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Emerging Care for Reputation by 3- to 7-year-olds

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Emerging Care for Reputation by 3- to 7-year-olds

By

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Bachelor of Science
Bachelor of Arts
Birmingham-Southern College
2005

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An abstract of
A thesis submitted to the Faculty of the Graduate School of Emory University
in partial fulfillment of the requirements for the degree of
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in Psychology
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Abstract

Emerging Care for Reputation by 3- to 7-year-olds

By Erin E. Robbins

Studies of early prosocial behavior document that between 3- and 5-years old,
children become less self-favoring and more egalitarian in their sharing
(Benenson, Markovits, Roy, & Denko, 2003; Fehr et al., in press; Rochat et al., in
press). Utilizing a modified public dictator (sharing) game, the current study
asked whether this developmental trend toward equity is determined in part by
concern for reputation and social evaluation, as well as by the child's ability to
theorize about other minds. In public and private conditions, 3- to 7-year olds
distributed twice a small collection of valuable coins between themselves and an
experimenter, or between two identical dolls (control condition). Compared to
their younger cohorts, older children were less self-favoring in the public
compared to the private condition and behaved more strategically in their
differential distribution of the coins. In relation to theory of mind, amongst five-
year olds, children who passed a classic false belief task (Callaghan et al., 2005;
Wellman & Liu, 2004) were more equitable in public (compared to private)
sharing than children who failed the task. Results suggest that care for reputation
emerges between 5-and 7-years of age and potentially correlates with the
emergence of theories of mind. The relevance of these findings to the
development of moral reasoning are discussed, with particular emphasis placed
on the child's adoption of an 'ethical stance.'

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INTRODUCTION

Non-human (Silk, 2002; Stephens, McLinn, & Stevens, 2002; Tomasello & Call, 1997) and human (Bazerman et al., 2000; Henrich et al., 2001; Rabin, 1993) models of negotiation and cooperation identify reciprocity as a key component of socio-moral exchanges. Although the norms that guide reciprocity—trust and fairness, among others—have been widely studied (Boyd et al., 2002; Fehr et al., in press; Gintis, 2000), there exists a comparative paucity of literature asking how individuals model accountability in such interactions and how this ability emerges in ontogeny.

Developmental research suggests that as early as two years old, children possess the tools (i.e., self-concept, agency, and perspective taking, among others) they need to navigate social environs (Rochat, 2001; Bischof-Kohler, 1991; Amsterdam, 1972), but how children incorporate these tools into their decision-making is less clearly understood. One possibility (commonly studied in the adult literature) is that a reputation affords the child a way to "keep score" of economic interactions, determine accountability, and predict future behaviors. Whereas in day-to-day language "reputation" refers to an individual's status or prestige, Conte and Paolucci (2003) note that in economic and social-scientific investigation, a reputation is more frequently defined as a transmission of how an agent's conduct conforms to socially desirable norms for cooperation, reciprocity, or obedience to social order; it is a statement about an individual's position in a social hierarchy. Interestingly, the etymology of "reputation" stems from the Latin *putare,* meaning to estimate or calculate; thus, to be reputable (as conceived in this paper) means to be accountable for how others perceive us.

The goal of the current study is to better understand how children conceptualize their own social exchanges by identifying, in the context of early sharing behavior, the emergence of concern for social evaluation. Of particular interest are potential developmental shifts in how children hold others in mind when they make decisions about accountability, and when the child's awareness of reputation becomes a salient part of that process. We question whether children's awareness of their reputation translates to observable, predictable changes in sharing strategies in games where there is great incentive to self-maximize gains. Does concern for social evaluation motivate children to behave equitably in an effort to conform to social norms regarding fairness?

In our effort to answer this question, we first outline the general cognitive competencies (such as self-other development) that support emergent pro-social behaviors like sharing. We review game theoretical and developmental evidence that children's equitable behavior in sharing games varies as a function of age, and examine how two perspectives (the general perceptual and theory of mind accounts) potentially explain children's developing sense of fairness and the trend toward more equitable sharing. Finally, in the discussion we ground these empirical and theoretical stances in a discussion about moral reasoning and the development of the child's 'ethical stance.'

Development of Prosocial Behavior

The ability to construe others (or the self) as accountable for past actions requires an individual to perform a set of complex cognitive gymnastics. First, an understanding of accountability necessitates a concept of self that is distinct from

one's concept of others. Second, recognition of other mental states is required: the child must understand that the self and the objectified other may have differing goals, desires, beliefs, and motivations (Holmgren, Eisenberg, & Fabes, 1998; Gopnik & Graf, 1988). These two abilities (which reach a developmental synthesis between two and five years of age) are presumed to develop conjointly with linguistic competency, and have been empirically examined using indices such as the Mirror Self-Recognition Task (Amsterdam, 1972). As this demarcation between self and other grows increasingly distinct, children expand concern for personal welfare to empathic concern for others (Robinson, Zahn-Waxler, & Robert, 1994). Holmgren, Eisenberg, and Fabes (1998) follow this trend into the preschool years, documenting that relative to three-year olds, five-year old children are more likely to recognize and empathically respond to distressed peers. One way by which such pro-social behaviors become linked (or incorporated into) moral reasoning is through the process of social perspective taking.

According to Hoffman (2001), an act of social perspective taking involves both awareness of what another is feeling and the imaginative act of placing oneself in that person's place. Social perspective provides the foundation for "do-as-you-would-be-done" reciprocity such as the Golden Rule or Piaget's (1932/1965) conception of ideal moral reciprocity. Further, social perspective taking allows for the condition of reversibility, or the sentiment that a behavior must be acceptable to both the instigator and target of that action (Gibbs, 2003). Tappan (2006) argues that by the second year of life, children have already had a great deal of exposure to such social standards in the context of conversations

with relatives and caregivers about how other individuals 'should' and 'ought' to be treated. Arguably, this element of mutual respect and social perspective taking is part of what makes the consequences of a moral transgression meaningful.

As the child's ability to combine multiple perspectives strengthens, value judgments and appeals to norms like fairness begin to characterize how children determine the appropriateness of social interactions (Piaget, 1932; Kohlberg, 1984). Through the process of perspective taking, children learn that they can influence the outcome of their interactions with others (Goubet, Rochat, Marie-LeBlond, & Poss, 2005); by the second year of life, this sense of personal agency becomes apparent in the child's understanding of possession and ownership. Faigenbaum (2005) notes that as children abandon purely instrumental understanding of objects, negotiation (particularly reciprocal exchange) features prominently in defining and redefining the value of a good or an act. Initially, younger children (three to seven years) are more self-serving in such negotiations, opting to maximize the gains to self over gains to others. As they approach adolescence, children demonstrate more adult-like awareness for societal norms (Buchanan-Barrow, 2005; Emler, Ohana, & Dickinson, 1990; Jahoda, 1984), with Harbaugh and Krause (2000) reporting that between 7-18 years, appeals to justice and fairness increasingly characterize negotiations as children gradually decline in their tendency to self-maximize gains.

