shared).

**Table 1. Task Description of Instrumental Helping and Sharing task**

Duration	Instrumental Helping task (each step lasted 10 seconds)	Sharing task (each step lasted 10 seconds)	Coding as Dependent variable 1, In which steps the toddler helped/ shared	Transforming into Dependent variable 2, Whether the toddler helped/shared in the experiment
0-10 seconds	The E was quiet and alternated E's gaze between the fallen pens and the infants' faces	The E was quiet and alternated E's gaze between the treats and the infants' faces	4	
10-20 seconds	The E looked at the toddler, called his/her name, and said, "My pens, they've fallen on the floor/table," while making two failed reach to the pens (The E stretched arm, palm down, but cannot reach to the pens).	The E looked at the toddler, called his/her name, and said: "Sweets, I have not gotten sweets", while making two failed reach to the treats (The E stretched arm, palm down, but cannot reach to the toddlers' bowl).	3	
20-30 seconds	The E kept looking at the toddler, called his/her name, and said, "My pens, I need them back," while making two failed reach to the pens.	The E kept looking at the toddler, called his/her name, and said, "Sweets, I want sweets" while making two failed reach to the treats.	2	1 (helped/shared)
30-40 seconds	The E looked at the toddler and said "Will you please help me?"; while holding out her hand, palm up.	The E looked at the toddler and said "Will you please share some sweets with me?"; while holding out her hand, palm up.	1	0 (did not help/share)

## Results

Statistical information is shown in Table 2. Preliminary analyses showed no gender differences on any of the dependent variables,  $p_s > .09$ , and there were no relations with age,  $p_s > .51$ . Within each condition, Chi-square Tests showed there was no relationship between the likelihood of helping and sharing,  $p_s > .41$ , and Pearson correlations showed no relationship between in which steps toddler helped and shared,  $p_s > .08$ , indicating that toddlers' performance in the helping task was not related to their performance in the subsequent sharing task.

For our main research question, we analyzed whether children in the affiliative prime (face-to-face) condition, differed from children in the other 3 conditions (non-affiliative social (back-to-back) prime, individualistic (alone) prime, and no prime), for each prosocial behavior (instrumental helping and sharing). First, for instrumental helping, a chi-square test was used to detect whether there was a difference between the affiliative (face-to-face) condition and the other conditions for the likelihood of helping. Results showed no differences,  $p_s > .12$ , effect sizes (Cohen's  $d_s$ )  $< 0.53$ . Second, independent sample T-tests were used to detect whether there was a difference between children in the affiliative condition and the other conditions on the steps needed before instrumental helping. Results again showed no differences,  $p_s > .08$ ,  $d_s < 0.58$ . In summary, for instrumental helping, there were no differences between any conditions for both helping measures.

For sharing, the chi-square tests on the likelihood of sharing showed a significant difference between the affiliative (face-to-face) condition and individualistic (alone) condition,  $p = .04$ ,  $d = 0.74$ , indicating that toddlers in the face-to-face condition are more likely to share than toddlers in the alone condition. In addition, a significant difference was found between the affiliative (face-to-face) and non-affiliative social (back-to-back) condition,  $p = .04$ ,  $d = 0.66$ , indicating that toddlers in the face-to-face condition are more likely to share than in the back-to-back condition. No differences were found between the affiliative condition and the no prime condition,  $p = .19$ ,  $d = 0.23$ . Second, independent sample T-tests showed that toddlers in the face-to-face condition needed less prompts compared with toddlers in the back-to-back condition,  $t(42) = 2.67$ ,  $p = .01$ ,  $d = 0.81$ . No differences were found between face-to-face condition and any other two conditions,  $p_s > .06$ ,  $d_s < 0.78$ . In summary, for sharing, toddlers in the affiliative (face-to-face) condition were more likely to share than their peers in the individualistic (alone), or non-affiliative social (back-to-back) conditions, and they shared more quickly than peers in the non-affiliative social (back-to-back) condition.

**Table 2.** *Descriptive Information for Toddlers' Helping and Sharing per Condition.*

	Conditions			
	Control <i>n</i> = 19	Alone <i>n</i> = 18	Face-to-Face <i>n</i> = 21	Back-to-Back <i>n</i> = 24
Age, <i>Mean (SD)</i>	27.63 (3.06)	27.92 (4.06)	27.86 (4.29)	27.63 (4.01)
Percentage of toddlers who helped	73.7%	72.2%	90.5%	83.3%
Step in which they helped, <i>Mean (SD)</i>	1.95 (1.55)	1.67 (1.32)	2.38 (1.16)	1.92 (1.28)
Percentage of toddlers who shared	84.2%	68.8%	90.5%	70.8%
Step in which they shared, <i>Mean (SD)</i>	3.11 (1.75)	2.69 (1.82)	3.75 (1.48)	2.33 (1.95)

## Discussion

By using the same manipulations for affiliation as in the previous study by Over and Carpenter (2009), we tested whether priming with affiliation would affect two types of prosocial behaviors (i.e., instrumental helping and sharing) in 28-month-olds. For instrumental helping, we found no differences between any conditions, implying that the priming of affiliation may have no effect on helping behavior in late toddlerhood. These results are in contrast to Over and Carpenter (2009) who found that 18-month-olds are more likely to engage in instrumental helping, and helped more quickly after being exposed to affiliation primes. For sharing, we found that 28-month-olds were more likely to share when primed with affiliation (i.e., face-to-face condition) than when primed with individuality (i.e., alone condition). Additionally, they were more likely to share, and shared more quickly in the face-to-face, rather than the back-to-back condition, indicating that it is the affiliative stance (and not the presence of two dolls) that matters for how quickly they shared. The key evidence for the affiliation effect lies in the comparison between the face-to-face and back-to-back conditions. As noted by Over and Carpenter (2009), the only difference between these two conditions is whether the two dolls are having a connection with each other or not (i.e., facing toward, or away from each other), with other lower-level social stimuli, such as the proportion of the dolls' faces shown in the picture, being controlled. In addition, we did not prime any prosocial behaviors in the current study, as the two dolls just stood next to each other without any other behaviors shown in the photo.



The findings for both helping and sharing behaviors in the current study, combined with the results from Over and Carpenter (2009), show that affiliation priming may apply to both types of prosocial behaviors, further supporting the idea that affiliation is important for stimulating prosocial behaviors in general. In addition, we propose that the affiliation priming might be secondary to the development of prosocial behaviors. Specifically, in the current study affiliation priming increased sharing behavior but we also found that 84% already shared in the control condition, indicating they have an inclination towards sharing even without the prime of affiliation. This claim is drawn on the developmental model suggested by Warneken and Tomasello (2013) regarding the relationship between prosocial behavior and reciprocity, and we extend this model to affiliation. That is, children start out as rather naive altruists and become more differentiated in their prosociality.

The current study also showed that this secondary effect of affiliation priming (on prosocial behaviors) may depend on the developmental level of the child performing these behaviors. This explanation is (partly) in line with a social-interactional view of prosocial behaviors. Specifically, this view suggests that stimulating and supporting prosocial behaviors is most influential when young children are not fully capable of engaging in these behaviors (Dahl, 2015; Hammond, Al-Jbouri, Edwards, & Feltham, 2017). Instrumental helping emerges around 14 months of age (Warneken & Tomasello, 2007; 2009), and by two years, toddlers have developed the social cognitive skills required for instrumental helping (Dunfield, 2014). Thus, after age two simple instrumental helping may no longer be affected by affiliation, as by this age children consistently engage in instrumental helping. In comparison, sharing behavior emerges around age two (e.g., Dunfield, 2014), and continues to develop into the preschool years. That is, children are still developing many social cognitive skills needed for sharing, such as recognizing and rectifying an unequal distribution of resources (Dunfield, 2014). Thus, until the preschool years, affiliation may still induce more sharing.

It should be mentioned that the current conclusions are drawn based on two studies for only two prosocial behaviors and relatively simple tasks. In order to further examine affiliation priming effects on prosocial behaviors, more studies are needed. Specifically, regarding *when* affiliation triggers prosocial behavior, a potential objection to our explanation is that the cost of instrumental helping tested in the current study is low, which might lead to toddlers helping the experimenter consistently and independent from the priming conditions. In order to further test this explanation, more studies are needed to examine affiliation effects

on more costly forms of instrumental helping and other prosocial behaviors, and both before and after individuals are fully capable of engaging in these behaviors.

In addition, although the current study suggests that the affiliation primes are important for stimulating prosocial behaviors when children's abilities to perform these behaviors are still limited, this does not imply that affiliation of social priming might not affect prosocial behaviors later on in development. Several studies have shown that affiliation primes affect prosocial behaviors among older children and adults (e.g., Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Guéguen & De Gail, 2003; Thomson, 2015; Weltzien, Marsh, & Hood, 2018). The question is what kind of affiliation affects prosocial behaviors and how. Specifically, we examined a general orientation of affiliation by showing two dolls standing face-to-face with no specific connection between the toddler and the dolls. Another line of research focuses on whether and how children differentiated their prosocial behaviors based on specific affiliations, for instance, by comparing children's sharing with friends and non-friends (e.g., Paulus & Moore, 2014), in- and out-groupers (e.g., Sparks, Schinkel, & Moore, 2017), or recipients who mimicked or did not mimic them previously (Carpenter et al., 2013). Some evidence shows that prosocial behaviors are becoming increasingly selective as children mature (e.g., young preschoolers shared more towards recipients with whom they have closer connections, for review, see Martin & Olson, 2015). This leaves the question about whether general affiliation still affects prosocial behaviors when more specific affiliations are provided. It is plausible that, before children develop strategies for becoming more discriminative in their behaviors, a prime of general affiliation, like what we used here, can induce prosocial behaviors while later in development these primes might serve to attune their strategies to be less discriminative. However, more studies are needed to further examine this possibility. For example, 4-year-olds shared more towards friends than non-friends (e.g., Paulus & Moore, 2014). Under this circumstance, the question becomes will a prime of general affiliation lead to more sharing, and if so, will 4-year-olds share more towards friends, non-friends, or both?

Overall, the current study found that the priming of affiliation increases sharing but not helping behavior in late toddlerhood. This result further supports the point made by Over and Carpenter (2009) that even a brief hint of affiliation can stimulate prosocial behaviors at a young age. Nonetheless, it also points to the possibility that affiliation effects may vary based on the developmental level of the children receiving the prime and the type of prosocial behaviors examined.

## Chapter 8

### **Having choice or not to share does not affect toddlers' subsequent sharing behavior**

Author note:

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Y. Song conceptualized the study. J. S. Dubas and M. L. Broekhuizen gave advice and feedback. Y. Song trained undergraduate and graduate students who collected and coded the data, J. S. Dubas and M. L. Broekhuizen gave advice on data collection. Y. Song analyzed the data and wrote the manuscript. J. S. Dubas and M. L. Broekhuizen provided feedback on the analyses and manuscript.

### **Abstract**

Aiming at studying how toddlers develop their sharing based on previous sharing experience, ninety-five 2- to 3-year-olds participated in a study in which they were either commanded or given a choice to share with a puppet (phase 1). Next, they were given the opportunity (i.e., choice) to share three stickers with a sad (phase 2) and then a happy puppet (phase 3). Results showed that (1) sharing under command or when given a choice did not affect subsequent sharing behavior in phase 2, and (2) toddlers who shared in phase 2 were more likely to share in phase 3. Furthermore, (3) they maintained their sharing strategy (either self-prioritizing or other-prioritizing) from phase 2 to 3. The current results show that toddlers are consistent in their sharing behaviors across different situations. At this age toddlers may need some instructions before sharing and these instructions (commands) do not negatively affect their sharing subsequently.

*Keywords:* freedom of choice, sharing, toddlers

Toddlers begin to share around age two (for a review, see Dunfield, 2014), but (sometimes) they still need direct instructions, even explicit requests (e.g., I want a [cracker], Brownell, Svetlova, & Nichols, 2009) before sharing. However, how instructions may play a role in toddlers' *subsequent* sharing is unknown. More specifically, if they were instructed to share initially, do they continue to share subsequently, even when there is no instruction to do so in subsequent tasks? Aiming to answer this question, the current study focused on one of the most strong forms of instruction, commanding, and tested whether sharing under command (or not) initially would affect sharing behaviors subsequently.

