

DEVELOPMENT OF FAIRNESS UNDERSTANDING IN PRESCHOOLERS

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Humans value fairness in themselves and others, but controversies exist as to how to allocate resources fairly. This dissertation explores ontogenetic roots of fairness by assessing preschoolers' responses in situations where different principles of distributive justice are put in conflict. Study 1 asked whether 3- and 5-year-old children are able to take others' subjective needs into account when distributing resources. Children allocated rewards to two recipients, one of whom was needier than the other, in two conditions: with an even and an odd number of resources. Results show that 3-year-olds use the equality principle as a default, but can distribute on the basis of need when resources cannot be divided equally. By 5 years of age, children's concern about others' needs is stronger and can trump the equality principle. Study 2 examined how children balance considerations of universal fairness with their own self-serving motives. Three- and 5-year-olds had to choose between two distributors, one of whom had previously been fair to everyone and the other had favored one of the recipients. Children either observed the distributions as a third party or served as favored recipients themselves. Results show that at 3 year of age, children only prefer fair distributors in third-party contexts. By age 5, children choose fair partners even when it conflicts with their own interests. This developmental period thus appears to be the time when norms of fairness grow in importance and can override children's self-regarding motives.

TABLE OF CONTENTS

LIST OF TABLES	VIII
LIST OF FIGURES	IX
PREFACE	X
1.0 GENERAL INTRODUCTION.....	1
1.1 CONTROVERSIES AROUND FAIRNESS.....	2
1.2 CHILDREN'S NOTION OF FAIRNESS	4
1.3 FAIRNESS UNDERSTANDING IN YOUNGER CHILDREN.....	7
1.4 RESPONDING TO OTHERS' FAIR OR UNFAIR BEHAVIOR	12
2.0 STUDY 1. EQUALITY VS EMPATHY: DO PRESCHOOLERS CONSIDER OTHERS' NEEDS WHEN DISTRIBUTING RESOURCES?	18
2.1 INTRODUCTION.....	18
2.1.1 Development of the sense of equality and equity	19
2.1.2 Role of empathy in fairness-related behaviors.....	21
2.2 METHOD	25
2.2.1 Participants	25
2.2.2 Materials and Design.....	26
2.2.3 Procedure	27
2.2.3.1 Non-social training.....	27

2.2.3.2	Testing	28
2.2.3.3	Coding and Reliability	29
2.3	RESULTS	29
2.4	DISCUSSION	32
3.0	STUDY 2. FAIR OR NICE? CHILDREN'S EVALUATIONS OF OTHERS AS DISTRIBUTORS	34
3.1	INTRODUCTION.....	34
3.2	METHOD	40
3.2.1	Participants	40
3.2.2	Materials and design	41
3.2.3	Procedure	43
3.2.3.1	Training.....	44
3.2.3.2	Testing.....	45
3.2.3.3	Coding and reliability	46
3.3	RESULTS	46
3.4	DISCUSSION	51
4.0	GENERAL DISCUSSION	55
4.1	MAJOR FINDINGS	56
4.2	METHODOLOGICAL IMPLICATIONS	62
4.3	THEORETICAL IMPLICATIONS.....	64
4.4	LIMITATIONS AND FUTURE DIRECTIONS	72
4.5	CONCLUSION	75
	APPENDIX A . TABLES AND FIGURES	78

A.1	FIGURES FOR STUDY 1.....	78
A.2	TABLES FOR STUDY 1.....	79
A.3	FIGURES FOR STUDY 2.....	81
A.4	TABLES FOR STUDY 2.....	85
APPENDIX B.	SCRIPTS FOR STUDY 1	87
B.1	TASK 1. ILL PUPPET AND DICE	87
B.2	TASK 2. HUNGRY PUPPET AND FOOD	88
B.3	TASK 3. SAD PUPPET AND MARBLES.....	89
APPENDIX C.	SCRIPTS FOR STUDY 2	90
C.1	“1ST PARTY” CONDITION	90
C.1.1	Demo 1	90
C.1.2	Demo 2	91
C.1.3	Test.....	91
C.2	“3RD PARTY” CONDITION	92
C.2.1	Demo 1	92
C.2.2	Demo 2	93
C.2.3	Test.....	94
BIBLIOGRAPHY.....		96

LIST OF TABLES

Table 1	Mean percentage of items given to the needy puppet across all 3 tasks as a function of age and distribution condition	79
Table 2	Number of 3-year-old children who favored the different puppets (or gave to them equally, where possible) in the three different tasks	80
Table 3	Number of 5-year-old children who favored the different puppets (or gave to them equally, where possible) in the three different tasks	80
Table 4	Means and standard deviations (in parentheses) for the proportions of trials on which children chose the Fair puppet	85
Table 5	Correlations between the five measures in Study 2 for 3.5-year-old participants, Pearson's <i>r</i>	85
Table 6	Correlations between the five measures in Study 2 for 5.5-year-old participants, Pearson's <i>r</i>	86

LIST OF FIGURES

Figure 1	Materials for Study 1	78
Figure 2	Set-up for Study 1	79
Figure 3	Materials for Study 2.....	81
Figure 4	Set-up for study 2: First Party condition.....	82
Figure 5	Set-up for study 2: Third Party condition.....	83
Figure 6	Number of children at each age and condition who favored the Fair puppet, favored the Preferring puppet, and chose both equally often, in response to 5 measures.	84

PREFACE

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1.0 GENERAL INTRODUCTION

Many agree that the key principle in the proper functioning of a society is the principle of fairness. Hardly anyone in the modern world (at least the modern Western world) would contest the view that people should have equal rights and be rewarded "fairly" for their efforts toward common good. In philosophy and other social sciences, fairness is considered to be one of the pillars of morality (Rawls, 1971; Haidt, 2012), something that makes us truly and uniquely human. Yet, while agreeing on its importance, people tend to disagree on what exactly fairness means and how exactly it should be applied.

This dissertation focuses on a few controversies related to people's understanding of what is fair. Its main goal is to examine how the notion of fairness develops in young children and how they resolve its various challenges as their social-cognitive skills develop over the preschool period. Until recently, children's understanding of fairness at this developmental period has been virtually unexplored; in the past few years, however, research began to show that young children might have a "sense of fairness" (Sloane, Baillargeon, & Premack, 2012), and to chart its developmental trajectory. The current work adds a few new pieces to the puzzle. I will begin by identifying the issues and reviewing the extant literature on the development of children's fairness-related judgment and behavior. In the following chapters, I will present two novel empirical studies that examine (a) the principles that children use when deciding how to allocate resources, specifically, their ability to balance the equality principle and reactions to others'

subjective needs, and (b) children's evaluations of others based on their previous fairness-related behavior, specifically, their preferences for impartially fair partners versus partners who had previously favored them. In the concluding chapter, findings from these studies are discussed in terms of their theoretical and methodological implications for the research on the development of fairness understanding.

1.1 CONTROVERSIES AROUND FAIRNESS

One of the long-standing debates related to fairness concerns the criteria that ought to be used to distribute resources "fairly". Utilitarian theories of fairness (Mill, 1859/2003; Harsanyi, 1976) propose the principle of "maximizing the good": the distribution should lead to the maximization of the total welfare across individuals, irrespective of each individual's rights, merits, needs etc. Even if some individuals get more and some get less (or nothing), utilitarianists would be satisfied as long as the greatest possible amount of "the good" was out in the world. On the contrary, deontological theories of fairness, most notably that of Rawls (1971), focus on the individuals and their situations, positing that it is more important to grant everyone his or her share than to maximize the overall good. But the question still remains how to determine each person's share. Rawls maintains that goods should generally be distributed equally, unless an unequal distribution is to the advantage of the least favored members of society. For others, the key criterion is each individual's productivity or effort (Adams, 1965). Lerner (1974) identifies several factors that contribute to the human "justice motive" and that can influence one's judgment simultaneously: parity (or equality), equity, law, justice of needs, social obligations and contract, Darwinian justice, and justified self-interest. Children seem to have some

sensitivity to (and arguably, preference for) equality very early, possibly in infancy, according to looking-time studies (Geraci & Surian, 2011; Schmidt & Sommerville, 2011); however, they are not able to make explicit equality-based decisions until school age (Damon, 1977, 1983). In the following sections, I will review the existing research on the criteria that children of different ages use when allocating resources.

Another point of debate is how impartial should a person's "fair" decision be. In theory, we value "fairness for all"; however, when it concerns resource distribution, issues of personal relationships and reciprocity often come into play. Under varying circumstances, people may place different emphasis on different criteria for "deservingness" of recipients. In sociology and economics, a distinction is drawn between communal and exchange relationships: in communal relationships people have a broad sense of responsibility for others' welfare, whereas exchange relationships emphasize exchange of comparable benefits and maximizing returns for the self (Clark & Mills, 1993). In exchange relationships, characterizing business-like interactions, *equity* rules—i.e., matching outcomes to each participant's input—are generally considered appropriate. In communal relationships, exemplified by friendships and family bonds, most adults consider *equality* rules—i.e., dividing resources equally regardless of each person's input, or *need-based distributions*—again, unrelated to individual contributions—to be most appropriate.

Evolutionarily, the motivation to be more prosocial toward certain individuals is believed to be based on two main principles: kin selection—promoting one's genes by helping relatives (Hamilton, 1964), and reciprocal altruism—helping others to the degree to which their help can be anticipated in return (Trivers, 1971). In humans, these principles are applied much more broadly than in other animals: we generally tend to be prosocial rather than not, even to non-kin and to people who we are not likely to ever meet again; however, when facing a forced choice

whom to help, the kin and reciprocity principles come back into play (Krebs, 2008). Importantly, in addition to direct reciprocity —tendency to prefer people who have been or are expected to be nice to us—humans also follow the principle of *indirect reciprocity*, that is, the tendency to return helpful and harmful acts in kind even if these acts have been directed not to us but to others (Alexander, 1987). In economic games, adults tend to reward partners who have behaved fairly and punish partners who have behaved unfairly, even when subjects were not affected by that behavior themselves (Fehr & Fischbacher, 2004; Singer et al., 2006). This ability to judge third-party interactions is important both for humans' choice of partners and for the formation of their own reputation in the group (Nowak and Sigmund, 2005). Therefore, there are two types of values that people apply both to themselves and when evaluating potential partners: one is impartial fairness toward all; the other is special treatment for special individuals, e.g. kin or people with whom we are interdependent. How does children's understanding of these values develop, and which values do they appreciate? A review of the relevant developmental literature follows.

1.2 CHILDREN'S NOTION OF FAIRNESS

Jean Piaget starts his seminal work on children's moral judgment by contemplating the game of marbles, which, in his view, "contains an extremely complex system of rules, that is to say, a code of laws, a jurisprudence of its own" (Piaget, 1932/1997, p. 13). Indeed, determining and following rules, deciding—and proclaiming—that particular acts are "fair" or "not fair" (and often vehemently reacting to the "not fair" ones) are parts of children's behavioral and verbal

repertoire from quite early on. Studying children's fairness-related decisions thus provides a unique window into the ontogenetic roots of fairness.

Classic studies of the development of fairness understanding, conceptualized as "positive justice" (essentially, justice in resource distribution) have looked at preschoolers and school-age children and have focused on their ability to make and explain decisions on how to distribute rewards among hypothetical others, or others and oneself. Following Piaget (1932) and Kohlberg (1969, 1981), who found moral judgment virtually non-existent until school age, Damon (1977, 1980, 1983) has proposed a stage-like age-related sequence in children's conception of distributive justice, with early reasoning based on one's selfish subjective wish or some arbitrary criteria, then—progressively—on universal equality (i.e., the notion that everyone should get the same), reciprocity and moral relativity (i.e., understanding that different people may deserve more or less depending on their previous behavior or need), and finally, on the ability to flexibly coordinate the above considerations according to specific situations. According to this research, the transition from the initial level (selfish or arbitrary reasoning) to the second level (reasoning predominantly based on equality) typically occurs between 6 and 9 years, the notion of moral relativity emerges between 8 and 10 years, and the ability to coordinate equality, reciprocity and moral relativity—after 10 years of age (Damon, 1983; Sigelman & Waitzman, 1991).

In a longitudinal study, Damon (1980) has shown that children aged between 4 and 9, interviewed on their conceptions of justice at one-year intervals over the period of two years, reliably followed a stepwise progression from one level to the next. This study used hypothetical stories about children who worked together (either made crafts to sell at a fair or delivered newspapers) and had different claims to rewards: some children were poor, some worked harder, some were well behaved, some were boys, some girls, etc. Children had to decide how rewards

should be distributed and justify why, and were assigned a score corresponding to their reasoning level. The majority of changes (over the two years' study period) were limited to movements by one or two levels, suggesting that the progression in justice reasoning is quite slow and gradual. However, subjects who had low scores for their age at the initial interview were the ones most likely to change positively by more than one level the following year, suggesting an overall tendency for children to catch up with their peers and to ultimately follow the universal stage-like sequence in positive justice reasoning.

An additional factor that has been proposed to affect children's developing judgments of fairness is the type of relationship between the involved parties, that is, whether the recipients of resources are strangers or close relations (McGillicuddy-De Lisi et al., 1994; Frederickson & Simmonds, 2008). Consistent with the distinction between communal and exchange relationships (Clark & Mills, 1993), it has been reported that distributive justice situations involving a sibling tended to elicit preference for equality norms in both children and adults (Thomson & Jones, 2005). To further examine the relationship factor in children's decision making about which recipients are more deserving, one study used the contrast friend/stranger as an independent variable, along with neediness and productivity, with 5- to 12-year-olds, and found that while it did not affect younger children's decisions, older children tended to allocate more resources to poor recipients who were friends, and to productive workers who were strangers (McGillicuddy-De Lisi et al., 1994), which is in general consistent with the communal/exchange relationships distinction.

These studies show that the concept of fairness, at least as measured by verbal responses to hypothetical stories, is extremely complex and appears to be quite late developing. The adult-like level of fairness-related reasoning, which takes into account the nuances of relationships

between the parties and each individual's contributions and needs, may not emerge until around 9-10 years of age. Before that, the most sophisticated principle that children seem to be able to apply to resource distribution problems is the principle of equality. When and how does this principle emerge in the reasoning of younger children? And can their distributive behavior—as opposed to judgment—reveal a more nuanced understanding of fairness?

1.3 FAIRNESS UNDERSTANDING IN YOUNGER CHILDREN

Precursors to fairness understanding start developing in toddlerhood. To be able to understand that different people might deserve equal (or, broadly, fair) treatment, one must first understand that others experience subjective internal states, such as needs and desires. Children start to become sensitive to needs of others—for example, respond empathically to others' distress—starting around their first birthday (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992; Nichols, Svetlova & Brownell, 2009). Early in the second year, they also begin to be prosocial toward others by helping them instrumentally and informatively (Warneken & Tomasello, 2007; Liszkowski et al., 2006), with the range and flexibility of prosocial behaviors increasing over the second and into the third year of life (Brownell & Carriger, 1990; Vaish, Carpenter & Tomasello, 2009; Svetlova, Nichols & Brownell, 2010). Two-year-olds are also able to share with others, especially when it is not costly for the child and when the recipient of sharing clearly expresses her need (Brownell, Svetlova & Nichols, 2009).

In addition, a few recent studies have shown that children might have a preference for equal and equitable distributions (or at least perceive them as different from other types of distributions) much earlier than previously thought. These studies used looking-time and

preferential choice paradigms in third-party tasks. When observing two differently behaving animated characters—one giving an object to each of two recipients and the other giving both objects to one recipient—16-month-olds seemed to know the difference and to expect a third character approach the equal distributor (they looked longer at this outcome than when the character approached the unequal distributor); also, when asked to pick a picture of one of the distributors, they chose the equal distributor more often (Geraci & Surian, 2011). In another experiment with a similar scenario, 15-month-olds looked longer (presumably being surprised) at an unequal outcome of a food distribution than at an equal outcome (Schmidt & Sommerville, 2011). Importantly, both these studies had non-social control conditions, either with inanimate “recipients” or with no distributor; in these conditions, children did not differentiate between symmetrical and asymmetrical distributions. Therefore, they reacted specifically to social situations involving distributions, and not just to perceptual features such as symmetry. Even though the looking time results in these two studies contradict each other, they suggest that toddlers do discriminate between equal and unequal distributions.

What about children’s own distributive behavior? Studies by Damon and colleagues, reviewed in the previous section and generally converging on the absence of the notion of distributive justice until age 6, used measures that might have been cognitively and/or verbally challenging for younger participants, and thus might have underestimated their competence. In recent years, a few studies have attempted to examine younger children’s concepts of fairness using behavioral methods and various non-verbal measures, with the hope that such methods would reveal a more nuanced picture of early development of fairness understanding. An additional approach to exploring these earlier processes that some of these studies used is to

measure *inequality aversion*—a construct that is a flip side of equality preference but that requires less active decision-making from the part of the child.

In a study with 3- to 8-year-old children, Fehr, Bernhardt and Rockenbach (2008) explored age-related changes in inequality aversion, which they conceptualized as preference for allocations that reduce inequality between oneself and one's partner, regardless of whether the inequality is to the subject's advantage or disadvantage. The tasks were to allocate sweets to self and/or a partner. To reduce the possible confound of expectations of reciprocity, for each task subjects were paired with one anonymous partner. There were three conditions: (i) choosing between a (1, 1) allocation—i.e., one item for self and one for the other—and a (1, 0) allocation, which tested whether subjects would benefit the other at no cost to themselves; (ii) choosing between allocations (1, 1) and (1, 2), which tested for the tendency to benefit the other more than oneself (again at no cost); and (iii) choosing between allocations (1, 1) and (2, 0), which tested whether subjects would provide a benefit to the other that is costly for themselves. Among 3- to 4-year-olds, the majority behaved selfishly, choosing randomly in the first two conditions—i.e., not taking the other's interests into consideration—and strongly preferring the self-benefiting (2, 0) allocation in the third condition. Five- to 6-year-olds chose randomly in the first two conditions, but were somewhat more likely to make a non-selfish (1, 1) choice in the third condition. A substantially different picture emerged for 7-8-year-old children. In the first two conditions, they were above chance in choosing the (1, 1) allocation, making sure that their partner received neither less nor more than themselves. In the third condition, 45% of 7-8-year-olds chose the non-selfish (1, 1) allocation over the self-benefiting (2, 0) allocation (as opposed to only 8% of 3-4-year-olds and 22% of 5-6-year-olds). Taken together, these findings suggest

that inequality aversion emerges after 6 years and increases significantly with age, whereas selfishness decreases steadily from 3 to 8 years of age.

As a follow-up of Fehr and colleagues' study, Moore (2009) systematically investigated 4- to 6-year-olds' tendencies to allocate resources equally between themselves and others (presented as pictures) depending on who the recipients were: the child's friend, a familiar non-friend, or a stranger. In several trials, children could either keep two stickers for themselves or keep one and give the other one to the recipient. In contrast to Fehr and colleagues' (2008) results, findings of this study indicated that preschoolers are able to opt for equal distributions, even at a cost to themselves, when the recipient is their friend.

A slightly different approach, with a potential to reveal earlier understanding of fairness, is to look at children's reactions as recipients of fair and unfair distributions. A study by LoBue et al. (2011), using both verbal and non-verbal (facial expressions, looking) measures of inequality aversion, found that when 3- to 5-year-old children were themselves recipients of unfair distributions, they exhibited neutral responses when the inequality was advantageous for them, but were distressed and/or protested when it was disadvantageous for them. In that study, pairs of children were given stickers in reward for cleaning up toys, and in each pair one child received two stickers and the other received four. All three ages—3-, 4- and 5-year-olds—had the same tendency to react negatively when they were at a disadvantage, even though, when asked explicitly what was wrong, less than 3% of them were able to verbalize fairness-related reasons. There was little evidence for an advantageous inequality aversion (protesting when the other received less than oneself). These findings suggest the presence of an aversion to disadvantageous unfair distributions already by the age of three, which might be a precursor to

the conscious conceptualization of equality, emerging after age of six according to Damon (1983).

In a further investigation of inequality aversion, Blake and McAuliffe (2011) devised an apparatus that allowed children (4- to 8-year-olds) to accept or reject unequal offers of candy that were disadvantageous to either the subject or the other recipient (an unfamiliar peer). Consistent with the study by LoBue et al., they found that 4- to 7-year-olds rejected disadvantageous offers, but accepted advantageous offers. However, 8-year-olds rejected both forms of inequality, suggesting that by that age, norms of fairness may grow in importance to the point of overriding children's selfish motives.