Game Theoretical Evidence

The proclivity to self-maximize (to act selfishly) has been studied in adults through game theoretical approaches in which participants are asked to make

decisions about how highly desirably commodities (such as candies or money) will be distributed, typically between two players. In some scenarios, such as the ultimatum game, such sharing is bidirectional: both players have an opportunity to decide how the good will be distributed, and both players have an opportunity to reject what they view as unfair offers. In other scenarios, such as the dictator game, only one participant distributes the good; the second player is a passive recipient of the game with no power to change the game's outcome. Across all games, however, the expression and repayment of trust serves as an important signaling mechanism: those who observe established behavioral norms are rewarded with reciprocity and cooperation, whereas players who attempt to conceal their behavior (i.e., evade accountability) and transgress these rules are often punished and often ostracized in future interactions (Eckel & Grossman, 1996; King-Cass et al., 2005). For example, as Bolton and Zwick (1995) and Henrich et al. (2006) note, adults often "altruistically punish" an opponent for making a stingy offer by ensuring that neither party receives a payoff; hence, the rebuke comes at the expense of personal gain.

Game theoretical approaches predict that rational players (i.e., those who promote self-interest) reach an equilibrium at which point they are both recipients of the good; outright monopolization of a resource is typically punished (Bolton, Katok, & Ockenfels, 2004; Conte & Paolucci, 2002). Thus, at least in the adult literature, accounting for one's past actions becomes a crucial part of the exchange process. As Axelrod (1984) notes, a reputation helps define the 'shadow of the future' by projecting what opportunities (or losses) are most likely given an individual's prior history and current action. However, a

reputation encapsulates more than just information about prior behavioral consistency and expected future outcomes; because it also transmits information about an individual's propensity to follow established norms, a reputation may also serve as 'affective capital' between individuals trying to establish trust and reciprocity.

Developmental studies regarding reputation have typically focused on peer perceptions of popular and neglected children rather than on how children conceptualize and model accountability (Hill & Pillow, 2006; Gifford-Smith & Brownell, 2003). Relevant to the current investigation, these studies commonly find that by five years old, children recognize that a reputation provides other with information about one's attitudes and expectations, and that cultivating a negative reputation may result in social consequences (Rogosch & Newcomb, 1989). Other researchers have examined children's socio-economic reasoning through by using the ultimatum game paradigm, finding that like adults, children disapprove of unfair monopolization of goods. According to Harbaugh and Krause (2000), children's proposals in the ultimatum game become more equitable (almost altruistic at points) as children age, with some participants in their study giving as much as 29% of their potential payoff to their game partner. Other game theoretical approaches conclude that children's generosity in ultimatum games stems from their emergent mentalizing abilities (Sally & Hill, 2006).

Competing Accounts: General Perceptual Theories and Theory of Mind

Developmentally, it is uncertain how children evaluate their own selfish or generous behaviors in light of well-established social norms. Does the trend toward equitable sharing necessarily depend on the child's recognition and adherence to socially-sanctioned rules of behavior? One alternative possibility (what we deem the general perceptual account) is that with age, children become better at detecting inconsistencies and inequalities. In the context of sharing, the equitable distribution of goods could be a purely perceptually-based solution for achieving balance or symmetry across groups of objects. It is possible that children inherently prefer displays in which objects are evenly distributed, and that the developmental story is one in which children gradually become better at organizing objects in this fashion (Pepper, 1998). Children become more fair in their sharing as their numerical reasoning skills develop (i.e., they become better at mapping one-to-one correspondences or conceptualizing"half"). In this account, a child's distribution of goods functions independently of any perspective-taking; the child need not consider her partner's mental state or a commonly held prescriptive norm to arrive at an equitable solution.

In contrast, theory of mind accounts of prosocial sharing behavior posit that the trend toward equity reflects the child's growing expertise with recognizing and interpreting the desires, intentions, and beliefs of others. Evidence for such rich, mentalistic explanations suggests that knowledge of different representational states advances in a roughly sequential but integrative fashion, with understanding of desires preceding more cognitively complex understandings of intent and belief (Repacholi & Gopnik, 1997; Wellman & Liu,

2004). Accordingly, older children may successfully solve a perspective-taking task because they are better able to synthesize and evaluate several kinds of representations. Young children may experience more difficulty with such tasks because they take fewer sources of information into account (i.e., they only contemplate a partner's desires) or because they of how they differentially weigh representations (e.g., perceiving the desires and beliefs of a partner, but treating desire as the more important factor). With regard to the current study, lack of concern for reputation on the part of young children might reflect that they do not yet recognize that a reputation functions as more than a collection of extraneous personal facts. Older children possibly recognize that a reputation represents a coalescence of facts about how one's desires, beliefs, emotions, and actions relate to the social norms that govern these behaviors.

In the context of moral development, the theory of mind approach offers several advantages over its perceptual counterpart. To elaborate, imagine a scenario in which a child must share six candies equitably with a partner. Five of the candies have plain wrappers, but one of the candies is larger in size with a more colorful wrapper (for an example of a similar experimental paradigm, see Rochat et al., in press). How should the candy be divided? While symmetry of number is possible, the presence of one candy that is different in appearance poses a problem for the general perceptual account (Frydman & Bryant, 1988). Decisions about equity often involve assessments of value that are difficult to complete without evoking some mentalistic representation of what the item might be *worth* to different parties. Thus, a major weakness of the general perceptual account is that many features (like value) that are useful in problem-

solving are cognitively opaque to the child or decision-maker. In contrast, mentalistic approaches offer a way around this opacity via theorizing or simulating another's mental state. Accordingly, children arguably ascribe to fairness norms when they know that their partner also defers to this rule, or when then realize that others hold them personally accountable to said norm (Gibbs, 2003; Gilbert & Jones, 1986).

The Current Study and Hypotheses

The current experiment assess such awareness of reputation by manipulating the context of a public dictator game played between the child and an experimenter. In public conditions, the outcome of the child's sharing is apparent to both players, but in private conditions, the outcome of the game remains a secret. We theorize that in private conditions, the anonymity of sharing will not make evaluative concerns about reputation a salient feature of the game, whereas in public conditions, the transparency of the outcome will create an incentive for the child to cultivate and project a reputation. Rather than being driven by general perceptual strategy, a child's distributions in the game will depend on whether or not the child perceives her reputation to be at stake. To this end, we examine the sharing behavior of three age groups (3, 5, and 7 year olds) not only to capture ages commonly associated with significant shifts in theories of mind, but also to include ages associated with the emergence of principled, normative reasoning (Gilbert & Jones, 1986) and shifts toward more equitable, egalitarian sharing (Benenson, Markovits, Roy, & Denko, 2003; Fehr et al., in press; Rochat et al., in press).

Thus, the goal of the study is to identify when children become concerned with how others perceive them and when this concern begins to translate into behavioral strategies that minimize self-maximization in favor of building a "good" (i.e., more equitable or egalitarian) reputation. We expect that relative to the control condition (sharing between two dolls), children will show a general trend of self-maximizing behavior when sharing with the experimenter, although this pattern should decline with age. We further hypothesize that children should exhibit less self-maximizing behavior when reputation is at stake (as in public conditions) than when it is not (as in private sharing). If we find evidence that older children are more sensitive to reputation, it may demonstrate that children utilize theories of mind to hold themselves (and others) accountable to socio-moral norms like fairness.