Two lines of research have found that sharing under command may undermine subsequent sharing behaviors. First, several studies show that toddlers are (at least) in part intrinsically motivated when conducting prosocial behaviors (e.g., Hepach, Vaish, & Tomasello, 2012; Warneken & Tomasello, 2008). Second, self-determination theory (e.g., Deci & Ryan, 1985) states that external reasons (e.g., rewards, approval and obeying) can undermine intrinsic motivations (Ryan & Deci, 2000a), and having choice is positively related to higher intrinsic motivation (for meta-analysis, Patall, Cooper, & Robinson, 2008). Given that at this age prosocial behaviors are (at least partly) intrinsically motivated, and choice may enhance intrinsic motivations, it is plausible that external demands would lead to a decrease of prosocial behaviors, whereas having choice would lead to an increase of prosocial behaviors. For instance, 20-month-olds showed less prosocial behaviors *subsequent* to being materially rewarded for their initial prosocial behaviors (compared with not being rewarded), suggesting that external rewards indeed reduce toddler's intrinsic motivation to perform prosocial behaviors (Warneken & Tomasello, 2008). As a more direct test of whether having a choice or being commanded influence young children's prosocial behavior, Chernyak and Kushnir (2013) investigated 4-year-olds' sharing behavior. They began with a first task in which children were prompted by given a costly choice (e.g., you can keep this sticker or give it to the puppet), a non-costly choice (e.g., throw this sticker away or give it to the puppet), or a command (e.g., you *have to* give this sticker to the puppet). The experimenter then gave children three stickers which they could keep them or share with a new, sad puppet (study 1a). For children who shared initially, more children in the costly-choice condition performed other-prioritizing sharing (i.e., gave the majority of the stickers to the puppet) compared to children in the non-costly choice condition, and to children in the command condition. In addition, in study 2 researchers further compared the costly and non-costly choice condition by manipulating the value of the objects shared initially. Half of them were given a colorful toy (high-cost), whereas the other half were given a plain white paper

(low-cost). Again, their subsequent sharing with a new, sad puppet was observed. For children who shared initially, more children in the high-cost choice condition performed other-prioritizing sharing *subsequently* than in the low-cost choice condition.

Although Chernyak and Kushnir (2013) found that compared to commanding, giving choice initially led to more sharing subsequently in 4-year-olds, it is unclear whether this is also the case at younger ages (e.g., 2- to 3-year-olds). The concept of choice develops from the early preschool age (Nucci & Weber, 1995; Rapp, Engelmann, Herrmann, & Tomasello, 2017), but infants may already grasp some basic understanding of choice. For instance, they can reason about alternative possibilities for actions (Kushnir, 2012). In addition, as mentioned above toddlers' prosocial behaviors are at least partly intrinsically motivated. Thus, commanding or having choice may affect toddler's prosocial behaviors subsequently at this age. To date, only one study directly compared 3-year-olds' prosocial behavior (helping) when commanded to do so or not (Rapp et al., 2017). The experiment consisted of four phases. First, 3-year-olds were either given a choice (e.g., You can help if you want to), or being commanded (e.g., You have to help) to help in cleaning up piles of paper shreds (phase 1). Their helping was measured by the total piles cleaned during the following phases, including helping together with an experimenter (phase 2), helping alone (phase 3), and being distracted by an attractive game (phase 4). No difference in helping was found between the command and choice conditions in 3-year-olds, indicating choice may not affect helping at this age. However, the task used may have some limitations that might partially explain the lack of effect. For instance, compared to helping, the alternative choice of joining an attractive game might be too tempting for 3-year-olds (Rapp et al., 2017). Furthermore, sharing and helping are (probably) driven by different mechanisms (e.g., Paulus, 2018), thus it is unclear to what degree the null findings on commanding in helping is also found for sharing. In the current study, we examine whether command or given choice predicts subsequent sharing without having an opportunity to join an attractive activity or playing with others.

A potential mechanism in explaining the difference between sharing under command and when given a choice *initially* is that having a choice in previous prosocial behavior can help children to construe their behaviors as prosocial (Chernyak & Kushnir, 2013), and further form, although maybe just implicitly, a perception of who they prefer to be and actually are (Chernyak et al., 2017; Chernyak & Kushnir, 2018). Toddlers who choose to behave prosocially, compared to those who do so to follow commands, might be more inclined to evaluate themselves as being good, and to stay self-consistent with these

evaluations. Additionally, this evaluation may be influenced by the cost (e.g., value of the object shared initially). The higher the value of the initially shared object, the more likely they evaluate themselves as being good, and the more likely to keep sharing subsequently (Chernyak & Kushnir, 2013). However, if having a choice previously can indeed help children to grasp a perception of who they are, then we would expect that toddlers who choose to share initially continue to share, *and* toddlers who choose not to share initially continue to not share subsequently. Nevertheless, limited by its research question (i.e., whether preschoolers' conducted prosocial behaviors more after given choice initially than under command), the Chernyak and Kushnir's study (2013) only included preschoolers who shared in the analyses, thus this study only tested half of the explanation (i.e., toddlers who choose to share initially continue to share), but did not test whether toddlers who choose not to share initially continue to not share subsequently.

### **The Current Study**

The current study aimed to explore two questions: First, whether toddlers' sharing subsequently would differ based on how previous sharing was initiated (i.e., under command or given a choice). Second, whether toddlers indeed stayed consistent in their behavior (prosocial or not prosocial) when they were given choice. The current study included three phases. In phase one, we manipulated both how sharing was prompted (i.e., given choice or under command), and the value of the object shared (i.e., high or low). Specifically, participants were given either a high- (a colorful, small toy cat), or low-value object (i.e., a small piece of plain, white paper), and were randomly assigned to either a command (having to share) or choice (being free to share) condition. In phase two, the same toddlers were given the opportunity to share three stickers with a sad puppet. In phase three, toddlers were given the opportunity to share three stickers with a happy puppet. In Chernyak and Kushnir's study (2013), participants faced sad puppets in both phases, and thus their sharing in different phases might be elicited by another's sadness (in this case, a puppet), but not for staying self-consistent. We included a happy emotion phase to further test this alternative explanation. If toddlers are indeed inclined to stay self-consistent, then we expect that they would keep their behaviors consistent across phase 2 and 3, independent of the emotion exhibited by the puppet. Noteworthy, the happy emotion phase always came after the sadness emotion phase, because we hoped to first replicate previous findings in 4-year-olds (which only had a sadness phase), and second to rule out the alternative explanation that subsequent sharing occurred through being elicited by a negative emotion. We focused on whether toddlers

would share in each phase, and how they shared, either other-prioritizing (shared more than half) or self-prioritizing (shared less than half).

The first question (i.e., whether toddlers' sharing subsequently would differ based on how previous sharing was initiated) was addressed from phase one to two. Because the concept of choice may just begin to develop (Nucci & Weber, 1995), it is plausible that there is no difference between sharing under command and when given a choice initially. However, if there is any difference, then we would expect that for toddlers who shared in phase 1, those in the choice condition would be more likely to share, and more likely to perform other-prioritizing sharing in phase 2 compared with those in the command condition. Moreover, we expected that these effects would be even greater for participants in the choice condition who initially shared a high-value object (i.e., high cost). That is, we expect that children would be more likely to share, and more likely to perform other-prioritizing sharing, compared with those who share a low-value object. In the command condition, however, we did not expect the value of the object would influence how children shared in the subsequent phases.

The second question (i.e., whether toddlers indeed stayed consistent in their behavior, either prosocial or not prosocial), was addressed from phase one to two, and from phase two to three. When toddlers indeed stay consistent in sharing across two adjacent phases when having choice, then we would expect that toddlers who share in phase 1, compared with those who did not share, would be more likely to share, and more likely to perform other-prioritizing sharing in phase 2. From phase 2 to phase 3, we expect that toddlers who share in phase 2, compared with those who did not share, would be more likely to share in phase 3. In addition, those who perform other-prioritizing/ self-prioritizing sharing in phase 2, would maintain the same other-prioritizing/ self-prioritizing sharing in phase 3.

## Methods

### Participants

Ninety five 2- to 3-year-olds (51 boys, ,  $M(SD)_{age} = 33.80(3.56)$  months, range = 27-41 months) participated in the current study. Of these 95 participants, 3 participants' behaviors in phase 3 were not recorded because they moved out of the cameras ( $n = 2$ ), or was too fussy to participate this phase ( $n = 1$ ). All participants were recruited through daycares in several urban areas across the Netherlands, and were from middle to upper-middle class families. The study was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences, Utrecht University. Informed written consent was obtained from all parents beforehand.



## General Procedure

The three-phase experiment was conducted in the child's daycare (e.g., separate room or a separate corner of a larger room) and all the experiments were videotaped for coding.

**Phase 1 (Manipulation phase):** The toddler met a stuffed dog who showed a very sad facial expression, and was told the dog was “really sad today”. Then the experimenter brought a plastic, translucent, empty cylinder and put it alongside the dog, and told the child this cylinder belonged to the dog. A two (command/choice) by two (high-value/low-value) between subject design was conducted as follows: In the *choice* condition, the child was given either a colorful, small toy cat (*high-value condition*) or a small piece of plain, white paper (*low-value condition*) and was told this toy/paper can make the dog feel happy. Then they were told they can either keep it or give it to the dog (by putting the toy, or paper in the cylinder near dog) so the dog would feel better. In the *command* condition, the procedure was mainly the same except the child was told he/she had to give the object to the dog. Once the child made the choice, the experimenter said “Good job!” and put the dog (with the cylinder) away. If the child chose to keep the toy cat or the paper, the experimenter told the child she would keep this for the child because they were going to play another game. At phase 1, no gender or age differences were found among conditions,  $p_s > .74$ .

**Phase 2 (Sad puppet):** The child met a new, stuffed horse who also showed a very sad facial expression, and was told that the horse was “also really sad today”. Then the experimenter brought out two identical plastic, translucent cylinders, one belonged to the horse (put alongside the horse), and one to the child. The two cylinders were kept the same distance from the child but the position (left or right) were counterbalanced across participants. Next, the experimenter gave the child three stickers and counted them one by one with the child, in order to emphasize the number of resources. After counting, the experimenter told the child the horse also really likes stickers, but there were no more for the horse. The child could keep as many as stickers as she/he wanted by putting the stickers in his/her own cylinder, or could give any of the stickers to the horse by putting the stickers in the horse's cylinder. If the child hesitated, or left any stickers on the table, the experimenter reminded the child about which cylinder belonged to whom by pointing to the cylinders and stated the child can put the stickers in either cylinder again, until all three stickers have been divided. Then the experimenter said “Good job!” and put the horse (with the cylinder) away. If the child kept any stickers, the experimenter told the child she would give the stickers to the teacher, and the child would get them when going home that day.

**Phase 3: (Happy puppet):** The procedure was mainly the same as for phase 2, except that the children met an identical stuffed horse with a happy facial expression, and was told that the horse was happy.

### Coding

The number of stickers shared with the horse in phase 2 and 3 were coded by two research assistants who were blind to the research hypotheses (one main research assistant coded all data with a second research assistant coding 25% of the data for reliability checking). Inter-rater reliability (Intra-class correlation coefficient with absolute agreement) was 0.87 for the sad and 0.89 for happy horse phase. Coding was further transferred into two dependent variables used. First, the likelihood of sharing (whether shared or not, 0 = not share, 1 = shared); Second, how they shared: 0 = self-prioritizing, that is, give minority (0 or 1) of the stickers to the horse; 1 = other-prioritizing, that is, give majority (2, or 3) of the stickers to the horse.

### Results

Results for phase 1 revealed that 100% of toddlers in the commanding condition (48 out of 48) and 74.5% of toddlers in the choice condition (35 out of 47) shared, Fisher's Exact Test,  $p < .00$ . Thus, more children shared when told to do so than children who were given a choice to do so. In addition, in choice condition, the sharing at phase 1 was not differ by the value of the object,  $p = .32$ , indicating that when given choice, the value of object did not affect the likelihood of sharing at phase 1. In phase 2, 77 toddlers shared, and 53 toddlers performed other-prioritizing sharing. In phase 3, 73 toddlers shared and 40 toddlers performed other-prioritizing sharing (Table 1).

To test whether choice and or the value of the item in phase 1 would affect sharing in phase 2, we only included children who shared in phase 1 (in total 83 toddlers,  $n = 48$  in command, and  $n = 35$  in choice condition) in the following Fisher's Exact Tests. The likelihood of sharing in phase 2 was not affected by command/choice in phase 1,  $p = .78$ , or the value of the item in phase 1,  $p = .78$ . In addition, how they shared in phase 2 (self- or other-prioritizing) was not affected by command/choice,  $p = 0.38$ , or value of the object,  $p = .38$ . Thus, the command/choice and value variation in phase 1 did not affect whether and how children shared at phase 2.

