

THE DEVELOPMENT OF ANONYMOUS GIVING IN RELATION TO OWNERSHIP  
UNDERSTANDING, THEORY OF MIND, EMPATHY, AND DIFFERENCES IN  
RELATEDNESS

by

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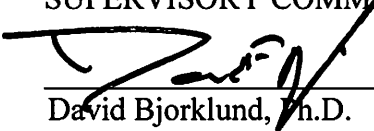
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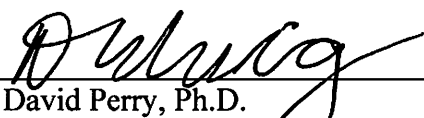
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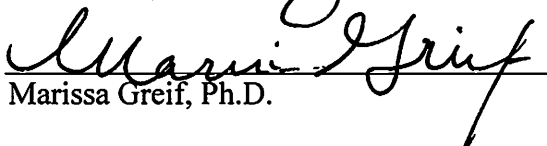
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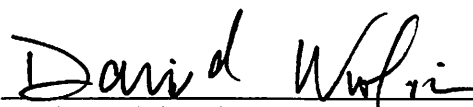
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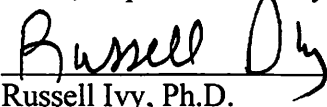
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## ABSTRACT

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Prosocial behavior can be defined as any behavior that an individual engages in to benefit another (Eisenberg, Fabes, & Spinrad, 2006). Prosociality is not one homogenous trait, however, but is made up of three specific types of behavior: helping, cooperating, and sharing (or, more accurately, donating) (Tomasello, 2009). Although helping and cooperating are important to understanding prosocial development, giving behaviors might be particularly informative when trying to understand prosociality in young children as it poses a distinct problem for younger children (Tomasello, 1998). Research on proximate causes of prosocial behavior state that these behaviors are influenced by emotions of empathy (Batson, 1991), theory of mind, or understanding of social norms of ownership (Blake & Rand, 2010). Research on more ultimate causes of prosociality suggest that these behaviors evolved due to mechanisms or kin selection (Hamilton, 1964) and inclusive fitness (Trivers, 1971), and is evident by the effect of social category

and relatedness on donations in resource- allocation games (Gummerum et al., 2009). Research with children using resource- allocations games, such as the dictator game, are sparse, but typically find that children donate more as they get older, and that out-group receive fewer allocations than in-group members (Moore, 2009). This research also highlight the importance of anonymity and its effect on prosociality. When tested using an anonymous design, children donate less and some children don't donate at all (Benenson et al., 2007).

Using an anonymous dictator game, children's giving behaviors were examined across in- group, out-group, and family members. Thirty-five children (12 3-year-olds (7 male), 13 4-year-olds (8 male), and 10 5-year-olds (7 male) completed the experiment. Each child participated in each condition, as well as measures of theory of mind and ownership understanding. Children's empathy scores were attained from a parent-questionnaire regarding children's empathic behaviors.

Results revealed that some children did not donate any stickers at all; seven in total, and that these children differed significantly from those that gave on measures of empathy. Of those that donated, 3-year-old children donated significantly more than 5-year-old children ( $F(1,3) = 3.64, p < .05$ ). This is contrary to previous findings which find that giving increases across age., There was no main effect for Recipient, and no significant interaction between Age and Recipient. Five-year-olds scored significantly higher on measures of ownership understanding ( $F(2, 25) = 4.36, p < .05$ ), suggesting that understanding of social norms of ownership may be partially responsible for their decrease in overall giving.

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## I. INTRODUCTION

The ability to exhibit prosocial behaviors is said to be one of the discerning characteristics between humans and other species (Haviland, Prins, Walrath, & McBride, 2004; as cited in Benenson, Pascoe, & Radmore, 2007), with further evidence from cross-cultural research also showing that prosociality is widespread across a variety of non-Western societies (Gurven, 2004; Henrich et al., 2005). Furthermore, human social organization is highly dependent on cooperative exchanges with others (Boyd & Richerson, 2005), putting the spotlight on what appears to maintain cooperation, prosocial behaviors (Moore, 2009). This interest in prosocial behaviors has sparked research into why humans cooperate, why they exhibit a seemingly unparalleled capability for prosocial behavior, and why altruism even exists.

At the most broad level, prosocial behavior can be defined as any behavior that an individual engages in to benefit another (Eisenberg, Fabes, & Spinrad, 2006). Prosocial behavior can be differentiated from many other forms of behavior because it is a response based on the observation and interpretation of another individual's demonstration of need. However, not all needs are the same; needs come in a number of forms, requiring different interpretative abilities and distinctive prosocial responses.

### *The Many Forms of Prosocial Behaviors*

Recent literature suggest that being prosocial is not one homogenous trait, but is made up of three specific types of responding behavior: helping others with achieving their goals, cooperating with others to reach a common goal, and sharing resources with

others (Tomasello, 2009).

*Helping.* Helping can be defined as any action that serves to alleviate an instrumental need (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011) by identifying and responding to another's inability to complete a specific goal-directed action. This behavior emerges surprisingly early in ontogeny. Warneken and Tomasello (2006) showed that infants as young as 14–18 months of age will spontaneously help when an adult reaches for an object they accidentally dropped on the floor. Another experiment found that the same-age infants will help an adult open a cabinet when the adult's hands are full, or is having trouble stacking a pile of books (Warneken & Tomasello, 2006). Infants engage in spontaneous helping even when it requires them to incur a cost, such as ceasing to play with a toy or engage in a fun activity, in order to help the adult (Warneken et al. 2007) More surprisingly, infants do this in the total absence of encouragement or praise.

But it is possible that children receive rewards for being helpful outside of the lab, and so rewards might account for these behaviors. However, in another study involving young children (and chimpanzees), it was found that when the person needing help held a reward in her hand the amount of helping did not increase in either species (Warneken et al., 2007). Another study with 20-month-old children found that providing material rewards *decreased* the amount of helping after it is terminated, suggesting that external rewards can actually undercut young children's intrinsic motivation to help, rather than being a motivator (Silk et al., 2005) (This phenomena is well-established in the social psychology research, please see Lepper et al. (1973) for further information on the 'overjustification effect' of external rewards with children).

*Cooperation.* Cooperation, also called mutualism or collaboration, can be defined as an action serving to benefit both individuals engaging in a task, or an action that works toward a shared goal (Rilling et al., 2008; Warneken et al., 2012). These behaviors don't emerge until 18-24 months of age, however, since peer interactions prior to 18 months are relatively rare, primitive, and minimally coordinated (Brownell & Brown, 1992; Eckerman & Peterman, 2001). One method used to test children's cooperation is allowing them to play cooperative games. The prototypical cooperative game puts children in a situation where they must cooperate with another (adult or child) to achieve a shared goal that neither could achieve alone. For example, two persons have to perform complementary roles to gain access to an object, typically candy. Only a few studies showing successful performance by young children in such cooperative problem-solving tasks exist. In one such problem-solving task, developed by Ashley and Tomasello (1998), only children over the age of 3 years old could successfully cooperate with a peer, and only slightly earlier for cooperating with an adult.

Another typical task involves placing children in a cooperative problem-solving task. Brownell and Carriger (1990, 1991) tested children between 12 to 30 months of age with cooperative problem-solving tasks where one child had to manipulate a spring-loaded handle to make toys accessible to another child. Only children 24 months or older were able to successfully solve this task, but task completion was nearly impossible for the youngest children who succeeded only accidentally and never reliably.

*Sharing.* Although helping others by expending an energy cost is pervasive at an early age, and cooperating for mutual benefit emerges shortly thereafter, sharing resources, especially valuable ones, with someone doesn't consistently emerge until later.

Sharing (or giving) can be defined as an action that is intended to alleviate a material need by recognizing and responding to another's lack of a desired material good.

Much of the research studying sharing and giving behaviors uses simple economic games, such as the dictator game and the ultimatum game (for reviews, see Camerer, 2003; Roth, 1995). In the dictator game one player, the dictator (or allocator), decides how to distribute a given quantity of resources (such as money, food, stickers, etc.) between him- or herself and another, usually anonymous player (the recipient) (for detailed descriptions, see Kagel & Roth, 1995). In this resource-allocation game, the recipient does not have the power to reject the offer. The key components of the dictator game consists of a one-shot allocation of a valued resource from one proposer to one recipient, both of whom are (typically) anonymous to each other and to others. For ease of analysis, resources are typically allocated into discrete parts, such as 10 units, which then can be divided between the two players. Given the anonymity between the players, and the lack of ability of the responder to reject the proposal, the only motivation the dictator has to provide some of their resources with the recipient is said to be altruistic.