METHOD

Participants

A total of 36 children (19 females, 17 males) participated in the study; of the 38 children recruited, two were excluded from analysis on the basis that they did not complete the study, yielding an attrition rate of 5%. Generally speaking, the children included in the study came families in the greater Atlanta area with moderate to high socioeconomic status (median household income = $55,953 USD).

Children ranged in age from 36 to 88 months (M = 57.21, SD = 15.92) and were grouped into three categories of 12 children each: three-year olds (6 female and 6 male; M = 41.35, SD = 3.87), five-year olds (4 female and 8 male; M = 55.08, SD = 5.32), and seven-year olds (9 female and 3 male; M = 75.47, SD =

7.94). All experimental procedures were completed at the Emory University Child Studies Center laboratory in accordance with IRB guidelines.

Experimental Paradigm

We utilized a multi-round public dictator game in which children were asked to split coins in a variety of contexts. Children shared small collections of coins ($N = 6$ and 7) with the experimenter and then again between two identical dolls (control condition). Children proposed how the coins would be split without any input the experimenter. In total, children distributed coins a total of 12 times across 3 experimental conditions (private, public, and mixed) as depicted in Figure 1.

Design

In the current study, a "warm-up" round preceded the three experimental conditions and was used to introduce the rules of the sharing game. In the "public" condition, the use of transparent banks to hold the coins ensured that payoffs were known to all players, effectively calling the child's reputation into question. In the "private" condition, opaque banks kept the outcome anonymous to the experimenter. The third and final "mixed" condition (described later in the procedure) combined elements of both public and private sharing.

Within each condition, children split coins a total of four times, twice as a recipient of the distribution (e.g., by splitting coins with the experimenter) and twice as a non-recipient of the distribution (e.g., by splitting coins between two identical dolls). First, children distributed an even number of coins (six) in which

four were regular coins and two were special; children then distributed an odd number of coins (seven) in which six were regular and only one was special. Thus, for each condition, children split a total of 13 coins between themselves and the experimenter, and another 13 coins between the identical dolls. The use of quantitatively and qualitatively different coins was designed to test how children share items when equality is possible (as with even numbers) or impossible (as with odd numbers), as well as how the inclusion of a more desirable item would influence overall distribution (Rochat et al., in press).

During the game, children sat across a small table from the experimenter. The experimenter placed coins on a clear tray in the center of the table, and children were asked to split the coins by moving them from this tray to different sides of the table or into different "piggy banks" (described in Materials). Games were conducted at the laboratory inside a spacious two-person tent. Partitioning the lab space this way fostered a sense of privacy by creating an environ in which children could share anonymously and without fear of scrutiny. During the private, public, and mixed conditions, the experimenter exited the tent and did not witness firsthand the child's sharing. Live video-feeds ensured that parents and coders could observe the interaction inside the tent. Additionally, the experimenter stayed within eye-sight of the child and monitored the tent covertly (for safety purposes) using the live video feed. At no time during the experiment were children left unmonitored or unsupervised.

Procedure

Inside the tent, the experimenter engaged the child in a warm-up round by introducing the basic rules of the game and emphasizing that these rules would be consistent throughout the game.   First, children learned that when sharing with the experimenter, any coins they gave themselves could be redeemed at a makeshift "store" in the laboratory at the game's conclusion. Next, children learned that they would not be the recipients of any coins when splitting coins between the identical dolls; instead, the dolls would keep these coins themselves. Throughout the game, odd trials always followed even trials to make the inequality inherent in the set more salient. Additionally, trials featuring the child as a recipient of the share always preceded trials where the child was a non-recipient; because trials with dolls removed the child as the beneficiary of the share, we worried that presenting these trials first might inadvertently predispose children to patterns of equitable responding that they might otherwise not exhibit. The trials with dolls were included as a control—a way to see whether children return to less egocentric behavior after sharing with the experimenter.

For each condition (private, public, and mixed), a trial was construed as one instance of sharing. Each condition therefore consisted of four trials—two in which the child was a recipient, and two in which the child was a non-recipient. The experimenter poured coins onto the tray in the center of the table before instructing the child to "split the coins how ever you want." If after 15 seconds the child made no move to distribute the coins, the experimenter prompted the child again ("See the coins? It's your job to split them. Can you show me who gets what?"). After each trial, the child collected her winnings, placing her coins

in one paper bag and the coins for the experimenter in a second paper bag (we conceived that this would re-emphasize the child's role as dictator in the game). In total, the game consisted of 16 trials in which the experimental conditions (private, public, and mixed) were counterbalanced using a Latin squares design.

During the warm-up, children split coins under the supervision of the experimenter, who remained in the tent. In the private, public, and mixed conditions, the Experimenter left the tent during distribution to give the child a sense of privacy during decision-making. In the public condition, children distributed coins into transparent banks, after which the experimenter returned to the tent to witness the child place the payoffs into the paper bags. We anticipated that this would effectively make the outcome obvious to both players and place the child's reputation on the line. In the private condition, banks were opaque, and the experimenter did not witness the child handle the payoffs. Because the outcome remained unknown to the experimenter, and because retaliation by other players was an impossibility, we expected children to self-maximize in the private condition without fear of damage to their reputations. In the mixed condition, children deposited coins into two different banks, one that made a loud clanging sound and one that was muffled. The "owners" of these two banks were counterbalanced across participants; half of the participants used the loud bank, and the other half used the muffled bank. The experimenter emphasized that she could hear very clearly what was happening inside the tent and could tell how many coins the child had awarded the owner of the loud bank (examples: "It sounds like you gave yourself a lot of coins!" or, "I heard two dings! It sounds like you gave me two coins!"). We counterbalanced the

ownership of the banks to control for the fact that the loud bank might be inherently rewarding. Concerns regarding fatigue effects similarly led us to collapse loud and muffled features into one condition.

The game concluded with a traditional false belief task (Wellman & Liu, 2004) involving the experimenter and an unfamiliar adult who was introduced to the child as a friend of the experimenter. The child and the experimenter witnessed the other adult hide a ball under one of two identical cups. The adult excused herself and exited the tent, at which point the experimenter confirmed that the child knew the location of the hidden ball. The experimenter then suggested that the child play a trick on the other adult by moving the ball to the other cup. After assisting the child hide the ball, the experimenter asked the child where the other adult would look for the ball when she returned. A child passed the task if she correctly guessed that the other adult would look in the first location; correct responses on the task require children to suspend their own knowledge to attribute a false belief to the tricked adult, and have been taken as evidence that the child has achieved a "theory of mind" (Callaghan et al., 2005).

Materials

Two kinds of identically-sized coins were used in the game: regular white poker chips and "special" blue poker chips. To emphasize the differing worth of the coins, and to provide incentives to participate, children were told that at the end of the game, they could redeem their coins at the laboratory "store." Prior to the start of each game, the experimenter took children to the store and demonstrated how the coins worked. Children learned that special blue coins

could buy toys, and that regular white coins could buy stickers. To ensure that children encoded this information, before each trial the experimenter prompted children to identify which coins could buy toys and which bought stickers. If the child responded incorrectly, the experimenter reviewed the store rules until the child responded accurately when prompted.