To test whether toddlers indeed stayed consistent in their behaviors when they were given choice, we analyzed whether children's behavior in phase 1 affected their behavior in phase 2 (Fisher's Exact Tests). Because all toddlers shared under command, we can only examine this question in the choice condition. Results showed whether toddlers shared in

phase 1 did not affect whether they shared in phase 2,  $p = 1.00$ , or how they shared in phase 2,  $p = .74$ . In addition, we compared children's behavior from phase 2 to phase 3. Results show that toddlers who shared in phase 2 were more likely to share in phase 3,  $p < .01$ . In addition, toddlers continue to perform either self-prioritizing or other-prioritizing sharing in these two phases,  $p < .01$ .

**Table 1.** Number of Participants Who Shared, and Performed Other-Prioritizing Sharing in Phase 2 and 3

	Command condition <sup>a</sup> $n = 48$	Choice condition <sup>b</sup> $n = 47$
Phase 2, toddlers who shared, $n$ (%)	38 (79.20%)	39 (82.30%)
Phase 2, toddlers who performed other-prioritizing sharing, $n$ (%)	24 (50.00%)	29 (61.70%)
Phase 3, toddlers who shared, $n$ (%)	38 (79.20%)	37 (80.9%)
Phase 3, toddlers who performed other-prioritizing sharing, $n$ (%)	18 (36.71%)	25 (53.20%)

<sup>a</sup> Two participants were not included in phase 3, because one was too fussy to attend, and another moved out of the camera at this phase; <sup>b</sup> One participant was not included in phase 3 because this participant moved out of the camera at this phase.

## Discussion

The current study found that toddlers' *immediate* sharing was affected by commanding, as they were more likely to share when under command than when given choice. However, toddlers' subsequent sharing was not affected by whether their initial sharing was under a command (having to share) or having choice (being free to share). This result is inconsistent with previous findings on 3-year-olds' helping (Rapp et al., 2017). However, the non-difference between the two conditions (command and choice) in that study might be due to a lack of inhibitory control at this age (Rapp et al., 2017). Compared to the previous experiment in which 3-year-olds needed to give up a fun game to help others, the current study used a less demanding (attractive) task, in which there were no alternate activities other than the sharing task. Thus, the toddlers in the current study maybe more likely to obey the command. Theoretically, our findings can be interpreted from two perspectives. First, it is plausible that having choice does not have a positive influence on sharing behaviors yet, as this concept is still under development (Rapp et al., 2017). Second and more importantly, it is also plausible that at this age, obeying instructions does not affect

(i.e., decrease) toddlers' prosocial behaviors yet. At this age, straightforward instructions might do more good than harm for toddlers' performance of prosocial behaviors. Specifically, in the current study all toddlers shared under command in phase 1, whereas about 75% shared when given a choice, further supporting the idea that instructions can stimulate toddlers' immediate prosocial behaviors (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013).

In addition to the finding that initially having a choice did not influence toddlers' *subsequent* sharing behavior, we found that toddlers were more likely to share, if they had shared previously, and they kept their sharing strategy (either self- or other-prioritizing) from phase 2 to 3. This is in line with previous findings that 4-year-olds who shared a higher proportion of resources previously were more inclined to engage in other-prioritizing sharing subsequently (Chernyak, Trieu, & Kushnir, 2017). Although toddlers might not have a clear moral self-perception (e.g., I am a moral child), it is possible that during this age they are capable of forming a moral intuition in evaluating behaviors, and what kind of person they prefer (Hamlin, Wynn, & Bloom, 2007). After all, even 6- and 10-month-olds evaluate helping and non-helping behaviors differently, and show a preference to helpers rather than hinderers (Hamlin et al., 2007). Based on this intuition, they can make a subtle inference about their own prosocial behaviors, and whether they prefer to help others (Chernyak & Kushnir, 2013). Especially, we found that toddlers' sharing behavior remained when the emotional distress and the need from the puppet was relatively lower (a happy puppet as a recipient). This further eliminates the possibility that toddlers only use sharing as a strategy of relieving their own emotional stress, or just in response to other's needs. Either explanation would lead to the expectation that they would be less likely to share with a happy puppet, compared with a sad one. However, this was not the case in the current study.

In conclusion, the current study finds that toddlers' are more likely to share *immediately* when under command than when given a choice, but their *subsequent* sharing is not affected by whether they were asked to share (having to share) or by choice (being free to share) previously. Additionally, toddlers do show a stability in behaving (e.g. either self- or other-prioritizing) in different phases. This effect was not affected by how prosocial behaviors were initially stimulated (either under command or out of a free choice). Nor was it affected by the value of the item to be shared. Thus, it seems that at this age, triggering prosocial behaviors, rather than how these behaviors are triggered (i.e., choice or command), is more important to stimulate prosocial behaviors subsequently.

## **Chapter 9**

### **General Discussion**

The current dissertation aimed to first delineate the general developmental trajectory for prosocial behavior (i.e., helping and sharing) from infancy to adolescence, with a more detailed focus on the period from early toddlerhood to the early preschool years. Second, this dissertation aimed to examine how social contextual factors may (or may not) play roles in the early development of prosocial behaviors. Specifically, three levels of social contextual factors were examined, including distal (i.e., culture), intermediate (i.e., values, goals, and practices), and situational factors (i.e., resource availability, affiliation, and choice). These aims were addressed in seven empirical chapters, using four samples, and employing meta-analytic, longitudinal, experimental and cross-sectional research designs. In addition, prosocial behaviors were mainly measured using standardized behavioral assessments, but also included parent- and caregiver-report (i.e., daycare teacher). In this final chapter, I first discuss how the findings in the seven empirical chapters speak to the two aims of the current dissertation (Table 1 displays main findings). I then note the strengths and limitations, and give directions for future research.

### **Findings in Relation to Aims of the Dissertation**

#### **Aim 1. Delineating the developmental trajectory of prosocial behavior**

Many individual studies have focused on the development of helping and/or sharing before adulthood, and a comprehensive meta-analysis on this topic was conducted 20 years ago (Eisenberg & Fabes, 1998), yet the developmental trajectory of each prosocial behavior is still unclear. Moreover, given the growing number of studies in the past two decades, a new meta-analysis (**Chapter 2**) was also timely and warranted. This new meta-analysis included articles on observational and experimental studies that examined instrumental helping and/or sharing behaviors in at least two age groups under age 18. Results showed that helping and sharing follow different developmental trajectories. Helping increased within infancy, from infancy to toddlerhood, and then showed no change within toddlerhood, within the preschool age, or from the preschool age to childhood. However, after that, helping increased again within childhood. For sharing, we found an increase from infancy to toddlerhood, and then neither an increase nor decrease from toddlerhood to the preschool age. After that, sharing increased again from the early preschool age through late childhood, and then (again) showed no change from childhood through adolescence.

An important conclusion drawn from our findings is that neither helping nor sharing develops linearly, which directly contradicts the claim that prosocial behavior increases from infancy to adolescence (e.g., Eisenberg, Fabes, & Spinrad, 2006). In **Chapter 2**, two periods seem to be particularly important for the increase of both helping and sharing: first, from

infancy to toddlerhood, and second, within childhood. Moreover, two periods were identified as “stable” (neither increase nor decrease) for helping and sharing: first, from toddlerhood to the preschool age, and second, after childhood. In addition, it seems that the period from the preschool age through early childhood also witnesses an increase of sharing, and not of helping. Nevertheless, only 4 studies have focused on the development of helping during this period, thus limiting the generalization of this conclusion. This meta-analytic review also indicated two major gaps in the literature. First, there is a lack of studies on helping behavior focused on the transition from toddlerhood to the preschool period. Second, there is a lack of studies on explaining how sharing behavior changes during toddlerhood, the age at which this behavior first emerges.

In addition to analyzing existing studies, in **Chapter 5** we conducted a longitudinal study focusing exclusively on the periods within toddlerhood and from toddlerhood to early preschool age (i.e., from 22 to 28 months, and from 28 to 34 months), and on three prosocial behaviors (i.e., instrumental helping, sharing and empathic helping). This study added to our understanding of the early development of prosocial behaviors in at least three aspects. First, as noted, based on the results from Chapter 2, there is a lack of studies comparing toddlerhood to the preschool age for helping, and for examining the development of sharing within toddlerhood. Thus, Chapter 5 helps to fill the blind spots for these periods. Second, most studies focusing on age differences on prosocial behaviors does so using a cross-sectional design, which is important for detecting a general developmental pattern. Nevertheless, these patterns can be obscured by between- individual differences. In comparison, Chapter 5 controlled for between-individual differences by testing the development of each behavior within the same children. Third, the results in Chapter 2 were mainly based on one kind of dependent measure, the likelihood of helping/sharing (i.e., whether the child helped/shared or not). However, some researchers propose a multi-measure assessment of prosocial behaviors (e.g., Dunfield, Kuhlmeier, O’Connell, & Kelley 2011). Therefore, in Chapter 5, in addition to examining the likelihood of each behavior, we also employed other kinds of dependent measures, including the readiness of instrumental/empathic helping (i.e., how many communicative clues are needed), and the proportion of items shared.

Findings in **Chapter 5**, compared with Chapter 2, indeed revealed a different developmental trajectory for helping and sharing. In Chapter 5, participants were increasingly likely to engage in each of the prosocial behaviors from early toddlerhood to the early preschool age, suggesting that even though behaviors may be stable on a between-person

level (e.g., Dunfield et al., 2011), the increase in these behaviors continues on a within-person level. In addition, we found that the three behaviors developed at different rates. Specifically, sharing develops more quickly than instrumental helping, which in turn develops more quickly than empathic helping. This result adds more evidence on the multi-dimensionality of early prosocial behaviors (e.g., Padilla-Walker & Carlo, 2014). Moreover, results on the readiness for helping showed that toddlers show an increase in the readiness to show instrumental helping from early to late toddlerhood (from wave 1 to wave 2), and to show empathic helping from early toddlerhood to early preschool age (from wave 1 to wave 2, and from wave 2 to wave 3). For sharing, we did not examine children's readiness in sharing, but instead we focused on the proportion of items shared. Toddlers shared roughly half of their resources at each wave, showing that they kept using a proportional-based sharing strategy during this period. It should be noted that, to date, this is the first study that examined the development of proportion-based sharing in toddlerhood.

Despite these new findings in Chapter 2 and 5, these chapters also demonstrated how little we still know on the development of helping and sharing. Although in general from toddlerhood through adolescence we found the developmental trajectories to be non-linear, the development in some periods, especially in the early (i.e., within infancy, within toddlerhood, from toddlerhood to the preschool age) and late years (i.e., from childhood throughout the adolescence), are tentative due to a lack of studies. Also, although it is important to use different dependent variables (e.g., likelihood, readiness) to examine the development of prosocial behaviors, in Chapter 2 we found that most of studies have only focused on the likelihood of helping/sharing, and/or number of items shared. Moreover, compared with cross-sectional studies, longitudinal studies on how prosocial behavior develops within persons are much fewer. Overall, despite the resurgence of research on the development of prosocial behaviors, more naturalistic observational, experimental, and longitudinal studies are still needed to examine the development of each type of prosocial behaviors separately.

### **Aim 2. Examining how social contextual factors may (or may not) contribute to development of prosocial behaviors**

In total, six empirical chapters addressed this question, focusing on three levels of social contextual factors, including distal (culture, **Chapter 3, 4**), intermediate (parents' values, goals, and practices, **Chapter 4, 5**; daycare teachers' practices, **Chapter 5**), and situational factors (resources, **Chapter 3, 6**; affiliation, **Chapter 7**; and choice, **Chapter 8**). In addition, these chapters were designed to examine one or more of three theoretical views



(natural-tendency, social-interactional, or socialization views). These three views are not mutually exclusive. The key difference among the three views is how important socialization processes are for (the development of) prosocial behaviors, and at what age. Specifically, the *natural-tendency view* emphasizes a general pre-disposition for prosociality in humans, and states that social contexts may have only a limited effect on the development of prosocial behaviors before the preschool age (e.g., Warneken & Tomasello, 2006; 2009; 2014). The *social-interactional view* claims that social contextual factors positively contribute to prosocial behaviors when they emerge, but are non-, or even negatively related to these behaviors when children are cognitively mature enough to perform them (e.g., Dahl, 2015). The *socialization view* proposes that social contextual factors contribute to prosocial behaviors both when they emerge and as they further develop (e.g., Brownell et al., 2016). In the following we also discuss how findings in each level speak to these theories.