In another study by Blake & Rand (2010), 3- to 6-year-old children participated in a Dictator Game, where they could share stickers with an anonymous recipient. Each child was given 10 copies of their most preferred sticker and 10 copies of their least preferred sticker. Separately for each type of stickers, children were asked to put some in an envelope for a child who will come tomorrow. About half of the children did not share at all. The percentage of those who did increased with age. On average, children (who did share) gave 50% of their least favorite stickers and 40% of their most favorite stickers; these averages were constant across ages, but frequencies of equal distributions increased with age. The majority of 3- to 4-year-olds did not share at all, whereas the majority of 5- to 6-year-olds divided the stickers equally (which was more pronounced for the low-value stickers).

Another factor that may affect children's propensity to share fairly is the social situation in which the rewards are obtained. Hamann and colleagues (2011) investigated whether working together to get rewards would influence 3-year-olds' tendencies to share equally. After training, in which pairs of children worked together to receive two marbles each, in the test phase, also

after working together, one child received one marble and the other received three. Compared to control conditions in which no collaborative work was involved, children who collaborated were more likely to redistribute the marbles to restore equality.

Children's sense of fairness is thus developing much earlier than thought previously. However, the patterns of their fairness-related behavior are quite complex, perhaps not less complex than those of adults. Preschoolers' selfish motives seem to be the main obstacle to fair behavior; it is also difficult for them to share with anonymous others, most likely because young children have not had much experience interacting with people outside of their small circle of family, teachers and familiar peers. Children's sense of fairness seems to be most pronounced when they have some sort of a connection with other recipients (friendship or collaborative work), when they are treated unfairly by others, or when their own interests are not at stake.

1.4 RESPONDING TO OTHERS' FAIR OR UNFAIR BEHAVIOR

The ability to evaluate other people's social and moral behavior is crucial for humans, both at an individual level and at the level of the society. For an individual, assessing the other's past or current behavior can help predict his or her future intentions and actions, and determine whether this person is worth affiliating with or should rather be avoided. For the society as a whole, monitoring each others' moral stances and adherence to norms helps prevent cheating, free-riding, and other types of behavior that present a threat to cooperative co-existence. In choosing partners, humans use both direct and indirect reciprocity (Alexander, 1987; Nowak & Sigmund, 2005).

Several studies have explored the effects of direct and indirect reciprocity on children's judgments and behavior toward variously behaving others. Similarly to the distributive justice studies, they have traditionally been conducted with school-aged children. For example, in a study by Harris (1970), fourth- and fifth-graders were given the opportunity to give tokens (previously won in a game) to charity or to an experimenter after observing the experimenter either share with them, give to charity, or not give to anyone. At both ages, children who observed any type of sharing were generally more likely to share themselves; those receiving tokens from the experimenter tended to share with her; and those observing her share with charity tended to donate to charity. Similar effects—sharing more with the one who had shared more—were observed in studies with first-graders (Presbie & Coiteux, 1971), fourth-graders (Staub & Sherk, 1970), and second- and sixth-graders (Keil, 1986; in that study, children's sensitivity to the other's behavior increased with age). Even though these findings point to the presence of direct reciprocity, they can also be interpreted as the effects of imitative learning: children might have perceived the other's behavior as a model and behaved in the way most similar to how she behaved.

To assess understanding of reciprocity in a more explicit way, Berndt (1979) asked 4- to 5-year-old preschoolers to judge prosocial acts of cartoon characters toward each other. Children tended to explain characters' reciprocity-based behavior in personal terms («The squirrel helped because he's nice») rather than in reciprocal terms («The squirrel helped because the horse had helped him»), suggesting that the explicit awareness of reciprocity norms might be limited at that age.

Levitt et al. (1985) examined very early development of direct reciprocity. In their study, pairs of three-year-old children were separated by a barrier in the same room, and only one child

was given toys, which the other child could observe. After waiting for a few minutes for the children to share spontaneously (which none of them did), mothers of children who had toys encouraged them to share with the toy-deprived peer. The roles were then reversed. Sharing behavior of the child who received the toys second was consistently related to whether or not the first child had shared. Thus, some reciprocity understanding might be operating already at the age of three; although children's responses in this study could again have been partly driven by imitation.

A few recent studies looked at how children's evaluations of others' moral behavior influences their distributive choices. One study, also focusing on reciprocity (Robbins and Rochat, 2011), tested 3- and 5-year-old children in a sharing game in which a generous puppet and a stingy puppet participated. At the end of the game, the child could punish one of the puppets, which involved sacrificing the child's previously earned coins. Five-year-olds, but not 3-year-olds, selectively punished the stingy puppet. Interestingly, a group of 5-year-olds tested in rural Samoa did not show the same propensity for negative reciprocity.

To our knowledge, only a few studies so far have examined the development of indirect reciprocity. Vaish et al. (2010) had 3-year-old children watch one adult either helping or harming another adult; then, children had a chance to help the harmful actor, the helpful actor, and a third (previously neutral) actor. Children helped the harmful adult less often than the neutral adult, but helped the helpful and neutral adults equally often. In a variation of this task where one actor intended but failed to harm someone, and another actor harmed someone accidentally, children were more likely to help the neutral and the accidentally harmful actors than the one who had harmful intentions. Children thus are able to use third-party information to form judgments about people, and tend to return indirect favors selectively to people without harmful intentions.

Another recent study (Olson and Spelke, 2008) examined factors influencing young children's resource distributions using a third-person giving task: 3.5-year-old children had to help a protagonist (a puppet) to allocate resources to other puppets, of which some were the protagonist's close relations, some had previously given to her, and some had previously given to others. On some trials the number of resources equaled the number of potential recipients, and on other trials the number of resources was smaller than the number of recipients. In the former case, when the equality option was possible, children tended to distribute resources equally to all the recipients, consistent with the previous research that established equality as the main operating principle for allocations by children before age six. But when there were fewer resources and children were forced to make a choice, a more interesting pattern emerged. First, children guided the protagonist to give more to siblings and friends than to strangers. Second, when choosing between puppets who had given to the protagonist (direct givers) and those who had given to others (indirect givers), they tended to prefer direct givers. Third, when choosing between indirect givers and non-givers (puppets who had previously kept all resources to themselves), children preferred indirect givers. Thus, in a forced-choice situation, children appear to apply the principles of both direct and indirect reciprocity already by 3.5 years of age.

Similarly, in a study by Kenward & Dahl (2011), 3- and 4-year-olds were exposed to one puppet who helped someone and another puppet who hindered someone. The children's task then was to distribute toy biscuits between the helper and the hinderer. When they had a small odd number of biscuits, 4-year-olds, but not 3-year-olds, gave more to the helper. However, when resources were plentiful, children at both ages distributed them equally. This, again, shows that young children may have some understanding of social situations, but it may be difficult for them to express appropriate behavior unless the situation forces them to make a choice.

A few theoretical and methodological conclusions can be drawn from the reviewed literature. First, children as young as 3 years of age do have a preference for fairness, particularly equality, when the distribution does not affect children themselves, that is, when they distribute something that they have no interest in, and do not serve as recipients. Under these conditions, more specialized questions about their understanding of fairness (e.g., about conflicting criteria for recipients' deservingness of resources) can be asked. When children's own interests are at stake, special conditions need to be created to elicit a fair response; since in this case they have quite a pronounced self-serving bias, even maintaining and restoring equality (like in the studies by Fehr et al., 2008, and Hamann et al., 2011) is challenging and can be viewed as prosocial. Second, even though under special circumstances children show some understanding of equity, reciprocity, and the like, they have a hard time acting on this understanding when an egalitarian distribution is possible. The "equality bias" overrides most other considerations (except perhaps the selfishness factor). Therefore, to examine children's more nuanced notions of various aspects of fairness, a situation needs to be created that forces the child to make a choice (e.g., there should be less resources available than recipients). Finally, there seem to be a few significant developmental shifts in children's distributive behavior, one approximately between the ages of 3 and 5, and another approximately between the ages of 5 and 8, possibly due to children's growing socialization into the culture and internalization of norms (with the transition to grade school potentially bringing the biggest change). Fairness understanding should thus be studied as a process rather than a phenomenon.

With all that in mind, we designed two studies that aim to add a few new pieces to the developmental picture of fairness understanding. One study explores a factor that is definitely in place in adults' judgment of distributive fairness and that children are likely to develop around

the same time when they start understanding equity; yet it has not been examined in young children: the "need principle". The other study looks further into children's normative understanding of fairness as measured by their evaluations of variously behaving distributors, and compares children's fairness-related judgments in situations where their own interests are either involved or not.

**2.0 STUDY 1. EQUALITY VS EMPATHY:
DO PRESCHOOLERS CONSIDER OTHERS' NEEDS WHEN DISTRIBUTING
RESOURCES?**

2.1 INTRODUCTION

The notion of fairness in resource distribution is as fundamental in human societies as it is controversial. When there is a limited amount of resources and multiple potential recipients, there are several ways to distribute “fairly”. The first, default way that comes to most people’s mind, especially in the absence of other information, is to allocate the equal amount of resources to everybody: the *equality principle*. But if we learn, for example, that some of the recipients worked harder to earn the resources, or that some recipients are in greater need, we may have to make adjustments to our distributive decisions. The widely accepted *equity principle* (Adams, 1965) posits that those whose inputs are greater should receive proportionally greater resources. The Marxian *justice of need* goes further to take into account disadvantaged members of the society, with the famous slogan “From each according to his ability, to each according to his need” (Marx, 1875). These three principles—equality, equity, and need—form the basis of distributive justice in most human societies (Deutsch, 1975), although many other factors (e.g., pre-existing rules; recipients’ efforts or talents; considerations of reciprocity, etc.; see Lerner, 1974, 2003) can influence these decisions under various circumstances.

In situations when two or more of these principles come into play simultaneously, one has to weigh multiple criteria to be able to allocate resources in an optimal way. For adults, such distributive justice problems are complex, and their resolutions are influenced by the knowledge of laws and precedents. But beneath this acquired, normative reasoning seems to lie an intuitive “sense of fairness” (Rawls, 1971), some elements of which are present quite early in ontogeny. What do children use as criteria for their distributive choices, and how do they deal with situations involving multiple criteria?

Of additional interest is the developmental sequence in which the different principles of distributive justice emerge. Several recent studies have examined the development of children’s notions of equality and equity, findings showing that equality is the first to emerge and that equity follows—although, as outlined in the previous chapter, there is still much controversy as to when specifically this happens. However, the early ontogenetic roots of the “principle of need” (in the context of resource allocation) have remained unexplored.

2.1.1 Development of the sense of equality and equity

According to recent looking-time studies, it is possible that children are already sensitive to equality/inequality in the second year of life (Geraci & Surian, 2011; Schmidt & Sommerville, 2011). Behavioral experiments with slightly older children have shown that by 3 years of age, children tend to actively prefer equal distributions. When given a choice to “help” a puppet allocate resources between other, variously behaving puppets, 3.5-year-old children distributed equally when the amount of resources matched the number of recipients; in addition, they were able to make more complex decisions when there were fewer resources, taking into account relationships between the donor and recipients and recipients’ previous behavior (Olson &

Spelke, 2008). In scenarios when both the child and someone else served as recipients, 3- to 5-year-olds protested when things were distributed unequally (LoBue, Nishida, Chiong, DeLoache & Haidt, 2011) and tended to share with others equally, especially after collaborative work (Hamann et al., 2011) and when the recipient was their friend (Moore, 2009). However, when asked to share with anonymous partners, 3- to 4-year-olds were likely to monopolize the resources, and preference for equal distributions under these circumstances emerged only around or after 5 years of age (Fehr, Bernhardt and Rockenbach, 2008; Blake & Rand, 2010). The developmental picture that emerges seems to indicate that at 3 years of age, children's notion of equality is present, but still unstable and dependent on several factors, such as what they know about the other recipients, what their previous experience with the recipients has been, whether the number of resources matches the number of recipients, and, importantly, how much the children themselves want the resources.

Another distributive principle that has been studied developmentally is the equity principle (matching distributions to work input). Lerner (1974) proposed that even though the different "justice motives" are often present in the same individual at the same time, equity might be the second important motive to form after equality (which he called parity). Just like with the other principles of fairness, it has been thought until recently that children could not apply the principle of equity to distributive situations until school age (Damon, 1977; Enright et al., 1984).

A few recent studies have contested this view. Baumard, Mascaro and Chevallier (2012) told 3- and 4-year-old children a simple illustrated story about two girls baking cookies, one doing most of the work and the other taking a break to play dolls. Children then had to distribute two cookies, one big and one small, to the two girls (by pointing to their pictures). Children consistently gave the bigger cookie to the girl who worked more. Then, the authors repeated the

experiment (with a different group of subjects), with the difference that the two cookies were of the same size; after children distributed these two cookies, the experimenter "found" a third one that the child could also give to someone. Children's distributions of the two identical cookies were mainly egalitarian (one cookie to each doll), but the additional cookie was, again, given to the greater contributor by the majority of the children.

In another recent study (Hamann, Bender, & Tomasello, in press), pairs of 3.5-year-old children participated themselves in a collaborative task that yielded rewards: they had to retrieve toys—4 toys at a time, coming out of two openings in a box—by pulling a rope together. One child's task, however, was more difficult, as her end of the rope had first to be retrieved in a complicated way with an additional tool. Children were familiarized with the game and retrieved two toys each in the training phase. In the test phase, children again pulled the rope (with one child, again, having to do more work), but the rewards "accidentally" came down unequally: three toys on one side and one toy on the other. Children who received three toys were more likely to give one to their deprived peer (thus restoring equality) when the peer had worked more than when the peer had worked less, suggesting some understanding of merit.

Thus, when simple and straightforward tasks are used and when children's responses are behavioral rather than verbal, their understanding of equality and equity is expressed at a much younger age than previously thought: around 3 years of age. It is possible, then, that they may understand other principles of fairness (such as the need principle) at an early age, too.

2.1.2 Role of empathy in fairness-related behaviors

Empathy and fairness are often considered the two foundations, or "pillars", of human morality (Haidt, 2003, 2012; Pizarro, 2000). In fact, the philosophical tradition of moral sentimentalism

(Smith, 1759/1981, Hume, 1739/1978) viewed empathy (also called benevolence) as the driving force of justice in society. Empathy motivates prosocial behavior, such as helping, in adults (Batson et al., 1981; Hoffman, 2000) and children (Eisenberg & Miller, 1987). As we know from the reviewed research, school-aged children are able to use empathy (or at least its cognitive component) when making hypothetical distributive decisions in interview studies (Damon, 1977, 1980).

But children are able to understand others' needs and react to them empathically much earlier, starting in the second year of life (preceded by an even earlier phenomenon of involuntary contagious crying in newborns; Sagi & Hoffman, 1976). Studies with toddlers, using simulated distress of adults and peers, have shown that between 12 and 24 months of age, children's responses to others' negative emotions gradually change from reactions of personal distress to more constructive, action-oriented behaviors (Zahn-Waxler et al., 1992; Nichols, Svetlova and Brownell, 2009). Children's helping behavior also emerges—and rapidly grows—at this age (Warneken & Tomasello, 2006; Dunfield et al., 2011). Whereas very early helping may be motivated by simpler mechanisms, such as desire to complete a goal, between the second and the third year of life children's ability to help in empathy-related situations grows significantly (Svetlova, Nichols, & Brownell, 2010). In tasks involving sharing (Brownell, Svetlova, & Nichols, 2009; Brownell et al., in press), 2-year-olds shared when the recipient clearly expressed her need. Experiments by Denham (1986) and Vaish and colleagues (2009) explored affective perspective-taking abilities in toddlers, and found that already by two years of age, toddlers begin to be able to make appropriate judgments about others' negative emotional reactions even without explicit emotional cues. It appears, therefore, that by the age when children start understanding equality and equity—roughly 3 years of age—they have a quite well

developed understanding of the idea of need, too, and can react to others' misfortunes appropriately.

However, research looking more or less directly at the role of responsiveness to need in distributive behavior has only been done with school-age children. One study examined 8- to 11-year-olds' resource allocation in a real classroom (Frederickson & Simmonds, 2008), with children's classmates as recipients of rewards. The classmates were classified beforehand as the subjects' best friends, acquaintances, and children with special educational needs. The subjects were told how much of work—a simple paper-and-pencil task—their classmate has completed, asked to finish their work for them (the task was pre-set so that the child subject's input was always greater than that of the absent peer), and then asked to distribute tokens between themselves and the peer. An age-related increase in children's sensitivity to both relationship type and need was found, such that older children tended to treat their best friends and children with special needs (irrespective of whether they were friends with them) more generously than acquaintances, to whom norms of equity were applied.

A study that measured the relation between empathy and distributive justice indirectly (Malti et al., 2012), again with school-aged children, found that children's sharing in a Dictator Game increased between 6 and 9 years of age, and that increases in sharing were associated with the earlier developing ability to sympathize with anonymous others. This suggests that children's empathic responsiveness may be an important factor in their fairness-related behavior.

However, no study to date has examined the involvement of the "principle of need" in younger children's distributive decisions. Our goal, therefore, was to fill this gap by exploring preschoolers' distribution of resources between recipients, one of which was needier than the other.

The main question of the current study was whether children would give more resources to one recipient than another on the basis of need. To minimize the possible influence of children's selfish tendencies, the task was to distribute resources between two puppets (as opposed to sharing resources between the child and another recipient). We tested 3-year-olds and 5-year-olds, because 3 years is the age when the other "fairness principles" appear to already be in place in some form (Olson & Spelke, 2008; Baumard et al., 2012; Kenward & Dahl, 2011). By age 5, children's social-cognitive abilities grow in complexity; for example, by this age they typically are able to pass the false belief task, which has been shown to affect sharing (children who passed the false belief task shared more, and tended to share more equally, than those who failed it; Takagishi et al., 2010). Fehr and colleagues (2008) and Robbins and Rochat (2011) have also found more sophisticated fairness-related abilities at 5 years of age than at 3. We thus expected that need-based allocations might increase between the ages of 3 and 5.

Since other studies looking at various factors that affect children's distributive decisions found an "equality bias"—tendency to distribute equally when the number of resources matched the number of recipients (Olson & Spelke, 2008; Baumard et al., 2012; Kenward & Dahl, 2011)—we gave children two opportunities to distribute: one with an even number of resources (thus allowing for an equal distribution between two characters, as well as other types of distributions) and one with an odd number of resources (forcing children to favor one recipient over the other).

We hypothesized that younger children would have a strong tendency for equality and so would not differentiate between the two recipients in the trials with the even number of items to distribute. However, we predicted that in the trials with the odd number of items, 3-year-olds

might allocate more items to the recipient who was needy. We expected 5-year-olds to take the recipient's need into account to a greater degree than would the 3-year-olds.

2.2 METHOD

2.2.1 Participants

Participants in the study were 28 3-year-old children (14 girls; mean age = 37.95 months, range = 36.03 to 40.11 months) and 28 5-year-old children (14 girls; mean age = 62.38 months, range = 60.20 to 64.08 months). An additional 6 children (four 3-year-olds, two 5-year-olds) were tested but excluded because of experimenter error or refusal to complete the tasks. The study was conducted in a medium-size city in Germany, and run in eight daycare centers. All children were Caucasian and spoke German. The sample was fairly homogeneous in terms of socio-economic background (corresponding to the American middle to lower-middle class), except for one daycare center that was located in a lower-SES area of the city. Analyses of the effect of daycare center showed no significant differences in any outcome measures. The study's procedure was approved by the Max-Planck Institute's Ethics Committee (corresponding to the IRB approval in the US), and followed the ethics and confidentiality guidelines of German research institutions. Parental informed written consent was obtained ahead of time.

2.2.2 Materials and Design

Each child participated in 3 tasks, each task with a 3-item and a 4-item trial, for a total of 6 trials. In each task the child was asked to distribute toy items between 2 puppets, one of whom was more “needy” of the items than the other. There were 3 pairs of puppets such that each child got a new pair of puppets for each task type (i.e., same pair for 3-item and 4-item versions of Sad, Hungry, and Ill). The order of tasks, as well as the order in which children received the 3-item and 4-item version of each task, was counterbalanced across children at each age. Also counterbalanced were the side on which the needy puppet was presented (to control for side bias), which puppet spoke first (to eliminate memory influence), and which puppet within each pair was needy (to control for possible preferences for particular puppets).