During the warm-up, children split coins placed on the tray by placing them on differing sides of the table. In recipient trials, coins for the child were placed on the child's right-hand side, and coins for the experimenter were placed on the child's left. In non-recipient trials, the experimenter emphasized to the child that the coins belonged to the dolls; children were not allowed to split until they successfully verbalized or demonstrated knowledge that in these rounds, coins placed on the right-hand side of the table belonged to the doll on the right and not the child herself.

During experimental conditions, children placed coins into piggy banks, which were actually 14-inch tall, 6-inch diameter plastic containers. Banks for the children and experimenter were identical in appearance; banks for the dolls were visually distinct from the child/experimenter banks, but identical to one another to underscore that the child was no longer the recipient. In public conditions, banks were transparent and lidless so that the contents were easily visible. In private rounds, the banks were fitted with slotted lids and decorated to appear opaque. The mixed condition combined aspects of both public and private conditions: two opaque banks fitted with slotted lids made distinctly different sounds when coins were deposited. A loud, clanking sound made the

payoff to the owner of this bank essentially public, whereas the second, muffled

bank masked the outcome and made the payoff to this player essentially private.

Scoring and Measurement

Coders watching the live video feed noted the number and kinds of coins

(regular or special) awarded to the child, the experimenter, and the two dolls, as

well as to whom the child distributed the first coin. A randomly selected sample

of 30% of video recordings were re-coded for reliability, yielding 96% inter-rater

reliability agreement.

RESULTS

Preliminary Analysis

Prior to hypothesis testing, we ran an omnibus analysis of variance

(ANOVA) using the coins distributed to the child or right doll in each condition

(public or private) as the dependent measure, and the child's status in the game

(recipient or non-recipient), trial type (even or odd) as within-subjects variables.

Age (3-, 5-, or 7-years) and order of conditions were included as between-subjects

factors. The test yielded no significant order effect, and no effect of trial type was

found ($F(1,17) = 2.347$ and $F(6,17) = .520$, respectively; both $p > .05$). Based on

these findings, odd and even sets of coins were collapsed together. (We consider

the analysis of the mixed condition separately to account for the fact that this

condition contained elements of both private and public sharing.) Figure 2

depicts the overall distribution of coins for each round (private or public) and

reflects the proportion of coins (out of 13) awarded to either the child (when the

child is a recipient) or to the right doll (when the child is a non-recipient) (refer to Table 1 for descriptive statistics). For each trial, we also coded to whom the child gave the first coin and the special coin(s).

Differences in Self-Maximizing Behavior

Prior studies document that between three and five years of age, self-maximizing behavior declines as children become more fair in their sharing (Rochat et al., in press; Fehr et al., in press). To test the hypothesis that children should behave less selfishly with age, we utilized the distribution scores described above as the dependent measure in a 2 (condition: private or public) x 2 (child's status: recipient or non-recipient) x 3 (age: 3-, 5-, or 7-years) mixed-design ANOVA. Because data violated both sphericity and homogeneity assumptions, the multivariate solution values are reported. The test yielded a significant 3-way interaction of moderate effect size between condition, status, and age, $F(2,33) = 3.630, p < .05, \eta^2 = .341$.

In follow-up simple effects tests, the interaction of age and condition was non-significant when the child was a non-recipient, $F(2,33) = 1.02, p > .05$. This result indicates that children when they distributed coins between identical dolls, children in each age group tended to split coins similarly in public and private conditions. Although we found evidence of a slight bias to favor the right doll (Fig 1), in general children did not favor significantly one doll over another as a function of age or condition. In contrast, the age and condition interaction was significant when the child was a recipient, $F(2,33) = 5.96, p = <.05$. In post-hoc analyses utilizing Bonferonni corrections, only 7-year olds were more self-

favoring in the private relative to the public condition, $p < .05$. 3-and 5-year-old children did not significantly differ in how they split coins between public and private conditions, $p > .05$. Comparing age groups, no significant differences were found with regard to sharing in the private condition (see Table 1 and Figure 2). 3-, 5- and 7-year- olds all demonstrated relatively similar levels of self-favoring behavior ($p > .05$ based on Bonferroni corrections). In contrast, marked differences were noted for public sharing: 7-year olds were less self-favoring than either 3- or 5- year olds (using Bonferroni corrections for post-hoc comparisons, $p < .05$). Children in the youngest age groups (3 and 5 years) did not significantly differ from one another, $p > .05$.

We had expected that 5-year olds would differ from 3-year olds on the basis of other research (Rochat et al., in press) that find such age differences on similar tasks. We questioned whether differences on false belief performance might account for these seemingly discrepant results. Whereas in the oldest and youngest old age groups there was a clear majority in terms of false belief performance (100% of 7-year olds passed and 83% of 3-year olds failed), 5-year olds were much more divided: 54% (N = 7) of participants passed and 46% (N= 5) failed the task. With this in mind, we decided to use false belief performance as a post-hoc blocking factor to re-examine the behaviors for the five-year old cohort only. In this analysis, children who passed false belief were relatively more equitable across private ($M = .627$, $SD = .111$), and public ($M = .551$, $SD = .072$) conditions than children who failed false belief (baseline: $M = .630$, $SD = .295$; private: $M = .695$, $SD = .140$; and public: $M = .678$, $SD = .099$). Furthermore, the difference between private and public conditions was on

average greater for passing than failing children, $t(10) = 1.86$, $p = .045$ (Figure 3),

mirroring the trend observed with 7-year olds. According to these findings,

children who passed false belief performed in a manner nearly identical to that of

the seven-year olds, while children who failed the task much more resembled

three-year olds.

Emergence of Equitable Sharing

The results of the ANOVA demonstrated that children's sharing behavior

changes as a function of age and condition, and the child's self-favoring behavior

as recipient and non-recipient was compared. However, it was predicted that

status would also influence sharing behavior relative to the expectation of an

equity norm (i.e., such that children would distribute more equitably when not a

recipient of the split and personal gain was an impossibility). To test this

hypothesis, we first needed to operationalize "equitable." Because children split a

total of 13 coins in each round, absolute equity (50:50 division of the coins) was

impossible. Instead, we chose to define equitable distributions as those in which

one player received 7 coins, or 54% of the total distribution. Using a one-sample

t-test, we compared this parameter to the distribution scores for public and

private conditions. Significant departures from this value of .54 would be taken as

indication of non-equitable sharing.

Across all age groups, the child's status in the game did not influence

sharing behavior in the public condition. 3-, 5-, and 7-year-old children did not

differ significantly from our operational definition of equitable behavior, either as

recipients ($t(11) = .952$, 1.57, and -.630 respectively, all $p > .05$) or as non-

recipients ($t(11)$ = .664, .829, and .552 respectively, all $p > .05$). These results suggest that children were relatively egalitarian both as recipients and as non-recipients when sharing was public.

This trend was not upheld in the private condition. When distributing coins as non-recipients, children in each age group were relatively equitable, ($t(11)$ = .781, .645, and 1.72 respectively, all $p > .05$). However, when distributing coins as recipients, 3-, 5- and 7-year olds were significantly less equitable and more self-favoring, $t(11)$ = 1.79, 2.13, and 1.81, all $p < .05$.

