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Evaluating Factors Related to Differences in Children's Distributive Justice

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Evaluating Factors Related to Differences in Children's Distributive Justice

By

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B.A., Rutgers University, 2010

Advisor: Philippe Rochat, Ph.D.

An abstract of
A thesis submitted to the Faculty of the
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Abstract

Evaluating Factors Related to Differences in Children's Distributive Justice

By Katherine Jayne

A growing body of research provides a detailed picture of children's developing concern for fairness, which seems to emerge reliably around 5 years of age. Two questions nonetheless remain largely unaddressed. First, children's tendencies toward fair distributions have been measured by two different game paradigms, the Dictator Game and the Prosocial Game. It is unclear that these games are comparable measures of children's preferences for fairness, or that the preferences they measure are stable over time. Second, it is not clear whether a child's behavior on such tasks might be related to child temperament or parental attitudes. The present study compares the relative stability of children's generous, fair, or self-maximizing behavioral patterns across these two different coin-distribution games, and at two different time points. Additionally, we investigated possible relationships between children's behavior, temperament, maternal Mind-Mindedness, and parental attitudes toward fairness and generosity. Our findings indicate that 7 year-olds, but not 5 year-olds, are fairly stable in their behavior in these games over time, with significant correlations between their distributions during session 1 and 2. In contrast, we found a correlation between parent's other-regarding motivations and their children's token distribution that was significant for children aged 5, but not 7, years. Our data did not support the hypothesis that two games measure equivalent constructs, as children's behavior in one had no significant relationship to their behavior in the other. Finally, contra hypotheses, we found no clear evidence that temperament or Mind-Mindedness correlated with children's fairness behavior in the Dictator or Prosocial Game.

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INTRODUCTION

Behavioral economic theories tend to posit that all humans should act based on self-interest alone. Within the context of this simple psychological premise, rationalism and utilitarianism should theoretically always prevail in economic decisions, including how to share resources with others. Accordingly, individuals should be primarily motivated by self-maximization. Results of studies conducted with economic games, however, demonstrate consistent levels of other-regard in players' behavior (Camerer & Thaler, 1995). Related research has revealed similar behavior in children, many demonstrating early signs of altruism toward other players (Benenson, Pascoe, & Radmore, 2007). These studies have inspired research on the developmental origins of fairness and inequity aversion (i.e., the avoidance of unequal, self- or other-advantageous distributions), which have been proposed as possible mechanisms of the other-regard observed by researchers in the field of behavioral economics (Fehr & Schmidt, 1999; Rabin, 1993) . Fairness and inequity aversion in children have been evaluated using two main experimental paradigms, the Dictator and Prosocial Games (see below), both of which utilize distributive justice games. Results of studies using either game have revealed a strong developmental trend toward the emergence of inequity aversion from around 5 years of age, but with considerable inter-individual differences in its expression (Fehr, Bernhard, & Rockenbach, 2008; Rochat et al., 2009) . The present study aims to examine factors that might account for inter-individual variations in the emergence of fairness and inequity aversion in child development, concentrating on the ages of 5 and 7. We focus our investigation on the role of factors specific to the child (temperament) and to the parent and parent-child relationship (parental attitudes toward fairness and generosity and maternal Mind-Mindedness). In addition, we aim to evaluate how consistent and stable children are in their more or less other-regarding behavior in the Dictator and Prosocial Games, as well as the extent to which an individual child behaves similarly over time in both games.

The Dictator Game

Economic games utilize real-world choice scenarios to tap into an individual's relative preference for self or other-regard. Originally designed to test predictions based on economic theory, their results have been a challenge for economists to interpret within the classical "utilitarian" economic framework. This framework is based on the assumption that rational human behavior should be guided only by the pursuit of personal advantage, and would predict that all players should maximize their own payoff at all times (Foster & Young, 2001). However, players' behavior in economic games shows considerable deviations from those predictions, with many players sacrificing potential gain to offer their partners non-zero allotments (Camerer & Thaler, 1995).

An example of an economic game that has produced results counter to predictions is the two-player Dictator Game. In this paradigm, one player (the 'Dictator') is given a quantity of resources ($10 in the standard paradigm) to anonymously distribute between themselves and their partner. Dictators are free to divide the resources however they choose, and economic models would predict that all Dictators should take the full sum themselves, leaving their partners nothing. However, results counter to economic predictions have been widely replicated, even across cultures (Cameron, 1999; Gowdy, Iorgulescu, & Onyeiwu, 2003; Hoffman, McCabe, & Smith, 1996). For example, Forsythe, Horowitz, Savin, & Sefton (1994) conducted a Dictator Game study in which they found that 70% of Dictators gave their partner a non-zero offer. Furthermore, though varying game parameters including perceived level of partner deservingness or player's level of anonymity has been shown to affect the amount offered, results of any single study still fail to conform to economic predictions (Eckel & Grossman, 1996; Koch & Normann, 2008). Behavioral variation usually includes a small number of players who offer nothing, another small group who offer more than half of the sum, and remaining players who fall

somewhere in-between (for a meta-analysis of standard Ultimatum and Dictator Game findings, see Oosterbeek, Sloof, & van de Kuilen, 2004) .