In the ultimatum game, similar to the dictator game, one player (the allocator) decides how to allocate the resource between the two players, but, unlike the dictator game, the recipient can either accept or refuse the proposal. If the recipient rejects the proposal, neither player collects anything, and if the recipient accepts, the resource is split according to the proposal. It is important to note that the ultimatum game also consists of a one-shot allocation of a given resource from an anonymous proposer to an anonymous recipient. The motivations of the allocators in this game are driven by both the desire to seem altruistic and the desire to avoid rejection of their offers.

Although these games have drawn some criticism, mainly arguing that they lack ecological validity, the strength of these games lies in their ability to permit the isolation of specific social behaviors that test simple predictions without naturally occurring confounds that cloud the influence of any one variable. Furthermore, modification of the parameters of these games allow for them to more closely simulate features of natural interactions (Falk & Fehr, 2003). These games can vary in the ability of other players to reciprocate, the number of players, the number of iterations, the ability of outside observers to reward and punish selfish behavior, payoffs from cooperation versus defection, and the reputation of other players (for a review, see Fehr & Fischbacher, 2003). They also differ in terms of stable individual differences of players, such as their age, sex, and culture (Henrich et al., 2005).

Research with adult participants provides evident for people's social concerns and fairness motives in resource-allocation dilemmas. In the dictator game, if individuals were concerned only about maximizing their own benefit, the dictator would take all the resources for him- or herself and leave nothing for the recipient. However, research indicates that dictators often distribute some share of the given resource to the recipients. For example, Forsythe, Horowitz, Savin, and Sefton (1994) found that 80% of adult subjects gave positive amounts of money (the resource used in their study) to their anonymous recipients in a dictator game. More so, more than 20% of the dictators split the money evenly. This pattern of results was found to be stable with respect to various game manipulations (see a recent meta-analysis of the dictator game by Engel, 2010).

Research using the ultimatum game, on the other hand, finds that offers are systematically higher than in the dictator game (Charness & Gneezy, 2008; Forsythe et

al., 1994). Typically, no zero offers are made and proposals with an equal split are frequently the common offer (Forsythe et al., 1994). Furthermore, offers of less than 20% are often rejected (Guth & Tietz, 1990; Roth, Prasnikar, Okuno-Fujiwara, & Zamir, 1991). In a clever study isolating the motivations of allocations between the two games, Van Dijk and Vermunt (2000) found that allocators participating in the ultimatum game wanted to appear fair to the recipients so to avoid rejections of offers, while participants in the dictator game displayed concern for real fairness.

### *The Development of Giving / Sharing*

Although many studies have examined the giving behaviors of adults, only a few developmental studies have used paradigms in which children must distribute resources. The studies conducted suggest that sharing and donating increase significantly over childhood, especially between the ages of 5 and 10 years (Fabes & Eisenberg 1998).

Hay, Castle, Davies, Demetriou, and Stimson (1999) found that, under naturalistic home observation conditions, 18–30-month-old children shared their toys with their peers, but Birch and Billman (1986), who observed sharing among children aged 3–5 when one of the children was given 20 food items for a “special snack” while a second child received only two, found that most children shared only small amounts and only when the second child asked.

Using resource-allocation games, Murnighan and Saxon (1998), allowed preschoolers to play simulated ultimatum games, where the situation was hypothetical and no actual goods were used. They found that kindergartners made larger offers and accepted smaller offers of candy than third or sixth graders did, but given its imaginary nature it’s unclear how to interpret these data. A study using real resources (money),

however, found that 7-year old children made and accepted smaller ultimatum proposals than adults (Harbaugh, Krause, & Liday, 2003). A similar study, however, found that 6-year-old children made offers as fair as those of adults although only after repeated rounds of play (Hill & Sally, 2006). These inconsistent findings are hard to interpret, especially in that children in these studies played with either points or tokens that could be exchanged for money or stickers later. Children may not have understood that these items were to be treated as proxies for real commodities. A study, using both the ultimatum game and dictator game with actual resources (stickers), found that 4-year-olds gave, on average, 4.7 stickers in the ultimatum game and 4.0 stickers in the dictator game (out of 10 total) (Lucas, Wagner, Chow, 2008). Although this adds to the growing literature of children's resource allocations, these experiments all lacked anonymity in their research design; the researcher or another adult always accompanied the child during the giving portions of the experiment. Fehr, Bernhard, and Rockenbach (2008) argue that the presence of a researcher or another familiar adult may influence children's giving behavior. Children might feel obligated to give more than they would if no one was watching them. Fehr et al. (2008) concluded that any assessment of altruistic or prosocial behavior should be done using an anonymous design.

A recent study by Benenson, Pascoe, and Radmore (2007), using an *anonymous* dictator game, found evidence for prosociality in 4-year olds, who, on average, donated 25% of their stickers (out of 10 total) to another classmate, with proposals increasing with age. Although this study found that even children as young as 4-years-old do behavior prosocially, they also found that a significant number of the children who participated did not give any of their stickers away (total of 23 4-year-olds, 12 6-year-



olds, and seven 9-year-olds). This was hypothesized to be as result of the donations being anonymous.

Although the developmental research suggests that even very young children can behave prosocially, these studies use a variety of methods that limit the generalizability of these findings. This is perfectly illustrated by a meta-analysis conducted by Eisenberg and Fabes (1998) who examined age and sex effects across 125 studies of prosocial behavior in children. They found that prosocial behavior was positively correlated with age, and that females were slightly more prosocial than males. The age and sex effects differed across three categories of prosocial behavior: instrumental helping, comforting, and sharing/donating. With further analysis, Eisenberg and Fabes (1998) found significant variation in prosociality across studies that used different methods. Furthermore, as depicted by Benenson et al.'s (2007) study, anonymity matters; the prosocial behaviors may have been skewed by the presence of the researcher or an adult during testing.

#### *Understanding Children's Giving Behaviors*

The literature described above suggests that young children are naturally helpful, generous, and collaborative from very early in ontogeny, with prosociality increasing with age. Younger children are less prosocial in their giving, sharing, helping, and cooperating than older children. Given various lines of evidence, it would not seem that this behavior is instilled in them initially by culture. However, it is obvious that social experience and cultural transmission become increasingly more influential over ontogeny. Research suggests that not only do giving and other prosocial behaviors increase with age, but young children begin to become discriminating in the targets of

their prosocial acts. For example, one dimension children may be attending to is how likely it is that their partners will reciprocate. A recent study asked 3-year-old children to decide how much a puppet should share things with others. The researchers reported that children directed the puppet to give more often if the partners had themselves shared previously (Rakoczy, Warneken & Tomasello, 2008). This concern for reciprocity and the preference for specific social partners may serve to explain the increase of these behaviors over time.

Preschool children also begin to modify their giving behavior in line with social norms and rules, which are attained through cultural transmission. Some norms are simply conventional ways of doing things, while others are “moral” norms, such as not hitting others or sharing “fairly” with others. These are even more directly related to prosociality, and children clearly distinguish these from conventional norms early on in preschool (Rakoczy et al., 2008). And so, although culture cannot be said to be the origin of prosocial behaviors in young children, later in ontogeny social norms comes to play a crucially important role in mediating children’s differential giving (Warneken & Tomasello, 2007).

The upcoming sections will outline the explanatory power of children’s social norms in relation to their giving behaviors, as well as examine how reciprocity and the behavioral propensity for altruistic punishment or altruistic rewarding, may be crucial for understanding human cooperation and prosociality.

### *Knowledge of Social Norms and Cognition*

The human species exhibits arrays of cooperation and prosociality that are unique in the animal world. As reviewed above, both adults and children frequently cooperate

with genetically unrelated individuals, even in large groups and when there is no reason to expect reciprocity or future interactions (2003). This constitutes an evolutionary puzzle because reputation-based models (Nowak & Sigmund, 1998), kin selection (Hamilton, 1971), and reciprocal altruism (Trivers, 1971; Axelrod & Hamilton, 1981), (to be briefly discussed below) cannot explain these patterns of behavior.