Taken together, results confirm our hypothesis that children's status in the game influenced their equitable behavior. When acting as non-participants, children perform relatively equitably in both conditions, but as recipients, children tend to favor themselves in the private compared to the public condition, with the strongest effects observed in 5- and 7-year olds.

Sensitivity to Changing Conditions

The ANOVA and one-sample t-test compared group means for each condition, which provided a general sense of how children adapted their behavior. To arrive at a more fine-grain assessment, difference scores were calculated for each participant by subtracting the child's distribution in the public condition from distribution in the private condition. On the basis that the mixed-design ANOVA yielded no condition effect on non-recipient behavior, difference scores were only calculated for rounds in which the child acted as recipient. This new dependent measure (the distribution difference score) was entered into a univariate ANOVA using age (3-, 5-, or 7-years old) as a between-subjects factor.

We expected that the difference distribution score would be greater for older children than younger children, reflecting greater self-maximizing behavior in the private compared to the public condition.

Results support the prediction. Age significantly influenced distribution difference scores, $F(2,33) = 4.05$, $p = .027$, d = .197. Relative to the 3-year olds, who gave themselves more coins in the public versus private condition ($M = -.032$, $SD = .015$), both 5- and 7-year olds favored themselves in the predicted direction, as evidenced by their mean distribution difference scores ($M = .031$ and .128, $SD = .051$ and .073 respectively), indicating that children in these groups tended to favor themselves in private versus public sharing.

In post-hoc comparisons using Bonferonni corrections, 3-year-olds differed significantly from both 5- and 7-year olds, $p < .05$. The comparison between 5-and 7-year-olds was non-significant, $p > .05$. These findings imply that the youngest children did not systematically orient their behavior to the sharing context. Children in the older age groups demonstrated sensitivity to sharing context giving themselves on average more coins in the private than the public condition.

Strategic Use of Coins

Given that the special coins were greater in value, it was important to determine whether children factored the different worth of the coins into their decision-making. For each round, children split a total of 3 special coins (2 on even trials, 1 on odd trials). We coded whether children changed the number of coins given to themselves (yes or no) between private and public conditions. In

binomial tests, the proportion of 5- and 7-year old children who changed their payoff of special coins between conditions (42% and 58%, respectively) was non-significant, both $p > .05$. In contrast, a significant majority (92%, $p < .05$) of 7-year olds changed the distribution of special coins between conditions.

Based on these findings, for each condition we calculated the percentage of the child's payoff comprised of special coins by dividing the total number of special coins the child gave to herself by the total number of coins won for that condition. This value was used as the dependent measure in a 2 (condition) x 3 (age) mixed-design ANOVA using the proportion of special coins awarded to the child as a dependent measure yielded a significant interaction, $F(2,33) = 3.45$, $p < .05$, $\eta^2 = .214$. Both 3- and 5-year olds demonstrated a non-significant trend ($p > .05$ using Bonferroni corrections) to give themselves more special coins in the private ($M = .727$ and $.694$; $SD = .360$ and $.356$, respectively) than in the public ($M = .567$ and $.642$; $SD = .446$ and $.346$, respectively) condition. This trend was also non-significant for the oldest children, although notable because it was in the reverse direction. Seven-year olds gave themselves proportionately more special coins in the public ($M = .807$, $SD = .222$) as opposed to the private ($M = .778$, $SD = .260$) condition, although again this difference only approached significance ($p = .08$).

In terms of age comparisons, in the public condition 7-year olds gave themselves significantly more special coins than did 3- or 5-year old children ($p < .05$ using Bonferroni corrections). In the private condition, the distribution of special coins did not differ significantly among 3-, 5-, and 7-year olds (all post hoc comparisons $p > .05$). Together, these results provide tentative support for

the hypothesis that the way in which children reason through the sharing task changes with age and as a function of condition.

Distribution of the first coin in each trial

Experimenters coded the recipient of the first coin in each trial as either the child or the experimenter. (Cases in which children distributed coins simultaneously to both players in their first act of sharing were rare and have been included in the second group.) Although the majority of children were expected to give the first coin to themselves in all conditions, it was reasoned that children who were concerned about social evaluation would be more likely to give the first coin to their partner in the public versus private condition. When collapsed across age, data revealed a significant effect of condition on recipient of the first coin, (Fisher's exact test, $p = .047$). The majority of children in the private condition (69%) awarded themselves the first coin, doing the same for the experimenter in only 31% of trials. This majority shrank notably in the public condition: 46% of children still favored themselves as the first recipient, but the experimenter received the first coin in over half (54%) of trials. Odds ratios determined that compared to the private condition, children were 1.67 times more likely to give the first coin to their partner when sharing publicly, $p < .05$. When examined by age group (Figure 4), this effect of condition on first coin recipient was non-significant for 3- and 5-year olds (Fisher's exact test, $p > .05$ for each age group) but significant for 7-year olds ($p = .050$).

Analysis of the Mixed Condition

As described in the Method section, banks in the mixed condition made either loud or muffled sounds. The bank used by the child was always different from the one used by the experimenter, and the "owner" of the loud bank was counterbalanced across participants. Because the payoff for at least one player was always salient, the mixed condition allowed an opportunity to observe children's sharing behavior when both public and private sharing were possible, but at the expense of greatly reducing statistical power (the *N* for each group was divided to account for half of the participants using muffled and half the participants using loud banks). Therefore, the following analyses collapse age and do not examine 3-, 5-, and 7-year olds as separate cohorts. Regarding reputation, although researchers did not discount that some children potentially realized the experimenter could deduce the outcome for the second player by listening to the banks, it was assumed that children would use their personal banks as a cue to decide whether they were being socially evaluated. It was expected that children using loud banks would behave equitably, as though the outcome of their sharing was public, and that children with muffled banks would be more likely to self-maximize gains, proceeding as though their sharing remained private.

With this in mind, paired *t*-tests compared children's sharing behavior in the mixed condition to that of the public and private conditions. The sharing behavior of children using loud banks did not differ significantly from their behavior in public or private conditions ($t(17)$ =.96 and 1.53, respectively; both p > .05). In contrast, children with muffled banks were significantly more self-

favoring in this condition than they were during public sharing ($t(17) = 2.45$, $p = .015$), though there was little departure from their performance in the private condition, $t(17) = .511$, $p > .05$. We interpret these findings to mean that children with muffled banks behaved as though their sharing was principally anonymous, whereas children with loud banks behaved as though their actions were private.

DISCUSSION

We hypothesized that children's relatively equitable and self-favoring behavior would be jointly influenced by age and by sharing context. Consistent with predictions, the results of the current study offers several converging lines of evidence that concern for reputation may play a role in shaping the developmental tendency (noted here and elsewhere) for children to become more egalitarian and less self-serving in their socio-economic exchanges with others, presumably because of the information reputation transmits about social norm conformity. Children tended to be more equitable when distributing coins as a non-recipient (i.e., when dividing the payoff between identical dolls), as revealed by the analysis of variance and one-way t-tests. Children also tended to be more equitable in the public condition than in the private condition, although this effect depended on age: 7-year olds most consistently modulated their behavior in response to whether reputation was made public or kept private. Furthermore, this trend was observed in other dependent measures, including the distribution of the first coin in each round as well as the special coins. In our discussion of the results, we focus how two issues—concern for reputation and social norm

conformity—unfold in development, and how these phenomena contribute to our broader understanding of the child's moral reasoning.