Researchers often interpret Dictators' monetary sacrifice as indicating altruism or other-regard. One mechanism proposed to account for this other-regard is a concern for fairness, typically conceptualized as a type of inequity aversion (for an example conceptualization, see Fehr & Schmidt, 1999). In these interpretations, a preference for fair outcomes motivates players to pursue more egalitarian distributions even at their own cost, offering their partners a greater percentage of the total sum in order to reduce disparity between the two allotments. A model based on this account was proposed by Fehr & Schmidt (1994), and was used to account for the behavior of players in a variety of economic games including the Dictator Game as well as the Ultimatum Game, cooperation games, market games, and gift exchange games.

The important role fairness might play in human decision-making has in turn inspired interest in its developmental origins. Though economic games were originally designed to be played by adults, researchers have successfully modified several paradigms for usage with children. For example, Gummerman et al. (2008) adapted the Dictator Game for use with children and adolescents aged 7 – 19, while Rochat et al. (2009) used the Dictator game and additional modified distributive justice tasks with children between 3 and 5 years old. These studies demonstrate that these and similar paradigms can be successfully utilized in research with even young children. Further, results indicate that children playing these games behave somewhat comparably to adults; players as young as 3-4 years old are also willing to show other-regard by giving a portion of their allotment to their partner (Rochat et al., 2009). Children, like adults, also show variation in their distributions, with children some self-maximizing, others giving away the majority of the share, and even more falling somewhere in the middle.

The Development of Fairness and the Prosocial Game

A growing body of research indicates that children's concern for fairness emerges reliably around 5 years of age across cultures. For example, using a modified Dictator game Rochat et al. (2009) demonstrated that self-hoarding of resources decreases significantly between 3 and 5 year-olds. In another study examining the role of moral emotion in preschoolers' Dictator Game allocations, Malti et al. (2009), also found that while the modal offer made by 3 & 4 year-olds was nothing, an equal split was the most common offer made by children at age 5.

Using another distributive justice paradigm, here termed the Prosocial Game, Fehr et al. (2008) also demonstrated a marked age increase in children's demonstration of inequity aversion. Inequity aversion drives participants to select distributive outcomes which provide relatively equal payoffs to both players, even when that equity comes at a personal cost. Fehr et al. (2008) proposed that inequity aversion develops between the ages of 3 and 8 years old, and motivates the other-regard demonstrated by children in these games. In this paradigm, children participate in three conditions. In each condition, two possible token distributions are pitted against one another, and children are allowed to select only one. One distribution in each condition is always equitable (a 1:1 split), while the other favors either the child or their partner. After children have selected a distribution in each condition, their choices are used to assign them to one of eight possible behavioral profiles indexing their relative level of inequity aversion. These profiles range from 'Strongly Egalitarian' to 'Stingy', and a complete list of all profiles and their composite distribution choices can be found in TABLE 1. Children who choose the equitable split in all three conditions are classified as 'Strongly Egalitarian', and are seen as demonstrating the highest level of inequity aversion. Using this paradigm, Fehr et al. (2008) were able to evaluate the development of inequity aversion from age 3 to 8, and found that the percentage of children who favored egalitarian distributions in at least two out of the three conditions increased greatly with age, from only 21% of 3-4 year-olds, to 33% of 5-6 year-olds and 60% of 7-8 year-olds.

Despite this developmental trend, variations among individual children's fair behaviors have also been observed even after inequity aversion emerges in ontogeny. In a study conducted by Harbaugh et al (2000), for instance, differences were found between younger and older children's distributions, with 2nd graders offering their partners significantly less on average than older and adolescent players. Benenson et al. (2007) also found differences in children's Dictator Game allocations based on socioeconomics-status (SES) level, with children aged 4, 6, & 9 years old from high SES levels donating on average significantly more than same-age children from low SES levels. Finally, Gummerum et al. (2008) found gender differences in Dictator Game allocations, with boys between the ages of 9-17 years old allocating significantly less than girls in the same age range.

These differences in allocations have also been found among cultures. Rochat et al. (2009) examined the behavior of children from seven different highly-contrasted cultural backgrounds, including children growing up in the US, China, Peru, Fiji, and several sites in Brazil. Results of this research confirmed previous findings that children's offers to partners generally increase with age, but also demonstrated significant differences among childrens' allocations based on culture. For example, children from Peru were significantly less likely than children from all other cultures except Fiji to keep a 'special' game token for themselves in one round of the Dictator Game. In addition, rates of self-hoarding were seen to decrease significantly for children from all cultures between ages 3 and 5, except for children from one of the three Brazilian sites. When the researchers collapsed this data across age groups, they also found that these Brazilian children were significantly more likely to self-hoard resources than children from Peru or China.