**Distal factor: Culture.** Two Chapters (3 and 4) examined the role of culture. Supporters of the natural-tendency view propose that at early ages there is no cultural difference in prosocial behaviors (e.g., Aime, Broesch, Aknin, & Warneken, 2017), and, that universal psychological mechanisms stimulate and sustain them (e.g., Aknin et al., 2013). However, researchers working from social-interactional and socialization views claim that culture (already) helps in shaping prosocial behaviors even during infancy and toddlerhood (e.g., Dahl, 2015). Research in this dissertation examined whether cultural differences were found in two aspects: first, the mean level of prosocial behaviors (e.g., amount and the degree of preforming), and second, the relationship between social contextual factors (e.g., parents' values, goals, and practices) and prosocial behaviors imbedded within each culture. That is, what aspects of culture were associated with the degree and the type of prosocial behavior.

**Chapter 3** examined a proposed psychological mechanism that helps to maintain prosociality in all humans, namely emotional rewards of prosocial behaviors. Findings in this chapter showed an increase of happiness after sharing and instrumental helping in both toddlers and young preschoolers, and more importantly, in both cultures tested (i.e., Dutch and Chinese). These results are consistent with previous studies on sharing, in which they found that sharing leads to more happiness in children from Canada and Vanuatu (Aknin, Hamlin, & Dunn, 2012; Aknin, Broesch, Hamlin, & Vondervoort, 2015). Thus, this chapter extended previous work by showing this mechanism in two additional cultures, and in both sharing and instrumental helping behaviors. Overall, these findings provided evidence for the natural-tendency view.

**Chapter 4** examined cultural differences on prosocial behaviors and the relationships

between parents' values, goals, and practices and prosocial behaviors. Results showed that, across three samples (i.e., Dutch, Indian and Chinese), there were no cultural differences in young preschoolers' mean level of prosocial behaviors (three observed behaviors: instrumental helping, sharing, and empathic helping, and two parent-reported behaviors: empathy and prosocial behaviors). In addition, when the three samples were combined, parents' self-enhancement values were negatively related to parent-reported prosocial behaviors, while relational goals positively related to parent-reported empathy, and parents' practices positively related to young preschoolers' observed empathic helping and parent-reported empathy. More importantly, several cultural-specific relationships were found, indicating that by this age, prosocial behaviors are indeed cultivated differently within specific cultural contexts. It is noteworthy that all cultural-specific relationships were found with parent-reported empathy/prosocial behaviors, but not observed prosocial behaviors. Specifically, within the Dutch sample we found relational goals to be negatively related to parent-reported empathy, and positively related with parent-reported prosocial behaviors. Also, socialization practices were positively related to parent-reported prosocial behaviors. Within the Chinese sample, we found parents' self-enhancement values to be negatively related to parent-reported prosocial behaviors while practices were positively related to parent-reported empathy. Thus, results in Chapter 4 showed that, although no cultural differences exist in mean levels of prosocial behaviors, their relationships with parents' values, goals and practices differed across cultures. This result indicates that culture may already play a role in shaping prosocial behaviors at young preschool ages, and provides evidence for both social-interactional and socialization views. In the next section, we further discuss how values, goals, and practices play a role in the development of prosocial behavior within specific cultural contexts.

**Intermediate social contextual factors, values, goals, and practices.** Two chapters examined intermediate social contextual factors. Specifically, as mentioned above, **Chapter 4** used a cross-sectional design to investigate the relationship between parents' values, goals, and practices and young preschoolers' prosocial behaviors. Findings in this chapter showed that, in general, parents' practices only related to observed empathic helping, but not instrumental helping, or sharing. Considering that at the young preschool age, sharing and empathic helping is still under development, but instrumental helping is already cognitively mature, these results partly support the social-interactional view. Also, as mentioned above, parents' values, goals, and practices related to parent-report on preschoolers' prosocial behaviors in daily activities, further supporting that these factors do

play a role in the early preschool years. In addition to this cross-sectional study, **Chapter 5** used a longitudinal design to examine how parents' goals and practices, as well as daycare teachers' practices related to observed prosocial behaviors (i.e., instrumental helping, sharing, and empathic helping). We found parents' autonomous goals when toddlers were 22 and 28 months to positively predict their sharing behavior at 34 months, and parents' obedience goals when toddlers were 28 months negatively related to toddlers' instrumental helping at 34 months. Nevertheless, across three waves, there was no relationship between parents' and caregiver's prosocial socialization *practices* (e.g., how often they praise toddlers after they help/share, or providing opportunities for toddlers to help/share) and toddlers' observed prosocial behaviors with the experimenter. These results indicate that prosocial behaviors that develop during toddlerhood throughout early preschool year, at least as assessed via standardized behavioral assessments, are likely not affected by the parents' practices we measured.

Combining findings in both chapters, we found relationships between intermediate social contextual factors and young preschoolers' (rather than toddlers') prosocial behaviors, suggesting the effects of these social contextual factors on an intermediate level may only *visible on* behaviors at young preschool age. However, these factors may still be important in refining prosocial behaviors during toddlerhood. For instance, goals parents set for their toddlers can predict these children's observed prosocial behavior 6 months to 1 year later. In order to further test how social contextual factors may affect prosocial behavior, in the next section we discuss how situational factors affect prosocial behaviors.

### **Situational factors, resources availability, affiliation, and choice.**

**Resource availability.** Two chapters (**Chapter 3** and **Chapter 6**) examined resource availability as a situational factor. **Chapter 3** examined whether resource availability would affect the increase of happiness after sharing, and found that sharing leads to an increase of happiness in both resource poor (i.e., 2- and 4-treat) and rich (i.e., 8-treat) conditions. In addition to previous studies (Aknin et al., 2012; 2015), results in this chapter showed that resource availability (e.g., a fulfillment of children's own material needs) did not affect happiness after sharing increased, further supporting the natural-tendency view. In addition, **Chapter 6** examined whether resource availability would affect three types of (subsequent) prosocial behaviors (i.e., instrumental helping, sharing and empathic helping). We found 18- and 24-month-olds are more likely to share in a resource rich than in resource poor conditions, and were more likely to engage in empathic helping subsequent to a resource rich than resource poor conditions. Overall, resource availability seems to enhance some

prosocial behaviors, but does not affect the emotional benefits of engaging in these prosocial behaviors.

**Affiliation.** Chapter 7 examined whether a prime of affiliation would lead to more prosocial behaviors (instrumental helping and sharing) on toddlers (28-month-olds). Results indicated that primes did not affect 28-month-olds' instrumental helping, but it did influence their sharing. Specifically, toddlers are more likely to *share* and *share more quickly* after a prime of affiliation. Combined with previous findings that 18-month-olds are more likely to *help* after a prime of affiliation (Over & Carpenter, 2009), the current results suggest that the effect of affiliation on prosocial behaviors may depend on the developmental level of the child and the prosocial behavior examined. Thus, these findings further support the social-interactional view that social contextual factors contribute to the development of prosocial behaviors when children are learning to perform such behaviors, but (may) no longer play a role once children are cognitively mature enough to perform these behaviors on their own.

**Choice.** Chapter 8 examined whether the demand characteristics of the behavior (choice or command) would influence preschoolers' prosocial behavior. Results showed that young preschoolers are more likely to share *immediately* under a commanding condition than a choice condition. Moreover, their *subsequently* sharing was not affected by choice (or commanding). These results suggest that at this age, toddlers may need some instructions (even commands) before sharing and these instructions (commands) do not negatively affect their sharing subsequently.

In summary, even a small changes in social contextual factors can promote prosocial behaviors, particularly when children are just learning these behaviors. Thus, all chapters provide some evidence for the social-interactional view. Nevertheless, there seems to be a robust psychological mechanism (i.e., emotional rewards) that is independent from situational factors like resource availability.

### **The role of social contextual factors on prosocial behavior, summary of findings at three levels**

Combining findings across three levels, it seems that social contextual factors can contribute to the early development of prosocial behaviors. Situational factors (i.e., being in a resource rich condition and being primed with affiliation) can lead to more prosocial behaviors immediately. In addition, intermediate factors (i.e., parents' autonomous goals) positively predict young preschoolers' prosocial behaviors 6- and 12-month later. Moreover, on a distal level, culture plays a role in shaping the relationship between these intermediate factors and preschoolers' prosocial behaviors. That is, by young preschool age, parents refine

their children's prosocial behaviors based on parents' values, goals, and practices. In this way, children's prosocial behaviors begin to align with the specific culture in which children live (Kärtner, 2018). Nevertheless, there are more cultural similarities than differences in prosocial behaviors shown at early ages. In summary, prosocial behaviors can be cultivated and stimulated within certain social contexts.

Nevertheless, it is noteworthy that the effect of social factors are not always positive, as we found some factors are negatively related to prosocial behaviors. In the current dissertation, parents' self-enhancement values (e.g., emphasizing personal success, status and dominance in the society) was negatively related to young preschoolers' prosocial behaviors. This result was in line with previous findings in adolescents and adults (for a review, see Schwartz, 2010). Overall, it seems that an emphasize on self-enhancement values may have negative effect on prosocial behavior from early ages and onwards. These results are particularly important as globalization occurs and these values begin to grow in cultures that traditionally endorse self-transcendence values more. More importantly, the effect of social contextual factors may change based on age (i.e., developmental level of the children). Although we found that goals of obedience parents set for their children at 28 months of age *negatively* predicted children's instrumental helping 6 months later, previous research found this goal to be *positively* related to toddlers' helping at 19 months of age, when this behavior just emerges (Kärtner, Keller, & Chaudhary, 2010). It is plausible that parents' emphasis on obedience may help young children to learn how to perform certain prosocial behavior when their abilities are still limited, but this same parents' goal becomes a setback when children are capable of doing it. Thus, parents should be sensitive to the developmental level of their children and adjust their goals and practices for their children accordingly.

Despite the findings that indicate the effect of social contextual factors on prosocial behaviors, it is also important to acknowledge that prosocial behaviors are (at least partly) rooted in human nature. Human beings have a natural inclination to be prosocial, and more importantly, psychological mechanisms such as emotional rewarding (i.e., an increase of happiness after prosocial behaviors) sustains us to keep being engaged in prosocial behaviors. However, acknowledging this natural tendency does not deny the potential roles social contextual factors play in the development of prosocial behaviors and in the development of individual differences in prosocial behaviors. Actually, even the natural-tendency view admits that some social contextual factors, such as socialization practices and cultural norms, shape children's altruism over development (Warneken, 2016). The current dissertation shed lights on whether and how some factors may play parts in refining this predisposition in children.

**Table 1.** Main Findings in the Current Dissertation

Chapter	Age focused	Social contextual factors examined	Main findings
2	From 12-month to 18-year		<ul style="list-style-type: none"> <li>Helping: an increase of helping behaviors within infancy, from infancy to toddlerhood, from the preschool age to childhood, and within childhood, while no increases were found within toddlerhood and within the preschool age.</li> <li>Sharing: an increase was found from infancy to toddlerhood, and from the early preschool age through late childhood, while no increase was found from toddlerhood to the preschool age, or from childhood through adolescence.</li> </ul>
3	Toddlerhood (study 1) Early preschool age (study 2 and 3)	Two cultural contexts <ul style="list-style-type: none"> <li>Dutch</li> <li>Chinese</li> </ul>	<ul style="list-style-type: none"> <li>In both cultures, toddlers and young preschoolers displayed more happiness after giving than receiving treats.</li> <li>Toddlers and young preschoolers displayed more happiness after instrumental helping than initially interacting with the experimenter.</li> <li>Toddlers' and young preschoolers' happiness remained the same after positive social interactions.</li> </ul>
4	Early preschool age	Three cultural contexts <ul style="list-style-type: none"> <li>Dutch</li> <li>Indian</li> <li>Chinese</li> </ul> Family <ul style="list-style-type: none"> <li>Parents' Values</li> <li>Parents' Goals</li> <li>Parents' Practices</li> </ul>	<ul style="list-style-type: none"> <li>There was no cultural difference in young preschoolers' prosocial behaviors.</li> <li>Indian and Chinese parents rated self-enhancement values as more important, emphasized relational goals more, and used prosocial-behavior-related social practices more often than Dutch parents.</li> <li>Across cultures parents' socialization practices were positively associated with observed empathic helping, reported empathy and prosocial behaviors, and parents' self-enhancement values were negatively related to reported prosocial behaviors.</li> <li>Within-culture analyses revealed slightly different patterns.</li> </ul>
5	From early toddlerhood to early preschool age	Family <ul style="list-style-type: none"> <li>Parents' Goals</li> <li>Parents' Practices</li> </ul> Daycare <ul style="list-style-type: none"> <li>Teachers' Practices</li> </ul>	<ul style="list-style-type: none"> <li>From early toddlerhood to early preschool age (wave 1: 22, wave 2: 28 month, and wave 3: 34 months), children were increasingly likely to engage in instrumental helping, sharing and empathic helping. By wave 3, 96.7% instrumentally helped, 90.8% shared, and 85.1% empathically helped.</li> <li>Parents' autonomous goals when toddlers were 22 and 28 months related to toddlers' sharing at 34 months, and parents' obedience goals when toddlers were 28 months related to toddlers' instrumental helping at 34 months.</li> <li>Longitudinally, there was no relationship between parents' and teachers' socialization practices and toddlers' observed prosocial behaviors.</li> </ul>
6	Infancy and toddlerhood	Number of resources	<ul style="list-style-type: none"> <li>Toddlers were more likely to share in the resource rich (8 treats) than poor (4 or 2 treats) conditions.</li> <li>The proportion of treats shared did not vary by resource availability.</li> <li>Toddlers tended to be more likely to engage in empathic helping in the resource rich than poor conditions.</li> <li>No resource effect was found for instrumental helping.</li> </ul>
7	Toddlerhood	Sense of affiliation	<ul style="list-style-type: none"> <li>Affiliation increased 28-month-olds' sharing, but not instrumental helping.</li> </ul>
8	Early preschool age	Having choice (sense of autonomy)	<ul style="list-style-type: none"> <li>Sharing under command or when given choice did not affect subsequent sharing behavior for 2- and 3-year-olds.</li> <li>Sharing strategy (either self-prioritizing or other-prioritizing) did not vary by choice condition.</li> </ul>