Do Children Demonstrate Concern for How Reputation is Evaluated?

According to De Cremer and Bakker (2003), being held accountable for one's actions (as is arguably the case when one is the subject of public evaluation) motivates individuals to behave in ways that promote reciprocity and adherence to social norms like fairness. In this sense, a reputation transmits information not only about personal agency and group identity, but also about the behaviors for which we feel responsible and the norms toward which we perceive ourselves accountable (Bennett, Yuill, Banerjee, & Thompson, 1998). With this in mind, we had hypothesized that concern for reputation (and therefore social evaluation) would influence children to behave relatively equitably during public sharing, and that concealed outcomes in the private condition would lead to an increase in self-favoring behavior.

Consistent with findings from adult (Bohnet and Frey, 1999) and child (De Cremer & Bakker, 2003) populations, in the current study the relative anonymity of the sharing conditions influenced how children distributed coins with the experimenter. Analyses revealed that seven-year olds were the most consistent in their differential distribution of coins between public and private conditions. When the sharing outcome was public, these children shared as equitably with the experimenter as they did between the two dolls, but when the relative anonymity of the private condition minimized concern for reputation, older children opted to self-maximize their gains in the game. Comparatively, younger

children (3-years old) did not strategically adapt their sharing strategies in response to the sharing context. Children in this age cohort maintained relatively high levels of self-maximization in both public and private conditions, suggesting that the desire to capitalize personal gain outweighed potential concerns about social evaluation.

Data from children in the intermediate age group (5-years olds) provided intriguing evidence that equitable behavior and concern for reputation may likely relate to the child's emergent understanding of other minds and perspectives. Five-year olds who passed the false belief task performed identically to the seven-year olds, significantly discriminating between public and private conditions when sharing with the experimenter. Conversely, the behavior of five-year olds who failed false belief matched that of the three-year olds in that these children did not systematically alter their sharing across private and public conditions. These findings appear to be consistent with hypotheses by Gibbs (2003) as well as Hoffman (2001) that social perspective taking, which may be a close cousin to the measure of Theory of Mind used in this study, helps determine when children will be motivated to observe social norms, such as those for reciprocity and equity.

Collectively, these results suggests that concern for social evaluation may be one among many factors that influence children to behave more equitably. As De Cremer and Bakker (2003) and Gilbert and Jones (1986) note, a reputation only matters insofar as one believes that others are also accountable to (and care about) social norms. In our sample, cultivating a reputation as a fair player arguably appeared to be of greater concern to older children (and younger

children who passed false belief), presumably because they were more likely to hold others in mind when making decisions. We feel this interpretation is consistent with other studies (Harbaugh, Krause, & Liday Jr., 2003) in which children 7-years and older were thought to use working knowledge of their partner's preferences to guide their sharing behavior in ultimatum game bargaining.

However, the feeling of accountability to social norms is likely not the only variable under consideration. It is possible that our results reflect a general trend that with age, children are more capable of reflecting upon and manipulating several competing representations (Gibbs, 2003). Potentially, 7-year olds are simply better than their younger counterparts at keeping the sharing condition, differing value of the coins, and personal status in the game in simultaneous consideration. (They may also have been more mindful of the video camera than younger children, which could provide an alternative account for their equitable behavior.) We turn to the analysis of the mixed condition, as well as to the analysis of the first and special coins, to help disambiguate whether the developmental trend noted here reflects general cognitive abilities that mature with age, or whether they reflect deliberate and strategic choices on the part of the child to manage others' impressions.

Does Strategic Distribution of Coins Demonstrate Social Norm Conformity?

Analysis of the mixed condition, in which children potentially used their bank (which was either loud or muffled) as a cue for whether sharing was public or private, suggest that children draw strategically from context to determine the

appropriate level of self-interestedness for their sharing proposal. Children appear tentative to self-maximize when their behavior is immediately discernable (as when using the loud bank) as opposed to situations where the child's behavior is less directly apparent (as when children use the muffled bank).

Two other dependent measures provided additional, compelling evidence that children tailor their sharing to appear consistent with social norms for fairness. Older children (7-years old) were more strategic than their younger counterparts when considering to whom they should distribute the first coin for each sharing trial. These children took advantage of the transparency in the public condition and projected a reputation as "fair sharers" by giving the first coin to the experimenter in over fifty-percent of the exchanges in this condition. In the private condition, seven-year olds could contradict without penalty this claim of equitable behavior by giving themselves the first coin in the majority of the sharing trials.

Children were also strategic in their distribution of the special coins. Amongst the 3- and 5-year-olds, special coins comprised a smaller portion of the child's overall payoff in the public relative to the private condition. Tentatively, results from the oldest children in the study suggest an opposite trend: on average, 7-year olds gave themselves more special coins in the public than the private condition (although again, this trend only approached significance). Thus, while the oldest may have been equitable with regard to the *total number* of coins shared, they were often self-serving with regard to the *worth* of the coins. To cite a common example, consider that children were asked to split six coins (4 regular, 2 special) in even sharing trials. In the public condition, many 7-year

olds gave three coins to both themselves and the experimenter; however, two of the child's three coins were special, compared to the experimenter who received only three regular and no special coins. In comparison, 7-year olds were more likely to split the special coins evenly when sharing between the identical dolls (i.e., when they were non-recipients).

This differential use of the special coins is one of the reasons we feel confident asserting that children relied primarily on mentalistic rather than general perceptual strategies (such as a preference for symmetry) to guide their decision-making (Frydman & Bryant, 1988). We offer two interpretations of the results. First, and harkening back to the arguments presented by Gibbs (2003), it is possible that children assigned different priorities to the various representations they were asked to juggle over the duration of the game. Potentially, older children assigned a priority to remembering the worth of the coins over competing ideas, such as performing equitably. Thus, 7-year olds may have rewarded themselves with more special coins in the public condition because they assigned more cognitive priority to recalling the worth of the coins, rather than the context in which they were shared.

Alternatively, children in the oldest age group may have found the competitive aspect of the game one of its more salient features. Consequently, 7-year olds may have used the public condition as a means to broadcast their competency in the game. According to this interpretation, children actively used the special coins to convey a message about how they saw themselves in relation to the other players in the game; coins were used to engage in impression management. Children were able to create a reputation for being fair and

equitable by sharing generously with the Experimenter (even giving her the first coin), but may have also attempted to project an image of a being a savvy player by giving themselves the most valuable coins.

Development of an 'Ethical Stance'

In general, 3-, 5-, and 7-year olds all shared equitably when splitting coins between the two identical dolls. Why then the discrepancy between their relatively fair behavior here and their typically self-favoring behavior when sharing with the experimenter? We hypothesize that although children as young as three years may be cognizant of social norms (as evidenced by their equitable sharing with the dolls when acting as non-recipients), they do not yet feel accountable to these norms. It is not until sometime between five- and seven years-old that children that children are motivated to take an 'ethical stance' and overcome their propensity to self-maximize. Children create 'moral meanings' from combined perspective taking and the observation of how social norms are both rewarded and punished (Tappan, 2006). For older children, the desire to win the game by obtaining as many coins as possible may conflict with the desire to be viewed by others in a positive light, or with the feeling that one 'ought' to be more equitable. That seven-year olds are more generous to the experimenter in the private condition (at the height of their self-maximization) than either 3- and 5-year olds in the public condition suggests strongly that these older children act in orientation with principles of equity and reciprocity.