These findings indicate that children's distributions vary among individuals, and that these differences might be related to group factors such as age, gender, SES, or cultural

background. At present, however, little is known regarding factors specific to the individual that might be related to differences in their preferences for fair outcomes.

The Current Study

This study aims to address three questions regarding these interindividual differences in children's distributions. First, in addition to the Dictator Game, another token-distribution game, the Prosocial Game, has been used to measure children's preference for fair resource distributions; at present it is unclear that these games are comparable measures, equally capturing children's propensities toward inequity aversion and fair distributions. It is indeed unknown whether the behavioral inclinations they measure are specific to the games, or on the contrary, if they represent more general preferences across situations. Second, we want to know the extent to which the preferences measured by these games are stable over time, as children are typically tested only once. Third, it is not clear whether a child's behavior on such token-distribution games is related to individual factors such as a particular child's temperament or their parent's attitudes toward resource distribution. In the following section, we will review the additional individual measures we utilized in our study as well as our rationale and interest in selecting them.

Additional Measures

A main goal of this research was to evaluate possible factors related to inter-individual differences in children's fairness behavior. To achieve this goal we elected to measure three additional variables which we hypothesized would be related to the expression of those behaviors: temperament, parental attitudes, and maternal mind-mindedness.

Though there is a paucity of work examining factors related to similar inter-individual differences in adults' propensity to behave fairly or altruistically in economic games, several studies indicate that personality factors might contribute to these differences. Hilbig & Zettler

(2009), for example, evaluated the relationship between participants' behavior in both the Dictator & Ultimatum Game and their scores on the personality dimension of Honesty-Humility (H-H). Though the Ultimatum Game begins with the same design as the Dictator Game – two players, a single sum of money, and a Dictator assigned to splitting it – it includes an additional step in which the recipient of the Dictator's allotment is given the opportunity to either accept or reject an offer made by the other player. If accepted, both players keep their shares, but if rejected, both shares are lost and players leave empty-handed. Using this and the Dictator Game paradigm, the researchers found a significant negative correlation between H-H and participants' self-maximizing behavior in both the games, with participants who scored higher in H-H allocating fewer points or resources to themselves. Boone et al. (1999) also found that individual differences in participants' score on internal locus of control, self-monitoring and sensation seeking scales were associated with cooperative behavior in several variants of the Prisoner's Dilemma game in which the participant must choose to either defect or cooperate with an anonymous partner. Finally, a study by Gunnthorsdottir et al. (2002) examined the relationship between participants' score on a Machiavellianism scale and their behavior in an economic trust game. Machiavellianism, a proposed personality trait based on the principles put forth in Machiavelli's 'The Prince', is related to an individual's tendency toward cynicism, the manipulation of others, and the belief that the end justifies the means. In this particular research, results indicated that participants who scored higher in Machiavellianism reciprocated significantly less often than other participants. Taken together, findings from these studies suggest that the prominence of certain personality traits might be predictive of players' performance in economic games.

In order to evaluate whether similar traits influence the behavior of children, we collected data measuring children's temperament. Temperament can be used as an infant and child analog to personality, and is often conceptualized as the measure of a child's enduring and biologically-

based pattern of reactivity and self-regulation (Rothbart, Ahadi, Hershey, & Fisher, 2001). In this sense, temperament can be used to understand an individual child's particular pattern of interacting with the world, and should remain fairly stable over time and situation. In addition, temperamental differences among children have also been shown to relate to the development of conscience, an important factor in the development of moral and social norms. In a study conducted by Kochanska et al. (1997), the temperament dimension of Inhibitory Control showed a significant positive correlation with children's behavior on several conscience-related tasks for both toddlers and preschool-aged children. These results indicate that variations in children's temperament might also play a role in their behavior in distributive justice tasks, which evaluate the development of social norms related to fairness.

In addition to factors related to the individual child, we were also interested in the relationship between parental attitudes towards fairness and generosity and children's own behavior. Parents provide their children with a key context for early social interactions as well as a powerful role model, and we thus propose that parents' own behavior and attitude should play some role in shaping children's developing expression of fairness and inequity aversion. This proposition is supported by previous empirical research. For example, a study by Wilhelm et al. (2008) evaluated the relationship between parents' and their adult children's charitable donations based on their responses to a survey regarding giving behavior, and found positive correlations between the behavior of parents and their children. These correlations were especially strong for religious giving measures, and less pronounced for secular giving, but both findings support the existence of a relationship between parents' and children's behavior in resource-distribution.

There is also evidence from studies conducted with children that early social experience can shape the development of differences in individual children's prosocial or altruistic behavior. Warneken & Tomasello (2008) found that socialization practices such as rewarding altruistic behavior affected rates of helping by 20 month-olds, with rewards actually decreasing instances

of later help. In investigating the role of observation in the expression of prosocial behavior, Rossenham & White (1967) found that witnessing a 'prosocial' adult model donate gift certificates to charity caused 4th & 5th grade children to be significantly more altruistic as measured by their own gift certificate donation, even when the model was absent. These results indicate that the interaction between children and others in the environment can produce changes in the expression of their prosocial behavior, even when that interaction is limited to observation. Finally, though these studies did not focus on the specific influence of parental behavior and attitudes on children's behavior, findings from a study by Rheingold et al. (1976) indicate that even very early in life, children share more with parents than with unfamiliar adults when observed sharing multiple objects in a laboratory setting. This difference demonstrates that the parent-child relationship maintains a privileged status in the early socialization of helping, sharing, or other prosocial behaviors.