Each child interacted with 6 puppets (3 pairs; see Fig. 1). The two puppets in each pair had identical faces but different hair and clothes. In addition, each puppet had some special features, which made it easier for the children to remember them in the test phase. In the Sad task, the needy (sad) puppet had paper tears attached to her face. In the Hungry task, the needy (hungry) puppet wore a clean bib, while the other puppet wore a dirty bib and was additionally stuffed to appear “full”. In the Ill task, the needy (ill) puppet had bandages on her head and leg.

During test trials, small ($D = 10$ cm) plastic containers for collecting the distributed items were placed on the table in front of each puppet. The same containers were also used for the training. The items that the children had to distribute were toy bananas for the Hungry task, marbles for the Sad task, and toy dice for the Ill task.

Two female experimenters (E1 and E2) administered the tasks. E1 gave instructions and E2 manipulated the puppets. During the testing, E1, E2 and the child sat at a child-sized table. E1 had a box standing next to her chair in which she kept the items to be distributed and the ball that

she used for warm-up. E2 also had a box next to her chair, in which she kept the puppets, and a bag in her lap, in which the puppets dropped the items that they received from the child.

2.2.3 Procedure

Children were tested in daycare centers, in a separate quiet room. The child, E1 and E2 sat at a table (see Figure 2 for set-up). E1 first played a ball-rolling game with the child for 5-10 minutes, to make sure the child felt comfortable and at ease. Then the training phase started.

2.2.3.1 Non-social training Piloting showed that children, especially in the younger group, had difficulties focusing on the quantities of the items they had to distribute, because they were too interested in the puppets. Another issue was that many children were distributing items one at a time, alternating between recipients and starting at a random side (without paying attention to the number of items); as a result, in the 3-item condition, one puppet would often receive more items only because the child started to distribute on that puppet's side. The training thus aimed to encourage children to (a) pay attention to the quantities of the items and (b) move the items toward the puppets simultaneously instead of alternating.

For the training, E1 placed two plastic containers on the table in front of her; she then took four items from a box and said "Let's see how we can divide the [items] between the two bowls". She demonstrated the following distribution possibilities: 2/2, 3/1, 0/4 (sides of unequal distributions counterbalanced between subjects, so that half of the children saw the last higher amount on the left side and half on the right side). She always distributed by first dividing the items in two piles, then moving them all toward the bowls with both hands simultaneously, then dropping them in the bowls and commenting, e.g. "Look, now there is the same amount in both

bowls” or “Now there are more [items] in this bowl than in the other”. After each demonstration, she asked the child: “Can you do what I just did?”, moved the bowls in front of the child, and handed her the items. While the child was distributing the items, E1 commented and drew the child’s attention to the amounts of the items in each bowl. Then E1 put one item back in the box, so that only three items were on the table in front of her, and said: “Look, when I have only 3, I cannot make it so each bowl has the same. I can do this (1/2). Can you do what I did?”. The same procedure as for 4 items was repeated for 3 items, with demonstrations of two possibilities: 1/2 and 3/0 (sides counterbalanced between subjects).

2.2.3.2 Testing After the training, E2 joined the table and sat across from the child. E1 was sitting diagonally from the child (see Figure 2). E2 took the first set of puppets from her box and put them on her hands. She also put the two bowls on the table in front of each puppet. E1 introduced the puppets by saying their names and explaining their situations. For example, in the Ill task, E1 said that one of the puppets had been ill and had not played for a long time, whereas the other puppet had just played all day at preschool (for the script for each task, see Appendix B). E2 then spoke for each puppet, repeating what E1 had said and asking for "something to play with" or "something to eat". E1 handed the required items (three or four, counterbalanced) to the child and asked her to “give some to the puppets”. After the child distributed, E2 said for each puppet: “I got [x] [items]” (this was done to facilitate later coding from videotape); the puppets dropped the items in a bag on E2’s lap and returned with empty bowls. E1 then said “Oh, look, I found some more. Give them to the puppets, too!” and handed the child the remaining (four or three) items. After the second set of items was distributed, the puppets, again, said how many each of them received and dropped the items in the bag. Then they said goodbye and went back

to their box. After a short break, during which E1 played a game with the child and E2 prepared the next set of puppets, the second task started. After the second task, the third task followed.

2.2.3.3 Coding and Reliability The number of items given to each puppet at each trial of each condition (for a total of 12 codes, ranging from 0 to 3 in the 3-item condition and from 0 to 4 in the 4-item condition) was determined by a single main coder from the videotapes. A second coder, blind to the hypotheses of the study, coded independently 25% of the children at each age. Agreement between the two coders was 100%.

2.3 RESULTS

Preliminary analyses were conducted to check for the effect of gender, daycare center, task order and condition (3- or 4-item distribution) order. None of these factors yielded any significant differences on any outcome variable, so all subsequent analyses were conducted on data collapsed over gender, daycare center, task order and condition order.

The main result of interest was whether children favored the needy puppet over the non-needy puppet. Table 1 shows the mean percentage of items given to the needy puppet for children of both ages, both when they had 3 items and when they had 4 items to distribute. The 5-year-old children distributed more items to the needy puppet at an above chance levels for both 3-item and 4-item trials (one-sample t-tests compared to .5, respectively: $t(27) = 8.07, p < .01$; $t(27) = 5.49, p < .01$). In contrast, the 3-year-old children distributed more items to the needy puppet at an above chance level only for the 3-item trials ($t(27) = 2.89, p < .01$), but not for the 4-item trials ($t(27) = 1.61, p = .12$).

When the mean percentages of items given to the needy are compared using a 2 (3-year-olds; 5-year-olds) x 2 (3-item, 4-item) ANOVA, there are no main effects and no interaction.

Next, we asked how many children at each age favored the needy puppet, favored the non-needy puppet, and distributed equally between the two. There were three types of trial representing three different types of need: Hungry, Sad, and Ill. Children received one trial of each type in the 3-item format and one trial of each type in the 4-item format. Tables 2 and 3 show for the 3-year-olds and 5-year-olds, respectively, how many children favored which puppet in each type of trial. For the purposes of these analyses, each child was classified for a given trial type as 'favoring needy', 'favoring other', or (in the 4-item trials) 'equal'. The distribution of children falling into these different types was then compared to chance using Chi-square analyses.

In the 3-item trials, children could behave in one of the two ways (as the equal distribution was not possible): favor the needy puppet (giving her 2 or 3 out of the 3 items) or favor the non-needy puppet (giving her 2 or 3 out of the 3 items). Among 3-year-olds, more children favored the needy puppet than favored the non-needy puppet in the 3-item Hungry task ($\chi^2(1, N = 28) = 5.14, p = .02$) and in the 3-item Sad task ($\chi^2(1, N = 28) = 5.14, p = .02$), but not in the 3-item Ill task ($\chi^2(1, N = 28) = .14, p = .71$). Among 5-year-olds, more children favored the needy puppet than favored the non-needy puppet in all three of the 3-item tasks: 3-item Hungry task ($\chi^2(1, N = 28) = 24.14, p < .001$), 3-item Sad task ($\chi^2(1, N = 28) = 17.28, p < .001$), and 3-item Ill task ($\chi^2(1, N = 28) = 11.57, p = .001$).

In the 4-item trials, there were three possible strategies the children could use: favor the needy puppet (giving her 3 or 4 out of the 4 items), favor the non-needy puppet (giving her 3 or 4 out of the 4 items), and distribute equally (giving each puppet 2 items). The majority of the 3-

year-olds did not give more to the needy puppet, but rather chose to give the items to the two puppets equally at greater than chance levels in all three tasks: in the 4-item Hungry task ($\chi^2 (2, N = 28) = 41.19, p < .001$), in the 4-item Sad task ($\chi^2 (2, N = 28) = 29.41, p < .001$), and in the 4-item Ill task ($\chi^2 (2, N = 28) = 24.14, p < .001$). The 5-year-olds in this condition did something very interesting. Not a single child ever favored the non-needy puppet. Instead for all three tasks children were roughly equally divided between a “favor the needy” and a “divide equally” strategy. This distribution differed from chance in all three cases: 4-item Hungry task ($\chi^2 (2, N = 28) = 24.5, p < .001$), 4-item Sad task ($\chi^2 (2, N = 28) = 27.26, p < .001$), and 4-item Ill task ($\chi^2 (2, N = 28) = 30.57, p < .001$).

When the six tasks were compared across age, more 5-year-olds than 3-year-olds favored the needy puppet in 4 tasks: the 3-item Hungry task ($\chi^2 (1, N = 56) = 6.48, p = .03$), the 3-item Ill task ($\chi^2 (1, N = 56) = 7.77, p = .01$), the 4-item Sad task ($\chi^2 (1, N = 56) = 5.92, p = .04$), and the 4-item Ill task ($\chi^2 (1, N = 56) = 8.0, p = .02$). There was a trend in this same direction for the 4-item Hungry task ($\chi^2 (1, N = 56) = 5.09, p = .06$), but no such trend for the 3-item Sad task ($\chi^2 (1, N = 56) = 2.82, p = .18$).

In summary, 3-year-old children gave more items on average to the needy than the non-needy puppets in 3-item trials; also, more children at 3 years of age favored the needy than favored the non-needy in two tasks out of three. Three-year-olds distributions in 4-item trials did not differ from chance; the majority of children gave equal numbers to the two puppets, and the rest of the children favored one or the other puppet, inconsistently.

For 5-year-olds, the effect of one recipient's neediness was more pronounced. Five-year-olds gave more items on average to the needy than the non-needy puppet in both 3-item and 4-item trials. In 3-item trials, more children favored the needy than favored the non-needy in all

three tasks, and in the 4-item trials, about half of the children favored the needy and the other half distributed equally. On the majority of the tasks, the needy puppet was favored by a higher percentage of 5-year-olds than 3-year-olds.

2.4 DISCUSSION

Previous studies of children's tendencies toward distributive justice have focused on their explicit judgments about how to distribute resources, typically in commenting on imaginary stories. In these studies, the youngest age at which children could depart from the equality principle and were able to take others' subjective needs into account was around 8 years of age. In the current study, in contrast, we examined children's actual behavior in distributing resources themselves in a simple and salient task, and we found strong evidence that children as young as 3 years of age already take into account how much individuals need the resources.

However, the equality principle was still much in evidence in our study. The 3-year-olds only favored the needy puppet when there were an odd number of items to be distributed. When there were an even number of items, the equality principle was stronger. The 5-year-olds also favored the needy puppet quite strongly when there were an odd number of items to be distributed. When there were an even number of items, the 5-year-olds split in almost exactly equal proportions between favoring the needy puppet and using the equality principle. We thus seem to have identified a developmental period in which two key strategies for distributing resources switch in their importance for young children.

We did not find any strong differences in children's reactions to the three different kinds of need. The 5-year-olds showed exactly the same pattern on all three of the task types in both

versions. The 3-year-olds showed the same pattern on 5 of the 6 tasks, with random formants in the 3-item Ill task. We have no explanation for this one outlier, except that perhaps the story accompanying these puppets' presentation was confusing: it might have been difficult for the children to make a connection between being ill and needing toys to play with.

The current results support our hypotheses and highlight two important facts about young children's early sense of distributive justice. First, young children's natural sense of empathy for others—as evidenced in many studies of their comforting and helping behaviors—also plays a role in their distribution of resources from as young as 3 years of age. Second, while the equality principle trumps these tendencies at 3 years of age when they are in competition, by 5 years of age, at least in some situations, their sense of empathy for those in need can sometimes trump the equality principle.

3.0 STUDY 2. FAIR OR NICE?

CHILDREN'S EVALUATIONS OF OTHERS AS DISTRIBUTORS

3.1 INTRODUCTION

Human social behavior, starting at its onset in the first few years of life, is governed by both self-regarding and other-regarding motives. The complexity of these motives and the balance between them change as the child's social-emotional development progresses and as social and moral norms are formed. Ultimately, to function in a society, one needs to be able to apply the same norms—norms of fairness—to oneself and others, and to acknowledge that others might deserve the same treatment as oneself. In addition, we monitor other people's adherence to these same norms, and often treat others and choose them as partners based on their moral beliefs and behaviors. This combination of conscious concern about the welfare of others and social-moral evaluation of others' behavior is crucial for sustaining human group living, as it enhances cooperation (Fehr & Fischbacher, 2004) and helps prevent free-riding (Axelrod & Hamilton, 1981; Dawes et al., 2007).

While much of human social interaction is structured by people's evaluations of one another, the translation of these evaluations into criteria for partner choice is not straightforward. One principle that we universally follow is direct reciprocity (Trivers, 1971): we prefer those who have been nice to us. Another principle is indirect reciprocity, which has its roots in

universal fairness (Alexander, 1987): we also prefer those who have been nice to others. Some situations, however, pose dilemmas that lead to a conflict of interests: for example, choosing a distributor who is nice to me could disadvantage other recipients. Studies show that children may start valuing fairness very early, possibly in the second or third year of life, preferring fair distributors to unfair ones (Geraci & Surian, 2011; Surian & Geraci, 2010). At the same time, young children's social preferences are influenced by considerations of reciprocity (Levitt et al., 1985; Robins & Rochat, 2011) and friendship (Moore, 2009). We also know that preschoolers tend to choose distributions that are beneficial for them (Fehr et al., 2008; Blake & Rand, 2010). Situations in which fairness and reciprocity are in conflict have only been studied in school-aged children (Shaw et al., 2012), with the finding that 6- to 8-year-olds prefer fair distributors in third-party situations, but are split when choosing between fairness and favoritism in first-party situations. Would younger children, who already value fairness but are still largely motivated by selfish motives, use fairness or direct reciprocity in their partner choice?

The existing research touches on some phenomena related to this question, establishing different age-related patterns for various types of responses and various roles that the child plays in each particular situation. When children serve as observers, they appear to be able to judge fair distributors as more "good" than unfair distributors at the age of three (Surian & Geraci, 2010). When they serve as distributors themselves (allocating resources to others only), 3- to 6-year-olds tend to behave equally prosocially toward variously behaving others when the equality option is available (McGillicuddy-De Lisi et al., 1994; Olson & Spelke, 2008); however, when there are fewer resources than recipients and a choice between recipients must be made, 3-year-olds prefer direct givers to indirect givers, and prefer indirect givers to non-givers (Olson and Spelke, 2008). When children are passive recipients of someone else's distributions, 3- to 5-year-

olds seem to be fine with unequal distributions that favor them, but react negatively to unfair distributions that favor others (LoBue et al., 2011). Finally, in a combined situation when children make choice about how to allocate resources between themselves and others (thus serving as a distributor and a recipient at the same time), they tend to care about others' interests progressively more between the ages of 3 and 8; however, selfish motives seem to predominate in their behavior at least until age 5 (Fehr et al., 2008).

In most experiments reviewed, when a contrast was made between a fair (equal) and an unfair (unequal) distribution, the child either was not directly involved as a recipient, or was involved in such a way that an equal distribution was also more advantageous for him/her. An exception is one of the conditions in the study by Fehr et al. (2008), where the child had a choice between a (1, 1) and a (2, 0) distributions and where the equal distribution benefitted the other at a cost to the child; however, in that experiment the other recipient was an anonymous one-time partner, not even physically present during the task, making it challenging to apply fairness/equality norms to this situation. Also, the study by LoBue et al. (2011) demonstrates that more sensitivity to inequality might be revealed when the child is a recipient of someone else's distribution, as opposed to serving as a distributor him/herself like in Fehr et al.'s (2008) study. No study so far has directly contrasted preschoolers' reactions to a fair (equal) distribution vs. an unfair (unequal) distribution advantageous to the child as a recipient. Such a contrast would be informative as children's preference for a fair distribution in this case would mean that they value universal fairness more than their own benefit.

Partner choice in different situations may be guided by different motives. For example, we may like and respect someone with high moral standards, but we may prefer a not-so-moral but close friend when choosing whom to spend time with. It is possible, therefore, that children,

just like adults, would be more likely to prefer impartially fair distributors in some cases, for example, when prompted to evaluate them, but choose the distributor who favors them in other cases, for example, to perform the next distribution in which they know they would be favored.

Thus, in the current study, we examined children's choices between two distributors (puppets), one fair and one preferentially favoring the child (a first-party condition), in response to different measures that were designed to tap into different aspects of partner preference. We also examined children's responses to an analogous situation, in which children themselves did not participate as recipients, but served as an observer (a third-party condition). In addition to children's choices of partner in the first-party situation, we were interested in the differences in their responses between the first-party and third-party conditions, and in the possible developmental changes between the ages of 3 and 5.

The current study directly contrasted children's reactions in situations where

- (i) they observed others (third-party) vs. were involved themselves (first-party);
 - (ii) the distribution was fair vs. unfair;
 - (iii) the distribution was more or less advantageous to the child (in the first-party condition).
- Importantly, in this condition we compared children's reactions to a distribution that was fair to them and someone else vs. the distribution that was unfair but beneficial to them (a distributor that prefers the child).

The ages of the children in this study were again 3 and 5 years of age. Like in Study 1, the ages of the subjects were chosen based on previous findings which demonstrated that at 3 years of age, children already have a nascent sense of fairness, but are still largely motivated by selfish motives—so, the contrast that we wanted to explore here might be especially salient for 3-year-olds. By age 5, children are more likely to take into account other people's interests (and

needs, as shown in Study 1) and have demonstrated significantly higher levels of various instantiations of fairness. Piloting Study 2's tasks with some of the subjects from Study 1 showed that young 3-year-olds often had difficulty keeping track of all the transfers and making connections between puppets' behavior toward other puppets and the subsequent choices that they had to make. Therefore, for this study, we used slightly older children: 3.5 and 5.5 years of age on average. Our general prediction for the developmental change was that selfish tendencies (expressed by choosing the unfair partner in the first party condition) would decrease, and fairness appreciation (expressed by choosing the fair partner in both conditions) would increase with age.

The general set-up for the study was to expose children to two characters: one character who is always fair and allocates resources equally (Fair puppet), and another character who is not fair but rather guided by personal preferences and allocates more resources to someone who he prefers (Preferring puppet). The child was either involved in the game as one of the recipients, that is, was treated fairly by the fair distributor and preferred by the unfair distributor (first-party condition), or observed the situation, in which the two characters distributed resources to others, as a disinterested party (third-party condition).

The specific questions that the study addressed were:

1. Would children *prefer* a fair or a preferring partner *as a distributor*, and would that differ between the first-party and the third-party conditions? This measure, in which the child's interests were most directly involved (because choosing the preferring partner would bring them more resources), focused on whether children care about universal fairness in the third-party situation, and whether they care more about self (view their own interests as more important) or about fairness (view their own interests as equal to other's interests) in the first-

party situation. We hypothesized that in the third-party situation, in which children's own interests are not involved, both age groups will tend to choose the fair partner as future distributor. Based on previous research that showed that preference for equality increases with age, we also considered the possibility that older children will be more sensitive to the distinction, whereas younger children will be more likely to choose randomly. In the first-party situation, we expected younger children to choose the preferring partner more often than the fair partner, as that choice would be beneficial to them; we expected older children to choose the fair partner more often, as they will presumably care about others' interests—and about fairness—more.

2. Would children *judge* one or the other distributor as being *nicer*, and would that differ between the first-party and the third-party conditions? This question gets at children's more abstract evaluation of the characters and at their understanding of how a "nice" person should behave. Children's choices of one or the other distributor in this situation would not affect their interests. We expected children at both ages to judge the fair distributor as nice in the third-party condition. In the first-party condition, children's responses would reveal whether they base their liking of others on reciprocity or on universal norms of fairness. We expected that younger children would be more likely to do the former and older children—the latter.

3. Would children themselves *behave fairly or preferentially* toward these different individuals, and would that differ between the first-party and the third-party conditions? To answer this question, children were given a chance to switch roles with the distributors and allocate resources—a potentially equal number of items—to them. In the first-party situation, children's responses to this prompt would show, again, whether they are more sensitive to direct reciprocity (if they allocate more resources to the preferring partner), indirect reciprocity (if they

give more to fair partner), or are driven by equality (if they distribute equally). We expected the age difference to be in the direction of movement from equality to direct reciprocity to indirect reciprocity. In the third-party situation, children at both ages were expected to distribute more to the fair character; however, we also considered the possibility that they would go with the “default” equal distribution.