The relationship between false belief task performance and equitable sharing amongst five-year olds points to theory of mind as a potentially

important mediator of such principled socio-moral behavior. Several studies suggest that prosocial behavior (such as empathic responding) and higher-order moral reasoning (as on Kohlbergian interviews) both depend on the child's emerging ability to engage successfully in perspective taking (Eisenberg-berg & Neal, 1979; Garrod, Beal, & Shin, 1990; Lagattuta, 2005). With regard to reciprocity, Sally and Hill (2006) find that passing second-order false belief is particularly predictive of fair offers in ultimatum games. They note that autistic children, who are presumed to exhibit deficits in mentalizing ability, are less equitable in their proposals than normally-developing children of comparable age. Such links between game theoretical approaches and emergent theory of mind are deserving of further study and could provide further insight into how moral conviction translates into real-world action (Kohlberg, 1984).

Future Considerations and Conclusions

Future studies could also benefit from a re-examination of the literature on delayed gratification and future-oriented reasoning. Moore, Barresi, and Thompson (1998) report that children who choose immediate gratification over smaller, long-term gains are less likely to take a partner's desires into consideration during negotiation games. (Intriguingly, the authors also find significant correlations between success on theory of mind tasks and the ability to delay gratification in service of future needs.) Similarly, in a study investigating rule-breaking and deontic reasoning, Lagattuta (2005) finds that children do not fully coordinate understanding of emotions, mental states, and societal obligations until around seven years of age, at approximately the same age that

they begin to use future-oriented explanations to justify decisions. We did not code children's emotional expressivity in this study; however, anecdotal evidence condition suggests that this may have been a good predictor for how children ultimately distributed coins, particularly in the mixed condition, where children commonly reacted to the conspicuousness of sharing with self-conscious expressions and gestures. Also with regard to the current study, greater insight children's reasoning about future events could better explain how children model accountability and why children come to view societal norms as enduring, universal rules for behavior. Preferences for delayed-gratification or future-oriented outcomes might also aid in our understanding of retaliation and punishment strategies in scenarios where players are inequitable in their proposals with another (Boyd, Gintis, Bowles, & Richardson, 2003; Henrich et al., 2006).

In conclusion, the current study finds that care for reputation emerges between five and seven years of age, becoming particularly evident as children begin to show evidence of theories of mind. Consistent with previous studies, children's tendency to self-maximize gains decreased with age, with older children showed the greatest differential responses to public and private conditions. We conclude that reputation plays an important role in how the child assesses and conforms to social expectations for fair and cooperative exchanges.

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TABLE 1

Mean proportion of coins (of 13) distributed when the child is either recipient or non-recipient of the share, as a function of age and condition

	PRIVATE		PUBLIC	
	Recipient	**Non-Recipient**	**Recipient**	**Non-Recipient**
3 YEARS	.603(.243)	.609(.293)	.635(.329)	.567(.136)
5 YEARS	.652(.190)	.575(.193)	.629(.203)	.586(.201)
7 YEARS	.611(.138)	.584(.089)	.488(.288)	.564(.152)

Note: Values presented as mean (standard deviation). For each age group, N = 12.

FIGURE CAPTIONS

FIGURE 1. *Diagram of the experimental design.* Children shared even and odd sets of coins (some of which were more valuable than others) both with an experimenter and between two dolls. Sharing occurred in three different experimental conditions: private, public, and mixed. In total, children completed a total of 12 trials.

FIGURE 2. *Children's distribution of coins by age and condition.* Mean proportion of total (13) coins distributed to either the child or the right doll for public and private conditions as a function of age (3-, 5-, and 7-years old). Black bars represent trials in which the child was a recipient and shared with the experimenter. Grey bars represent trials in which the child was a non-recipient and split coins between identical dolls. Horizontal line serves as a relative reference, indicating what the point of absolute equity (i.e., point at which 50% of coins awarded to the other player) would be if the 13 coins could have been divided equally. Error bars represent +/- 1 standard error.

FIGURE 3. *Mean proportion of coins distributed to child as function of five-year olds' false belief performance.* The child's performance on the false belief task (pass or fail) was used as a post-hoc blocking factor to further analyze trends in five-year-olds' distribution of coins in public and private conditions. Values reflect only those trials in which child was a recipient of the share (i.e., trials in which child split coins with the experimenter.) Horizontal line serves as a relative

reference, indicating what the point of absolute equity (i.e., point at which 50% of coins awarded to the other player) would be if the 13 coins could have been divided equally. Error bars represent +/- 1 standard error.