Finally, we were also interested in how variability in the early parent-child relationship might relate to children's fairness behavior. We measured this variability by evaluating maternal Mind-Mindedness. Mind-mindedness is used to index mothers' propensity to treat their children as mental agents, and has been shown to positively correlate with children's early mentalizing abilities (Meins & Fernyhough, 1999). The ability to mentalize, or effectively predict and act in accordance with the mental states and desires of another, has, in turn, been linked to behavior in economic games conducted both with adults and children. For example, Hoffman, McCabe & Smith (2010) conducted a study that included a prompt reminding adult players to consider what their partner expected when proposing their offer in the Ultimatum Game. This manipulation, however, resulted in an increase in Dictators' offers from $3.71 to $4.17 out of $10 (Hoffman, McCabe, & Smith, 2000). Studies with children have also indicated that mentalizing ability is linked to "positive" Ultimatum Game performance (as defined by a recipient's acceptance of the distribution). For example, a study conducted with children ages 6, 8, and 10 years old, as well as

a sample of children diagnosed with autism spectrum disorders, examined initial Ultimatum Game offers based on performance on a second-order false-belief test, which measures mentalizing ability. Their findings indicated that a higher proportion of fair offers was made by children who passed the test, regardless of age or diagnosis (Sally & Hill, 2006). These results suggest that a portion of children's fairness behavior in economic games is affected by their perspective-taking or mentalizing ability. Thus, children whose mothers score higher in mind-mindedness should have enhanced mentalizing ability, which could in turn play a role in the expression of their children's fairness behavior in economic games similar to those reviewed above.

Predictions for the Current Study

The present study assessed children's behavior on two different token-distribution games and at two time points in order to determine the extent to which a child engages in similar fairness behavior on both games, as well as the relative stability of that behavior over time. We hypothesized that 7 year-olds would demonstrate more consistent behavior over time than five year olds, with older children selecting a greater number of similar outcomes during both sessions of each game than younger children. We also hypothesized that older children would demonstrate more consistent behavior between games, with 7 year-olds selecting the same type of outcomes in both games (either fair, generous, or self-maximizing) more often than younger children.

We also aimed to evaluate possible relationships between individual variables related to the parent and child and children's fairness behavior in both games. We collected data regarding child temperament, parental mind-mindedness (parent's view of the child as a mental agent), and parental attitudes toward giving. We hypothesized that there would be a positive correlation between children's scores on the Effortful Control temperament scale and the level of other-regard in their distributions. We also hypothesized that parental Mind-Mindedness would

positively correlate with children's other-regard as well, with higher levels of Mind-Mindedness corresponding to greater levels of fairness and generosity by children as measured in both economic games. Finally, we hypothesized that greater levels of parental fairness behavior and attitudes would also correlate with greater levels of fairness by children.

METHOD

Participants

A total of 59 children participated in the study (25 females). Of the 64 children recruited, 5 were excluded on the basis that they were unable to complete the study procedure, yielding an attrition rate of 7.8%. Children were recruited from the Emory Child Studies Center database, and came from families in the greater Metro-Atlanta area with moderate to high socioeconomic status (median household income = $55, 953 USD). The majority of participants were white (n = 47), black (n = 6), or other (n = 6). Participants ranged from 52 to 98 months old in age (M = 77.23, SD = 12.73) and were grouped into two age categories of roughly equal size: five year-olds (14 females; M = 65.20, SD = 5.01) and seven year-olds (11 females; M = 88.86, SD = 3.87). Of the 59 children who participated in the first experimental session, 55 (23 females) returned to complete a second session. This appointment was conducted between 0.8 and 2.0 months after the first (M= 1.30, SD= 0.38). The majority of parents also participated in the study, with 48 completing a Mind-Mindedness Interview and 46 completing the parental survey. Because some of the participants tested were siblings, we collected Mind-Mindedness Interviews for a total of 56 children (28 5 year-olds & 28 7 year-olds), and parental surveys for a total of 50 children (21 5 year-olds & 29 7 year olds). All experimental procedures were conducted at the Emory University, excluding some parental surveys, as parents were given the option to complete the online survey during the child's first or second experimental session or at home.

Design

All children played two games during two successive, identical experimental sessions spread approximately 4 weeks apart. The order of games (Dictator and Prosocial) was counter-balanced across children, but was kept the same between session 1 and session 2. During Session 1 parents completed one paper copy of the Very Short Form of the Childhood Behavioral Questionnaire (CBQ) and a recorded Mind-Mindedness Interview with the experimenter. Parents completed an online parental fairness survey during either Session 1, Session 2, or in the time interval between both sessions depending on timing constraints.