## Strengthens and Limitations

The current dissertation has many strengths that help in revealing how prosocial behaviors develop at young ages. First, this dissertation was built on a comprehensive, meta-analytic review, which systemically summarized what the field has found regarding the developmental trajectory of prosocial behavior, and pointed out the gaps in literature. Second, addressing the gap that too little is known about the development of prosociality among young children, *six* empirical chapters focused on the period from the early toddlerhood to the early preschool years. These studies also represent the key developmental period that addresses the differences among the natural-tendency, social interactional, and socialization view on how social contextual factors may (or may not) contribute to prosocial behaviors. Third, social contextual factors were examined at three levels (i.e., distal: culture; intermediate: parents' values goals, practices, and teachers' practices; and situational: resource availability, affiliation, choice). Fourth, this dissertation addressed different types of prosocial behaviors (e.g., instrumental helping, sharing, and empathic helping). By delineating their developmental trajectories separately, and examining how social contextual factors may relate to each of them, we drew a comprehensive picture on how prosocial behaviors develop, and spotlighted nuanced differences among these behaviors. Fifth, we mainly observed these behavior in standardized behavioral assessments. Compared with self- or other-report, this measurement strategy set up a more concrete base to compare the (development) of these behaviors. Sixth, the current dissertation used multiple types of study designs (experimental, longitudinal, and cross-sectional), that allowed us to examine the causal, bi-directional, and correlational relationships between social contextual factors and prosocial behaviors.

However, several limitation should be considered when interpreting the results. The measurements on parenting/teachers' practices might be not sufficient enough in detecting their relationship with prosocial behaviors. Specifically, we measured parents' practice through parent-report on *how often* they used practices, and previous studies measured parents' practices in more details, such as observing how parents interact with their toddlers (e.g., Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013), or by asking parents to describe their parenting (e.g., Dahl, 2015). It could be that the quality rather than frequency of the interactions matters more for eliciting toddlers' observed prosocial behaviors (Brownell et al., 2013). Additionally, previous studies mainly focused on one specific parents' practices, such as encouragement. In comparison, the current study used an overall approach (i.e., combined different types of practice, such as encouragement, rewards, and providing

opportunities for helping/sharing) which could have obscured results. It is plausible that some practices are more related to prosocial behaviors than other practices, and/or some practices may be more related to prosocial behavior at one age than another age. Overall, more detailed measures on parents' practices are needed to further examine how parents' practices related to prosocial behaviors.

In addition, in every study, each prosocial behavior was only measured by one trial. Previous studies mainly used multiple trials (i.e., more than three) in measuring one behavior (e.g., Brownell et al., 2013; Dunfield & Kuhlmeier, 2013; Warnkern & Tomeslo, 2006). Thus, caution should be used in comparing our results with previous ones. In addition, the use of only one trial per behavior may limit our understanding on the development of prosocial behaviors. Toddlers help and share in some, but not all tasks. Thus, using more trials in testing one behavior would allow researcher to gather more information on within-person variances.

### **Directions for Future Research**

While this dissertation contributes to knowledge on the development of helping and sharing behaviors in young children and the how social contextual factors contribute to this development, several unresolved issues remain and should be addressed in further studies. We discuss two lines of research below.

First, children need both the cognitive abilities (i.e., recognizing others are having a problem, and identifying the cause of the problem) and willingness (i.e., motivations) in order to perform prosocial behaviors (e.g., Dunfield, 2014; Dunfield & Kuhlmeier, 2013). In the current dissertation, we used a series of communicative clues to scaffold their cognitive abilities in recognizing and identifying the problems. However, this dissertation neither manipulated nor examined the children's motivations. Young children might be cognitively mature but not willing to engage in prosocial behaviors, and this unwillingness can be seen on two levels. First, some children help more than others, and second, most children help in some situations but not in others. Thus, more studies are needed to further examine the motivation of prosocial behaviors at these two levels. Examining toddlers' and young preschoolers' motivation of prosocial behaviors is extremely difficult (for a review, see Paulus, 2014), but also important. Especially, a key controversy between the natural-tendency view and socialization view is whether there is a natural, intrinsic, genuine prosocial motivation. Accordingly, examining the motivation of prosocial behavior in early years can also help in reconciling theoretical debates, concerning the origin of prosocial behaviors.

Second, we found two types of elements that may contribute to prosocial behavior:



the emotional benefits and social contextual factors, however, less is known about how social contextual factors may or may not contribute to the emotional benefits of prosocial behaviors. This question could help us to understand the interaction between these two types of contributors. Studies in adults showed that social contextual factors may have a positive effect on this self-rewarding system. For instance, the emotional benefit of sharing is larger when social connection with the recipient is stronger (i.e., showed more happiness when sharing with friends than with strangers, Akinin, Sandstrom, Dunn, & Norton, 2011). However, the age at which social connection begins to boost the emotional benefits is unknown. Specifically, in the current dissertation we measured toddlers' and young preschoolers' happiness after behaving prosocially towards a stranger (i.e., the experimenter). Thus, further studies can examine whether and how happiness may change after being prosocial towards other recipients, such as parents or siblings. In addition, social contextual factors may also have a negative effect on the self-rewarding system. Based on the self-determination theory (Ryan & Deci, 2000), extrinsic motivation (e.g., obeying or external rewarding) would lead to less prosocial behaviors, and more importantly, less subjective well-being (e.g., happiness). In the current dissertation, we found that for toddlers and young preschoolers, a positive social interaction (the experimenter saying "thank you" to the participant) did not lead to an increase of their happiness, suggesting that the social rewards may not affect happiness yet. Nevertheless, more explicit manipulations of social rewards are needed, for instance, praising. Moreover, studies can also focus on other contexts. Material rewards, for instance, are likely to affect emotional benefits at this age. Indirect evidence supporting this claim was found in one previous study, in which material rewards lead to less sharing behaviors in 30-month-olds (Warnkern & Tomesslo, 2013). However, more studies are needed to take research a step further and test whether material rewards would decrease happiness (after prosocial behaviors) directly.

### **General Conclusion**

Despite the resurgence of interest in prosocial behaviors in the past two decades, several questions remained concerning how these behaviors develop. This dissertation focused on delineating the general developmental trajectory of helping and sharing behaviors, and investigating how social contextual factors may contribute to the early development of these behaviors. The current dissertation found helping and sharing to show different developmental trajectories, further supporting the multi-dimensional nature of prosocial behaviors. Also, both behaviors do not develop linearly. Specifically, each behavior shows an increase-plateau; increase-plateau trajectory from infancy to adolescence. In addition, the

development from toddlerhood through the early preschool years showed three types of prosocial behaviors (instrumental helping, sharing, and empathic helping) increases throughout this period. As for the roles of social contextual factors on (the early development of ) prosocial behaviors, this dissertation showed that these factors can stimulate different types of prosocial behaviors when they first emerge. Prosocial behaviors can be promoted through (even) small changes in the situational, social contextual factors (e.g., prime of affiliation), and also through parents' socialization (e.g., prosocial-related socialization practices). Next to emphasizing the importance of social contextual factors on prosocial behaviors, the current dissertation also show a robust, psychological mechanism (i.e., emotional benefits after prosocial behavior), suggesting prosocial behaviors are (partly) rooted in human nature. Moreover, parents in different cultures may promote prosocial behaviors through cultural-specific ways. Nevertheless, across cultures preschoolers show similar level of prosocial behaviors. Thus, these different pathways seem to serve a similar goal that holds for all societies: to refine our natural prosocial inclinations, in order to raise little benefactors for the society in which we live.

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## **Nederlandse Samenvatting**

Prosociaal gedrag, zoals helpen, delen en troosten, zijn relatief unieke en belangrijke aspecten binnen onze menselijke samenleving (zie Dovidio, Piliavin, Schroeder, & Penner, 2017 voor een *review*, zie Melis, 2018). Dergelijke gedragingen zijn essentieel voor het overleven en ontwikkelen van onze soort (Darwin, 1871; Ebstein, Israel, Chew, Zhong, & Knafo, 2010; Fehr & Fischbacher, 2003; Wilson, 1975), en worden als waardevol gezien binnen alle menselijke samenlevingen (Padilla-Walker & Carol, 2014). Om deze redenen is er veel interesse voor het begrijpen van het ontstaan en de ontwikkeling van prosociale gedragingen (Dovidio et al., 2017). Na meer dan tweeduizend jaar van filosofische discussies over de aard van prosociale gedragingen, zijn psychologen sinds een halve eeuw dit onderwerp empirisch aan het onderzoeken. Ontwikkelingspsychologen hebben zich gericht op het ontstaan en de ontwikkeling van sociaal gedrag. Zij hebben deze gedragingen over de gehele levensloop onderzocht met speciale aandacht voor kinderen onder de 18 jaar (Handlon & Gross, 1959; Knafo & Plomin, 2006; Ongley, Nola, & Malti, 2014; Presbie & Kanareff, 1970). Desondanks ontbreekt er binnen de wetenschappelijke literatuur nog steeds kennis over het ontstaan en de ontwikkelingspaden van specifieke prosociale gedragingen, en hoe deze worden beïnvloed door sociaal contextuele factoren. Het overkoepelende doel van de huidige dissertatie is om de algemene ontwikkelingspaden van specifiek gedefinieerde prosociale gedragingen te beschrijven en te onderzoeken of, en zo ja, hoe sociaal contextuele factoren bijdragen aan deze ontwikkelingen. Deze dissertatie richt zich specifiek op de dreumestijd (1 tot 2 jaar) tot peutertijd (2 tot 4 jaar), aangezien de meeste prosociale gedragingen voor het eerst rond deze leeftijd ontstaan.

In de huidige dissertatie is sociaal gedrag gedefinieerd als “een vrijwillige actie die ten goede komt aan een ander persoon of een andere groep, zoals helpen, doneren, delen en troosten” (Eisenberg & Fabes, 1998; Eisenberg et al, 2006). Het is belangrijk dat deze definitie geen grenzen stelt aan de motivatie voor sociaal gedrag (Eisenberg & Fabes, 1998; Eisenberg et al., 2006). Ook kan sociaal gedrag volgens deze definitie kostbaar of kosteloos zijn. Daarnaast focust deze dissertatie zich hoofdzakelijk op drie soorten sociaal gedrag, namelijk: instrumenteel helpen, empathisch helpen en delen. *Instrumenteel helpen* refereert aan een handeling die anderen helpt om een handelingsgericht doel te behalen, zoals het oppakken en aangeven van een object dat buiten bereik is (Svetlova, Nichols, & Brownell, 2010). *Delen* refereert aan een handeling die in andermans behoefte aan materiële goederen voorziet. (Dunfield, Kuhlmeier, O’Connell, & Kelley, 2011). Tot slot refereert *empathisch helpen* aan handelingen die zijn gebaseerd op bezorgdheid om de ander (Svetlova et al., 2011). Om deze gedragingen te meten heeft de huidige dissertatie hoofdzakelijk

gestandaardiseerde gedragsmatige taken gebruikt. In deze taken werd het prosociale gedrag van participanten gestimuleerd middels verschillende stappen van meer impliciet tot directe verzoeken (*scaffolding*).