FIGURE 4. *Number of children in the private (left) and public (right) conditions who distributed the first coin to themselves or to the experimenter by age group (3-, 5-, or 7-years-old).* Numbers represent only those trials for which the child was a recipient. Black bars depict the number children who gave the first coin to themselves; grey bars depict the number of children who gave the first coin to the experimenter. Horizontal line represents 50% of cases in each age group.
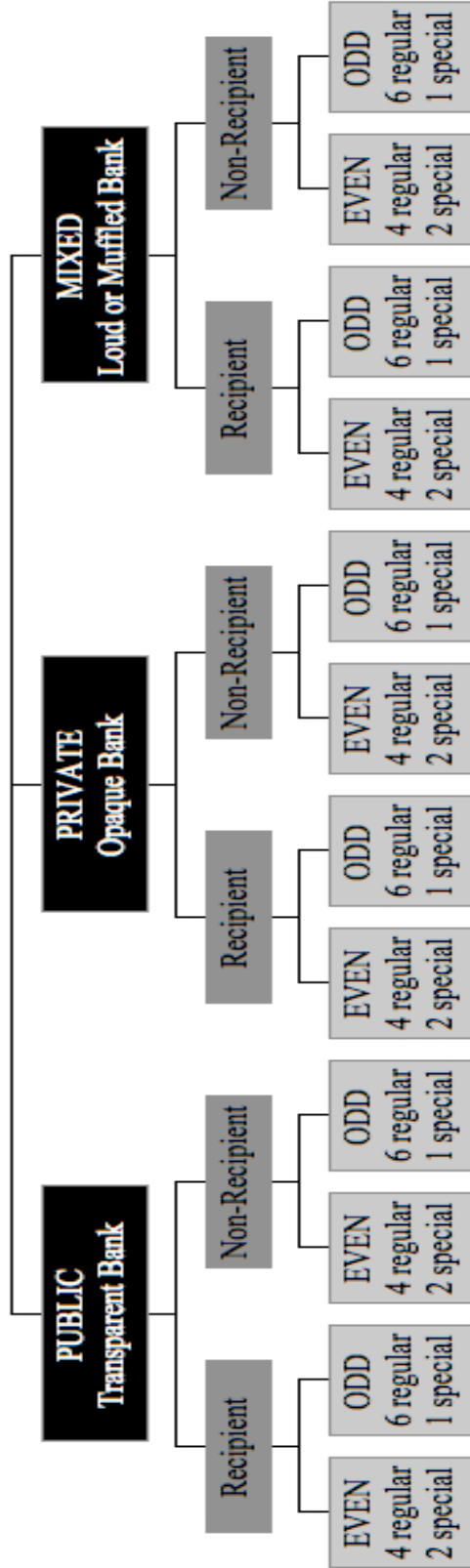
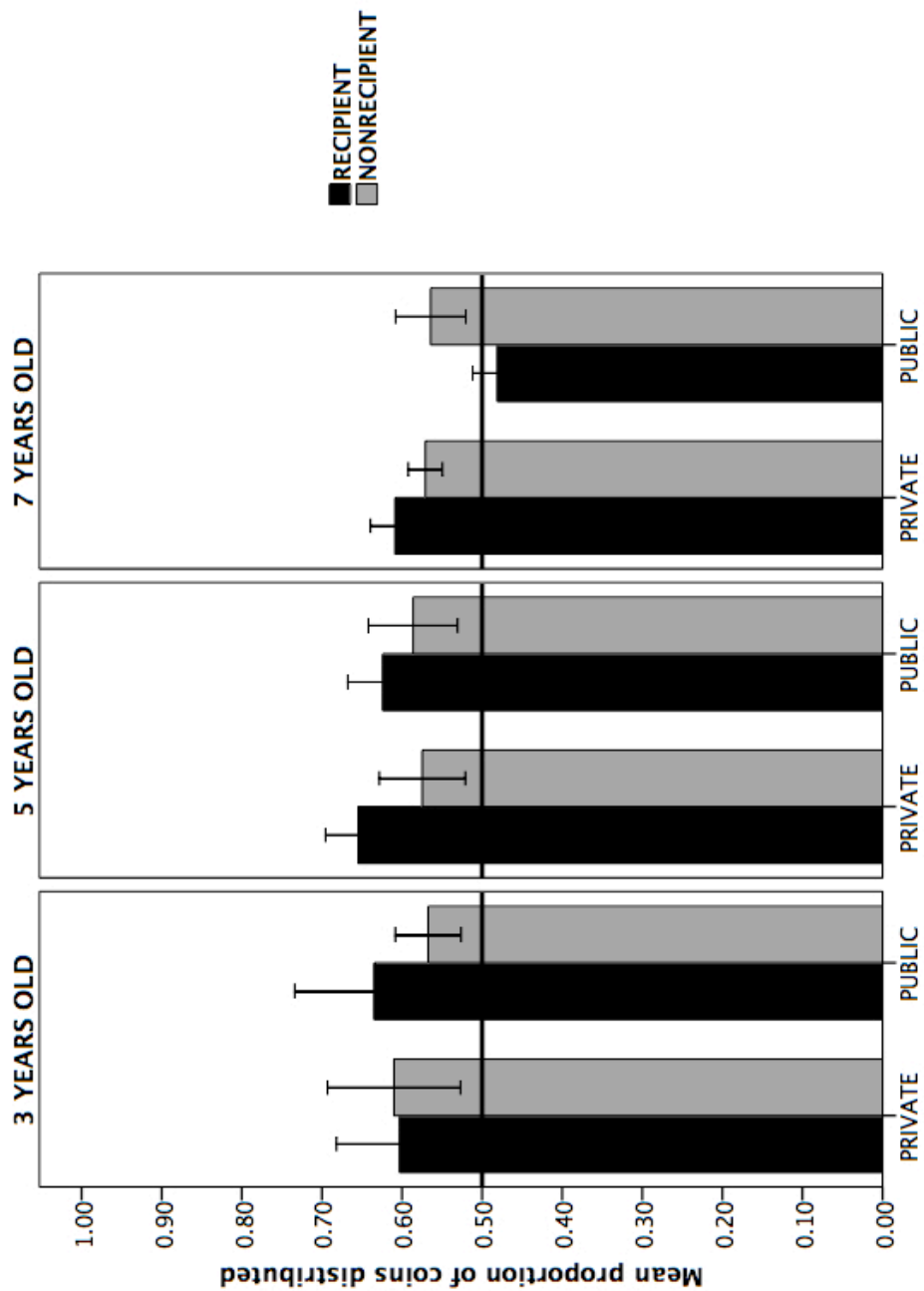FIGURE 1

EXPERIMENTAL DESIGN
(total 12 trials)

FIGURE 2

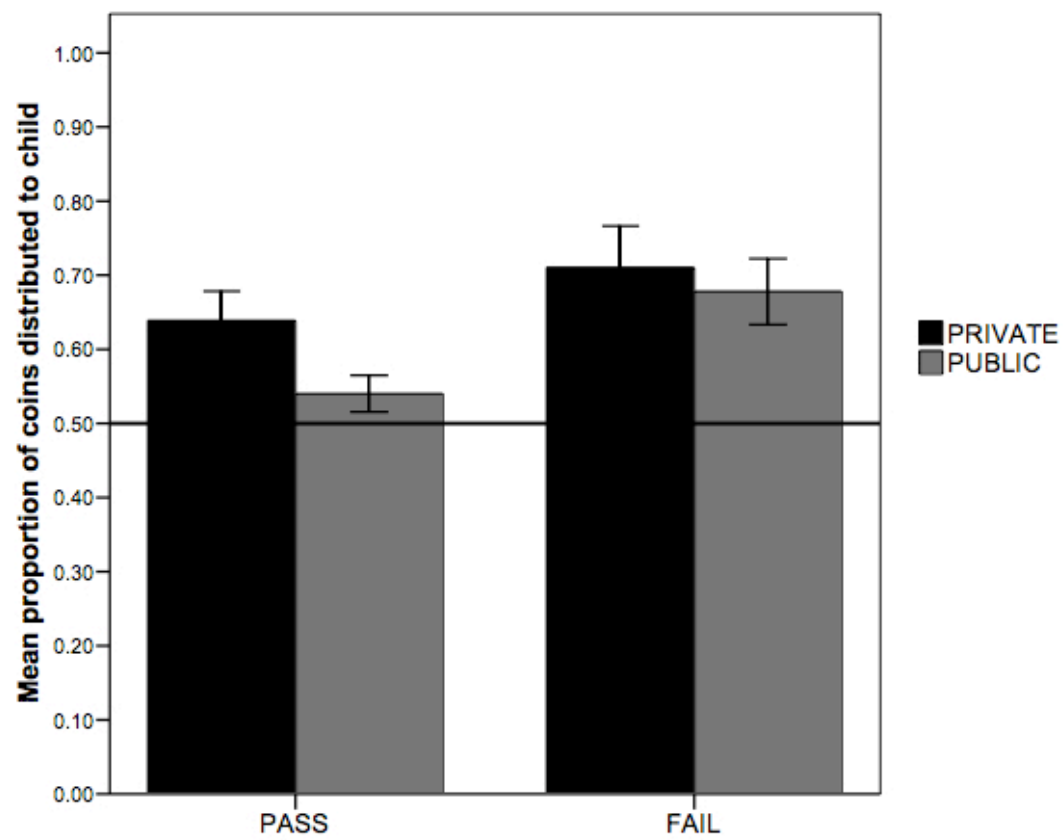FIGURE 3

FIGURE 4