In addition, children were given a chance to give one item to one of the distributors. In this case, we again expected them to choose the fair partner in the third-party situation, and expected an age-related transition from favoring the preferring distributor to favoring the fair distributor in the first-party situation.

4. Would children *affiliate* with a fair or a preferring distributor, and would that differ between the first-party and the third-party conditions? This question assessed children’s perceptions of partners’ personal characteristics, and perhaps, indirectly, their views of how they themselves would like to behave. To test that, we asked children to choose one of the puppets for a subsequent game. Compared to predicted outcomes of the other sets of questions, we expected here that children at both ages might be more likely to affiliate with the fair partner even in the first-party situation, as well as in the third-party situation.

3.2 METHOD

3.2.1 Participants

Forty-eight 3.5-year-old children (mean age = 44.03 months, range = 41.35 months to 45.89 months; 24 girls) and forty-eight 5.5-year-old children (mean age = 68.23 months, range = 65.87

months to 69.44 months; 24 girls) participated in the study. Eleven additional children (seven 3.5-year-olds and four 5.5-year-olds) were tested but excluded because of experimental error or absence of clear response on more than half of the trials. The study was conducted in a medium-size city in Germany, and run in eleven daycare centers. All children were Caucasian and spoke German. The sample was fairly homogeneous in terms of socio-economic background (corresponding to the American middle to lower-middle class), except for one daycare center that was located in a lower-SES area of the city. Analyses of the effect of daycare center showed no significant differences in any outcome measures. The study's procedure was approved by the Max-Planck Institute's Ethics Committee (corresponding to the IRB approval in the US), and followed the ethics and confidentiality guidelines of German research institutions. Parental informed written consent was obtained ahead of time. None of the children participated in Study 1.

3.2.2 Materials and design

The two conditions (First party, Third party) were administered between subjects. In both conditions, children were exposed to two types of distributors; the difference was that in the First-party condition, the child was one of the recipients of the distribution (and the child was favored by one of the distributors) and in the Third-party condition, the child observed distributions to two other characters (one of whom was favored).

Each child participated in four tasks. In each task, a separate pair of distributors (animal puppets) gave toy items to the same pair of recipients. One distributor in each pair (the Preferring puppet) consistently favored one of the recipients, and the other (the Fair puppet) always

distributed equally. After the distribution, the child was asked to choose one of the distributors in response to 5 prompts.

The order of tasks (that is, animal pairs) was varied and counterbalanced across children at each age. Also counterbalanced were the sides on which the Fair and the Preferring puppets were presented; which puppet in each pair was the Fair one; which puppet distributed first; the sides of the child and the other recipient (in the first-party condition), and the sides of the preferred and non-preferred recipients (in the third-party condition). The order of some of the questions in the test phase was also counterbalanced.

The materials used for the study included anthropomorphic recipient puppets (one for the First-party condition, two for the Third-party condition; matched with the child's sex); eight different animal puppets (four pairs) who served as distributors; a "pling machine" consisting of a box with an opening and a xylophone inside, making noise when something was inserted in the opening (from Warneken, Hare, Melis, Hanus, & Tomasello, 2007); four sets of objects to distribute: marbles, dice, wooden balls, toy bananas; and two paper circles with arrows that were used by E1 to remind the child of what the distributors did (see Figure 3 for illustrations).

The animal puppets that served as distributors were all approximately the same size (about 30 cm tall), were made out of soft materials, and looked equally friendly. To eliminate potential systematic preference for one animal in the distributor pairs, a preference test was conducted ahead of time with a separate group of children, and the animals were paired based on similar preference scores.

The "arrow pads" (paper circles) were about 20 cm in diameter; one of them had two parallel thick red arrows (pointing to the same direction; the "II-pad") and the other had similar

thick red arrows but pointing to perpendicular directions (the "V-pad"). They served as identification markers for the two different distributors.

The "pling machine" was placed on the floor under the table at which the child and others sat. It was placed between the child and E2 in the first-party condition, and in front of the child and equidistant from E2 and E3 in the third-party condition. It was used to make the distributions more interesting and the game more motivating, as recipients got to throw the items they received into the pling machine and listen to the fun noise that it made. The machine's opening was at the level of the child's chest and within close reach. In the third party condition, where children were observing other recipients and did not participate in the game themselves, the pling machine's opening was covered with a paper flap, and the child's task was to open this flap to "help" the puppets throw their items into the machine.

3.2.3 Procedure

Children were tested at daycare centers, in a separate quiet room. Depending on the condition, two or three female experimenters (E1, E2 and E3) conducted the testing. E1 always manipulated the two distributor puppets and asked the test questions. In the first-party condition, E2 manipulated one recipient puppet; the child served as the other recipient. In the third-party condition, E2 and E3 manipulated two recipient puppets. The child and the experimenters sat at a child-sized table, E1 always on one side of the table and everybody else (the child, E2 and E3) on the opposite side (see Figures 4 and 5 for the set-up). In the First-party condition, the child sat next to E2; in the Third-party condition, the child sat between E2 and E3. The procedure started with E1 playing a ball or a shape-sorting game on the table with the child, to make sure

the child felt at ease. Then E1 introduced the “pling machine” and let the child put a few small toys in it.

3.2.3.1 Training Because piloting showed that many children had difficulties (a) paying attention to the numbers of items during distributions and (b) remembering which puppet had been fair and which had been preferring, a non-social training phase with "arrow pads" was administered before the testing. E1 sat across from the child and placed two plastic containers between herself and the child. She then put one of the pads ("V" or "II", with arrows pointing to either two or one container, correspondingly) on the table and retrieved two small wooden blocks from a bag. She asked the child to watch what she will be doing. She moved the two blocks slowly, following the arrows on the pads, and put the blocks into the containers, saying: "Look, with this pad I am putting both blocks in one bowl, and there is nothing in the other" (II-pad) or "Look, with this pad I am putting one block in this bowl and one block in that bowl" (V-pad). She repeated it four times in the following order: II-pad pointing to one bowl, V-pad pointing to both bowls, II-pad pointing to the second bowl, V-pad pointing to both bowls.

After the non-social training, E2 (and E3 if applicable) produced the recipient puppets from a box and put them on their hands (one puppet per person). The recipient puppets were anthropomorphic, and their gender was matched to that of the child. They looked similarly except wearing different clothes. E1 introduced the puppets by name and stated that they liked to play with the “pling machine”. The puppets “talked” as well, repeating what E1 said. E1 gave a toy to each of the recipients and encouraged them to throw them in the machine. Then the main tasks began.

3.2.3.2 Testing E1 started by announcing that some animals will come and give different things to throw in the pling machine to the recipients. Each of the four tasks consisted of a demonstration phase and a test phase.

Demonstration phase E1 adjusted her chair to that she sat in front of the two recipients, equidistant from them. She placed two distribution items (depending on the task, marbles, wooden balls, toy dice or wooden bananas) on the table in front of her and brought (and wore on her hand) one of the distributor puppets: depending on the order, either the Fair one (F) with the "V"-pad or the Preferring one (P) with the "II"-pad. The pad was laid on the table in front of the distributor, so that the arrows point, correspondingly, either to two recipients ("V") or both to one of the recipients ("II"). To draw the child's attention to the situation, the recipient puppet(s) said "I wonder if I'll get to play!" before the distribution. The distributor puppet (manipulated by E1) then moved the two items toward the recipients, in two different manners for F and P. F gave one item to each recipient and said: "I will give one [item] to you and one [item] to you, because that way each gets the same". P gave both items to one of the recipients and said: "I will give both [items] to you because I like you". The recipients threw the items that they received in the pling machine and stated how many items they received. The recipient puppet who did not get any items "sighed" and assumed a sad posture. This was repeated twice. For the script that was used, see Appendix C.

Test phase After the demonstration was over, E1 moved her chair to sit directly across from the child, and put both distributor puppets on her hands and the corresponding "V" and "II" pads on the table in front of them, to remind the child which distributor behaved fairly and which behaved preferentially. She then asked the child to choose one of the distributors in response to 5 prompts:

1. "There are two more [items]; which animal should distribute them next?"
2. "Which one was nice?"
3. "The animals want to play, too, and here is one [item]; who will you give it to?"
4. "I found two more [items], who will you give it to?"
5. "One animal has to leave now and the other will stay and play with you; which one should stay?" (see Appendix C for the detailed script).

The order of the first and fifth questions was kept constant because this order was the most natural: the "next distribution" came right after the last distribution of the demonstration phase; at the end of the whole interaction, one animal left and the other stayed to play a game with the child. The order of questions (2), (3) and (4) was counterbalanced across subjects.

3.2.3.3 Coding and reliability Children's choices of distributors were coded in response to each of the 5 measures for the 4 tasks. The choice of the Fair puppet was coded as 1 and the choice of the Preferring puppet was coded as 0. For the 2-item distribution measure, giving both items to F was coded as 1, giving both items to P was coded as 0, and distributing the items equally was coded as .5. A single coder coded all the data; to assess reliability, a second coder, blind to the hypotheses of the study, coded 25% of children at each age. The agreement between the coders was 100%.

3.3 RESULTS

Each child was administered 4 trials, with different distributor puppets acting in each trial. Within each trial, after the demonstration (in which the Fair distributor behaved fairly and the

Preferring distributor favored someone), the child was asked to choose one of the distributors in response to three questions and asked to give objects to them twice. There were thus 5 outcome measures for each of the 4 trials. For each measure, we coded the choice of the puppet and calculated on how many trials the child chose the Fair puppets (0-4). Because some children did not complete all the trials, the proportion of the times the child chose the Fair puppets out of the completed trials was calculated and used in the following analyses.

The first set of analyses aimed to determine whether children displayed preferences for either the Fair or the Preferring puppets. To test whether their choices were significantly different from chance, we used one-sample t-tests with a test value of .5 on the proportion of choices in favor of the Fair puppets, applied separately for the five response measures and the four combinations of age and condition.

Table 4 shows the mean proportions of choosing the Fair puppets for each outcome measure, for the two conditions and the two ages. Note that, since the responses were dichotomous (choosing either one puppet or the other), lower proportions of “choosing the Fair” also mean higher proportions of “choosing the Preferring”, and vice versa.

In the first-party condition, 3.5-year-olds chose the Fair puppets less often than chance in response to the question “Who was nice?” ($t(23) = -3.05, p < .01$), and showed a trend for choosing the Fair puppet significantly less than chance when asked to distribute one toy to the puppets ($t(23) = -2.02, p = .056$). In the third-party condition, 3.5-year-olds chose the Fair puppet significantly more often than chance on two measures: in response to the questions “Who should distribute [x] next time?” ($t(23) = 3.02, p < .01$), and “Who was nice?” ($t(23) = 2.70, p = .01$).

5.5-year-olds as a group did not show a significant preference for either type of distributor in the first-party condition. However, in the third-party condition, their preference for the Fair puppets was significantly greater than chance on four measures: in response to the questions “Who should distribute [x] next time?” ($t(23) = 3.10, p < .01$), “Who was nice?” ($t(23) = 4.40, p < .001$), “Who do you want to play with?” ($t(23) = 2.60, p < .05$), and when asked to distribute one toy to the puppets ($t(23) = 3.65, p < .01$).

Since it appeared that in some cases children’s preferences were distributed bi-modally between choosing the Fair and choosing the Preferring distributors, suggesting that individual children might have had strong preferences for either of the two puppets (without showing a consistent preference across children), we used Monte-Carlo simulations to test whether such a pattern could have arisen from chance.¹ The Monte-Carlo simulations revealed that 5.5-year-olds’ responses were significantly different from random distributions in the first-party condition on the four measures that were not significant when the group means were compared to chance: “Who should distribute next?”, “Who was nice?”, “Who do you want to play with?”, and when asked to give one toy to one of the puppets (all p ’s $< .01$). Thus, even though the mean proportions were not different from chance, in this condition 5-year-olds were not choosing randomly: some children strongly preferred the Fair puppets, and some strongly preferred the Preferring puppets. Figure 6 shows the number of children choosing the Fair puppets on the majority of the trials, those choosing the Preferring puppets on the majority of the trials, and

¹ These simulated children randomly choosing among the two puppets with the number of choices corresponding to the actual number of choices per child. We compared the children’s preference score with that simulated by measuring the absolute deviation of the proportion of choosing the Fair puppets from the expectation (.5) and averaging that score across the children (the possible range of this test statistic is 0 - .5). We ran 1000 simulations (into which we included the original data as one ‘simulation’) and determined the P -value as the proportion of simulations revealing a test statistic at least as large as that of the actual children. Note that in case of a significant one-sample t-test this simulation is not informative, but in case of a non-significant t-test it can reveal a pattern of individual preferences.

those choosing the Fair and the Preferring equally often (note the bimodal distribution of the 5.5-year-olds' responses in the first-party condition).

A further set of analyses aimed to determine whether children's tendencies to choose either the Fair or the Preferring distributor differed between the two conditions, and whether these tendencies (if any) were different at the two ages. To this end, we conducted a two-way ANOVA for each outcome measure, with condition (First-party; Third-party) and age (3.5 years; 5.5 years) as between-subject factors.² None of the ANOVAs revealed an interaction. On three measures, there was a main effect of condition, with children choosing the Fair puppets more often in the third-party than the first-party condition: "Who should distribute next?" ($F(1, 92) = 8.02, p < .01$) and "Who was nice?" ($F(1, 92) = 15.60, p < .001$), and when asked to distribute one toy, ($F(1, 92) = 10.70, p < .001$). There was also a main effect of age, with older children choosing the Fair more often than younger children, on the "Who was nice?" measure ($F(1, 92) = 8.40, p < .01$), and a trend in the same direction for two additional measures: in response to "Who do you want to play with?" ($F(1, 92) = 3.56, p = .06$) and when asked to distribute one toy ($F(1, 92) = 3.72, p = .06$).

Because not all the data were normally distributed, we also conducted Generalized Linear Model (GLM, McCullagh & Nelder, 2008) into which we included the two factors and their interaction.³ The GLM revealed largely identical results to those of the ANOVAs, additionally

² Since we did the analyses separately for each of the five response measures, an error level correction was required. We achieved that using Fisher's omnibus test. This test combines a number of P-values into a single chi-square distributed test-statistic with degrees of freedom equaling twice the number of P-values. Overall, there were clear effects of age and condition on the children's probability to choose the fair puppet (Fisher's omnibus test, combining full null model comparisons of the five GLMs: $\chi^2=82.9, df=10, P<0.001$).

³ The model was fitted in R (2.14.2; R Development Core Team (2011). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.) with binary error structure and logit link function (i.e., a logistic model). As a response we used the proportion of choices in favor of the Fair puppet (i.e., one value of response per child). As an overall test of the impact of both factors and their interaction we

revealing significant main effects of age on the two measures where ANOVAs detected trends: for children's responses to the question "Who do you want to play with?" ($Z = 2.24, p = .03$) and when asked to distribute one toy ($Z = 2.48, p = .01$).

Additional correlation analyses on the five measures used in the study (see Tables 5 and 6) have revealed no relations between any measures for 3.5-year-olds' responses in the First party condition, suggesting no consistency in individual children's tendencies to choose the Fair vs. the Preferring partner in response to the different prompts in the condition when children's own interests were at stake. In the Third party condition, however, 3.5-year-olds responses correlated on a number of measures. Specifically, children's responses to the question "Who should distribute next?" were related to their distributions of two items to the puppets, to their choice of play partner and judging a puppet as "nice" (in various combinations; a total of 7 significant correlations). 5.5-year-olds' responses were consistent across measures in both the First party (7 significant correlations) and the Third party condition (5 significant correlations), suggesting that individual children who preferred one of the puppets in response to one prompt were likely to make the same choice in response to other prompts.

In summary, the results show an interesting age trend in children's evaluations of variously behaving distributors, reflecting the changing balance between valuing selfishness and/or reciprocity and valuing universal fairness. In the third-party condition, even 3-year-olds judged the fair distributors as more "nice" than the unfair distributors, and more often authorized the fair ones to do next distributions. However, in the first-party condition, 3-year-olds judged

initially compared the full model with a null model comprising only the intercept using a likelihood ratio test (Forstmeier W, Schielzeth H .2011. Cryptic multiple hypotheses testing in linear models: overestimated effect sizes and the winner's curse. *Behav. Ecol. Sociobiol.*, 65, 47–55; Dobson, A. J. 2002. *An Introduction to Generalized Linear Models*. Chapman & Hall/CRC, Boca Raton.). *P*-values for main effects (i.e., the two factors) we only inspected when their interaction was not significant and removed from the model.

the distributors who favored them as more “nice” and tended to give them more toys (when egalitarian allocation of toys was not possible). Five-year-olds strongly preferred the fair distributor in the third-party condition on all the measures, except for the 2-item allocation where they distributed equally. In the first-party condition, 5-year-olds as a group did not show significant preferences; but additional non-parametric analyses revealed that they were split in two major groups, one of which preferred the fair distributor and the other preferred the one who was nice to them.

3.4 DISCUSSION

In this study we explored the interplay between various motives that guide children’s choice of partner in a distributive context. We exposed 3.5-year-old and 5.5-year-old children to two distributors: one who was always distributing resources equally to two recipients and one who preferentially gave more resources to one of the two recipients. In a first-party condition, the child was one of the recipients and was preferred by one distributor; in a third-party condition, the child observed distributions to other recipients, one of whom was preferred. The child then was asked to choose one of the distributors (the Fair one or the Preferring one) in response to 5 different prompts. Children’s choices in the third-party condition, when their own interests were not involved, were meant to reflect their normative understanding of fairness, whereas their choices in the first-party condition involved an additional demand of weighting their self-serving interests and/or considerations of direct reciprocity against fairness considerations.

Overall, the results of the study supported our general prediction that over the preschool years, children’s appreciation of fairness—and preference for fair partners—increases, and

selfishness decreases. Children at both ages preferred the fair distributors in the third-party condition, suggesting that already by 3.5 years, they understand and value fairness and prefer fair individuals, even when it does not affect children's own interests. At 3.5, they chose the fair puppet over the preferring puppet in response to two prompts; at 5.5, they did so in response to all four prompts that involved a forced choice of one puppet over the other (note that for the one measure that allowed to choose both puppets at a time, children opted for this egalitarian choice at both ages and in both conditions). In contrast, in the first-party condition, younger children never chose fair puppets more than preferring puppets, and on two measures they chose the preferring puppets significantly more often than the fair ones. Among 5.5-year-olds, there were some who showed the same tendencies, but also some who strongly preferred the fair distributors, even though it went against children's own interests. This costly preference for fairness thus seems to emerge around 5 years of age, consistent with Fehr et al. (2008) findings.

We also had specific hypotheses regarding each measure; not all of them were supported. The measure that we thought would contrast selfishness and fairness most directly was the question "Who should be the next distributor?". We hypothesized that in the third party condition, children at both ages would choose the fair puppet, and that in the first party condition, younger children would choose the preferring and older children would choose the fair. Our prediction was met in that in the third party condition, children indeed wanted the fair puppet to be the next distributor. However, 3.5-year-olds in the first party condition responded randomly, and 5.5-year-olds were split in two groups, one favoring each type of distributor. It could be that the question was too challenging for the younger children and they did not quite understand its implications. It could also be that the 3.5-year-olds were actually not that

interested in acquiring more toys; they were interested in the puppets and liked them all, and the question about the next distribution was not salient enough to elicit a strong preference.

Somewhat surprisingly, the measure that turned out to be the most productive was the question “Which of the puppets was nice?”. This measure focused on the evaluation of the distributors’ personal characteristics, but possibly also revealed most clearly the children’s notion of what was the right thing to do. Consistent with our hypothesis, in the third party condition all the children chose the fair distributor; in the first party condition younger children chose the preferring distributor, and older children, once again, were divided in two groups with opposite preferences. All these results were significantly different from chance, and there were also significant effects of both age and condition.

On the other hand, the question “Who do you want to play with?” yielded the least meaningful results. One significant result was that 5.5-year-olds chose more often to play with the fair than the preferring puppets. 3.5-year-olds seemed to choose the play partner randomly in both conditions. Since it was clear from the experimenter’s behavior that the game for which the puppet was being chosen was unrelated to the distribution game, the question might have been too far removed from the context of evaluating the partners’ fairness.