It has been argued that humans' cognitive and emotional abilities (Boyd & Richerson, 1988) and their capacity to establish and enforce social norms are essential prerequisites for these unique patterns of cooperation. A plethora of data suggests that individuals who obey social norms for altruistic or prosocial behavior obtain rewards, whereas those who defy norms incur punishment even at a cost to those inflicting the punishment (see Fehr & Fischbacher, 2004 for review). The third-party punishment game (Fehr & Fischbacher, 2004), in which a third subject observes the behavior of two subjects who play resource-allocation games, such as but not limited to the ultimatum game or dictator game, is one paradigm used for examining whether violations of the cooperation norm are penalized. In this task, the two players in the resource-allocation game play the resource-allocation game, and the third participant, who has a monetary endowment, observes. The third participant, the watcher, then has the choice to sanction one, two, or none of the other players. Sanctions are not costless for the punishing subject; the third party in the experiment incurred a cost if he or she punished another player. This task is suitable for testing the existence of social norms because the other players' actions do not affect the third subject's economic payoff in any way. The third party is just a passive onlooker of the game and should, therefore, have no reason for punishing any of the other players. In fact, because punishing another player is costly for

the third participant, and because this is an anonymous one-shot experimental design (therefore there are no future benefits from punishing), punishing those who violate the norm should be rare unless the desire to punish norm violations is strong enough to overcome the third party's self-interest. This means that if punishment by "disinterested" third parties is observed, one can conclude that there is a strong social norm behind the desire to punish violators.

Results using this paradigm (Fehr & Fischbacher, 2004) found that about 50% of the subjects in the role of a third party were willing to punish players who defected, whereas they never punished any player for cooperative choices. Additionally, defection was punished much more severely if it was followed by a cooperative move. This suggests that unilateral defection is considered to violate the social norm of sharing more so than when both players defect.

These results provide a wonderful window into the understanding of social norms of adults, but how does this translate to children's understanding of social norms? Recent evidence suggests that children as young as 5 years old consistently punish defectors in resource-allocation games (McAuliffe, Jordan, Warneken, unpublished manuscript), with this effect increasing as children get older. The results of another study by Olson and Spelke (2008) found that 3.5 year old children, when put in a situation to decide how much another donor should get, suggests that a donor should give more to a recipient who shared previously rather than to a recipient who did not. A more recent study found that children as young as 3 years old shared more with partners who previously shared with them. (Warneken & Tomasello, 2013)

But sharing toys or giving away a resource they value, such as stickers or candy,

might be particularly difficult for children. Children begin to claim property over objects by saying “Mine!” at roughly 2 years of age, unambiguously asserting ownership of items (Tomasello, 1998). Additionally, a majority of conflicts in young children between peers involves arguments over possession and ownership (Hay & Ross, 1982; Ramsey, 1987), suggesting that children have difficulty adopting appropriate social norms for property.

Ownership understanding may be one piece of early social cognition that is essential to sharing behaviors. Sharing (or giving) of a resource necessitates transferring of ownership. Until children understand ownership they cannot be characterized as prosocial for sharing. Furthermore, children must learn social rules regarding private property in order to integrate into their peer group. Research suggests that very early on, around 18 to 24 months of age, conflicts over toys with peers and siblings is quite common (Eckerman & Peterman, 2001).

A rudimentary understanding of ownership seems to develop early on in infancy (Pedersen & Nash, 1982), but doesn’t seem to become somewhat concrete until 2 years of age. For example, 2 year olds can identify to whom specific objects belongs, whereas children younger than 2 years are inconsistent and accurate only by chance (Fasig, 2000). Two-year-olds are also able to make inferences about possession based on previous ownership, whereas 1-year-olds cannot differentiate (Freidman & Neary, 2008). However, this understanding is still rather abstract. For example, although 2 year olds can identify their own property and infer the ownership of others, they have a difficult time inferring the negativity of others when, for example, their belongings get taken away or gets damaged (Rossano, Rakoczy, & Tomasello, 2011). Furthermore, they seem to lack understanding of group ownership, the concept that something belongs to the whole class,

for example. When a given toy was the property of their classroom, children aged 2 shared much less than 4- and 5-years-olds (Eisenberg, Haake, Hand, & Sadalla, 1979).

One aspect children may be struggling with is the understanding of how ownership is transferred. For example, children may not understand that when they share their toys they can expect to reclaim ownership, but when they offer a gift, they should not expect to regain ownership. Comparably, a child who finds an item might not understand that the item still belongs to its original owner. Blake and Harris (2009) examined the development of ownership transfers in 2-, 3-, 4-, and 5-year-old children using vignettes about a child stealing and a child giving a gift to another child. The children were asked a set of questions for each vignette to gain a comprehensive representation of their understanding of ownership for each vignette. Results suggest that children only truly develop a “mature” understanding of ownership transfers when approaching 5 years of age. Also, younger children show a bias for first possessor, suggesting that they have a hard time comprehending the transfers of ownership, rather than initial ownership (Blake & Harris, 2009).

### *Theory of mind and Empathy*

Related to understanding social norms is children’s developing theory of mind. Theory of mind (ToM) understanding refers to the ability to attribute mental states (beliefs, intentions, desires, knowledge, etc.) to the self and others, and the ability to understand that others have beliefs, desires, and intentions that may be different from one's own (Premack & Woodruff, 1978). Theory of mind has been shown to correlate with children’s ability to behave prosocially, allowing for perspective taking (Povinelli & Preuss, 1995). Furthermore, recent neuroimaging studies have shown a remarkable

overlap of activation in the brain when measuring participants' responses in ultimatum and dictator games and theory of mind (Rilling, Sanfey, Aronson, Nystrom, & Cohen, 2004), hinting to a connection between prosociality and theory of mind over human evolutionary history. From this perspective it is feasible that ToM understanding has an impact on prosocial behavior.

Prosocial behaviors and theory of mind both undergo developmental changes during the preschool years (Benenson et al., 2007; Blake & Rand, 2010; Fehr, Bernhard, & Rockenbach, 2008; Rochat et al., 2009; Wellman & Liu, 2004). Walker (2005) showed that ToM negatively predicted aggressive disruptive behavior for preschool boys and positively predicted prosocial behavior for preschool girls. Furthermore, theory of mind is correlated with increased fairness-related behavior (Sally & Hill, 2006), and higher offers in the resource allocation games (Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). These studies suggest that children with a more advanced ability of understanding others' mental states are more likely to act prosocially.

Others have stated that one reason why theory of mind understanding is correlated with prosocial behavior is because ToM predicts empathy (Tomasello, 2008; Warneken & Tomasello, 2009b; Zahn-Waxler, Robinson, & Emde, 1992). Empathy refers to an other-oriented emotional response corresponding with the observed well-being of another (Batson, Fultz, & Schoenrade, 1987). Batson (1991) adds that empathy results from adopting the perspective (i.e., imagining the thoughts and feelings) of the person in need. Previous research suggests that empathically aroused individuals help those in need, even when physical escape from the need situation is easy, and this evidence has been used to support the claim that empathy evokes prosocial motivation.

First signs of empathy are seen in infancy through helping. As noted earlier, instrumental helping appears around 12–14 months of age (Liszkowski et al., 2006; Warneken & Tomasello, 2007), and stems from early-developing understanding of goal-directed behavior (Woodward, 1998). The ability to respond prosocially to others' emotional distress emerges later, around 18 and 24 months of age, in expressions of concern and comforting behavior toward others, termed empathic helping (Zahn-Waxler et al., 1992). This is correlated with the development of objective self-awareness and children's understanding of others as psychological agents (Hoffman, 2007; Moore, 2006, 2007; Zahn-Waxler et al., 1992). A recent study by Svetlova, Nichols, and Brownell (2010) examined instrumental helping, empathic helping, and altruistic helping (the child giving up an object of their own to make the other person feel better) in 18 and 30-month old infants. They found that all children at both ages helped in the instrumental helping condition. Empathic helping, however, was difficult for the 18-month-olds, and required explicit communication from the adult about her needs before the child responded with help. Altruistic helping was extremely difficult and rare for children at both ages, although was seen in 30-month olds significantly more than in 18-month olds.

#### *An Evolutionary Approach to Prosociality*

Several investigators of prosocial behavior have recently argued that the early development of helping, sharing, comforting, and cooperating are not due to socialization processes because infants are allegedly too young to have received sufficient input or guidance (parental or otherwise) regarding these norms and behaviors (Dunfield et al., 2011; Olson & Spelke, 2008; Warneken & Tomasello, 2009). Rather, the first demonstrations of prosocial behaviors are said to originate from a natural predisposition



to act prosocially (Hoffman, 2007; Warneken & Tomasello, 2009; Wynn, 2008). As the research reviewed above demonstrates, only later, in the preschool years, do children begin to understand and uphold norms of caring, empathy, and ownership.