Materials & Procedure

During each session, participants played two token-distribution games. As an incentive to accumulate as many tokens as possible, children were first shown the tokens they would be playing with as well as a make-shift 'toy store' set up in one area of the testing room. Tokens were small plastic poker chips either red or white in color and approximately 1.5" in diameter. Children were told that the tokens they earned during the games could be used to purchase prizes from the store (small toys and stickers). The same token types were used in both games: a 'plain' token (white) that could be exchanged for low-value stickers, and a 'special' token (red) that could be exchanged for higher-value toys. All toys and stickers had a similar monetary value of <$2 USD. Before they began playing the games, children were asked to differentiate between the two token types and match them to what they could be exchanged for in order to ascertain that they understood the token value system. Each game was played between the child and the experimenter, with players sitting across from one another at a small table. Each player was also given a paper lunch bag with an identifiable sticker to store their tokens in.

The first game included in the study was a modified Dictator Game. This game incorporated both third-person (control) and first-person (experimental) distribution conditions. The third-person condition was always presented first in order to establish a child's baseline

preference for equity when self-interest was not included as a factor. In this condition children were presented with sets of tokens to freely distribute between two small figures. Figures were identical, 2" plastic rubber ducks. They were placed on opposite sides of the table (left/right) and children were told that, like themselves, the figures wanted to earn tokens to purchase prizes from the store. Tokens were placed in a circular formation in the center of the table and children were told to 'split' them however they would like. To give a token to either figure children were simply instructed to place the token on the table in front of that figure. Children were also instructed that neither they nor the experimenter would be able to keep any of the tokens during this condition, and that only the ducks would keep them. In order to ensure children's understanding of the game rules, participants were asked before and after each round to identify where they should place tokens for each duck, as well as the color of the 'special' or 'plain' tokens. Children participated in two rounds of the game. Rounds differed based on the quantity and quality of tokens children were given to divide; the first set of tokens had eight 'plain' tokens while the second set had six 'plain' tokens and one 'special' token. Following each round, any tokens given to the ducks were cleared from the table and placed in a paper bag assigned to that duck for storage and the next round began.

After both rounds were completed, the total number of tokens the child gave to the figure on the same side of the table as was later assigned to the child (see below) was counted. This number was compared to the number of tokens that represented an equitable split (8 units for each duck) in order to assess the child's baseline preference for fairness in distributions. 'Special' tokens were assigned twice the value of a 'plain' token (plain = 1 unit, special = 2 units) for a total value of 16 units (14 coming from 'plain' tokens, 2 coming from 'special' tokens). Tokens were counted in this way for several reasons. First, this allowed us to preserve the higher value of 'special' tokens while also keeping them on the same scale as 'plain' tokens. Second, it allowed for the possibility of an equitable split even when an odd number of tokens was present; by giving

one duck 4 ‘plain’ tokens and another 2 ‘plain’ tokens and 1 ‘special’ token, children were still able to resolve the distribution of resources fairly for each duck.

After baseline measures were established in this control condition, children participated in an identical first-person experimental condition of the game. In this condition, children were again presented with a set of tokens to divide between themselves and the experimenter. Tokens were placed in a circular formation in the middle of the table, and children were told to ‘split’ the resources however he/she would like. Both child and experimenter were assigned to a side of the table (left/right, counter-balanced across participants) and the child was instructed to place the tokens they wanted to give to either player on their respective table side. Both before and after splitting, children were asked to identify the sides of the table assigned to them and the experimenter as well as the color of the ‘plain’ or ‘special’ token to ensure their understanding of the protocol. Children participated in two rounds of the game identical to the two rounds played in the control condition: the first round included eight ‘plain’ tokens, while the second round included six ‘plain’ tokens and one ‘special’ token. After each round was completed, the child and experimenter cleared the tokens from the table and placed any they had received in their bags and began the next round. The total number of tokens a participant gave himself/herself versus the experimenter across both rounds of the game was counted using the same units as above (plain = 1 unit, special = 2 units).

The final game children participated in also involved distributing resources between the child and experimenter and was adapted from a game developed by Fehr et al. (2008). Unlike the open-ended distribution of the Dictator Game, this game presented the child with two predetermined token distributions of which they could choose only one. Only ‘plain’ tokens were used in this game. Distributions were presented simultaneously, each on a different side of the table (left/right). Tokens for each distribution were placed on differently-colored bowls (red/blue), with one bowl color corresponding to each player. Thus, each game play included two

possible payoffs for each player. To ensure their understanding of the protocol, children were asked to identify the payoff players would receive in each distribution both before and after choosing.