Finally, asking children to give one and two items to the distributors revealed the same pattern that several other studies, including our Study 1, have previously found. When two items were available, the vast majority of children followed the “default” equality principle, giving one to each puppet. However, when there was only one item, children behaved consistently with their general patterns for each condition: in the first party condition, younger children tended to give the one item to the preferring puppet; in the third party condition, older children gave it to the fair puppet. This measure might have provided the closest approximation of direct and indirect

reciprocity, as it asked for the same type of behavior from the child as his partners just displayed toward him. The results thus suggest that younger children tend to use direct reciprocity and older children are able to use indirect reciprocity in their evaluative and distributive decision-making.

The general conclusion from Study 2 is that by age 3.5, children begin to understand and value fairness in third-party situations, but not when the fair actor's behavior conflicts with children's own interests. By age 5, children develop a strong preference for fairness, and some of them prefer fair partners even when it is disadvantageous to them. This developmental period thus seems to be the time when universal norms of fairness grow in importance and can override children's self-regarding motives.

4.0 GENERAL DISCUSSION

The classic picture of children's sense of fairness in the context of distributive justice has remained in place for some time. In that picture, preschool children were almost completely selfish, or perhaps occasionally generous, but not in any sense fair in distributing resources among themselves and others (Damon, 1977; 1980). Fairness was thought to be beyond their comprehension and competence, perhaps for purely cognitive reasons or perhaps because it was an out-of-reach developmental achievement in moral competence more specifically.

The current results call this view into question and suggest a much richer and nuanced picture of preschoolers' sense of fairness in the context of distributive justice. They do this not by undermining the classic findings, but rather by complementing them with new findings using a different method of assessing children's competence. The classic results are still valid: when preschool children are interviewed verbally about their understanding of fairness in the context of distributive justice, they are unable to reason coherently. That is to say, they are incompetent when their understanding is measured with the classic Piagetian interview technique, which demands explicit, verbally articulated knowledge. But a new wave of research has emerged in the past decade or two which examines children's competence in various domains of prosocial and moral development not by asking for verbal articulation, but by asking for behavioral competence in decision-making. Children are asked to translate their knowledge into action

appropriate to the social context. This requires cognitive competence also, though perhaps of a different kind than verbal articulation.

4.1 MAJOR FINDINGS

The main finding of the current studies is that 5-year-old children show striking tendencies toward fairness of different kinds in distributive justice contexts, and 3-year-old children show these same tendencies, though a bit less strongly. These are the first studies to establish these competencies in children this young.

More specifically, in the first study 3- and 5-year-old children were presented with situations in which one of two possible recipients of resources was more needy than the other. At both ages, the majority of children favored the needy puppet over a more neutral puppet when they were given an unequal number of resources to distribute. This suggests that most preschoolers recognize when someone is in need, and have a tendency to give that individual more resources to meet that need, either directly (e.g., food for the hungry) or indirectly (e.g., toys for the injured). But that was in the situation where children were, in a sense, forced to choose. When they were given an equally divisible number of resources to distribute, 5-year-olds showed that they possess another principle of distributive justice as well, namely, the principle of equality in which all individuals receive the same amount of resources. The 5-year-old children split almost equally into two groups, those favoring the needy puppet (e.g., dividing the resources 3 to 1) and those giving equal resources to both puppets (i.e., dividing the resources 2 to 2)—with not a single child favoring the non-needy puppet. Most of the 3-year-old children also changed their strategy when given an equal number of resources to distribute. The majority

now divided the goods between the two puppets equally, much like the 5-year-olds, but the interpretive problem is that the remaining 3-year-olds did not reliably favor the needy puppet, as they had when distributing an unequal number of resources, but rather roughly equal numbers favored the needy and non-needy puppets.

In the view of Lerner (1974, 2003), there are many different ways to distribute goods fairly. Distributing goods to others on the basis of need is one way, and both 3- and 5-year-old children clearly followed this principle in the current study. Another way is based on a general principle of equality among individuals. Many would consider this the prototypical form of fairness—all individuals are considered equal—because it would seem to be the default principle when there are no other considerations in play. Roughly half of the 5-year-old children in the current study followed this principle over the need principle when both possibilities were available (because there were an even number of resources to distribute). This competition between principles is important in interpreting children's behavior. If children were simply given an even number of resources and told to distribute them between two puppets, one could imagine them doing this on the basis of preference for symmetry or numerical equality, without considering the equal moral deservedness of the recipients. But in the current study, most of the 5-year-olds favored the needy puppet when given an unequal number of resources to distribute, and roughly half of them did so even with an equal number of resources. This makes the strategy of roughly half of the 5-year-olds to divide the resources equally between the two puppets more meaningful. The fact that they had a competing tendency to favor the needy puppet makes it unlikely that they were just dividing the resources in a symmetrical fashion because there was nothing else compelling to do. They had something else compelling to do, indeed something *morally* compelling to do, and many of them chose to divide equally nevertheless. This suggests,

although of course it does not prove, that the 5-year-old children were in a mode of moral decision-making and so their equal divisions were based on some kind of moral principle. The fact that the 3-year-olds, when given an equal number of resources, either divided them equally or behaved randomly makes this argument less available for them. Although they did favor the needy puppet when given an unequal number of resources, when given an equal number of resources they did not show (by favoring the needy puppet more than the non-needy puppet) that they were in a moral decision-making mode.

Thus, the overall conclusion from the first study is that both 3- and 5-year-old children understand and operate competently with the principle of need in distributing resources. This is one form of distributive justice. Five-year-old children also understand and operate competently with the principle of equality in distributing resources, and their tendency to use this principle is of approximately equal strength is their tendency to use the principle of need. Three-year-old children's understanding and competence with the principle of equality is not certain at this point, until we can more confidently rule out non-moral strategies for their equal divisions.

This finding, along with other recent findings concerning children's behavior in situations where more than one type of fairness is in play (e.g., Olson & Spelke, 2008; Kenward & Dahl, 2011; Baumard et al., 2012; Kanngiesser & Warneken, 2012), is also potentially challenging for the classic theories of stable stage-like progressions from simple principles (i.e., equality) to complex ones (i.e., equity and need). Taken together, findings from these studies show that young children may have several principles operating at the same time, and what changes with age is the flexibility with which they are able to balance them.

Whereas the first study put into competition two principles of distributive justice, equality and need, the second study put into competition one principle of distributive justice,

equality, with the child's own self-serving motives. Once again the findings were quite clear for the 5-year-olds. When they were third-party observers, children of this age evaluated a distributor much more positively if he had distributed fairly (equally) among two recipients than if he had favored one of them with more resources. When the child herself was one of the recipients, the 5-year-old children split in the way they reacted to the distributors, forming two major groups (along with a smaller group that behaved inconsistently). Roughly half of the children evaluated the distributor most positively who distributed equally between the child and another recipient, whereas the other half favored the distributor who had given more resources to the child. Much like in the first study, the competition between children's response tendencies helps in the interpretation, and in addition the third-party condition helps to reinforce the view that children's understanding and competence with the equality principle is not just based on their desire to divide things up symmetrically. Thus, in the third-party condition, when they themselves were not a recipient, children of this age clearly favored someone who distributes among recipients equally. In this study they did not themselves distribute, and even if they did show some preference for a symmetrical distribution as produced by someone else, the questions they answered about the distributor went way beyond this. Children evaluated the puppet who distributed equally as being nicer, they preferred him to be the next distributor, they wanted to play with him, and they actually gave him more when they themselves distributed reciprocally in return—none of which would follow directly from any preference for seeing resources distributed symmetrically for some non-moral reason. When children themselves were one of the recipients, they of course had obvious reasons to favor the puppet who favored them. Nevertheless, in a pattern not unlike in the first study, in this first-party situation one major group of the 5-year-old children favored the equal distributor and the other major group favored the

distributor who favored them. Thus, once again, it appears that children of this age have two competing tendencies—in this case a selfish tendency and a tendency toward equality in distributive justice—that can potentially compete with one another. And it turns out, empirically, that in the situation tested here these two tendencies are of roughly equal strength for 5-year-olds.

The 3-year-olds also favored equal distributors in the third-party condition, when they themselves were not a recipient, most clearly for two of the measures. But, in contrast to the 5-year-olds, when they themselves were a recipient in the first party condition, these younger children often favored the distributor who favored them (again for two of the measures especially). For the most straightforward and evaluative question—who is nicer—the 3-year-olds chose the equal distributor in the third-party condition, but chose the distributor who favored them in the first party condition. As in the case of the 5-year-olds, 3-year-old children's answering of specific questions about the distributor in the third-party condition would suggest that they were making social or moral judgments about the distributor, not just preferring a symmetrical distribution for non-moral reasons. But, in contrast to the 5-year-olds, these younger children clearly valued their own personal interests more strongly than they valued fairness in a distributor when these were put in direct competition. The explanation for this developmental difference was not a part of the current investigation directly. But one obvious explanation would be that 3-year-old children are more selfish than 5-year-old children, either in the sense that their selfish motive is stronger or in the sense that their ability to comprehend and value the principle of equality is weaker. It is also possible that children of both ages are capable of operating in similar ways when selfish tendencies and the principle of equality conflict, but 5-year-old children are sensitive to how selfish behavior appears to others (in this case the adult

experimenters, who were in the room with them) in a way that 3-year-olds are not. This latter possibility gains credence from the fact that the youngest age at which children have been shown to have a concern for self-reputation is around 5 years of age (Banerjee, 2002; Engelmann et al., 2012).

Thus, the overall conclusion from the second study is in general agreement with the first. Five-year-old children clearly understand and operate with some kind of principles of fairness, in this case impartial equality. Moreover, the findings of this second study provide more positive evidence that the 3-year-old children also understand and operate with the principle of equality. Even though they made choices favorable for themselves more often than did the 5-year-olds, in the third-party condition 3-year-old children judged that a distributor was “nicer”, and they wanted him to be the next distributor, when he had previously distributed equally. To reiterate the above argument, the fact that they answer these kinds of questions reliably suggests that 3-year-olds’ tendency to themselves distribute equally in the first study was not just a result of some sort of aesthetic preference for symmetry. Although we cannot be nearly as confident in the results for the 3-year-olds as for the 5-year-olds in these studies, our hypothesis is that 3-year-olds also understand and operate with some kind of principle of equality, even if it is not as strong as it is for the older children.

Interestingly, the issue of preference for equal, or egalitarian, distributions came up in Study 2 again when children were asked to give two objects to the two distributor puppets. At both ages and in both conditions, children in this situation distributed equally by giving one object to each puppet. This is in contrast to their distributions of one object to the same puppets: in that situation, when forced to make a choice, 3-year-olds in the first-party condition tended to favor the preferring puppet, and 5-year-olds in the third-party condition favored the fair puppet.

This discrepancy reflects the equality bias, noted above for Study 1 and also observed in other studies (Olson & Spelke, 2008; Kenward & Dahl, 2011; Baumard et al., 2012).

4.2 METHODOLOGICAL IMPLICATIONS

Some developmental researchers might claim that it is not only 3- and 5-year-olds who understand and operate with principles of fairness (especially equality), but that even 15-month-old infants do as well. This would be based on recent findings that even infants of this young age display looking-time differences in response to distribution events that end up in inequality as opposed to equality (Geraci & Surian, 2011; Schmidt & Sommerville, 2011). These studies controlled for a simple expectation of symmetry by having infants also view resources laid out in equal and unequal manners in the absence of any active distribution by a person. Nevertheless, the fact that infants expect to see people distribute equally says nothing about their moral judgment of whether that is a good thing to do, or a fair thing to do, and whether they themselves would choose to do it. It is surprising that infants this young have tuned into distribution events and their outcomes in such a way so as to form firm expectations, and these expectations are indeed relevant—we may think of them as developmental precursors—to moral actions and judgments proper. But expecting equal distributions is not the same thing as actually choosing to do them or judging people more positively when they do them.

So, the claim that the current studies are the first to tell us that preschool children have a more nuanced sense of fairness than previously thought rests at least partially on a methodological claim, or actually a pair of methodological claims. The first is that while verbal interviews are a valid measure of children's understanding and competence with principles of

distributive justice, they are the same time too demanding. It does not seem correct to say that a world champion chess player or Nobel prize-winning mathematician is not fully competent in their chosen profession (or that prelinguistic infants and animals are cognitively incompetent in general) because they are unable to articulate clearly in language what it is they are doing when they play chess or prove mathematical theorems. If they can articulate in language what they are doing, so much the better, and this displays a reflective knowledge that may indeed be considered “higher” or more secure or more explicit than straightforward cognitive competence as displayed in behavioral decisions. Such cognitive competence—again, when this includes decision-making appropriate to context —reflects a full and important form of knowledge and competence, just not one that is fully reflective and explicit.

On the other hand, expectations are not moral judgments, as they completely lack the normative element—the judgment about how things should work—which are the essence of moral judgments. So, the looking time studies do not establish that 15-month-olds have a sense of fairness. They provide us with very important information about children's competencies, and in some domains they may be sufficient to establish the foundations of children's knowledge, perhaps especially in the physical world. But judgments of fairness, and other moral judgments including a normative dimension, would seem to require some evidence from the child going beyond just what they expect and do not expect to occur in the social world.

Thus, the methodological approach of the current study has favored the level of behavioral decision-making over explicit verbal descriptions, on the one hand, and over looking time methodologies, on the other. One could argue that from an evolutionary perspective, the level of behavioral-decision making is basic, as natural selection does not operate on verbal descriptions or on expectations that do not translate themselves into adaptive action. Rather,

natural selection operates on making adaptive choices in action (Alcock, 2001; Henrich, 2004). But this is a methodological issue faced not just by this study or this topic area alone, but rather by the field of developmental psychology as a whole. Our view is that all three of these methods lead to valid assessments of young children's knowledge and competence, and it may be simply that some of them are more appropriate in some topic areas rather than others. Most relevant here, we would claim that when normative judgments about what is the fair or right thing to do are involved, the level of behavioral decision making is sufficient to establish this normative dimension without being too linguistically demanding.

4.3 THEORETICAL IMPLICATIONS

The classic Piagetian model of cognitive development is a stage model, with a new mode of functioning transforming and replacing an older mode. The classic work on children's sense of distributive justice by Damon (1977; 1980) and others had this model as an implicit developmental theory. Preschool children were considered selfish and incapable of thinking about justice and equality and taking into consideration their behavioral decision-making. Then in early school age children become egalitarian and concerned with treating all others on an equal basis, followed in later school age by more complex considerations in which they take into account such factors as the needs of recipients or their merit in producing the resources in making fairness judgments. Although clearly these theorists recognize that the older tendencies do not go away when the new ones emerge, there is a sense that the new way of operating transforms the old and is ascendant.

As outlined in the introduction, a different way of conceptualizing these matters theoretically is a model by the social psychologist Lerner (1974; 2003). In this way of viewing fairness—in Lerner's terms "justice"—people of all ages have many different principles they employ for making judgments of fairness, including in situations involving distributive justice. The major ones on which Lerner focuses are: equality (parity), need, merit (in terms of work effort), and social rules (e.g., in competitive games in which the winner deserves the prize regardless of any issues of need, merit, or equality). All of these are in constant competition, of course, with humans' selfish motives for maximizing their own gains. Which of these motives is (or are) primary, and is (are) determinative in a given act of individual behavioral decision-making, depends on a number of factors. Most importantly, the weighting of these different principles in a given act of decision-making depends on, at least (i) social context; (ii) individual differences; and (iii) developmental period.

First, which motive or motives are critical for determining behavioral decisions in distributive justice situations depend on the particular social context. For example, in classic paradigms in which preschool children are found to be fairly selfish, children are given some resources to possess (Fehr et al., 2008; Blake & Rand, 2010). They are then instructed that they may keep all of these resources or give some of them to another child, as they wish (the structure is thus that of a dictator game from game theory). Preschool children are selfish in such context because they have to give up things that they already possess, which is costly, even painful. This effect may be more pronounced in younger children, whose sense of possession, even if just emerging, appears to often override other motivations. Indeed, Svetlova et al. (2010) found that 2-year-old children shared neutral objects with an adult much more readily than they shared objects which they owned themselves. In Fehr et al. (2008) study 3- to 4-year-olds consistently

chose allocations that maximized the number of their possessions. So in this context, prior possession encourages selfish behavior in sharing objects and the distribution of resources.

But consider another context used in a recent study with pairs of 3-year-old children. Hamann et al. (2011) set up situations in which one child of the pair ended up with three valuable toys and the other child ended up with only one. The "lucky" child handed one of the toys to the "unlucky" child—and so equalized the distribution at two apiece—at drastically different levels depending on how the unequal split came about. In the collaboration condition children work together to retrieve the toys from the apparatus. In this case, when the toys came down, surprisingly, in an unequal manner, the lucky child equalized the distribution by giving one toy to the unlucky child in over 80% of the cases. In contrast, if the children simply entered the room and saw three toys already in the receiving tray of one side of the apparatus, and one toy in the other, the lucky child equalized the distribution by giving one toy to the unlucky child in only 10% of the cases. Generating unowned resources collaboratively thus seems to encourage in children a tendency to equalize the co-produced resources, perhaps because the collaborative activity generates in children a sense of the collaborators being equally deserving of the outcome. But when each child finds her own resources on her own side, any sharing that might ensue is more like the dictator game, in which she has to give up something that she already possesses. In addition, it might be that children in this condition have some implicit understanding that the 3/1 split which they find upon entering the room was done by the adults, and so this must be the way the game is supposed to be played. The lucky child reasons that she is supposed to have three toys, and the other child only one, in this game as it is set up and authorized by adults.

Another variation involves work effort, or merit. Classically, in the work summarized by Damon (1977; 1980), children only took work effort or other forms of merit into account later in the school years. It was thought that children start with the sense that everyone is equal, and only later are able to make more nuanced judgments that essentially involve a distribution proportional to some other factor, such as work effort. But recent research in the same general framework as the current research has shown that even preschool children take merit into account when that plays a salient role in generating the resources. Studies by Baumard et al. (2012), Kanngiesser & Warneken (2012), and Hamann et al. (in press) all found that when preschool children perceive that one individual put in more effort to generate resources, that individual deserves a greater proportion of the generated rewards. So in this context, fairness does not mean equality among persons as individuals, but something more along the lines of equality per unit of work effort.

From the point of view of Lerner's theory, different principles of distributive justice are appropriate, and so are utilized by individuals, in different contexts. What we have highlighted here is differences in how the resources are generated and the role played by the different recipients, if any, in generating the resources. Children have as part of their knowledge and competence several different principles that they and others would consider fair ways of distributing goods in different circumstances. And, of course, there may be other situations in which it might be appropriate to favor oneself or to favor one's friend or kin with goods—though it might be debatable whether those could be justified by an appeal to fairness, or whether they must be justified by an appeal to some other principle like loyalty to one's self, friends, or kin.

Second, the weighting of different principles of fairness or justice, and how they might compete with other principles of individual decision-making such as selfishness and favoritism,

obviously differ as well for different individuals regardless of context. Thus, it would seem obvious that some individuals are more selfish than others across contexts, some individuals are more sympathetic than others toward the concerns of other people, some individuals are more assiduous rule followers than others, and some individuals become more upset when undeserving people get rewarded (cheater detection) (Haidt, 2012). Such individual differences might be part of the natural variation of human behavioral preferences and personality, they might be due to different socialization experiences, or they might derive from some combination of the two. A productive future direction would be to assess, along with measures of fairness understanding such as the ones in our studies, various factors that could be related to individual differences in children's fairness-related responses. Unfortunately, we were not able to use questionnaire measures in either study. Future studies could use data from such instruments as Strengths and Difficulties Questionnaire (Goodman, 1997), Children's Behavior Questionnaire (Rothbart et al., 2001), Parental Socialization Goals Questionnaire (Keller et al., 2006) and others. It would also be interesting to see whether children's exposure to and interaction with other children (including siblings and peers at daycare centers) could be associated with differences in children's own, and their evaluation of others', fairness-related behavior.

Whatever their origin, Haidt (2012) makes an interesting case that an important outcome of such individual differences (along with some other similar dimensions that he identifies) is people's attitudes towards society as a whole and political institutions in particular. Thus, in the American context, people who are more comfortable with selfish motives, more strict followers of rules (including respect for authority), more loyal to their group and negative toward rewards for undeserving individuals (cheaters), etc., tend to lean more to the right politically, whereas individual high on sympathy for others in need tend to lean more to the left politically. This is a

very "far cry" from the 3- and 5-year-olds distributing toys in the current study, but it has an interesting potential implication that individual differences in how preschoolers interact with puppets might predict in the long run how they relate to the society into which they are born more generally.