It is possible, on the other hand, that parents shape these behaviors by rewarding children beginning early on in development. However, there are several issues with explanations that draw on external reinforcement. For example, natural observations with children show that parents do not appear to systematically reward prosocial behaviors with material rewards and will only occasionally acknowledge the helpful act (Grusec 1991). Additionally, studies with older children showed that reinforcing prosocial behaviors does not transfer to other types of situations or interactions; when the children stopped getting rewards, the behavior ceased (Moore & Eisenberg, 1984). Lastly, studies on helping in young children suggest that children help unfamiliar adults in novel, unfamiliar situations, excluding the possibility that they were rewarded for such behaviors in the past. Given these examples, it seems rather unlikely to propose that children are solely socialized for prosociality.

*Differences in Relatedness: Recipient matters!*

Prosocial behavior originally proved difficult to explain in evolutionary terms. Charles Darwin himself obsessed over the presence of altruism in human behaviors, unable to fully integrate it with his theory of natural selection. After all, as any gene promoting altruism should be rapidly driven to extinction. From an evolutionary perspective, a prosocial (or altruistic) behavior is a one that benefits others at a cost to oneself (Gummerum, Takezawa, & Keller, 2009), and is therefore costly and could not evolve without mechanisms that offset these costs (Nowak, 2006).

The solution was provided by Hamilton's (1964) theory of kin selection and inclusive fitness, as well as Triver's (1971) theory of reciprocal altruism. Kin selection states that altruistic behavior is more likely to occur between kin because this would provide a benefit to one's inclusive fitness (close relatives of an organism share some identical genes, therefore a gene can also increase its evolutionary success by promoting the reproduction and survival of these related individuals), and therefore predicts that altruistic behavior will vary proportionately with the amount of genes shared with a given person (Hamilton, 1964). The theory of reciprocal altruism posits that altruism will occur between non-kin if there is reciprocity, and if the cost of the act is less than the benefits to the other person (Trivers, 1971).

A number of studies have examined the affect of kinship on prosocial behaviors using vignette or questionnaire designs (Burnstein, Crandall, & Kitayama, 1994; Kruger, 2003; Park & Schaller, 2005; Webster, 2004). In these experiments, participants are presented with a series of hypothetical scenarios and report the likelihood of helping a given individual depending on their genetic relatedness to the participants. Results of these experiments typically find that college students are more inclined to help relatives than non-relatives, and particularly when the scenario is a life-and-death situation (Burnstein et al., 1994; Korchmaros & Kenny, 2001; Kruger, 2003). Other research by Essock-Vitale and McGuire (1985) surveyed 100 women and found that these women reported being more likely to help closer kin than more distant kin, and that helping among friends was more likely to be reciprocated than helping among kin.

But differences in cost also matter. Evolutionary principles suggest that there will be differences in the nature of prosociality directed toward kin vs. nonkin. Stewart-

Williams (2007) asked undergraduates to complete a questionnaire about helping different recipients who differed in relatedness (siblings, cousins, friends, or acquaintances). They found that greater genetic relatedness was associated with higher levels of helping. Friends were an exception, however, receiving as much or more help as kin, but only when helping had minimal cost to the participant. As the cost of helping increased, kin received a larger share of the help given, whereas nonkin received a smaller share.

Although most of the research on prosociality from an evolutionary perspective has focused on adult behavior, research with children corroborates such findings; virtually all developmental studies conclude that young children behave selfishly towards genetically unrelated individuals (for reviews, see [Damon, 1977](#); [Eisenberg & Fabes, 1998](#)). More recently, however, studies regarding children's prosocial behavior across recipients have surged. A study by Gummerum, Takezawa, and Keller (2009) tested whether social category, particularly in-group or out-group membership, influences children's altruistic behavior. One-hundred-and-fifty-seven children, from second and sixth grade, were each assigned into a trivial social group based on their performance on an arbitrary estimation task. Given coins in a dictator game, the researchers found that sixth-grade children allocated more to in-group members than out-group members, while second-grade children did not differ in the amount they gave. The authors stated that reciprocity and group membership did not serve as salient social information for the second-grade children, and therefore did not influence their behavior. Although this study does suggest that group membership may be important in understanding altruistic behaviors, as evident by the differential giving in the sixth graders, the results with

younger children may be due to the use of trivial groups rather than real social categories.

A study by Moore (2009) also tested the differences in children's altruistic behavior using group membership, but unlike Gummerum et al. (2009), used actual social categories. Sixty-six children between the ages of 4.5 and 6 years old were tested, much younger than the second-grade sample in Gummerum et al.'s (2009) study. The children were asked to think of a classmate they liked to play with, which served as the in-group, and a classmate they did not like playing with, which served as the familiar out-group. Children were also told to imagine a stranger, which served as the non-familiar out-group.

There were two conditions in the study: a prosocial choice and a sharing choice condition. In the prosocial choice, children decided between one item for themselves immediately or one item for themselves and the other recipient at a later time. In this condition, there was no material cost to the child, only a delay cost. In the sharing-choice condition, children decided between two items for themselves immediately or one item for themselves and the other recipient at a later time. In this condition, there is both a material cost and a delay cost if they choose the altruistic alternative.

Each child drew a picture of each recipient (friend, familiar non-friend, unknown child), which was attached to a paper bag, and then given the stickers. With the researcher present, the children made their choices as to how much to put in each paper bag. Moore (2009) found that when the recipient was a friend, children shared as much when there was both a material and delay cost to themselves as when there was only a delay cost. When the recipient was a familiar non-friend, children were less likely to share across both conditions. When the recipient was a stranger, children shared just as

much as they did when the recipient was a friend, but only when there was no cost to themselves. When there was a cost, however, children treated strangers like non-friends.

Although these findings suggest that group membership is salient to children as young as 4.5 years of age, these findings may have been skewed by the presence of the researcher during testing. As mentioned above, Fehr, Bernhard, and Rockenbach (2008) argue that the presence of the researcher may influence the children's behavior and that an anonymous design is key to measuring prosociality. This criticism begs the question as to how altruistic children would behave toward those in different social categories while no one is present to observe them. These studies examining the influence of recipient on children's giving add to the existing literature regarding children's motivations and development of giving, and help provide a more comprehensive portrayal of children's prosociality.

#### *Present Study*

The present study will attempt test the saliency of group membership (Moore, 2009) while using a modified Dictator's game (Benenson et al., 2007) and an anonymous design in order to measure children's prosocial giving when not under the influence of the presence of a researcher. It is hypothesized that children will, on average, donate less than what was reported in Moore (2009), but still find that in-group members will receive more than out-group members. It is also hypothesized that children will donate more to a genetic relative than to both the in-group or out-group members.

This study will be examining resource-game allocations in preschool children, ages ranging from 3 to 5 years of age. These ages seem to be of particular interest when examining prosociality using resource- allocation game as children younger than 3 years

old rarely understand the rules of the game, and older child, around 7 years old, seem to consistently behave similar to adults (citation). Consistent with previous findings (Blake & Rand, 2010; Benenson et al., 2009; Gummerum et al., 2009; Lucas et al., 2008; Sally & Hill, 2006), it is hypothesized that younger children will donate, across recipient, less than older children.

Children's understanding of social norms through their knowledge of ownership transfer rules will also be measured to see if it interacts with children's giving. It is hypothesized that sharing for those children who have a better understanding of social norms will positively correlate with a greater difference of giving between conditions in the dictator game. That is, children who understand social norms will give more to their classmate, less to a stranger, and most to their relative. Furthermore, theory of mind and empathy will be measured given that children's theory of mind is highly correlated with prosocial behavior (Povinelli & Preuss, 1995). It is expected that higher scores on theory of mind tasks will also correlate with a greater difference between giving conditions in the dictator game.

The goods used in the dictator games were stickers. Stickers were chosen because they have many of the properties that money has for adults: they are highly desirable, familiar, and commonly used to reinforce good behavior. These concepts apply equally well to stickers as they do to money. The choice of stickers is also consistent with other research (such as Benenson et al., 2007).