The game consisted of three rounds, each of which presented the child with one equitable distribution in which both players received one token (1,1) and another distribution that favored either the child or experimenter. One round, the 'Prosocial Game', pitted an equitable distribution (1,1) against a distribution in which the child received one token and the experimenter received none (1,0). In this game the child received the same absolute payoff (1 token) regardless of their choice, but received *relatively* more if they selected the inequitable distribution. Another round, the 'Sharing Game', pitted the same equitable (1,1) distribution against one in which the child received two tokens and the experimenter received none (2,0). In this game the child had to choose between equity at a cost to their own payoff (1 vs. 2 tokens) and self-maximization at a cost to the experimenter's payoff (1 vs. 0 tokens). Finally, the last 'Envy Game' presents an equitable distribution (1,1) in conjunction with one which favored the experimenter (1,2). In this round, the child once again received the same absolute payoff regardless of their choice (1 token) but received *relatively* less if they select the inequitable distribution.

After each round of the game was concluded, players placed any tokens they received in their bags and the next round began. Once all three rounds were completed, the distribution the participant chose in each round was used to assign them to a behavioral profile indexing their relative preference for fair outcomes. Profiles ranged from 'Strongly Egalitarian', in which the child chose the equitable distribution in all three rounds, to 'Stingy', in which the child chose the distributions that favored them in both the Sharing and Prosocial Games and the equitable distribution in the Envy Game. A complete list of all possible choice combinations and their corresponding behavioral profiles can be found in Table 1. The order of the three rounds, the side

of the table each distribution was presented on, and the bowl color assigned to the child were all counterbalanced across children.

Child Temperament

During Session 1 parents completed the Very Short Form of the Childhood Behavioral Questionnaire (CBQ) to assess child temperament. Developed by Rothbart, et al. (2001), this questionnaire included 36 statements regarding their children's reaction to a variety of situations and assessed temperament along three dimensions: Extroversion, Negative Affectivity, and Effortful Control. Parents rated each statement based on how accurately it described their child on a scale from 0-7. 12 questions addressed each temperament dimension, and ratings on these questions were averaged to calculate a score for each dimension. Thus, each child received a numerical temperament score for Extroversion, Negative Affectivity, and Effortful Control.

Mind-Mindedness

During the first experimental session parents completed a Mind-Mindedness Interview as developed by Meins, et al. Conducted by the experimenter, the interview consisted of the open-ended question: "Can you describe [child's name] for me?" Parents were instructed to speak freely and openly, and were told that the response had no minimum or maximum length. When asked for further guidance or direction regarding their response, parents were instructed to simply report whatever came to mind. Reponses were recorded and transcribed. Transcriptions were later analyzed based on the proportion of mental attributes (references to the child's mental life, such as their interests, intelligence, emotions, etc.) to all other attributes (such as behavioral or physical attributes) parents used to describe their child. This proportion is used to represent the degree to which a parent views their child as a mental agent.

Parental Survey

Parents were also asked to complete a survey regarding their own fairness-related behavior and beliefs. This survey was developed specifically for this study and included several different types of questions. First, parents were asked to report how much they left as a tip the last time they ate a meal at a restaurant. We believe tipping represented a basic measure of parent's proclivity to act in accordance with a social norm of fairness, namely the norm of leaving between 15-20% of the total check as a tip for a server. We chose to investigate parents' tipping behavior in particular as the context of tipping actually shares certain commonalities with the situation players encounter in the Dictator Game. Both incorporate some level of anonymity (in as far as a server usually only discovers the amount a patron has left after the patron has departed) and both present the player/tipper with an open-ended opportunity to distribute resources. Like players in the Dictator Game, tippers are not typically required to tip any particular amount, but still often leave a non-zero amount based purely on the observance of a social norm, similar to the norm of fairness cited to be at work in the Dictator Game.

Next parents were asked to think of the last several times they had engaged in behaviors such as making financial donations to charitable organizations, volunteering, giving to pan-handlers, donating goods and services to charitable organizations, etc. With this in mind, they were asked to rate a series of possible motivations (*I want to make another feel better with my gift, I will be able to deduct this from my taxes*, etc.) on a four-level scale ranging from 'Not At All Motivating' to 'Very Motivating'. Each level was assigned a point value from 0-3, and motivations were divided into two mutually exclusive and exhaustive groups: self-interested motives and principled/other-regarding motives. In order to calculate the degree to which a parent was motivated by principles/other-regard versus self-regard, we first assigned a point value to each possible motivation based on their response. Thus, possible motivations rated as 'Not At All Motivating' were given a score of 0, those rated as 'Slightly Motivating' were given a score of 1, those rated as 'Somewhat Motivating' were scored as 2, and those rated as 'Very Motivating'

were scored as 3. We then totaled the scores for all self-interested motivations into one number (S-I) and all the principled/other-regarding motivations into another number (O-R). In order to find the relative weight a parent placed on principled/other-regarding motives in their giving, we calculated the percentage of their total motivation score (S-I + O-R) that was made up of principled/other-regarding motives. Thus, higher scores represent a greater relative amount of motivation based on principles/other-regard.