Third, the different principles of fairness/justice as elaborated by Lerner (and perhaps other relevant principles) might differ in their weighting across development. The pattern might be one reminiscent of the classic picture in some ways but still be importantly different because of the way the dimensions of fairness are thought to interact with one another. The results of the current study, along with those of many others, would suggest that it is indeed the case that young preschoolers often do behave more selfishly than school-aged children (and the current first study, along with many others, would seem to rule out that young children cannot identify others' needs in straightforward cases). But it is still a question whether that is due to selfishness being a stronger motive, sympathy for others' needs being a weaker motive, or socialization into rules of fairness having had less time to work. The second study here suggests at least a tentative answer. Both 3- and 5-year-olds were more positive about a puppet who distributed fairly than one who favored one individual when this judgment was made from a third-party perspective. So children of both ages would seem to share the equality principle in this situation. But when they themselves were one of the recipients, 3-year-olds, but not 5-year-olds, switched to preferring the puppet who favored them. Importantly, this included their judgment about who was "nice", in which they identified as nice the fair puppet in the third-party context but the puppet who favored them in the first party context. This pattern of results would seem to suggest that it is not that young preschoolers cannot identify and sympathize with others' needs in straightforward situations (they do this in the first study), and it is not that they do not appreciate individuals who

are fair toward others (they do this in the third-party condition of the second study). It is simply that they seem to value their own individual needs and/or desires in situations of distributive justice more than do older children.

The results of the first study suggest that 3-year-olds give more weight to the principle of equality than to the principle of need. When they were given an equal number of resources to divide, the majority of them divided the shares equally and the others had no preference for the needy versus the non-needy puppet. The 5-year-olds gave equal weight to the principle of equality and the principle of need, as when they were given an equal number of resources to divide, roughly half of them did so on the basis of equality and half of them did so on the basis of need. This developmental ordering is again somewhat reminiscent of the classic picture in which children are first egalitarian and then take into account other factors, but of course displaced in age downward by several years. What all of this might mean is that the classic account in which young children go from selfish to equal (egalitarian) to equity-based (equality tempered by the merit and need) still holds up to the facts quite well. It is just that when they need to express themselves in verbal justifications, this developmental pattern is displayed several years later than when they express themselves in behavioral decision-making. Also, as noted above, the theoretical conceptualization is different because it is not that children at a particular age are overall selfish or egalitarian—they are capable of acting with respect to any of four or more principles of fairness in distributive justice contexts from at least 3 years of age—it is that in the current conceptualization the ordering of those different principles in their behavioral decision-making may be different at different developmental periods.

In this theoretical framework, then, the key is not just to investigate children's behavior in operating with one of the principles of fairness/justice, but rather, as in the current studies, to put

them into competition with one another (and/or with other principles of behavioral decision-making, such as selfishness). If children from 3 years of age are capable of operating with several different principles of fairness depending on the particular situation, then a systematic research program would be to map preferences within a situation across age, and then compare across situations as well. It is only with such “competition” experiments that we will be able to determine the structure of children's sense of fairness at any given age.

The developmental progression in fairness understanding evidenced by the current study's findings could be explained by several processes taking place during early childhood. Consistent with previous literature on moral development, we found clear indications that older preschoolers are more concerned with the welfare of others than are younger preschoolers. This may be one of the manifestations of the increasing role of “collective identity” (Ruble et al., 2004; Amiot, De la Sablonniere, Terry, & Smith, 2007), when in addition to a personal self the child begins to represent herself as a part of a group, a “collective self”, and is able to identify with others' subjective interests and needs. At the same time, children's social-cognitive abilities, such as understanding of others' mental states, also grow in complexity during this period. Studies that investigated the role of theory of mind in prosocial behavior and judgment have found that children who passed the false belief task (typically around the age of 4, i.e., the transitional period between our study's two age groups) were sharing more generously in the Ultimatum Game (Takagishi et al., 2010) and were able to make more nuanced judgments about moral transgressions (e.g., were less likely to punish accidental transgressors; Killen et al., 2011) than those who did not pass false belief tasks. More advanced theory of mind skills could thus be a part of the developmental picture that contributed to the differences in 3-year-olds' and 5-year-olds' fairness-related decisions.

Finally, one other dimension of developmental change in children's moral development, that can be relevant for the current findings, is suggested by Tomasello and Vaish (2013). They propose that the prosocial and moral behavior of children younger than 3 years of age might be based not on abstract social norms and rules that apply to everyone alike, as is the case for adults. Rather, the prosocial and moral behavior of 2-year-olds, for example, might be based on a concern for the particular individual or on a sense of equality between two particular individuals, such as my sister and myself. This is the so-called second-personal dimension of adult morality in which, for example, one individual makes a promise to another and so owes a debt to her specifically. In adults, this is reinforced by a general rule that one should keep one's promises in general, but the proposal is that 2-year-old children do not have these general rules and so they are only operating with second-personal moral inclinations. In this view, then, we might expect some instability and lack of consistency in the moral behavior and judgments of children below 3 years of age as they are responding to particular situations based on a number of idiosyncratic characteristics of the person involved. Older children's more norm-based moral behavior and judgments are more consistent because they are based on more abstract, cross-situational, agent-neutral principles.

4.4 LIMITATIONS AND FUTURE DIRECTIONS

Several limitations of the current studies must be noted. First, as with many experimental studies, the ecological validity of our experiments could be questioned. The children were tested by adult experimenters and could have tried to behave in a manner that would, in the children's view, please the adults or correspond to the adults' expectations. This is possible but not very likely,

because we did our best to embed the experimental situations in a playful context and ensure that the children were engaged with the tasks. A more likely threat to ecological validity, however, could come precisely from that playful context. The children knew that they were “playing a game”; their partners were funny talking puppets; the whole situation was quite far removed from real life. Perhaps modeling more realistic situations, especially involving peers, could be a more productive approach to exploring the same questions. Another related issue might have been task complexity. Despite our efforts to make the tasks as simple as possible, younger children in our sample might have had some difficulties with sustaining attention during the tasks and remembering the individual puppets’ situations.

Second, as already mentioned, we unfortunately did not have access to children’s demographic information (such as number of siblings or hours spent at daycare) or other variables that could have potentially been useful in explaining individual differences. In both studies, whereas 3-year-olds were fairly homogeneous—or, fairly equally dispersed—in their performance, 5-year-old children showed a few distinct patterns of responses and could be classified into distinct groups according to their strategies, suggesting that by this age, some additional variables could contribute to marked individual differences. These variables could include temperamental characteristics as well as environmental influences, such as parental attitudes and values, parenting techniques, and children’s experiences at daycare centers. Recent studies have shown, for example, that already in toddlerhood, parental discourse about others’ mental states, and especially parental elicitation of children’s mental state talk, is related to children’s emotional competence and other-regarding behavior (Denham, S., Bassett, H., & Wyatt, 2007; Brownell et al., 2013). One could speculate, therefore, that children whose parents draw their attention to fairness-related issues would be more competent at making appropriate

distributive decisions. Parents' own ethical and political views, e.g. their preference for egalitarian, meritocratic or need-based distributions of goods could also influence their socialization of values and affect children's fairness-related behavior.

In addition to the family environment, the role of overall culture in which the child is born and raised could not be underestimated. In adults, the degree to which a society is involved in market exchange has been shown to correlate with Ultimatum and Dictator game performance: more exposure to a market economy is associated with more equal offers to an anonymous other (Henrich et al., 2010). Differences in children's distributive justice decisions across cultures have also been reported, although findings are not entirely consistent with those of studies with adults. For example, in a cross-cultural study by Rochat et al. (2009), 3- to 5-year-old children growing up in small-scale urban and traditional societies showed less self-interest and made more equal distributions than children from industrialized societies. On the other hand, a recent study comparing Western children to children from two small-scale societies in Africa (Schaefer et al., 2013) has found that in highly hierarchical traditional societies children tend to base resource allocations more on "arbitrary" principles (e.g. recipient's rank) than on either equality or merit. It would be interesting to administer the experiments reported here (and likely influenced by the Western market-economy values) in more traditional and/or more collectivist cultures, to investigate whether children in those cultures would be more attuned to others' needs and perhaps more (or, perhaps less) likely to value equal distributions.

4.5 CONCLUSION

In *A Theory of Justice*, Rawls (1971) surveys all of the different considerations that people and their political representatives might take into account—indeed, *ought* to take into account—when structuring their societal and political institutions. His conclusion is that many of these are contentious and problematic unless and until they are boiled down to the distribution of concrete resources. Whereas it is not clear what a government could or should do for mental illness or for a widow's bereavement, the one thing it can and should do is to find ways of distributing resources among its members in ways that are mutually satisfactory. Indeed, in a later book Rawls dubs his theoretical conception *Justice as Fairness* (2001).

What comes out clearly in this philosophical account is that conceptions of justice and fairness in the distribution of resources are many and various and conflict with one another in many and various ways in concrete situations. This account fits well with the theoretical orientation of the current studies in which even very young children have multiple senses of what is fair in distributive justice situations depending on many different considerations. This means that there are no simple solutions to many moral and political problems, but that there must always be the negotiation in which both facts and values are debated. Perhaps it is not too much to hope that a better understanding of how young children begin thinking and acting toward others "fairly" in distributive justice situations—reduced to their simplest and most straightforward elements—might contribute to our understanding of how these phenomena work.

Coming back to developmental psychology more specifically, the current findings establish with more certainty than any previous findings that preschool children already have a sense of fairness in distributive justice contexts. Indeed, they have multiple senses of fairness in such contexts, for example, based on equality (everyone deserves the same) and on need (those

who are in need should get more resources). Other studies have shown that children this young take merit into account as well, and it is almost certainly the case that they believe that most adult rules for distributing resources are by that very fact fair. Thus, when we use active behavioral decision-making as our measure of children's comprehension and competence rather than linguistic competence, and we operate with a pluralistic theoretical framework, we find that children as young as 3 years of age are already in possession of the most basic senses of fairness that operate in contemporary society. This does not mean that they always use their sense of fairness in making behavioral decisions—we have shown here that they are often selfish as well—but it means that in situations in which other motives are under control, young children can make moral judgments about the distribution of resources that they themselves consider fair. These early-emerging senses of fairness then form the basis for their participation in all kinds of complex social and political institutions in which only those who at least possess these senses of fairness are legitimate participants.

Much research remains to be done. In particular, the current studies point toward a more systematic use of the “competition” methodology in which children's different senses of justice are pitted against one another—supported by a theoretical framework providing a unified account of these differences. Doing this systematically with all of the different senses of fairness available to young children of different ages could potentially provide us with a very detailed map of the factors that go into the moral decision-making of children at different developmental periods as they face complex social situations with multiple types of fairness potentially at play. This map would be at a level of detail not imaginable in the classic theoretical framework in which children operate from a kind of unified level of development in their conception of justice

at each developmental period (Piaget, 1932; Damon, 1977). In the new theoretical framework, this level of detail is not only imaginable but attainable.

APPENDIX A

TABLES AND FIGURES

A.1 FIGURES FOR STUDY 1



Figure 1 Materials for Study 1

Pairs of recipient puppets and the items that children had to distribute

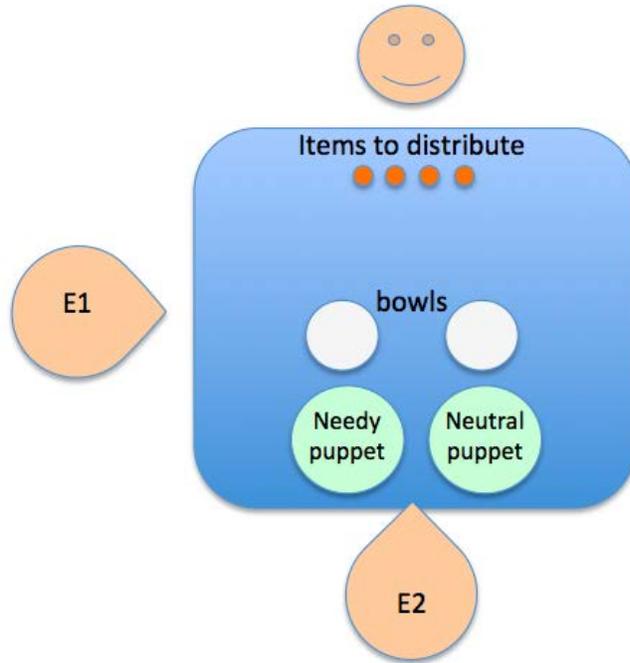


Figure 2 Set-up for Study 1

A.2 TABLES FOR STUDY 1

Table 1 Mean percentage of items given to the needy puppet across all 3 tasks as a function of age and distribution condition

	3-item trials	4-item trials
3 year olds	.62*	.55
5 year olds	.63*	.62*

(* = different from chance at .05 level or less.)

Table 2 **Number of 3-year-old children who favored the different puppets (or gave to them equally, where possible) in the three different tasks**

	3-item trials		4-item trials	
HUNGRY	Needy	20	Needy	7
	Other	8	Equal	19
			Other	2
SAD	Needy	20	Needy	7
	Other	8	Equal	17
			Other	4
ILL	Needy	15	Needy	6
	Other	13	Equal	16
			Other	6

Table 3 **Number of 5-year-old children who favored the different puppets (or gave to them equally, where possible) in the three different tasks**

	3-item trials		4-item trials	
HUNGRY	Needy	27	Needy	14
	Other	1	Equal	14
			Other	0
SAD	Needy	25	Needy	13
	Other	3	Equal	15
			Other	0
ILL	Needy	23	Needy	12
	Other	5	Equal	16
			Other	0

A.3 FIGURES FOR STUDY 2

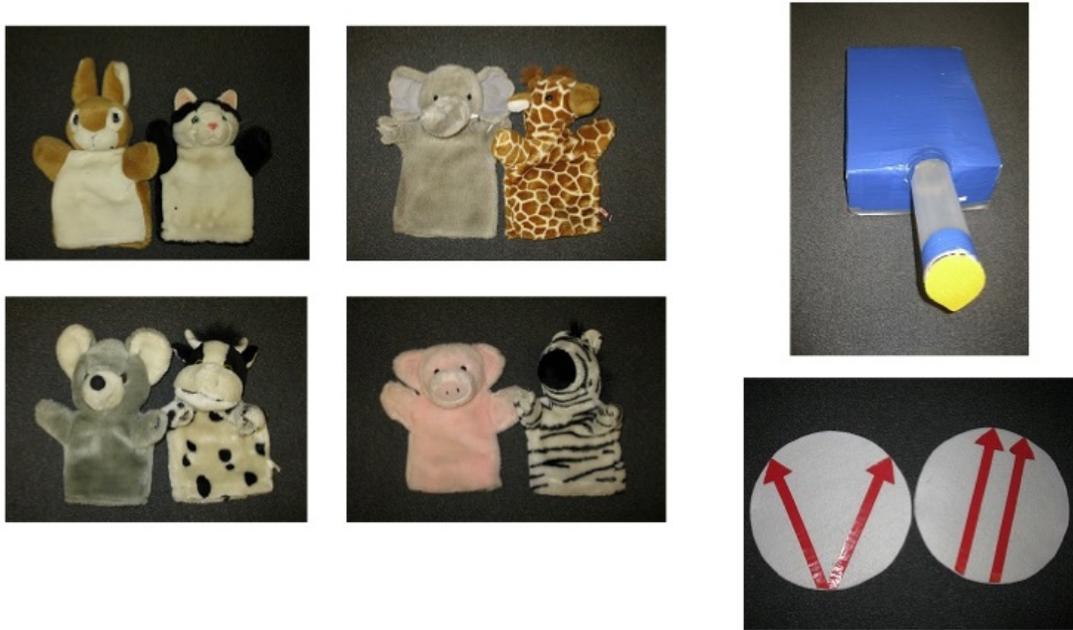


Figure 3 Materials for Study 2

The four pairs of distributor puppets; the "pling machine" (here, with a flap that the child had to lift in the third party condition); the arrow pads used as identification markers for the Fair distributor and the Preferring distributor

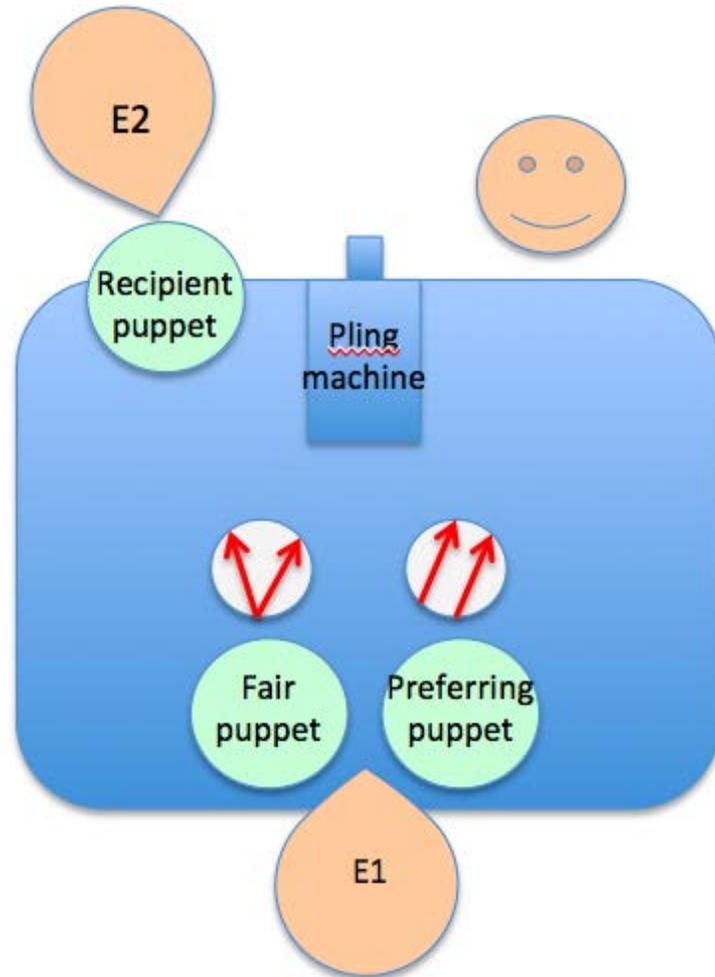


Figure 4 Set-up for study 2: First Party condition

(Test phase). The smiley face indicates the child.

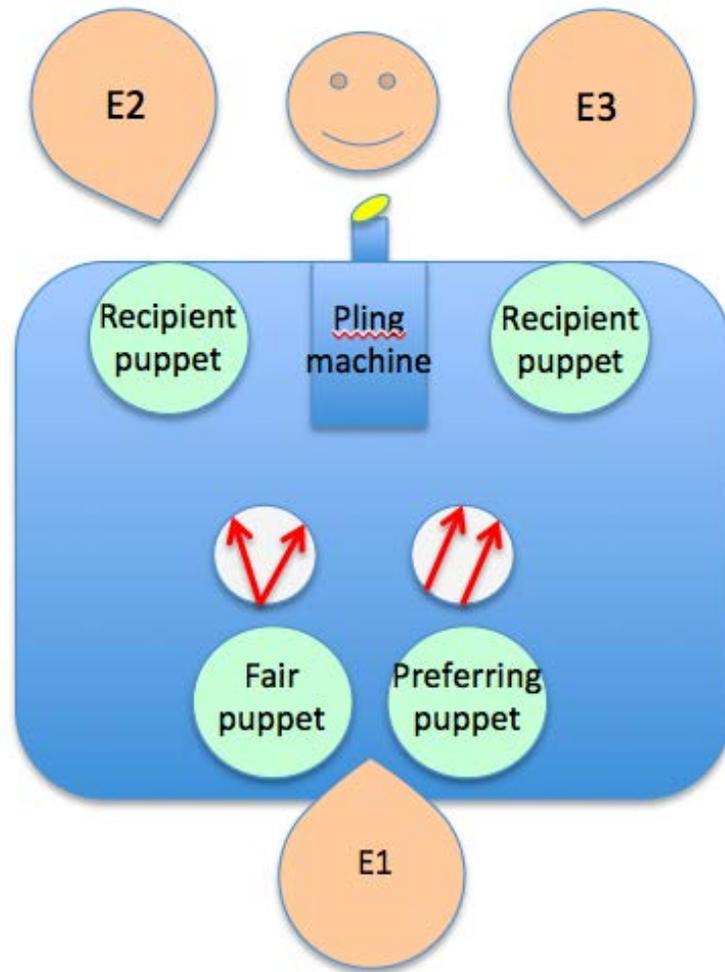


Figure 5 Set-up for study 2: Third Party condition

(Test phase). The smiley face indicates the child.