De huidige dissertatie wordt geleid door drie theoretische benaderingen, namelijk (1) de natuurlijke tendens benadering (Warneken & Tomasello, 2006; 2009; 2014), (2) de sociaal-interactionele benadering (Dahl, 2015) en (3) de socialisatie benadering (Brownell et al., 2016). Deze benaderingen verschillen in de mate waarin ze zich richten op hoe natuurlijke rijping en sociaal contextuele factoren bijdragen aan de ontwikkeling van prosociale gedragingen. Hoewel alle drie de benaderingen het belang erkennen van zowel aanleg als omgevingsinvloeden voor de ontwikkeling van prosociale gedragingen, is het belangrijkste verschil tussen de drie benaderingen welke rol socialisatieprocessen spelen bij prosociaal gedrag en op welke leeftijd. De *natuurlijke tendens* benadering stelt dat socialisatieprocessen niet bijdragen aan het ontstaan van prosociaal gedrag en een zeer beperkte (indien aanwezig) invloed hebben vòòr de leeftijd van drie jaar. De *sociaal-interactionele* benadering stelt dat socialisatieprocessen een belangrijke rol spelen in het stimuleren van het ontstaan van prosociaal gedrag. Wanneer het kind echter beschikt over de volledige cognitieve capaciteiten om prosociaal gedrag te vertonen, zal het effect van de sociale context niet langer bestaan of negatief zijn. De *socialisatie* benadering stelt dat socialisatieprocessen niet alleen belangrijk zijn voor het ontstaan van prosociaal gedrag, maar ook voor het behoud en de verdere ontwikkeling van deze gedragingen.

Het doel van de huidige dissertatie is om allereerst de algemene ontwikkelingspaden van prosociaal gedrag (helpen en delen) te schetsen van de babytijd tot adolescentie, met een meer gedetailleerde focus op de dreumestijd tot peutertijd. Het tweede doel van deze dissertatie is om te onderzoeken of en, zo ja, hoe sociaal contextuele factoren een rol spelen in de vroege ontwikkeling van prosociale gedragingen.

### **Doel 1: Schetsen van ontwikkelingspaden van prosociale gedragingen**

In **Hoofdstuk 2** is een meta-analyse uitgevoerd met betrekking tot de ontwikkeling van twee prosociale gedragingen (instrumenteel helpen en delen) vanaf de babytijd tot in de adolescentie. Veel individuele studies hebben zich gefocust op de ontwikkeling van deze gedragingen in de periode vòòr de volwassenheid. Een uitgebreide meta-analyse over dit onderwerp werd 20 jaar geleden uitgevoerd (Eisenberg & Fabes, 1998). Op dit moment is het ontwikkelingspad van iedere prosociale gedraging echter nog steeds onduidelijk, waardoor een nieuwe meta-analyse gerechtvaardigd en nodig is. In dit hoofdstuk hebben we zowel observationele als experimentele studies geïnccludeerd die instrumenteel help en/of deel

gedrag onderzochten in ten minste twee leeftijdsgroepen onder de 18 jaar. De resultaten tonen aan dat instrumenteel helpen en delen verschillende ontwikkelingspaden volgen. Helpen neemt toe tijdens de babytijd en van de babytijd naar de dreumestijd, maar laat geen verandering zien binnen de dreumestijd, binnen de peutertijd of van de peutertijd naar de kindertijd. Gedurende de kindertijd neemt helpen echter weer toe. Voor delen vonden we een toename van de babytijd naar de dreumestijd, maar geen toe- of afname van de dreumestijd naar de peutertijd. Daarna nam delen toe van de peutertijd tot de late kindertijd. Van de kindertijd tot in de adolescentie werd geen verandering gezien. Helpen en delen ontwikkelen zich beide dus niet lineair.

Naast een meta-analyse van bestaande studies, hebben we in **Hoofdstuk 5** een longitudinale studie uitgevoerd die zich exclusief focuste op de periodes binnen de dreumestijd en van de dreumestijd tot de peuterleeftijd (van 22 tot 28 maanden, en van 28 tot 34 maanden) en op drie prosociale gedragingen (instrumenteel helpen, delen en empathisch helpen). Op basis van de literatuur is dit de belangrijkste periode om de drie theorieën over de vroege ontwikkeling van prosociaal gedrag te onderzoeken, maar er zijn maar weinig studies die focussen op deze leeftijdsperiode. De resultaten van de huidige studie tonen aan dat de kans dat participanten prosociaal gedrag lieten zien toenam vanaf de dreumestijd tot de peuterleeftijd. Dit was het geval voor elke prosociale gedraging. Daarnaast bleek dat de drie gedragingen zich verschillend ontwikkelden. Meer specifiek ontwikkelde delen zich sneller dan instrumenteel helpen, wat op zijn beurt weer sneller ontwikkelde dan empathisch helpen. Daarnaast bleek uit de resultaten dat dreumesen een toename laten zien in de gereedheid (i.e., minder hulp nodig hebben) om instrumenteel te helpen van de dreumestijd tot de vroege peuterleeftijd (van wave 1 naar wave 2), en om empathisch te helpen van dreumestijd tot de late peuterleeftijd (van wave 1 naar wave 2, en van wave 2 naar wave 3). We hebben de gereedheid van kinderen om te delen niet onderzocht. In plaats daarvan focusten we ons op de proportie van items die werden gedeeld. De dreumesen en peuters deelden ruwweg de helft van hun middelen bij elke wave. Dit laat zien dat zij tijdens deze periode een op proportie gebaseerde strategie bleven gebruiken.

## **Doel 2. Onderzoek naar hoe de sociaal contextuele factoren bijdragen (of niet bijdragen) aan de ontwikkeling van prosociale gedragingen**

Het tweede doel van de huidige dissertatie is om de rol van sociaal contextuele factoren in de vroege ontwikkeling van prosociale gedragingen te onderzoeken. Contextuele factoren zijn speciale omgevingskarakteristieken waar rekening mee dient te worden gehouden voor het begrijpen waarom een specifieke set van gedragingen wordt geobserveerd. In de huidige

dissertatie hebben zes empirische hoofdstukken deze vraag behandeld. Hierbij kunnen drie niveaus van sociaal contextuele factoren worden onderscheiden, namelijk distale (cultuur, **Hoofdstuk 3, 4**), intermediërende (waarden, doelen en praktijken van ouders, **Hoofdstuk 4, 5**; praktijken van dagopvang medewerkers, **Hoofdstuk 5**), en situationele factoren (beschikbaarheid van middelen, **Hoofdstuk 3, 6**; verbondenheid **Hoofdstuk 7**; en keuze, **Hoofdstuk 8**). Daarnaast zijn deze hoofdstukken vormgegeven om één of meer van de drie theoretische benaderingen (natuurlijke tendens, sociaal-interactionele of socialisatie benadering) te onderzoeken.

**Cultuur.** Cultuur is een breed concept dat bestaat uit geloofssystemen, kennis, waarden en alle andere praktijken (Erickson, 2002). Vaak bestuderen onderzoekers overeenkomsten en/of verschillen tussen culturen maar onderzoeken ze niet de waarden of het geloofssysteem die onderliggend zijn aan deze verschillen. Om deze reden refereren we naar cultuur wanneer het op deze wijze onderzocht wordt als een distale factor. De huidige dissertatie onderzocht het effect van cultuur op prosociale gedragingen van dreumesen en jonge peuters gebaseerd op de natuurlijke tendens benadering (**Hoofdstuk 3**) en de socialisatie benadering (**Hoofdstuk 4**).

De natuurlijke tendens benadering stelt dat prosociale gedragingen diepgeworteld zijn in de aanleg van de mens, en dus universeel zijn over culturen en tijd (Warneken, 2016). Een onderzoekslijn die focust op de emotionele voordelen van sociaal gedrag biedt ondersteuning voor deze benadering. Wereldwijde studies naar volwassenen vonden dat er, binnen verschillende culturen, een causale positieve relatie bestaat tussen het uitgeven van geld voor anderen en geluk (e.g., Aknin et al., 2013). Belangrijker, zowel een studie naar Canadese dreumesen als een studie naar Vanuatu peuters vonden dat delen leidt tot een hoger niveau van geluk (Aknin et al., 2012; Aknin et al., 2015), wat het idee ondersteunt dat een toename van geluk na delen inderdaad een universeel psychologisch mechanisme is. In **Hoofdstuk 3**, onderzoeken we dit voorgestelde mechanisme (een toename in geluk na prosociale gedragingen) verder in drie soorten prosociale gedragingen (instrumenteel helpen, delen en empathisch helpen) in Nederlandse dreumesen en peuters, en Chinese peuters (**Hoofdstuk 3**). We vonden een toename in geluk na delen en instrumenteel helpen bij dreumesen en peuters, en belangrijker, in beide geteste culturen (Nederlands en Chinees). Dit hoofdstuk heeft voorgaand werk uitgebreid door dit mechanisme aan te tonen in twee additionele culturen en voor zowel delen als instrumenteel helpen. Deze resultaten bieden bewijs voor de natuurlijke tendens benadering.

De socialisatie benadering stelt dat sociaal gedrag ontstaat en ontwikkelt binnen

bepaalde socioculturele contexten (Brownell et al., 2016). In overeenkomst met deze benadering kunnen er in de vroege jaren culturele verschillen zijn in prosociale gedragingen. De empirische bevindingen zijn echter gemengd. Terwijl sommige studies culturele verschillen vonden (Giner Torrés & Kärtner, 2017; Rochat et al., 2009), vonden anderen deze niet (Aime, Broesch, Aknin, & Warneken, 2017; Kärtner, Keller & Chaudhary, 2010). Bovendien wordt prosociaal gedrag binnen verschillende culturen bekrachtigd. Dit zou kunnen leiden tot een gemiddeld of eenzelfde niveau van prosociaal gedrag tussen culturen (Giner Torrés & Kärtner, 2017). In overeenkomst met deze visie zouden culturele effecten niet zichtbaar zijn in het gemiddelde niveau van prosociaal gedrag van peuters, maar in hun relatie tot specifieke sociaal-culturele factoren, zoals de opvoedingsdoelen die ouders hanteren (Giner Torrés & Kärtner, 2017) en hun opvoedingspraktijken (Giner Torrés & Kärtner, 2017). In **Hoofdstuk 4** hebben we de prosociale gedragingen van jonge peuters en de relatie tussen het prosociale gedrag van de peuters en drie soorten sociaal-culturele factoren (waarden, doelen en praktijken van ouders) vergeleken. Resultaten toonden dat er tussen de drie steekproeven (Nederlands, Indiaas en Chinees) geen culturele verschillen waren in het prosociale gedrag van de peuters (drie geobserveerde gedragingen: instrumenteel helpen, delen en empathisch helpen, en twee ouder-gerapporteerde gedragingen: empathie en prosociaal gedrag). Niettemin werden verschillende cultuurspecifieke relaties gevonden tussen prosociale gedragingen en ouderlijke waarden, doelen en praktijken. Deze resultaten indiceren dat prosociaal gedrag op deze leeftijd inderdaad verschillend wordt gecultiveerd binnen specifieke culturele contexten. De resultaten in **Hoofdstuk 4** tonen aan dat, hoewel er geen culturele verschillen bestaan in het gemiddelde niveau van prosociaal gedrag, de relaties met de waarden, doelen en praktijken van ouders verschillen tussen culturen. Dit resultaat indiceert dat culturele invloeden mogelijk al een rol spelen in het vormen van prosociale gedragingen op de peuterleeftijd, wat in lijn is met de socialisatie benadering. Door deze processen te onderzoeken komen we dichterbij de sociaal culturele factoren die mogelijk invloed hebben op de ontwikkeling van prosociaal gedrag. Hierna focussen we op deze factoren die gecategoriseerd zijn als intermediërend.