Finally, parents were also asked to respond to a classic economic game known as the Prisoner's Dilemma. Presented as a hypothetical situation, the game forces players to choose between cooperation and defection, and has been used in myriad studies. It has played an especially important role in research investigating the evolution of cooperative strategies within populations (Axelrod, 1980). Furthermore, the binary choice offered players can be used to assess their relative tendency towards self-interest or other-regard, as defection has the potential to result in a better outcome for the player at the partner's cost, while cooperation produces a relatively positive outcome for both player and their partner.

In this hypothetical situation, parents are told that they and a partner have been caught in an act of theft and are being held by the police for questioning. The police offer them a deal by which they can receive a shorter sentence if they testify against their partner. However, if both they *and* their partner testify against one another, both will receive longer sentences, while if *neither* testifies (stays silent) they will only receive moderate sentences. Finally, if they remain silent and their partner testifies, they will receive a longer sentence while their partner is only given a short one. This payoff matrix has been summarized in Figure 2. Following the dilemma set-up, parents were asked whether they would testify against their partner (defection) or stay silent (cooperation). Transcriptions of all survey questions as given to parents can be found in Appendix A. Parents' responses were analyzed for each question type and were used to determine parents' proclivity for behaving in accordance with fairness social norms, the extent to which

they were motivated by principled/other-regarding motivations, and their likelihood of adopting a strategy of cooperation.

All experimental procedures were conducted at the Emory University Infant & Child Lab, excluding some parental surveys, as parents were given the option to complete the online survey during their child's testing session or at a later time at home.

RESULTS

Baseline Measures

To first confirm the assumption that fairness, here expressed through inequity aversion, is present in children at age 5, we examine the relative equity of children's distributions in the control condition of the Dictator Game[1]. In this condition, children were not recipients of the allotment, and thus had no self-interest in the outcome of the distribution. As predicted, children in both age groups proposed distributions very close to an even split, represented by distributing 8 token units out of the total 16 to each rubber duck. When we evaluated the number of tokens children distributed to duck on the side of the table that would later be theirs, we found that 5 year-olds distributed an average of slightly less than 8 tokens (M = 7.90, SD = 1.93), with 7 year-olds behaving similarly equitably in their distributions (M = 7.73, SD = 1.55). These results confirmed that fairness in distributions as expressed through inequity aversion is present in children at both age 5 and 7.

Age & Gender Differences in Fairness Behavior

[1] To maintain consistency with other studies utilizing the Dictator and Pro-social Games, which have used them as one-shot tasks, only data collected from the first session was used in the bulk of analyses. Though additional data was collected during a second session, that data was only used for comparing behavior across time. Thus, unless otherwise noted, all further references to children's distributions or behavioral profiles refers only to their behavior during the first session.

As prior studies demonstrate significant age and gender differences in children's behavior on distributive justice tasks, we also examined group differences on both the Dictator Game and Prosocial Games based on age and gender. As predicted, an Independent Sample T-Test performed on the number of token units children allocated to themselves with age category as the grouping variable yielded a significant effect of age, [$t(57) = 2.24$, $p = .029$], with children at age 5 distributing significantly more of the 16 total token units to themselves ($M = 10.34$, $SD = 2.33$) than children at age 7 (M = 8.97, SD = 2.39). An additional T-Test with Gender as the independent variable and number of self-allocated token units as the dependent variable revealed no significant difference between males and females when collapsed across age groups [$t(57) = -0.56$, $p = .58$].

Individual's Behavioral Stability over Time

In order to establish the consistency of children's preference for fairness over time, we compared children's behavior in both games during session one and two. We first compared the number of token units children allocated to themselves out of the total 16 during both sessions of the Dictator Game. As we hypothesized, our data show a significant correlation between 7 year-olds' but not 5 year-olds' distributive behavior between session one and two of the Dictator Game ($r = 0.669$, $p < 0.01$) (Figures 1 & 2). To compare children's consistency in the Prosocial Games, we assessed whether they were assigned to the same behavioral profile during both sessions. Chi-square analyses comparing the likelihood of 5 & 7 year olds to display the same behavioral profile at both session one and two indicate that 7year-olds are significantly more stable in their fairness behavior across both sessions ($\chi^2(1, 51) = 4.25$, $p < 0.05$) (Figure 3). These results indicate that 7 year-olds, but not 5 year-olds, maintain stable fairness behavior over time.

Individual's Behavioral Consistency Across Games

One of our main study aims was to evaluate similarities in individual children's behavior in both the Dictator & Prosocial Games. To address this question, we first condensed Prosocial Behavioral Profiles from the original eight profiles into three super-ordinate categories, termed the Abbreviated Prosocial Profiles: Egalitarian, Generous, and Other. The Abbreviated Egalitarian profile consisted of the Strongly & Weakly Egalitarians profiles; the Abbreviated Generous profile consisted of the Strongly & Weakly Generous profiles; and the Other profile consisted of the Ambiguous 1/2/3 & Stingy profiles. By collapsing profiles into these larger categories, we were able to increase the number of children classified in each Abbreviated Profile while still dividing children into clear groups based on differences in their distributive behavior. Next, we conducted a Univariate ANOVA with Abbreviated Prosocial Behavioral Profile as the independent variable and the child's self-token allocation as the dependent variable. Contra hypotheses, we found no significant relationship between a child's behavior in the two games [$F(2, 55) = 1.41$, $p = .253$] . In other words, Egalitarian ($M = 9.35$, $SD = 2.25$) , Generous ($M = 9.19$, $SD = 2.77$), and Other ($M = 10.42$, $SD = 2.36$) children did not significantly differ in the number of coins they allocated to themselves during the Dictator Game (Figure 4).