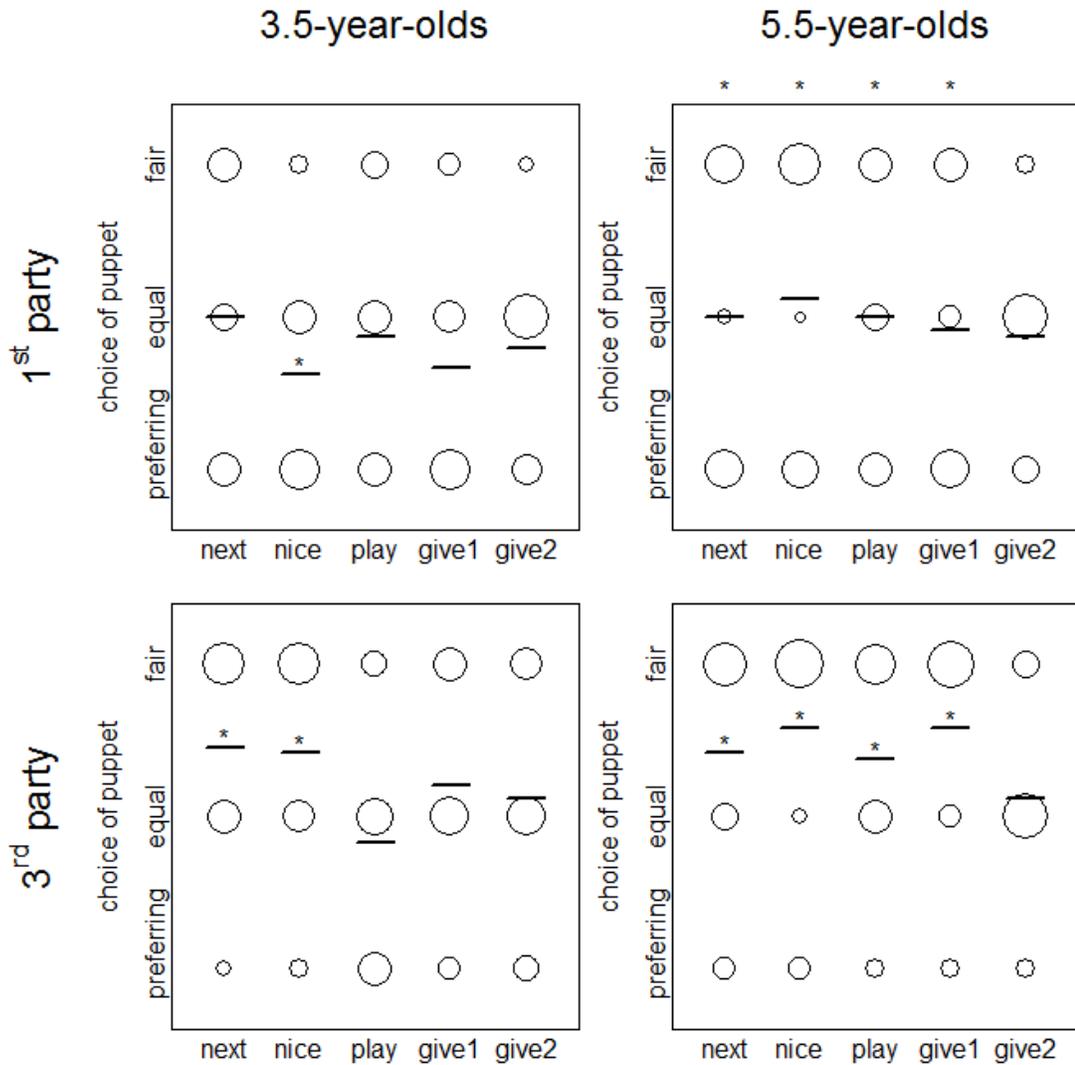


Figure 6 Number of children at each age and condition who favored the Fair puppet, favored the Preferring puppet, and chose both equally often, in response to 5 measures.

The lines indicate mean proportions of times choosing either puppet, and stars indicate significance of t-test at .5 level. Stars above the body of the graph for the 5.5-year-olds in the first party condition indicate significant difference from chance of the distribution of children using each strategy (Monte-Carle test).

A.4 TABLES FOR STUDY 2

Table 4 Means and standard deviations (in parentheses) for the proportions of trials on which children chose the Fair puppet

Measure	3.5-year-olds		5.5-year-olds	
	1st party	3rd party	1st party	3rd party
"Who should distribute next?"	0.486 (.29)	0.656* (.24)	0.51 (.39)	0.698* (.18)
"Who was nice?"	0.337* (.26)	0.646* (.22)	0.573 (.45)	0.813* (.31)
"Who do you want to play with?"	0.49 (.27)	0.438 (.22)	0.51 (.37)	0.646* (.26)
Child distributes 1 item	0.375 † (.30)	0.563 (.23)	0.479 (.41)	0.698* (.26)
Child distributes 2 items	0.469 (.08)	0.536 (.10)	0.474 (.12)	0.521 (.16)

(* = difference from chance at $p < .05$)

Table 5 Correlations between the five measures in Study 2 for 3.5-year-old participants, Pearson's r .

Condition	2.	3.	4.	5.	
1st party	1. "Who should distribute next?"	,274	,070	-,040	,269
	2. "Who was nice?"	---	,244	-,040	,243
	3. Child distributes 2 items		---	-,082	,126
	4. Child distributes 1 item			---	-,083
	5. "Who do you want to play with?"				---
3rd party	1. "Who should distribute next?"	,739**	,715**	,284	,405*
	2. "Who was nice?"	---	,561**	,196	,338
	3. Child distributes 2 items		---	,539**	,539**
	4. Child distributes 1 item			---	,469*
	5. "Who do you want to play with?"				---

* = $p < .05$; ** = $p < .01$

Table 6 Correlations between the five measures in Study 2 for 5.5-year-old participants, Pearson's *r*.

Condition		2.	3.	4.	5.
1st party	1. "Who should distribute next?"	,804**	,398	,690**	,800**
	2. "Who was nice?"	---	,384	,581**	,594**
	3. Child distributes 2 items		---	,127	,463*
	4. Child distributes 1 item			---	,714**
	5. "Who do you want to play with?"				---
3rd party	1. "Who should distribute next?"	,456*	-,102	,555**	,313
	2. "Who was nice?"	---	,307	,478*	,405*
	3. Child distributes 2 items		---	-,124	,200
	4. Child distributes 1 item			---	,443*
	5. "Who do you want to play with?"				---

* = $p < .05$; ** = $p < .01$

APPENDIX B

SCRIPTS FOR STUDY 1

B.1 TASK 1. ILL PUPPET AND DICE

E2 holds Molly (with bandage, sad posture, head down) and Sally.

E1: - Look, this is Molly. Poor Molly, she came right from the hospital. She was sick and hasn't played for a long time. And this is Sally, she is feeling well, she's been going to kindergarten every day and playing a lot with friends.

Molly (E2): - I really want to play; at the hospital it was so boring. Do you have something for me to play with?

Sally (E2): - I just played a game, and I want to play some more. Do you have something for me to play with?

E1: - OK, I know what we can do! I have some dice here!

(gets out 4 dice and puts them on the table in front of the child)

- Molly and Sally like them. Can you give some dice to them?

(if the child pushes them all in the middle)

- Give some to each puppet!

(gets out 3 more dice)

- Look, I found three more! You can give them to the puppets, too!

*Molly and Sally (E2) state how many items each of them received,
e.g. - I got two dice!*

Puppets drop their items in the bag under the table.

*E1 plays ball (or another game) with the child while E2 changes
puppets. E1 has things to be distributed in the next task ready.*

B.2 TASK 2. HUNGRY PUPPET AND FOOD

*E2 holds Ulf (with dirty bib and fat belly) and Sven (clean bib, sad
posture, head down).*

E1: - Now, these are Ulf and Sven. Look, Ulf has just eaten, his bib is dirty. And Sven is hungry. He hasn't eaten for a long time. His bib is clean.

Sven (E2): - I am so hungry, I haven't eaten for a long time! Do you have some food for me?

Ulf (E2): - I just ate, but I want some more! Do you have some food for me?

E1: - We do have something for you!

*(gets out 4 wooden bananas and puts them on the table in front of
the child).*

- Ulf and Sven like to eat these. Can you give some to them?

(if the child pushes them all in the middle)

- Give some to each puppet!

(gets out 3 more pieces)

- And there are 3 more. Give them to the puppets, too.

*Ulf and Sven (E2) state how many items each of them received,
e.g.- I got two bananas!*

Puppets drop their items in the bag under the table.

E1 plays ball (or another game) with the child while E2 changes puppets. E1 has things to be distributed in the next task ready.

B.3 TASK 3. SAD PUPPET AND MARBLES

E2 holds Uwe and Bert (with Velcro tears, sad posture, head down).

E1: - These are Uwe and Bert. Look, Bert is sad, his cat ran away. He is crying. And Uwe is happy, he is having a good day!

Bert (E2): - I am so sad. My cat is gone. Can someone comfort me? Do you have something I can play with?

Uwe (E2): - I feel good today! I also would like to play! Do you have something I can play with?

E1: - Yes! We have some marbles for you to play!

(gets out 4 marbles and puts them on the floor in front of the child)

- Uwe and Bert love to play with marbles. You can give them to Uwe and Bert.

(if the child pushes them all in the middle)

- Give some to each puppet!

(gets out 3 more)

- And here are three more marbles, give them to them, too.

*Uwe and Bert (E2) state how many items each of them received,
e.g. - I got two marbles!*

Puppets drop their items in the bag under the table.

APPENDIX C

SCRIPTS FOR STUDY 2

C.1 “1ST PARTY” CONDITION

C.1.1 Demo 1

E1: - You and [Recipient puppet =R] will play with these different animals, and they will give you things to put in the pling machine! Now you will play with [Animal 1, preferring the child =P] and [Animal 2, fair =F]. Watch what they do!

E1 gets F with the V-pad.

R: - I wonder if I'll get to play!

F: - I will give one [thing] to you and one [thing] to you, because that way each gets the same.

(distributes things, E1 encourages the child and R to throw them in the machine)

E1 gets P with the II-pad.

R: - I wonder if I'll get to play!

P (*to the child*): - I will give two [things] to you, because I like you.

(gives both to the child, E1 encourages the child to throw them in the machine)

R: - F gave one to you and one to me, and P gave both to you.

C.1.2 Demo 2

E1: - Now, they have some more [things]. Let's see what they do now.

E1 gets F with the V-pad.

R: - I wonder if I'll get to play!

F: - I will give one [thing] to you and one [thing] to you, because that way each gets the same.

(distributes things, E1 encourages the child and R to throw them in the machine)

E1 gets P with the II-pad.

R: - I wonder if I'll get to play!

P (*to the child*): - I will give two [things] to you, because I like you.

(gives both to the child, E1 encourages the child to throw them in the machine)

R: - F gave one to you and one to me again, and P gave both to you again.

F: - Yes, I gave one thing to each, so that each person gets the same!

P: - And I gave all the things to [Child], because I like him/her!

C.1.3 Test

For each question, E1 holds the 2 distributor puppets (and their pads) in front of the child, so that the child can choose one by naming or pointing.

1. E1: - Now you can decide, which animal will distribute things next. Remember, F gives to both of you, and P always gives to you. Who should give things now?

(let the child point/name. Whoever the child chooses, does his distribution first; then the other puppet does his distribution)

2. E1: - Now that you saw what they did, what do you think, who was nice?

(let the child point/name)

3. E1: - Now, P and F want to play with the pling machine, too, and you will give [things] to them. Here, give them these two [things].

(hands 2 things to the child; after he distributes, the animals put them in the machine)

- And here is one more [thing]. Who do you give it to?

(hands 1 thing to the child; after he gives it to one animal, the animal puts it in the machine)

4. E1: - Now we are going to play another game. (moves all the equipment away and gets the [ball] out). One animal will have to leave, and one will stay. Who should stay and play with you?

(let the child point/name. The non-chosen puppet says goodbye and goes away (in the box).

The chosen puppet plays the game with the child)

REPEAT WITH THE OTHER THREE PAIRS OF DISTRIBUTORS

C.2 “3RD PARTY” CONDITION

C.2.1 Demo 1

E1: - These two puppets, [R1] and [R2], will play with these different animals, and the animals will give them things. And you will help [R1] and [R2] to put these things in the pling machine! You will help them by lifting this flap... (demonstrates) Now [Animal 1, preferring one recipient, =P] and [Animal 2, fair =F] will distribute things. Watch what they do!

E1 gets F with the V-pad.

R1: - I wonder if I'll get to play!

R2: - I wonder if I'll get to play!

F: - I will give one [thing] to you and one [thing] to you, because that way each gets the same.

(distributes things, EI encourages the child to hold the flap while the recipients throw them in the machine)

EI gets P with the II-pad.

R1: - I wonder if I'll get to play!

R2: - I wonder if I'll get to play!

P (to R1): - I will give two [things] to you, because I like you.

(gives both to R1, EI encourages the child to help R1 throw them in the machine)

R1: - F gave me one.

R2: - And F gave me one, too.

R1: - And P gave two to me.

R2: - And P didn't give me any.

C.2.2 Demo 2

E1: - Now, they have some more [things]. Let's see what they do now.

EI gets F with the V-pad.

R1: - I wonder if I'll get to play!

R2: - I wonder if I'll get to play!

F: - I will give one [thing] to you and one [thing] to you, because that way each gets the same.

(distributes things, EI encourages the child to help the recipients throw them in the machine)

EI gets P with the II-pad.

R1: - I wonder if I'll get to play!

R2: - I wonder if I'll get to play!

P (to R1): - I will give two [things] to you, because I like you.

(gives both to R1, E1 encourages the child to help R1 throw them in the machine)

R1: - F gave me one.

R2: - And F gave me one, too.

R1: - And P gave two to me.

R2: - And P didn't give me any.

F: - Yes, I gave one thing to each, so that each person gets the same!

P: - And I gave all the things to [preferred puppet], because I like him/her!

C.2.3 Test

For each question, E1 holds the 2 distributor puppets (and their pads) in front of the child, so that the child can choose one by naming or pointing.

1. E1: - Now you can decide, which animal will distribute things next. Remember, F gives equally to the two puppets, and P always gives to one of them. Who should give things now?

(let the child point/name. Whoever the child chooses, does his distribution first; then the other puppet does distribution)

2. E1: - Now that you saw what they did, what do you think, who was nice?

(let the child point/name)

3. E1: - Now, P and F want to play with the pling machine, too, and you will give [things] to them. Here, give them these two [things].

(hands 2 things to the child; after he distributes, the animals put them in the machine)

- And here is one more [thing]. Who do you give it to?

(hands 1 thing to the child; after he gives it to one animal, the animal puts it in the machine)

4. E1: - Now we are going to play another game. *(moves all the equipment away and gets the [ball] out)*. One animal will have to leave, and one will stay. Who should stay and play with you?

(let the child point/name. The non-chosen puppet says goodbye and goes away (in the box/bag). The chosen puppet plays the game with the child)

REPEAT WITH THE OTHER THREE PAIRS OF DISTRIBUTORS

BIBLIOGRAPHY

- Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp. 267-299). New York: Academic Press.
- Alcock, J. (2001). *Animal behavior: an evolutionary approach*. P. Farley (Ed.). Massachusetts: Sinauer Associates.
- Alexander, R. D. (1987). *The biology of moral systems*. New York: De Gruyter.
- Almås, I., Cappelen, A. W., Sørensen, E., Ø. & Tungodden, B. (2010). Fairness and the development of inequality acceptance. *Science*, 328, 1176-1178.
- Amiot, C. E., De la Sablonniere, R., Terry, D. J., & Smith, J. R. (2007). Integration of social identities in the self: Toward a cognitive-developmental model. *Personality and Social Psychology Review*, 11, 364-388.
- Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science*, 211, 1390-1396.
- Banerjee, R. (2002). Children's understanding of self-presentational behavior: Links with mental-state reasoning and the attribution of embarrassment. *Merrill-Palmer Quarterly*, 48, 378-404.
- Batson, C. D., Duncan, B. D., Ackerman, P., Buckley, T., & Birch, K. (1981). Is empathic emotion a source of altruistic motivation? *Journal of Personality and Social Psychology*, 40, 290-302.
- Batson, C. D., Klein, T. R., Highberger, L., & Shaw, L. L. (1995). Immorality from empathy-induced altruism: When compassion and justice conflict. *Journal of Personality and Social Psychology*, 68, 1042-1054.
- Baumard, N., Mascaró, O., & Chevallier, C. (2012). Preschoolers are able to take merit into account when distributing goods. *Developmental Psychology*, 48, 492-498.
- Baumard, N., André, J.B. & Sperber, D. (in press). A mutualistic approach to morality, *Behavioral and Brain Sciences*.
- Berndt, T. J. (1977). The effect of reciprocity norms on moral judgment and causal attribution. *Child Development*, 48, 1322-1330.

- Berndt, T. J. (1979). Lack of acceptance of reciprocity norms in preschool children. *Developmental Psychology, 15*, 662-663.
- Bischof-Köhler, D. (1991). The development of empathy in infants. In M. E. Lamb & H. Keller (Eds.), *Infant development: Perspectives from German speaking countries* (pp. 245-273). Hillsdale, NJ: Erlbaum.
- Blake, P.R., & Rand, D.G. (2010). Currency value moderates equity preference among young children. *Evolution and Human Behavior, 31*, 210-218.
- Blake, P. R., & McAuliffe, K. (2011). "I had so much it didn't seem fair": eight-year-olds reject two forms of inequity. *Cognition, 120*, 215–224.
- Boyd, R.T., & Richerson, P. (2005). *The origin and evolution of cultures*. New York: Oxford.
- Brownell, C. A., & Carriger, M. S. (1990). Changes in cooperation and self-other differentiation during the second year. *Child Development, 61*, 1164-1174.
- Brownell, C. A., & Kopp, C. B. (2007). *Socioemotional development in the toddler years: Transitions and transformations*. New York, NY, US: Guilford Press.
- Brownell, C.A., Svetlova, M., & Nichols, S. (2009). To share or not to share: When do toddlers respond to another's needs? *Infancy, 14*, 117-130.
- Brownell, C., Iesue, S., Nichols, S., & Svetlova, M. (in press). Mine or yours? Development of sharing in toddlers in relation to ownership understanding. *Child Development*.
- Brownell, C. A., Svetlova, M., Anderson, R., Nichols, S. R., & Drummond, J. (2013). Socialization of early prosocial behavior: Parents' talk about emotions is associated with sharing and helping in toddlers. *Infancy, 18*, 91-119.
- Chiang, Y. (2010). Self-interested partner selection can lead to the emergence of fairness. *Evolution and Human Behavior, 31*, 265-270.
- Clark, M. S., & Jordan, S. D. (2002). Adherence to communal norms: What it means, when it occurs, and some thoughts on how it develops. *New Directions for Child & Adolescent Development, 95*, 3-26.
- Clark, M. S., & Mills, J. (1993). The difference between communal and exchange relationships. *Personality and Social Psychology Bulletin, 19*, 684-691.
- Cohen, G. A. (1989). On the currency of egalitarian justice, *Ethics, 99*, 906-944.
- Cortina, M., & Liotti, G. (2010). Attachment is about safety and protection, intersubjectivity is about sharing and social understanding: The relationships between attachment and intersubjectivity. *Psychoanalytic Psychology, 27*, 410-441
- Damon, W. (1977). *The social world of the child*. San Francisco, CA: Jossey-Bass.