## II. METHOD

### *Participants*

Forty-five participants were recruited from local preschools in south Florida. Data from 10 participants were excluded from this experiment; one child did not demonstrate appropriate understanding of the experiment and its requirements, three children wanted to cease the experiment, four children were excluded from the analyses due to equipment error, and two children were excluded due to experimenter error. Thirty-five participants (12 3-year-olds (7 male), 13 4-year-olds (8 male), and 10 5-year-olds (7 male)) were used for analyses. All participants gave verbal consent at the time of experimentation in addition to previous consent by a legal guardian.

### *Materials*

*Dictator Game.* The dictator game, as described above, is a resource-allocation game where one player, the proposer, can allocate “currency” to another anonymous player, the responder. The responder can only accept an offer from the proposer, meaning that the proposer always decides unilaterally. The responder does not need to be physically present to receive an allocation from the proposer. All participants played the dictator game as a proposer.

There were three conditions in this modified dictator game: in-group, out-group, and family. This task was masked as a reward for playing the other games and occurred in between the other tasks. In all conditions, the researcher presented the child with a plate full of stickers. Children were asked to choose 10 stickers that they like the most

from the plate. Following their selection, the researcher confirmed that these are the stickers they think are best. The child was told that these stickers belong to him/her, but, if they would like, they may want to give some of those stickers to either a classmate, a student in a different school, or someone at home, dependent on the condition, since not everyone in class may have the opportunity to play the games or get any stickers.

The child was instructed that *if* he/she wanted to donate any amount of stickers to another girl/ boy in the class, then the child should place the stickers in a colored envelope and place it in a large pile of different colored envelopes, and that he/she should place the stickers that the child wanted to keep for him/herself in the white envelope marked with the child's name. The researcher then explained to the child that the researcher would leave the room to make a quick phone call, and they would never know what the child decided to do. Finally, the interviewer confirmed that the child understood the instructions. Standard-sized white and colored envelopes were used.

The experimenter emphasized to the child that he/she does not have to give away any stickers and could keep all of them. The child was informed that neither the child nor the researcher would know who received the child's stickers. Instead, another researcher would distribute the stickers to those children who were not interviewed. The researcher went to great lengths to emphasize that the child understood that the child's decision was completely anonymous.

Once the child was returned to the classroom, the researcher returned to the testing room and tallied up the amount of stickers donated from each condition. The order of the conditions was counterbalanced to eliminate any order effects. Children had the opportunity to donate a maximum of 30 stickers, 10 per condition.



*Theory of Mind.* Two theory-of-mind tasks were administered to get a fuller understanding of children's theory of mind understanding.

*Uncommon Desire Task.* Adapted from Rieffe, Meerum, Terwogt, Koops, Stegge, and Oomen (2001), this task provided the participants with a printed drawing of a desirable and a non-desirable food (in this case ice cream and broccoli, respectively). Children were asked to choose the food item they prefer. They were then told a story of another child sitting in front of a table with the same two items, and this child (in the picture) absolutely loves broccoli (reliably the opposite response of the child when asked for their preference). The child is then asked which food they think that the child in the picture would choose when they go in for a snack.

*Sally-Anne Task.* Two miniature plastic dolls were used to represent Sally and Anne in the classic Sally-Anne theory of mind task (Wimmer & Perner, 1983; Baron-Cohen et al.,1985). We also used a miniature box and basket, all attained at a local toy store.

The Sally-Anne task presents participants with a story about two characters, Sally and Anne. Sally has a marble that she puts in a box that she has. She then goes away to play, and while she is gone, Anne hides Sally's marble in her basket without Sally's knowledge. Then Anne leaves the scene, and Sally returns. The participant is then asked the crucial question of where Sally will look for her marble when she returns: the location she put it in, or the place where Anne had moved it. This task allows for researchers to test whether children (and sometimes adults) can understand that someone else (in this case, Sally) does not hold the same knowledge or belief about something that they do

(that Anne has moved her marble), also termed false-belief. This false-belief task is ubiquitous in theory of mind research and is a reliable measure for preschool children.

*Ownership Transfer Task.* To test children's development and understanding of ownership transfer rules, two vignettes were presented to participants: a gift-giving story and a stealing story (Blake & Harris, 2001). Toys for these vignettes included miniature girl and boy figurines, a miniature toy table, a small box wrapped like a gift, and a miniature stuffed animal. All toys were attained at a local toy store.

The first vignette was a gift-giving story about a boy/girl (matched to the child's gender), in which the first possessor wraps up a toy "like a present," brings it to a birthday party (set in a park), and gives the toy to the birthday child. The second vignette was a stealing story about a girl/boy, in which the first possessor brings the toy to a park but then leaves it to go get a drink of water; while the first possessor is away, the second character comes over and takes the toy. After each story, a facts check question was asked: "At the beginning of the story whose toy was this?" Children were prompted to point to the character and those who failed the fact check were told the story again. Then, three test questions were asked: (a) At the end of the story is it still (the first possessor's) or is it (the current possessor's)?; (b) Which boy/girl can take the toy home?; and (c) This boy/girl (second possessor) is holding the toy at the end of the story. Does s/he need to give the toy back to (the first possessor)?

*Empathy.* To measure children's empathy I used a subset of a parent-reported empathy questionnaire (EmQue: Rieffe, Ketelaar, & Wiefferink, 2010). Parents were asked to rate six items on a 5-point scale (1=almost never, 2=rarely, 3=sometimes,

4=often, 5=almost always). The questionnaire was attached to the parental consent form and was voluntary. A copy of this questionnaire is in Appendix A.

### *Procedure*

Children were brought into a familiar playroom individually by an experimenter. After playing with the child for a few minutes to ensure the child is comfortable, the researcher asked the child to sit in a chair across a child-sized table. The researcher asked the child if he/she wanted to play a few games, and that those games could earn them some stickers. If the child assented, the researcher began with the tasks. The tasks were then administered in the following order: 1) one of the two Ownership Transfer task (either gift-giving or stealing, counterbalanced across participants); 2) one of the three dictator game tasks (in-group, out-group, or family condition, counterbalanced across participants); 3) the second Ownership Transfer task; 4) one of the two theory of mind tasks (either Uncommon Desire task or Sally-Ann task, counterbalanced); 5) the second dictator game task; 5) the second theory of mind task; and, finally 6) the third dictator game task. Order was counterbalanced within each task across children (please see Figure 1 for a visual representation). When all tasks were completed children were given their white envelopes and taken back to their classroom. All sessions and tasks were visually recorded.

### III. RESULTS

Of the 35 children tested, seven did not donate any stickers across any recipient. Analyses were run both on all data, regardless of whether any stickers were given, along with separate analyses excluding those children who failed to donate at least one sticker. Previous literature has also separated givers and non-givers from analyses since they seem to be categorically different; they differ in age (non-givers are more likely to be younger than older) (Benenson et al., 2007), socioeconomic status (lower SES are less likely to donate) (Benenson et al., 2007), and understanding of social norms (givers tend to have higher scores on measures of social norms) (Fehr & Fischbacher, 2004).

#### *Data for Non-givers and Children Who Gave at Least One Sticker*

Mean number of stickers given to an In-Group, Out-Group, and Family member by each age group is presented in Table 1. The total number of stickers donated by participants was examined in a 3 (Age: three-year-olds, four-year-olds, five-year-olds) X 3 (Recipient: in-group recipient, out-group recipient, family member recipient) ANOVA with Recipient as a within-subject variable. Although the three-year-old children donated more stickers ( $M = 4$ ) than the both the four-year-old ( $M = 3.62$ ) and five-year old children ( $M = 2.23$ ), the main effect of Age Group was not significant,  $F(1,2) = 0.96, p > .05$ . Also, although children in all three age groups donated more stickers to Family members ( $M = 3.64$ ) and In-Group members ( $M = 3.27$ ) than Out-Group ( $M = 2.93$ ) members, the main effect of Recipient was also not significant,  $F(2,64) = 0.78, p > .05$ , nor was the Age Group x Recipient interaction,  $F(2,64) = 1.61, p > .05$ .