***Intermediërende sociale contextuele factoren (ouders en leerkrachten): Waarden, doelen en praktijken***

Socialiserende personen (e.g., ouders en leerkrachten) brengen hun waarden en doelen over aan kinderen (Verkasalo, Lönnqvist, Lipsanen, & Helkama, 2009), bijvoorbeeld door socialisatie praktijken (Grusec, & Kuczynski, 1980). Waarden zijn de kern, situatie-



overstijgende ideeën en overtuigingen van een individu of samenleving die richting geven aan het gedrag in dagelijkse situaties (Verkasalo et al., 2009). Twee typen waarden, zelfverbetering en zelftranscendentie waarden, blijken sterk gerelateerd aan prosociale gedragingen (Schwartz, 1973; 2006). Zelfverbetering waarden benadrukken persoonlijk succes, status en dominantie in de samenleving en zijn negatief gerelateerd aan sociaal gedrag. Zelftranscendentie waarden benadrukken het welzijn van anderen en zijn positief gerelateerd aan prosociale gedragingen (voor een review, zie Schwartz, 2010). Dit bewijs is echter afkomstig van studies naar adolescenten en volwassenen, waardoor het onduidelijk is of deze waarden ook al gerelateerd zijn aan prosociale gedragingen bij jonge kinderen. Daarom hebben we in **Hoofdstuk 4** onderzocht of de waarden van ouders (zelfverbetering en zelftranscendentie) gerelateerd zijn aan het prosociale gedrag van peuters tussen en binnen elke cultuur (Nederlands, Indiaas en Chinees). We vonden dat zelfverbetering waarden van ouders negatief gerelateerd waren aan het prosociale gedrag van kinderen, maar alleen binnen de Chinese steekproef. Deze relatie werd niet gevonden binnen de Nederlandse en Indiase steekproef. Deze resultaten ondersteunen dat ouderlijke waarden ook al een rol spelen in de peuterleeftijd.

De doelen die ouders stellen voor hun kinderen kunnen de ouderlijke waarden reflecteren (Darling & Steinberg, 1993; Luster, Rhoades, & Haas, 1989). De huidige studie focuste op de autonome en relationele socialisatie doelen van ouders die gerelateerd zijn aan de centrale verschillen tussen collectivistische en individualistische culturen (Tamis-LeMonda, et al., 2008). Tot dusver hebben onderzoekers zich gefocust op drie soorten socialisatie doelen van ouders (gehoorzaamheid, sociaal gedrag en autonome doelen) in relatie tot sociaal gedrag van jonge kinderen. Er is echter maar één onderzoek gedaan naar de relatie tussen socialisatie doelen van ouders en sociaal gedrag van dreumesen. Hieruit bleek dat gehoorzaamheid doelen positief gerelateerd waren aan helpgedrag van dreumesen (Kärtner et al., 2010), terwijl er geen relatie werd gevonden voor sociaal gedragsdoelen of autonome doelen en helpgedrag. Echter, deze studie focuste enkel cross-sectioneel op helpen in één leeftijdsgroep (19 maanden). Daarnaast zouden ouderlijke doelen longitudinaal kunnen bijdragen aan de ontwikkeling van sociaal gedragingen, aangezien dreumesen tijd nodig hebben om de doelen te internaliseren. Daarom hebben we in **Hoofdstuk 4** de relatie tussen de drie bovengenoemde doelen (gehoorzaamheid, sociaal gedrag en autonome doelen) en een reeks van sociaal gedragingen, over en binnen de culturen, onderzocht. We vonden dat over alle culturen, relationele doelen positief gerelateerd waren aan ouder-gerapporteerde empathie. Ook vonden we binnen de Nederlandse steekproef dat relationele doelen positief

waren gerelateerd aan ouder-gerapporteerde empathie en dat ze negatief gerelateerd waren aan ouder-gerapporteerde prosociale gedragingen. Daarnaast hebben we in **Hoofdstuk 5** bij dreumesen van 22 maanden (wave 1) onderzocht of, en hoe, ouderlijke doelen prosociale gedragingen konden voorspellen 6- en 12-maanden later (wave 2 en wave 3). We vonden dat de autonome doelen van ouders met dreumesen en peuters van 22 en 28 maanden een positieve voorspeller waren van het deelgedrag van peuters van 34 maanden. Daarnaast bleken gehoorzaamheidsdoelen van ouders wanneer peuters 28 maanden waren negatief gerelateerd aan het instrumenteel helpen van peuters bij 34 maanden.

Verder bleek dat waarden en doelen geen directe, maar een indirecte invloed lijken te hebben op het prosociale gedrag van jonge kinderen via verschillende praktijken van ouders gericht op het stimuleren van sociaal gedrag (Kärtner, 2018). Zowel de verschillende gebruikte praktijken als de relaties tussen de praktijken en de prosociale gedragingen lijken afhankelijk te zijn van cultuur. Indiase moeders geven bijvoorbeeld in vergelijking met Duitse moeders minder complimenten en gebruiken meer straffende maatregelen in het socialiseren van sociaal gedrag bij kinderen (Giner Torrens & Kärtner, 2017). Daarnaast bleken straffende maatregelen negatief gerelateerd te zijn aan helpen in de Duitse steekproef, terwijl er sprake was van een positieve relatie in de Indiase steekproef (Giner Torrens & Kärtner, 2017). Ouders lijken naast specifieke praktijken dus meer dan één manier te gebruiken om sociaal gedrag te ondersteunen. De huidige dissertatie focuste zich erop hoe de gecombineerde praktijken (inclusief cognitieve ondersteuning, complimenten, aanmoediging en sociale beloning) van ouders een rol spelen in prosociale gedragingen. Dit werd gedaan door ouders te vragen om te rapporteren hoe vaak zij gebruik maakten van deze verschillende manieren in hun dagelijkse activiteiten. Net zoals bij ouderlijke doelen hebben we deze relatie in **Hoofdstuk 4** onderzocht onder peuters uit Nederlandse, Indiase en Chinese steekproeven. We vonden dat er in de verschillende culturen sprake was van een positieve relatie tussen ouderlijke praktijken en geobserveerd empathisch helpen van peuters en ouder-gerapporteerde empathie. Ook vonden we binnen de Nederlandse steekproef dat socialisatie praktijken positief gerelateerd waren aan prosociale gedragingen die door de ouders waren gerapporteerd. Binnen de Chinese steekproef vonden we dat socialisatie praktijken positief gerelateerd waren aan door ouders gerapporteerde empathie. Daarnaast hebben we in **Hoofdstuk 5** de dynamische relaties tussen ouderlijke praktijken en prosociale gedragingen van jonge kinderen onderzocht over drie verschillende waves. Hierbij vonden we geen verbanden.

Naast onderzoek naar de rol van ouders heeft de huidige dissertatie ook gefocust op de

rol van dagopvang medewerkers. Er werd gekeken naar de relatie tussen praktijken van dagopvang medewerkers en prosociale gedragingen in de periode van de dreumestijd tot de vroege peutertijd (**Hoofdstuk 5**). Dagopvang medewerkers zijn belangrijke socialiserende personen, die door hun praktijken sociale contexten creëren voor prosociale interacties binnen de klas (Eisenberg, Cameron, Tryon, & Dodez, 1981; Kienbaum, 2001). Echter, zijn er maar weinig studies die de rol van dagopvang medewerkers in de vroege ontwikkeling van sociaal gedrag hebben onderzocht. In **Hoofdstuk 5** hebben we de dynamische relatie onderzocht tussen de praktijken van dagopvang medewerkers en prosociale gedragingen van peuters over drie waves. We hebben geen verbanden gevonden. Deze resultaten indiceren dat de prosociale gedragingen die zich ontwikkelen gedurende de dreumestijd en vroege peutertijd, zoals gemeten middels de gestandaardiseerde gedragsmatige instrumenten, mogelijk niet worden beïnvloed door de gerapporteerde praktijken van ouders en dagopvang medewerkers gebruikt in Hoofdstuk 5.

#### *Situationele factoren.*

Situationele factoren omvatten verschillende karakteristieken zoals omgevingscues (objectieve fysieke stimuli in een omgeving), psychologische omgevingskarakteristieken (subjectieve betekenissen en interpretaties van situaties) (Rauthmann, 2017). In de huidige dissertatie hebben we gefocust op drie situationele factoren: beschikbaarheid van middelen, aansluiting en keuze.

*Beschikbaarheid van middelen.* De beschikbaarheid van middelen is met name relevant voor delen, aangezien kinderen middelen moeten opgeven om te kunnen delen. Dit is vooral belangrijk voor een- en tweejarigen die delen, aangezien zij net hebben geleerd om te delen en dit soms niet willen doen. Een- en tweejarigen zijn in staat om te differentiëren tussen een conditie met weinig middelen (2 items) en een conditie met veel middelen (8 items) (Sarnecka & Gelman, 2004; Xu, 2003). Dit impliceert dat zij mogelijk in staat zijn om, op basis van de hoeveelheid beschikbare middelen, te herkennen welke kosten gepaard gaan met delen. Desondanks zijn er op dit moment nog geen experimentele studies gedaan die het delen bij een- en tweejarigen hebben onderzocht door de beschikbaarheid van middelen direct te manipuleren met behulp van gestandaardiseerde gedragsinstrumenten. In de huidige dissertatie hebben we de rol van de beschikbaarheid van middelen onderzocht voor twee aspecten van delen. Allereerst lijkt de beschikbaarheid van middelen invloed te hebben op het gedrag zelf. Studies naar kleuters laten zien dat kleuters minder deelden wanneer er sprake was van een conditie met weinig middelen in vergelijking met een conditie met veel middelen. Dit lijkt te komen doordat de kosten van het delen van één item relatief groot zijn

in een situatie met weinig middelen. Ten tweede lijkt de beschikbaarheid van middelen invloed te hebben op de blijdschap na delen. De blijdschap van kinderen lijkt groter te zijn in een conditie met weinig middelen dan in een conditie met veel middelen. Onderzoekers vonden dat kostbaar delen tot meer blijdschap leidt dan kosteloos delen (Aknin et al., 2012; 2015). In de huidige dissertatie hebben we de rol van de beschikbaarheid van middelen onderzocht in twee hoofdstukken. In **Hoofdstuk 3** hebben we onderzocht of de toename in blijdschap, na het delen, verschilde op basis van de hoeveelheid middelen die beschikbaar waren om te delen. Uit de resultaten bleek dat delen leidt tot een toename van blijdschap in zowel de conditie met weinig middelen (2 en 4 snoepjes) en veel middelen (8 snoepjes). In aanvulling op voorgaande studies (Aknin et al., 2012; 2015) toonden de resultaten in dit hoofdstuk dat de beschikbaarheid van middelen, (i.e., de vervulling van de eigen materiële behoeften van een kind), geen invloed had op het niveau van blijdschap nadat er sprake was van een toename in delen. Deze bevinding ondersteunt de natuurlijke tendens benadering. Daarnaast hebben we in **Hoofdstuk 6** onderzocht of de beschikbaarheid van middelen invloed zou hebben op het delen zelf. We vonden dat jonge kinderen van 18 en 24 maanden eerder deelden in een situatie met veel middelen in vergelijking met een conditie waarin er sprake was van weinig middelen. Over het algemeen lijkt delen gestimuleerd te worden door de beschikbaarheid van middelen. Echter, de beschikbaarheid van middelen lijkt geen invloed te hebben op de emotionele voordelen van delen.

*Verbondenheid.* Op basis van evolutionaire theorie is de relatie tussen de ervaring van sociale verbondenheid en prosociaal gedrag fundamenteel, automatisch en impliciet (Over & Carpenter, 2009) en is het ontwikkelen van een gevoel van verbondenheid een belangrijke manier om het prosociale gedrag van peuters te stimuleren (Giner Torr ns & K rtner, 2018). Niettemin is het onduidelijk welke soorten prosociaal gedrag worden gestimuleerd door sociale verbondenheid en op welke leeftijd dit gebeurt. Verbondenheid lijkt te zorgen voor een toename van instrumenteel helpen bij jonge kinderen tot ze 25 maanden oud zijn (Barragan & Dweck, 2014; Carpenter, Uebel, & Tomasello, 2013; Cirelli, Einarson, & Trainor, 2014; Over & Carpenter, 2009), en lijkt geen invloed te hebben bij oudere kinderen (30 en 42 maanden oude kinderen, Warneken & Tomasello, 2013). Wanneer het verbondenheidseffect op prosociale gedragingen fundamenteel is, dan zouden we verwachten dat dit effect ook bestaat voor andere soorten prosociaal gedrag dan instrumenteel helpen. Niettemin is er op dit moment enkel   n studie naar wederkerigheid die heeft getoond dat het delen van peuters van 30 maanden niet werd be nvloed door de ervaring van wederkerigheid (Warneken & Tomasello, 2013). Daarnaast zijn er op dit moment geen studies die het effect

van sociale verbondenheid op delen direct hebben onderzocht bij kinderen die jonger dan drie jaar zijn. In **Hoofdstuk 7** hebben we instrumenteel helpen en delen, na het primen van verbondenheid, geobserveerd om verder te onderzoeken in hoeverre verbondenheid invloed heeft op prosociale gedragingen op jonge leeftijd. De resultaten toonden aan dat het primen geen invloed had op het instrumentele helpen van peuters van 28 maanden. Echter, had het wel invloed op hun deel gedrag. Peuters lijken eerder te delen en sneller te delen na een prime van verbondenheid. Deze resultaten suggereren, in combinatie met voorgaande bevindingen dat dreumesen van 18 maanden eerder helpen na een prime van aansluiting (Over & Carpenter, 2009), dat het effect van verbondenheid op sociaal gedrag afhankelijk is van het ontwikkelingsniveau van het kind en de specifieke prosociale gedraging die wordt onderzocht. Deze bevindingen ondersteunen de sociaal-interactionele benadering. Deze stelt dat sociaal contextuele factoren bijdragen aan de ontwikkeling van prosociale gedragingen wanneer kinderen leren om desbetreffende gedragingen te vertonen, maar dat deze factoren niet langer een rol spelen wanneer kinderen cognitief voldoende ontwikkeld zijn om deze gedragingen zelf te vertonen.