- Damon, W. (1980). Patterns of change in children's social reasoning: a two-year longitudinal study. *Child Development, 51*, 1010-1017.
- Damon, W. (1983). *Social and personality development: Infancy through adolescence*. New York: W. W. Norton.
- Dawes, C. T., Fowler, J., Johnson, T., McElreath, R., & Smirnov, O. (2007). Egalitarian motives in humans. *Nature, 446*, 794-796.
- Demetriou, H., & Hay, D. F. (2004). Toddlers' reactions to the distress of familiar peers: The importance of context. *Infancy, 6*, 299-318.
- Denham, S., Bassett, H., & Wyatt, T. (2007). The Socialization of Emotional Competence. In J. Grusec & P. Hastings (Eds.), *Handbook of socialization: Theory & research* (pp. 614-637). New York, NY: Guilford.
- Deutsch, M. (1975). Equity, equality, and need: What determines which value will be used as the basis of distributive justice? *Journal of Social Issues, 31*, 137-150.
- Dunfield, K., Kuhlmeier, V. A., O'Connell, L., & Kelley, E. (2011). Examining the diversity of prosocial behavior: Helping, sharing, and comforting in infancy. *Infancy, 16*, 227-247.
- Dunn, J., & Munn, P. (1986). Siblings and the development of prosocial behaviour. *International Journal of Behavioral Development, 9*, 265-284.
- Dunn, J., & Munn, P. (1987). Development of justification in disputes with mother and sibling. *Developmental Psychology, 23*, 791-798.
- Eisenberg, N. (1983). Children's differentiations among potential recipients of aid. *Child Development, 54*, 594-602.
- Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin, 101*, 91-119.
- Eisenberg, N., Fabes, R. A., Miller, P. A., Shell, R., Shea, C., & Mayplumlee, T. (1990). Preschoolers' vicarious emotional responding and their situational and dispositional prosocial behavior. *Merrill-Palmer Quarterly, 36*, 507-529.
- Engelmann, J. M., Herrmann, E., & Tomasello, M. (2012). Five-year-olds, but not chimpanzees, attempt to manage their reputations. *PLoS ONE, 7* (10): e48433. doi:10.1371/journal.pone.0048433
- Enright, R. D., Bjerstedt, A., Enright, W. F., Levy, V. M., Lapsley, D. K., Buss, R. R., Harvell, M., & Zindler, M. (1984). Distributive justice development: Cross-cultural, contextual, and longitudinal evaluations. *Child Development, 55*, 1737-1751.
- Fehr, E. & Fischbacher, U. (2004). Social norms and human cooperation. *Trends in Cognitive Sciences, 8*, 185-190.

- Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, *454*, 1079–1083.
- Fiske, A. P. (1992). Four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99*, 689-723.
- Fishbein, H. D., & Kaminski, N. K. (1985). Children's reciprocal altruism in a competitive game. *British Journal of Developmental Psychology*, *3*, 393-398.
- Frederickson, N., & Simmonds, E. (2008). Special needs, relationship type and distributive justice norms in early and later years of middle childhood. *Social Development*, *17*, 1056-1073.
- Geraci, A. & Surian, L. (2011). The developmental roots of fairness: infants' reactions to equal and unequal distributions of resources. *Developmental Science*, *14*, 1012-1020.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin*, *136*, 351-374.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*, 581-586.
- Gummerum, M., Hanoch, Y., Keller, M., Parsons, K., & Hummel, A. (2010). Preschoolers' allocations in the dictator game: The role of moral emotions. *Journal of Economic Psychology*, *31*, 25–34.
- Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 852–870). New York, NY: Oxford University Press.
- Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. New York: Pantheon Books.
- Hamann, K., Warneken, F., Greenberg, J.R., & Tomasello, M. (2011). Collaboration encourages equal sharing in children but not chimpanzees. *Nature*, *476*, 328-331.
- Hamann, K., Bender, J., & Tomasello, M. (in press). Meritocratic sharing is based on collaboration in three-year-olds. *Developmental Psychology*.
- Hamilton, W. D. (1964). The genetical evolution of social behaviour. I & II. *Journal of Theoretical Biology*, *7*, 1-52.
- Hamlin, J., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, *450*, 557-559.
- Harris, M. B. (1970). Reciprocity and generosity: Some determinants of sharing in children. *Child Development*, *41*, 313-328.

- Harsanyi, J. C. (1976). *Essays on ethics, social behavior, and scientific explanation*. Holland: Dordrecht.
- Hastings, P. D., Zahn-Waxler, C., & McShane, K. (2006). We are, by nature, moral creatures: Biological bases of concern for others. In M. Killen & J. G. Smetana (Eds.), *Handbook of moral development* (pp. 483-516). Mahwah, NJ: Erlbaum.
- Helwig, C. C., & Turiel, E. (2003). Children's social and moral reasoning. In P. K. Smith, & C. H. Hart (Eds.), *Blackwell handbook of childhood social development* (pp. 475-490). Oxford: Blackwell.
- Henrich, J. (2004). Cultural group selection, coevolutionary processes and large-scale cooperation. *Journal of Economic Behavior & Organization*, *53*, 3-35.
- Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., et al. (2010). Markets, religion, community size, and the evolution of fairness and punishment. *Science*, *327*, 1480-1484.
- Hepach, R., Vaish, A., & Tomasello, M. (2013). A new look at children's prosocial motivation. *Infancy*, *18*, 67-90.
- Hill, K., & Hill, C. (1977). Children's concepts of good and bad behavior. *Psychological Reports*, *41*, 955-958.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. New York, NY: Cambridge University Press.
- Hook, J. G. (1978). The development of equity and logico-mathematical thinking. *Child Development*, *49*, 1035-1044.
- Hook, J. G., & Cook, T. D. (1979). Equity theory and the cognitive ability of children. *Psychological Bulletin*, *86*, 429-445.
- House, B., Henrich, J., Sarnecka, B., & Silk, J.B. (in press). The development of contingent reciprocity in children. *Evolution and Human Behavior*.
- Hsu, M., Anen, C., & Quartz, S. R. (2008). The right and the good: Distributive justice and neural encoding of equity and efficiency. *Science*, *320*, 1092-1095.
- Hume, D. (1739/1978) *A treatise of human nature*. Oxford: Oxford University Press.
- Iannotti, R. J. (1985). Naturalistic and structured assessments of prosocial behavior in preschool children: The influence of empathy and perspective taking. *Developmental Psychology*, *21*, 46-55.
- Kanngiesser, P., & Warneken, F. (2012). Young children consider merit when sharing resources with others. *PLoS ONE*, *7*: e43979.
- Kant, I. (1788/1949). *Critique of practical reasoning*. Chicago: University of Chicago Press.

- Keil, L. (1986). Rules, reciprocity, and rewards: A developmental study of resource allocation in social interaction. *Journal of Experimental Social Psychology*, 22, 419-435.
- Keller, H., Lamm, B., Abels, M., Yovsi, R. D., Borke, J., Jensen, H., et al. (2006). Cultural models, socialization goals, and parenting ethnotheories: A multi-cultural analysis. *Journal of Cross-Cultural Psychology*, 37, 155-172.
- Kenward, B., & Dahl, M. (2011). Preschoolers distribute scarce resources according to the moral valence of recipients' previous actions. *Developmental Psychology*, 47, 1054-1064.
- Killen, M. (1991). Social and moral development in early childhood. In W. M. Kurtines & J. L. Gewirtz (Eds.), *Handbook of moral behavior and development* (pp. 115-138). Hillsdale, NJ: Erlbaum.
- Killen, M., Pisacane, K., Lee-Kim, J., & Ardila-Rey, A. (2001). Fairness or stereotypes? Young children's priorities when evaluating group exclusion and inclusion. *Developmental Psychology*, 37, 587-596.
- Killen, M., Mulvey, K. L., Richardson, C., Jampol, N., & Woodward, A. (2011). The accidental transgressor: Morally-relevant theory of mind. *Cognition*, 119, 197-215.
- Knafo, A., Zahn-Waxler, C., Van Hulle, C., Robinson, J. L., & Rhee, S. H. (2008). The developmental origins of a disposition toward empathy: Genetic and environmental contributions. *Emotion*, 8, 737-752.
- Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. In *Handbook of Socialization: Theory and Research* (Goslin, D.A., ed.), pp. 347-480, Rand McNally.
- Kohlberg, L. (1981). *The philosophy of moral development: Moral stages and the idea of justice*. San Francisco, CA: Harper and Row.
- Kohlberg, L., Levine, C., & Hewer, A. (1983). *Moral stages: A current formulation and a response to critics*. Basel: Karger.
- Krantz, M., & Andrews, D. (1979). Reward deservedness and children's sharing behavior. *The Journal of Psychology*, 103, 241-247.
- Krebs, D. L. (2008). Morality: An evolutionary account. *Perspectives on Psychological Science*, 3, 149-172.
- Lane, I.M., & Coon, R.C. (1972). Reward allocation in preschool children. *Child Development*, 43, 1382-1389.
- Leimgruber, K. L., Shaw, A., Santos, L. R., & Olson, K. R. (2012). Young children are more generous when others are aware of their actions. *PLoS ONE*, 7 (10): e48292. doi:10.1371/journal.pone.0048292

- Lerner, M. J. (1974). The justice motive: "equity" and "parity" among children. *Journal of Personality and Social Psychology*, 29, 539-550.
- Lerner, M. J. (1977). The justice motive: Some hypotheses as to its origins and forms. *Journal of Personality*, 45, 1-52.
- Lerner, M. J. (2003). The justice motive: Where psychologists found it, how they lost it, and why they may not find it again. *Personality and Social Psychology Review*, 7, 388-399.
- Leventhal, G. S. (1976). *Fairness in social relationships*. Morristown, N.J.: General Learning Press.
- Leventhal, G. S., Popp, A. L., & Saywer, (1973). L. Equity or equality in children's allocation of reward to other persons? *Child Development*, 44, 753-763.
- Levitt, M., Weber, R., Clark, M.C., & McDonnell, P. (1985). Reciprocity of exchange in toddler sharing behavior. *Developmental Psychology*, 21, 122-123.
- Liszkowski, U., Carpenter, M., Striano, T., & Tomasello, M. (2006). 12- and 18-month-olds point to provide information for others. *Journal of Cognition and Development*, 7, 173-187.
- LoBue, V., Nishida, T., Chiong, C., DeLoache, J. S., & Haidt, J. (2011). When getting something good is bad: Even three-year-olds react to inequity. *Social Development*, 20, 154-170.
- Long, G.T., & Lerner, M.J. (1974). Deserving, the "personal contract," and altruistic behavior by children. *Journal of Personality and Social Psychology*, 29, 551-556.
- Malti, T., Gummerum, M., Keller, M., Chaparro, M. P., & Buchmann, M. (2012). Early sympathy and social acceptance predict the development of sharing in children. *PLoS ONE*, 7 (12): e52017.
- Marx, K. (1875/1989). *Critique of the Gotha Programme*. Moscow: Progress Publishers.
- McCrink, K., Bloom, P., & Santos, L. (2010). Children's and adults' judgments of equitable resource distributions. *Developmental Science*, 13, 37-45.
- McCullagh, P., & Nelder, J. A. (2008). *Generalized linear models*. London, Chapman and Hall.
- McGillicuddy-De Lisi, A.V., Watkins, C., & Vinchur, A. J. (1994). The effect of relationship on children's distributive justice reasoning. *Child Development*, 65, 1694-1700.
- McGillicuddy-De Lisi, A. V., De Lisi, R., & Van Gulik, K. (2008). The effects of grade level, context and family type on male and female adolescents' distributive justice reasoning. *Journal of Adolescence*, 31, 107-124.
- Mill, J. S. (1859/2003). *On liberty*. New Haven, CT: Yale University Press.

- Miller, D.T. & Smith, J. (1977). The effect of own deservingness and deservingness of others on children's helping behavior. *Child Development*, 48, 617-620.
- Moore, C. (2009). Fairness in children's resource allocation depends on the recipient. *Psychological Science*, 20, 944-948.
- Ng, R., Heyman, G., & Barner, D. (2011). Collaboration promotes proportional reasoning about resource distribution in young children. *Developmental Psychology*, 47, 1230-1238.
- Nichols, S. (2010). Emotions, norms, and the genealogy of fairness. *Politics, Philosophy, and Economics*, 9, 275-296.
- Nichols, S. R., Svetlova, M., & Brownell, C.A. (2009). The role of social understanding and empathic disposition in young children's responsiveness to distress in parents and peers. *Cognition, Brain, Behavior*, 13, 449-478.
- Nowak, M. A., & Sigmund, K. (2005). Evolution of indirect reciprocity. *Nature*, 437, 1291-1298.
- Olejnik, A. B. (1976). The effects of reward-deservedness on children's sharing. *Child Development*, 47, 380-385.
- Olson, K. R., & Spelke, E. S. (2008). Foundations of cooperation in young children. *Cognition*, 108, 222-231.
- Peterson, C. (1975). Distributive justice within and outside the family. *Journal of Psychology*, 90, 123-127.
- Peterson, Peterson, & McDonald. (1975). Factors affecting reward allocation by preschool children. *Child Development*, 46, 942-947.
- Peterson, L., Hartmann, D.P., & Gelfand, D.M. (1977). Developmental changes in the effects of dependency and reciprocity cues on children's moral judgments and donation rates. *Child Development*, 48, 1331-1339.
- Piaget, J. (1932/1997). *The moral judgment of the child*. New York: Simon and Schuster.
- Pizarro, D. (2000). Nothing more than feelings? The role of emotions in moral judgment. *Journal for the Theory of Social Behaviour*, 30, 355-375.
- Presbie, R. J., & Coiteux, P. F. (1971). Learning to be generous or stingy: Imitation of sharing behavior as a function of model generosity and vicarious reinforcement. *Child Development*, 42, 1033-1038.
- Rawls, J. (1971). *A theory of justice*. Cambridge, MA: Harvard University Press.
- Rawls, J. (2001). *Justice as fairness: A restatement*. Cambridge, MA: Belknap Press.

- Rheingold, H. L. (1982). Little children's participation in the work of adults, a nascent prosocial behaviour. *Child Development*, *53*, 114-125.
- Robbins, E., & Rochat, P. (2011). Emerging signs of strong reciprocity in human ontogeny. *Frontiers in Psychology*, *2*:353, doi:10.3389/fpsyg.2011.00353
- Robinson, P., Kurzban, R., & Jones, O. (2007). The origins of shared intuitions of justice. *Vanderbilt Law Review*, *60*, 1633-1688.
- Rochat, P., Dias, M. D. G., Liping, G., Broesch, T., Passos-Ferreira, C., Winning A., et al. (2009). Fairness in distributive justice by 3- and 5-year-olds across seven cultures. *Journal of Cross-Cultural Psychology*, *40*, 416-442.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at 3-7 years: The Children's Behavior Questionnaire. *Child Development*, *72*, 1394-1408.
- Ruble, D. N., Alvarez, J., Bachman, M., Cameron, J., Fuligni, A., Garcia Coll, C., & Rhee, E. (2004). The development of a sense of "we": The emergence and implications of children's collective identity. *The development of the social self*, 29-76.
- Sagi, A., & Hoffman, M. L. (1976). Empathic distress in newborns. *Developmental Psychology*, *12*, 175-176.
- Schaefer, M., Haun, D., & Tomasello, M. (2013, April). Fair isn't fair everywhere: Cross-cultural variation in children's consideration of merit when sharing amongst peers. In Svetlova, M. (chair). *The Many Faces of Fairness: Developmental and Cross-Cultural Perspectives* (symposium). Paper presented at the biennial meeting of the *Society for Research in Child Development*, Seattle, WA.
- Schmidt, M., & Sommerville, J. A. (2011). Fairness expectations and altruistic sharing in 15-month-old human infants. *PLoS ONE*, *6*, e23223.
- Sen, A. (2008). The idea of justice. *Journal of Human Development*, *9*, 331-342.
- Sigelman, C. K., & Waitzman, K. A. (1991). The development of distributive justice orientations: Contextual influences on children's resource allocations. *Child Development*, *62*, 1367-1378.
- Singer, T., Seymour, B., O'Doherty, J. P., Stephan, K. E., Dolan, R. J., & Frith, C. D. (2006). Empathic neural responses are modulated by the perceived fairness of others. *Nature*, *439*, 466-469.
- Singer, T. (2007). The neuronal basis of empathy and fairness. In G. Bock & J. Goode (Eds.), *Empathy and Fairness* (pp. 20-30). Chichester, UK: Wiley.

- Singer, T., & Steinbeis, N. (2009). Differential roles of fairness- and compassion-based motivations for cooperation, defection, and punishment. *Annals of the New York Academy of Sciences*, *1167*, 41-50.
- Sloane, S., Baillargeon, R., & Premack, D. (2012). Do infants have a sense of fairness? *Psychological Science*, *23*, 196-204.
- Smetana, J. (1993). Understanding of social rules. In M. Bennett (ed.) *The Development of Social Cognition: The Child as Psychologist*. New York: Guilford Press.
- Smith, A. (1759/1981). *The theory of moral sentiments*. Indianapolis: Liberty Fund.
- Staub, E., & Sherk, L. (1970). Need for approval, children's sharing behavior, and reciprocity in sharing. *Child Development*, *41*, 243-252.
- Surian, L., & Geraci, A. (2010, March). Egalitarian evaluations in 27-month-olds. Poster presented at the biennial meeting of the *International Conference on Infant Studies*, Baltimore, MD.
- Svetlova, M., Nichols, S., & Brownell, C. (2010). Toddlers' prosocial behavior: From instrumental to empathic to altruistic helping. *Child Development*, *81*, 1814-1827.
- Takagishi, H., Kameshima, S., Schug, J., Koizumi, M., & Yamagishi, T. (2010). Theory of mind enhances preference for fairness. *Journal of Experimental Child Psychology*, *105*, 130-137.
- Thomson, N. R., & Jones, E. F. (2005). Children's, adolescents', and young adults' reward allocations to hypothetical siblings and fairness judgments: Effects of actor gender, character type, and allocation pattern. *The Journal of Psychology*, *139*, 349-368.
- Tomasello, M. (2009). *Why we cooperate*. Cambridge, MA: MIT Press.
- Tomasello, M., Melis, A., Tennie, C., Wyman, E., & Herrmann, E. (2012). Two key steps in the evolution of human cooperation: The mutualism hypothesis. *Current Anthropology*, *53*, 673-692.
- Tomasello, M., & Vaish, A. (2013). Origins of human cooperation and morality. *Annual Review of Psychology*, *64*, 4.1-4.25.
- Tompkins, B. M., & Olejnik, A. B. (1978). Children's reward allocations: The impact of situational and cognitive factors. *Child Development*, *49*, 526-529.
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, *46*, 35-37.
- Turiel, E., & Smetana, J. G. (1984). Social knowledge and social action: The coordination of domains. In J. L. Gewirtz & W. M. Kurtines (Eds.), *Morality, moral development, and moral behavior* (pp. 261-282). Mahwah, NJ: Erlbaum.

- Turiel, E. (1998). The development of morality. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (5th ed., Vol. 3., pp. 863-932). New York: Wiley.
- Vaish, A., Carpenter, M., & Tomasello, M. (2009). Sympathy through affective perspective-taking and its relation to prosocial behavior in toddlers. *Developmental Psychology, 45*, 534-543.
- Vaish, A., Carpenter, M., & Tomasello, M. (2010). Young children selectively avoid helping people with harmful intentions. *Child Development, 81*, 1661-1669.
- Vaish, A., & Tomasello, M. (2013). The early ontogeny of human cooperation and morality. In M. Killen and J. G. Smetana (Eds.), *Handbook of Moral Development*. Taylor and Francis.
- Warneken, F., Chen, F., & Tomasello, M. (2006). Cooperative activities in young children and chimpanzees. *Child Development, 77*, 640-663.
- Warneken, F., & Tomasello, M. (2006). Altruistic helping in human infants and young chimpanzees. *Science, 311*, 1301-1303.
- Warneken, F., Hare, B., Melis, A. P., Hanus, D., & Tomasello, M. (2007). Spontaneous altruism by chimpanzees and young children. *PLoS Biology, 5*, 1414-1420.
- Warneken, F., Lohse, K., Melis, A.P., & Tomasello, M. (2011). Young children share the spoils after collaboration. *Psychological Science, 22*, 267-273.
- Warneken, F., & Tomasello, M. (2007). Helping and cooperation at 14 months of age. *Infancy, 11*, 271-294.
- Wellman, H. M., Larkey, C., & Somerville, S. C. (1979). The early development of moral criteria. *Child Development, 50*, 869-873.
- Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Developmental Psychology, 28*, 126-136.