Levels of theory of mind, ownership understanding, and empathy were also examined and are presented by age group in Table 1 for the entire sample. To examine whether 3-, 4-, and 5-year-old children differed on measures of empathy, theory of mind, and ownership understanding, one-way ANOVAs were conducted with Age Group as a between-subjects factor for each dependent measure. When considering all children (i.e., both “givers” and “non-givers”), three-year-old children ( $M = 1.75$ ,  $SD = .86$ ) differed significantly from both four-year-old ( $M = 2.69$ ,  $SD = .63$ ) and five-year-old children ( $M = 2.6$ ,  $SD = 1.1$ ) on measures of theory of mind,  $F(2, 34) = 4.418$ ,  $p < .05$ . Furthermore, five-year-old children score higher on ownership understanding ( $M = 5.9$ ,  $SD = 2.1$ ) than both three-year-olds ( $M = 3.33$ ,  $SD = 1.6$ ) and four-year-olds ( $M = 4.23$ ,  $SD = 1.4$ ),  $F(2, 34) = 6.361$ ,  $p < .01$ . On the measure of empathy, there was no significant difference between three-year-olds ( $M = 19.92$ ,  $SD = 4.1$ ), four-year-olds ( $M = 19.62$ ,  $SD = 3.7$ ), and five-year olds ( $M = 18.6$ ,  $SD = 4.1$ ),  $F(2, 32) = .327$ ,  $p > .05$ .

Correlations (two-tailed) among the different dependent measures were calculated to examine the relationships between age, empathy, theory of mind understanding, ownership understanding, and giving behaviors and are presented in Tables 3 for the entire sample. For all participants, age (in months) was significantly and negatively correlated with out-group giving,  $r = -.35$ ,  $p < .05$ , and positively correlated with theory of mind,  $r = .39$ ,  $p < .05$ , and ownership understanding,  $r = .58$ ,  $p < .01$ . Giving to in-group members was significantly correlated to giving to family member,  $r = .59$ ,  $p < .01$  and giving to out-group members,  $r = .58$ ,  $p < .01$ . Additionally, giving to out-group members was significantly correlated to giving to family members,  $r = .59$ ,  $p < .01$ . There

were no significant correlations among ownership understanding, theory of mind, or empathy with giving to any recipient.

*Data for Children Who Gave at Least One Sticker*

A comparable set of analyses was conducted including only those children who donated at least one sticker. Mean number of stickers shared for children who donated at least one sticker (i.e., “givers”) is presented in Table 2 by age group and recipient. The Age Group x Recipient analysis produced a significant main effect of Age Group,  $F(1,2) = 3.74, p < .05$ . Three-year-old children donated significantly more stickers across recipients ( $M = 6.0$ ) than five-year-old children ( $M = 2.48$ ), but not significantly more than four-year-old children ( $M = 4.27$ ). Children in all age groups gave more stickers to Family members ( $M = 4.72$ ) than to In-Group ( $M = 4.17$ ) or Out-Group ( $M = 3.86$ ) members, but the main effect of Recipient was not significant,  $F(2,4) = 0.75, p > .05$ . Lastly, the interaction of Age x Recipient interaction was not significant,  $F(2,4) = 1.48, p > .05$ .

Levels of theory of mind, ownership understanding, and empathy were also examined for those who gave at least one sticker, and are presented by age group in Table 2. One-way ANOVAs were conducted with Age Group as a between-subjects factor for each dependent measure. Five-year-old children had higher scores for ownership understanding ( $M = 6.0, SD = 2.18$ ) than both four-year-old ( $M = 4.0, SD = 1.27$ ) and three-year-old children ( $M = 4.0, SD = 1.51$ ),  $F(2, 27) = 4.36, p < .05$ , however, there was no significant difference between age group on measures of theory of mind,  $F(2, 27) = 1.75, p > .05$ , or empathy scores,  $F(2, 27) = .43, p > .05$ .

In order to compare those children who gave at least one sticker with those who gave none, across age, one-way ANOVAs were conducted with Giving as a between-subjects factor for each dependent measure. These analyses indicated that non-givers differed significantly in their empathy ( $M=16.86$ ,  $SD= 4.67$ ) from those who gave ( $M = 20.07$ ,  $SD = 3.44$ ),  $F(1,35) = 4.24$ ,  $p < .05$ . Non-givers, however, did not differ on ownership understanding ( $M = 3.43$ ,  $SD = 2.07$ ) from givers ( $M = 4.64$ ,  $SD = 1.87$ ),  $F(1,35) = 2.268$ ,  $p > .05$ , or on theory of mind understanding,  $F(1,35) = .391$ ,  $p > .05$ ) ( $M = 2.14$ ,  $SD = .90$  for non-givers and  $M = 2.39$ ,  $SD = .96$  for givers). Although there was a significant difference in empathy between those who gave and those who did not give, these analyses have marginal explanatory power given that there were only seven non-givers.

Correlations among the dependent measures for children who donated at least one sticker are presented in Table 4. Age was significantly negatively correlated with Out-group giving,  $r = -.56$ ,  $p < .01$ , and giving to family member,  $r = -.50$ ,  $p < .01$ . Age was also significantly positively correlated with ownership understanding,  $r = .50$ ,  $p < .01$ . Family giving was significantly correlated with in-group giving ( $r = .40$ ,  $p < .05$ ) and out-group giving ( $r = .48$ ,  $p < .05$ ). Giving to a family member was also significantly negatively correlated with theory of mind,  $r = -.44$ ,  $p < .05$ .

#### IV. DISCUSSION

In this study, early development of giving across recipients without the influence of a researcher was examined. The pattern of results observed in this investigation provides a mixed picture of the development of children's giving behaviors. Initial analyses found a main effect for age, with three-year-old children donating significantly more stickers than five-year-old children. When examining further, the analyses revealed that a few of the younger children did not donate stickers to any recipient. When excluding those from the analyses, the main effect for age persisted. These findings do not align with previous research. Prior studies consistently and reliably found that children donate more as they get older, hypothesized to be due to their increased theory of mind understanding (Povinelli & Preuss, 1995), increased socialization (Dunfield et al., 2011;) or knowledge of group membership (Gummerum et al., 2009). Although a main effect for recipient did not emerge, the differences were trending in the right direction. Subsequent t-tests suggest that family members received the highest donations across age, while in-group donations and out-group donations were equivalent. Paired with the findings that five-year-old children have significantly higher levels of ownership understanding, these findings suggest that younger children's donations might be driven by their lack of understanding of social norms of ownership.

Non-givers, children that did not donate any stickers to any recipient, only differed from givers, children who donated at least one sticker to any recipient, from their age group on the measure of empathy. The non-givers had significantly lower scores



on empathy than givers, suggesting that their lack of giving behaviors may be due to their decrease in empathy for the recipient. Although these analyses are relatively inconsequential given the low number of participants that were categorized as “non-givers”, this suggests the possibility that a threshold level of empathy needs to be met before children begin donating.

In line with the findings here, it is possible that younger children (3- and 4-year-olds) donate more across each condition than 5-year-olds because they have more understanding of social norms, specifically for ownership. Older children, understanding a little more about ownership, donate a high proportion of their stickers to both in-group and family member, but possibly understand that out-group members may not be able to reciprocate and could therefore be a waste of resources.

### *Limitations*

There were multiple limitations in this study. First, the sample size was a significant constraint; a third of the population had to be excluded from the analysis due to numerous reasons, such as the child wanting to cease participation, the video camera turning off, and experimenter error. The resulting number of participants provided restraints for both analyses and generalizations. Another limitation was how empathy was measured; parental reports are recognized to be useful, but can be inaccurate or skewed (Mangelsdorf, Schoppe, Buur, 2000). A corroborating measure or a behavioral measure of empathy would ideally accompany parental reports regarding children’s overall empathy. Furthermore, the overall quantity of stickers may have been an issue. Anecdotally, some of the children commented by the third dictator game trial that they had so many stickers already (as much as 20) that they struggled picking out the ones

they like from the pile (even though there were at least 50 different stickers in the pile). This could have resulted in children giving a lot more to the recipient in the third dictator game because it was the third condition, not because they were thinking about the recipient. Unfortunately, given the low N, analyses on order could not be conducted.