*Keuze.* Om eerst de keuze te hebben om te delen lijkt belangrijk te zijn voor het stimuleren van het hierop volgende delen (Over & Carpenter, 2009), omdat kinderen *“rationeel hun prosocialiteit kunnen afleiden door moeilijke, autonome keuzes te maken”* (p. 1971, Chernyak & Kushnir, 2013). In een studie kregen 3- en 4-jarigen de keuze of werden zij opgedragen om iets te delen met een pop (fase 1). Daarna kregen zij de kans om opnieuw te delen met een nieuwe pop (fase 2). Voor diegenen die deelden in fase 1 bleek dat de kinderen die de keuze hadden gekregen om te delen meer deelden in fase 2 dan diegenen die opgedragen werden om te delen in fase 1 (Chernyak & Kushnir, 2013). Echter, het is onduidelijk of het hebben van een keuze ook belangrijk is voor sociaal gedrag onder de leeftijd van drie jaar. **Hoofdstuk 8** onderzocht of de manier waarop gedrag wordt aangespoord (keuze of bevel) invloed had op het prosociale gedrag van peuters. Resultaten toonden aan dat de kans waarschijnlijker was dat peuters direct deelden in een bevelende situatie dan in een situatie waarin een keuze mogelijk was. Daarnaast leek het hierop volgende delen niet beïnvloed te worden door keuze of een bevel. Deze resultaten wekken de suggestie dat peuters op deze leeftijd instructies (zelfs bevelen) nodig lijken te hebben voordat ze delen. Deze instructies (bevelen) hebben geen negatieve invloed op het daaropvolgende deelgedrag.

Samengevat lijken zelfs kleine veranderingen in sociaal contextuele factoren te kunnen zorgen voor het stimuleren van prosociale gedragingen, met name wanneer kinderen deze

gedragingen net aan het leren zijn. Alle hoofdstukken lijken ondersteuning te bieden voor de sociaal-interactionele benadering. Niettemin lijkt er sprake te zijn van een robuust psychologisch mechanisme (i.e., emotionele beloningen in de vorm van blijdschap) dat onafhankelijk is van situationele factoren zoals de beschikbaarheid van middelen.

### **Samenvatting: Sociale Contextuele Factoren en Prosociaal Gedrag**

Wanneer de bevindingen op drie niveaus worden gecombineerd, zijn er aanwijzingen dat sociaal contextuele factoren kunnen bijdragen aan de vroege ontwikkeling van prosociale gedragingen. Situationele factoren (i.e., het hebben van veel middelen en het primen van verbondenheid) kunnen direct leiden tot meer sociaal gedrag. In aanvulling daarop kunnen intermediaire factoren (i.e., autonome doelen van ouders) het sociaal gedrag van peuters 6 en 12 maanden later positief voorspellen. Daarnaast spelen op een distaal niveau culturele invloeden een rol in het vormgeven van de relatie tussen deze intermediaire factoren en prosociale gedragingen van peuters. Op deze leeftijd verfijnen ouders de prosociale gedragingen van hun kinderen op basis van ouderlijke waarden, doelen en praktijken. Op deze manier komt het sociaal gedrag van de kinderen op één lijn met de specifieke cultuur waarin de kinderen leven (Kärtner, 2018). Niettemin zijn er meer culturele overeenkomsten dan verschillen in sociaal gedragingen die vertoond worden op jonge leeftijd. Samengevat kunnen prosociale gedragingen gecultiveerd en gestimuleerd worden binnen bepaalde sociale contexten.

Het is belangrijk om te beseffen dat de effecten van sociale factoren niet altijd positief zijn, aangezien we vonden dat sommige factoren negatief gerelateerd zijn aan sociaal gedragingen. In de huidige dissertatie bleken zelfverbetering waarden van ouders (e.g., het benadrukken van persoonlijk succes, status en dominantie in de samenleving) negatief gerelateerd te zijn aan sociaal gedragingen van peuters. Dit resultaat is in overeenstemming met voorgaande bevindingen bij adolescenten en volwassenen (voor een review, zie Schwartz, 2010). Over het algemeen lijkt het dat een nadruk op zelfverbetering waarden een negatieve invloed heeft op sociaal gedrag van jonges af aan tot op latere leeftijd. Deze resultaten zijn met name belangrijk nu deze waarden, dankzij globalisatie, beginnen te groeien binnen culturen die van oudsher meer focusten op zelftranscendentie waarden. Belangrijker nog is dat het effect van sociaal contextuele factoren kan veranderen met de leeftijd (ontwikkelingsniveau van kinderen). Hoewel we vonden dat de door ouders gestelde gehoorzaamheidsdoelen voor kinderen van 28 maanden een negatieve voorspeller waren van instrumenteel helpen 6 maanden later, vond voorgaand onderzoek dat deze doelen positief gerelateerd waren aan het helpen van dreumesen van 19 maanden, wanneer dit

gedrag net ontstaat (Kärtner, Keller, & Chaudhary, 2010). Het is plausibel dat de nadruk van ouders op gehoorzaamheid zal helpen om jonge kinderen te leren hoe zij bepaalde prosociale gedragingen moeten uitvoeren wanneer hun mogelijkheden nog beperkt zijn. Echter, ditzelfde doel lijkt juist voor een inzinking te zorgen wanneer kinderen al in staat zijn om dit gedrag te vertonen. Ouders zouden dus rekening moeten houden met het ontwikkelingsniveau van hun kind en hun doelen en praktijken hieraan moeten aanpassen.

Ondanks de bevindingen die indiceren dat er sprake is van een effect van sociaal contextuele factoren op prosociale gedragingen, is het ook belangrijk om te erkennen dat prosociale gedragingen (ten minste deels) geworteld zijn in de menselijke aanleg. Mensen hebben de natuurlijke neiging om sociaal te zijn. Psychologische mechanismen als emotionele beloning (i.e., een toename van blijdschap na sociaal gedrag) lijken ervoor te zorgen dat we sociaal gedrag blijven vertonen. Echter, door de natuurlijke tendens te erkennen wordt de potentiële rol van sociaal contextuele factoren in de ontwikkeling van prosociale gedragingen en in de ontwikkeling van individuele verschillen in sociaal gedrag niet ontkent. Zelfs de natuurlijke tendens benadering geeft toe dat sommige sociaal contextuele factoren, zoals socialisatie praktijken en culturele normen, invloed hebben op het ontwikkelen van altruïsme in kinderen (Warneken, 2016). De huidige dissertatie belicht of en hoe sommige factoren een rol spelen in het verfijnen van deze predispositie bij kinderen.

### **Algemene conclusie**

Ondanks de terugkerende interesse in sociaal gedrag in de afgelopen twee decennia, bleven verschillende vragen bestaan hoe deze gedragingen zich ontwikkelen. Deze dissertatie focuste op het schetsen van de algemene ontwikkelingspaden van helpen en delen, en onderzocht hoe sociaal contextuele factoren bijdragen aan de vroege ontwikkeling van deze gedragingen. De huidige dissertatie vond dat helpen en delen verschillen in hun ontwikkeling over tijd, wat de multidimensionele aard van sociaal gedrag verder ondersteund. Daarnaast bleek dat beide gedragingen zich niet lineair ontwikkelen. Meer specifiek toont elke gedraging een stijging-plateau, stijging-plateau traject van de babytijd tot de adolescentie. Daarnaast bleek dat van de dreumestijd tot de peutertijd drie soorten sociaal gedrag (instrumenteel helpen, delen en empathisch helpen) toenemen. Deze dissertatie toonde verder aan dat sociaal contextuele factoren verschillende soorten prosociale gedragingen kunnen stimuleren wanneer zij voor het eerst ontstaan. Sociaal gedrag kan zelfs gestimuleerd worden door kleine veranderingen in de situationele, sociaal contextuele factoren (e.g., primen van verbondenheid) en ook door socialisatie van ouders (e.g., sociaal gerelateerde socialisatie praktijken). Naast het benadrukken van het belang van

sociaal contextuele factoren op prosociale gedragingen, heeft de huidige dissertatie ook een robuust psychologisch mechanisme (emotionele voordelen na prosociaal gedrag) aangetoond. Dit suggereert dat prosociale gedragingen (deels) geworteld zijn in de menselijke aard. Daarnaast lijken ouders in verschillende culturen prosociaal gedrag te stimuleren op cultuurspecifieke manieren. Niettemin tonen peuters uit verschillende culturen overeenkomsten in prosociaal gedrag. Deze verschillende paden lijken een soortgelijk doel te dienen wat voor alle samenlevingen geldt: het verfijnen van onze natuurlijke prosociale neigingen om kleine weldoeners op te voeden binnen onze samenleving.



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To my parents, I am so grateful for their support throughout these years, both mentally and economically. Before I was born, they already hoped that I would be a Ph.D. one day, so this is their dream-come-true moments as well. However, this journey is harder and longer than they expected. Watching their only child doing a Ph.D. abroad at her 30s is not easy for them. Moreover, within the current Chinese cultural contexts, they took over tons of social pressures for me. Without their support, I could not focus on my project to this degree. The comfort for them is that, I will go back home soon, and work in the university in my hometown. Because they do not speak English, I will close this paragraph as it is now. After all, I have years to express my love to them face to face.

Thank you for your reading and reading so far. I think this book is, to some degree, the story of a young scholar pursuing a Ph.D. degree, and the potential of her life. However, this is not only about her, but it is also the story about so many people she has encountered, the days and nights they worked together, the laughs and tears they shared. It is a wonderful story, and the journey continues. I hope I will see you all again, and to tell you how grateful I am personally in the future.

## **Curriculum Vita**

### About the author

Yue Song was born on September 25, 1988, in Nanjing, China. She studied psychology at Nanjing Normal University and obtained her Bachelor's degree and an honor program certificate in 2011. After that, she went to Beijing Normal University and obtained her research Master's degree in social psychology in 2014. In the same year, she received a grant from the Chinese Scholarship Council, which allowed her to study abroad for her Ph.D. program.

In September 2014, she came to Utrecht University and started her Ph.D. project at the department of Developmental Psychology with prof. dr. Judith Dubas as her promoter. In the Spring of 2015, dr. Martine Broekhuizen joined this project as the daily supervisor for her. This project focused on the early development of prosocial behaviors, and resulted in her doctoral dissertation, entitled “Little Benefactors: How Helping and Sharing Develops within Social Contexts”.

As a Ph.D. candidate, Yue managed to collect a 3-wave longitudinal data in Dutch toddlers (although her Dutch is not better than her participants). Also, she collected cross-sectional data in Chinese young preschoolers. She also organized and participated in several symposia at international conferences. Next, to conducting research, Yue participated in supervising several Bachelor and Master students. Also, she was a member of the Ph.D. council of the Faculty of Social and Behavioral Sciences (2016-2017).

Yue will enter her tenure-track (as a lecture) at Nanjing Normal University in December 2019.

## Scientific Publications

- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *A meta-analysis on age difference in helping and sharing behaviors under 18 years old*. Manuscript to be submitted for publication.
- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *Happy little benefactor: Prosocial behaviors promote happiness in young children from two cultures*. Manuscript submitted for publication.
- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *A three-wave study on the development of prosocial behaviors across toddlerhood: The role of socialization*. Manuscript submitted for publication.
- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *The early development of prosocial behavior: Does the number of resources matter?*. Manuscript submitted for publication.
- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *Priming with affiliation increases 28-month-olds' sharing, but not instrumental helping*. Manuscript submitted for publication.
- Song, Y., Broekhuizen, M. L., & Dubas, J. S. (2019). *Having choice or not to share does not affect toddlers' subsequent sharing behavior*. Manuscript in preparation.
- Song, Y., Malhotra, S., Broekhuizen, M. L., Wang, Y., Chen, B. B., & Dubas, J. S. (2019). *Prosocial behavior in young preschoolers: A cross-cultural study across the Netherlands, India, and China*. Manuscript submitted for publication.