Table 1: Measurement Means and Standard Deviations Across Age Group for All Participants

Measure	3-Year-Olds	4-Year-Olds	5- Year-Olds	Total Mean
In-Group Giving	3.58 (4.6)	2.85 (3.7)	3.40 (2.8)	3.26
Out-Group Giving	4.00 (4.5)	3.69 (3.7)	1.10 (1.7)	3.06
Family Giving	4.42 (4.2)	4.31 (3.2)	2.20 (3.1)	3.74
Total Mean	4.00	3.62	2.21	
Theory of Mind	1.75 (.87)	2.69 (.63)	2.60 (1.1)	2.34
Ownership Understanding	3.33 (1.6)	4.23 (1.4)	5.90 (2.1)	4.40
Empathy	19.92 (4.1)	19.62 (3.7)	18.60 (4.1)	19.43

Table 2: Measurement Means and Standard Deviations Across Age Group for Children Who Donated at Least One Sticker

Measure	3-Year-Olds	4-Year-Olds	5-Year-Olds	Total Mean
In-Group Giving	5.38 (4.7)	3.36 (3.9)	3.78 (2.7)	4.07
Out-Group Giving	6.00 (4.3)	4.36 (3.6)	1.22 (1.7)	3.82
Family Giving	6.63 (3.3)	5.09 (2.8)	2.44 (3.1)	4.68
Total Mean	6.00	4.27	2.48	
Theory of Mind	1.88 (.99)	2.64 (.67)	2.56 (1.1)	2.39
Ownership Understanding	4.00 (1.5)	4.00 (1.3)	6.00 (2.2)	4.64
Empathy	21.00 (3.2)	19.91 (3.9)	19.44 (3.3)	20.07

Table 3: Correlation Matrix for All Participants

	Age (months)	In- Group Giving	Out- Group Giving	Family Giving	Empathy	Owner- ship	Theory of Mind
Age (months)	1	-.10	-.35*	-.25	-.16	.58**	.39*
In-Group Giving	–	1	.58*	.54**	.06	.16	-.03
Out-Group Giving	–	–	1	.59**	.29	-.10	-.01
Family Giving	–	–	–	1	.19	-.11	-.28
Empathy	–	–	–	–	1	.09	.08
Ownership	–	–	–	–	–	1	.41*
Theory of Mind	–	–	–	–	–	–	1

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

Table 4: Correlation Matrix for Children Who Donates at Least One Sticker

	Age (months)	In-Group Giving	Out-Group Giving	Family Giving	Empathy	Owner- ship	Theory of Mind
Age (months)	1	-.25	-.56**	-.50*	-.23	.50**	.25
In-Group Giving	–	1	.49**	.40*	-.13	.06	-.10
Out-Group Giving	–	–	1	.48**	.21	-.27	-.07
Family Giving	–	–	–	1	.02	-.34	-.44
Empathy	–	–	–	–	1	.03	.07
Owner- ship	–	–	–	–	–	1	.31
Theory of Mind	–	–	–	–	–	–	1

Figure 1. Procedure of Tasks

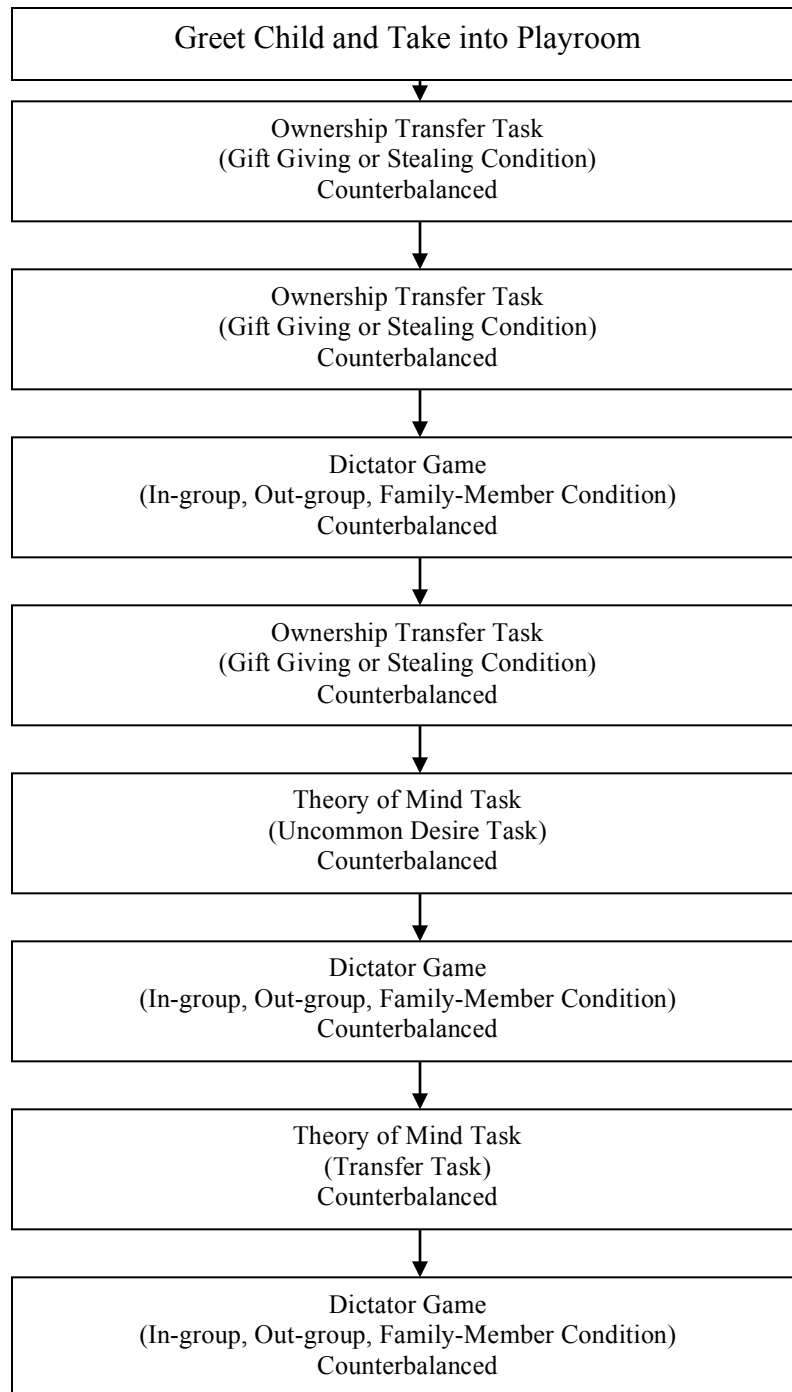


Figure 2: Measurement Means for All Data for Age X Recipient

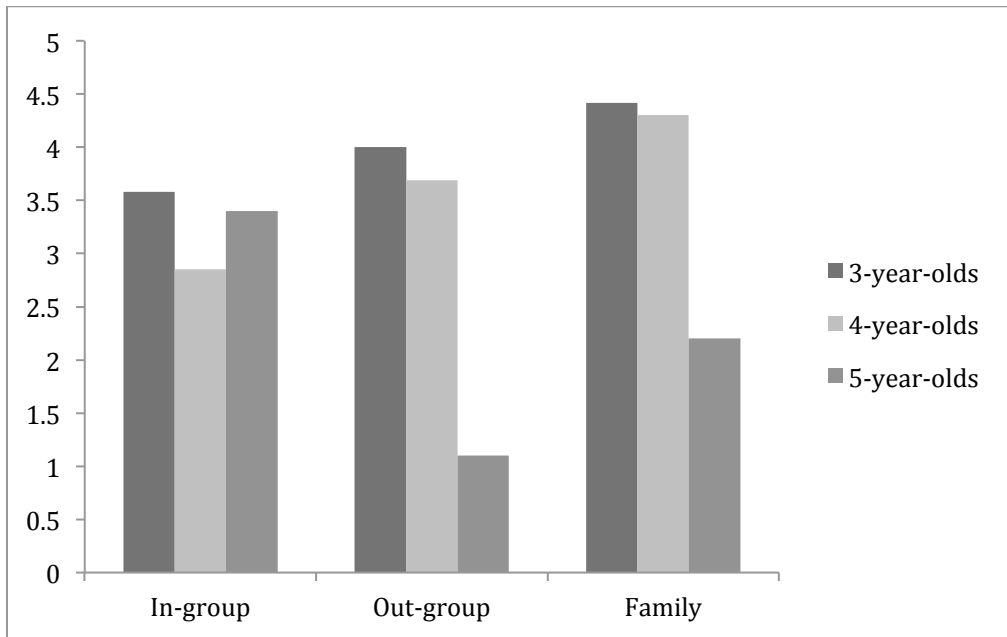




Figure 3. Measurement Means for Giver Data Only Age X Recipient

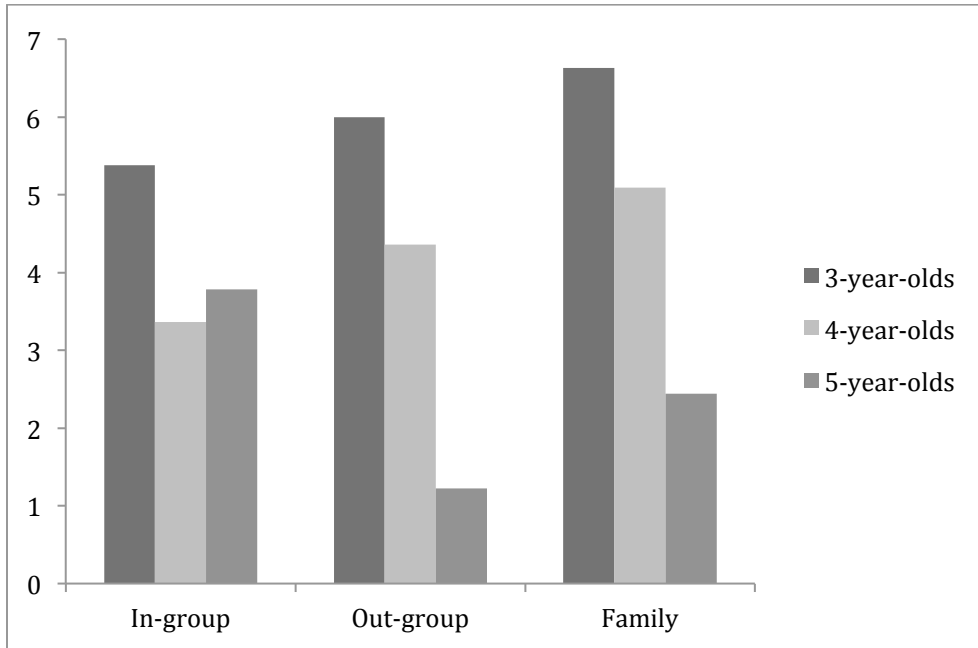


Figure 4. Theory of Mind, Empathy and Ownership Scores for All Data

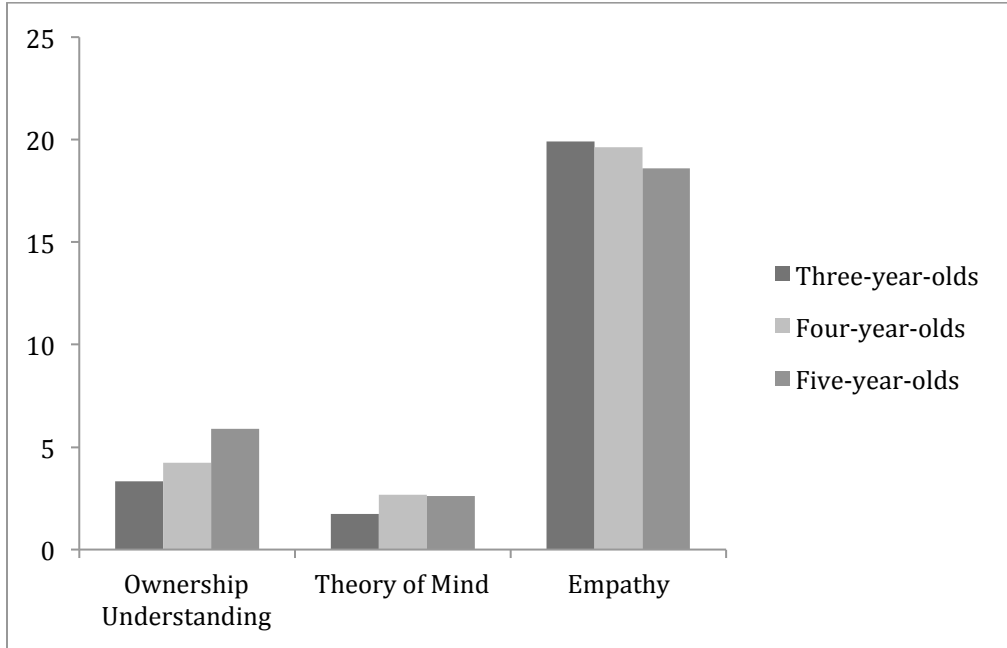


Figure 5. Theory of Mind, Empathy and Ownership Scores for Giver Data Only

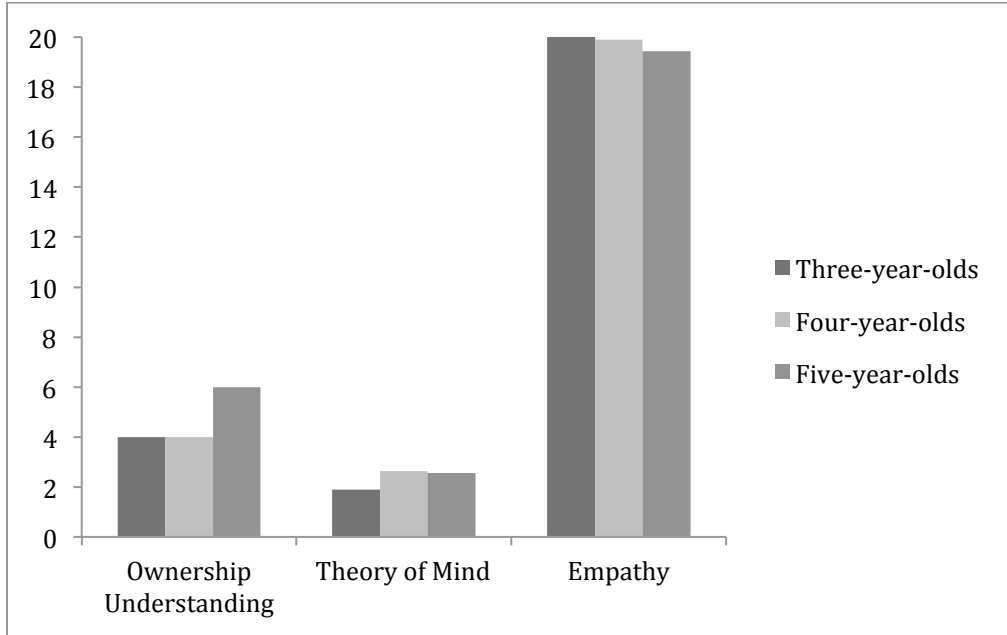
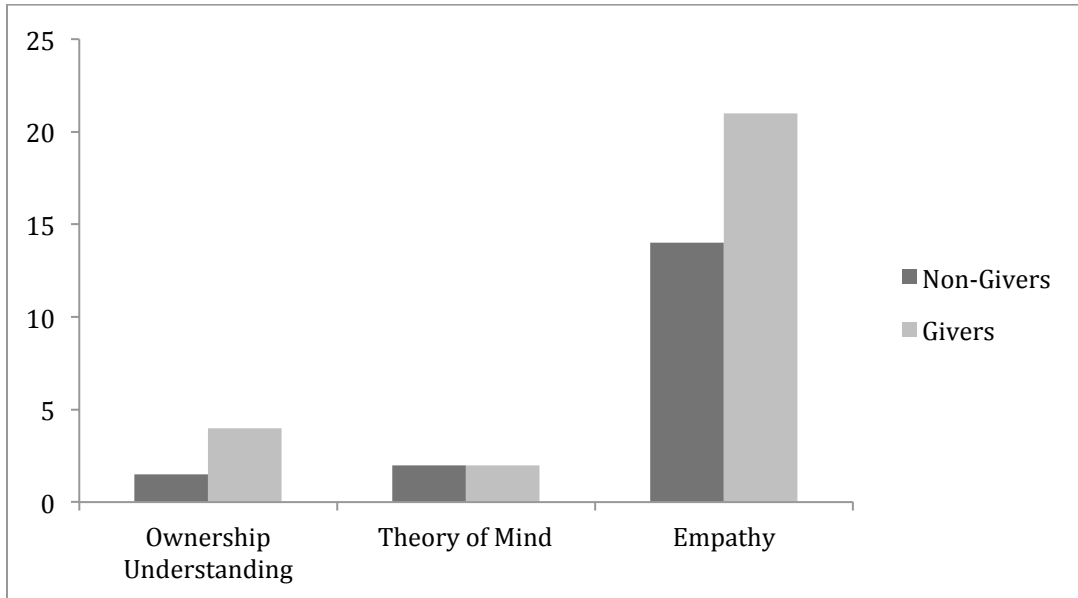


Figure 6. Theory of Mind, Empathy and Ownership Scores for Givers and Non-givers



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