Temperament

In order to assess the extent to which temperament was related to children's behavior on the Dictator Game, we calculated correlations between all three temperament scales (Extroversion, Negative Affectivity, and Effortful Control) and the number of token units children allocated to themselves. Of particular interest were possible relationships between children's Effortful Control score and their distribution behavior. However, no significant correlations were found between any temperament scale and token allocation when collapsed across ages, or when ages were examined separately (p-value for all correlations >0.05).

We also conducted a Univariate ANOVA with temperament scores on all three subscales as the dependent variables and Abbreviated Prosocial Profile as the independent variable in order to evaluate any group differences in temperament based on children's classification in the Prosocial Game. We found no significant differences between temperament scores on any subscale based on children's Abbreviated Prosocial Profile; this held even when children were examined separately according to age and gender (*p*-value for all analyses > .05).

Maternal Mind-Mindedness

In addition to child variables, we were also interested in the extent to which the context of the relationship between parent and child might relate to children's behavior in the Dictator & Prosocial Games. To this end, we conducted two analyses comparing Mind-Mindedness to children's fairness behavior. Mind-Mindedness is here used to index the extent to which a mother regards her child as a mental agent, with higher scores corresponding to a greater number of mental attributes used by mothers in their descriptions of their children. To complete the analyses, we first examined the correlation between Mind-Mindedness scores and the number of tokens children allocated to themselves. We found no significant correlation (r = .164, p = n.s.). Next, we also conducted a Univariate ANOVA with Abbreviated Prosocial Profile as the independent variable and Mind-Mindedness score as the dependent variable. This revealed no significant group differences in Mind-Mindedness scores based on children' Abbreviated Prosocial Profiles.

Parental Measures – Tip, Giving Motivation, & Prisoner's Dilemma

To evaluate the extent to which parental behaviors and attitudes related to children's behavior, we began by examining possible correlations between parent-reported tip amount and the number of tokens children allocated to themselves. We found no significant correlations between the two measures (r =.148, p = n.s.).

Following that, we also calculated the correlation between the relative amount of parents' principled/other-regarding motivation and their children's Dictator Game self-token allotment. We found no significant correlations between these two measures when we collapsed across age groups, but did find a significant negative correlation between parental motivation and token allotment by 5 year-olds (r = -.592, p = .005). This indicates that as parents increased in their other-regarding and principled motivations, their 5 year-olds children's self-allotments decreased (Figure 5). This correlation was not found for 7 year-old children.

Finally, we conducted an Independent Samples T-Test examining group differences in children's self-token allocation based on whether their parents chose to cooperate (stay silent) or defect (testify) in the Prisoner's Game. We found no significant differences in children's behavior [t(40) = 1.50, p = .141] based on their parent's response.

DISCUSSION

The present research attempted to answer several main questions previously unaddressed. First, in order to address the question of stability and consistency in children's fairness behavior, we evaluated the extent to which individual children exhibited similar behavior in both the Dictator Game and the Prosocial Game, as well as over two temporally separated experimental sessions. Second, in order to investigate possible relationships between children's fairness behavior and additional individual factors, we examined the relationship between children's temperament scores, their parents' Mind-Mindedness scores, and their parents' reported attitudes and behavior regarding fairness and generosity. In the following discussion, we review the results of this investigation, pointing out possible explanations for insignificant findings and directions for future research.

Is children's behavior stable over time?

Our results indicated that 7 year-olds displayed fairly stable behavior in both the Dictator & Prosocial Games between session one and two. In contradistinction, 5 year-olds' token distribution in session one of the Dictator Game had no correlation to their distribution in session two, and chi-square analyses revealed that 7 year-olds were significantly more likely to be assigned to the same behavioral profile in both sessions of the Prosocial Games than 5 year-olds. While these findings were congruent with our hypothesis, they have several interesting implications for future research on children's developing fairness behavior and inequity aversion.

While our results revealed that fairness does indeed emerge around the age of five, with an average donation by 5 year-old participants of 5.66 tokens to their partner, it might be the case that this behavior is still fragile in children of this age and thus generally open to more variation over short periods of time. This opens up several directions for future investigation. First, if children at this age are only just beginning to prefer fairness in their distributions and are thus more flexible in their behavior, it would be interesting to explore possible factors which might affect the short-term expression of that preference. For instance, it is unclear if early fairness behavior might be more prone to change based on environmental factors, changes in the individual such as mood variations, or implicit cues, than more well-developed inequity aversion. Second, if children at age 7 are already fairly stable in their fairness behavior, further studies regarding the correlates of fairness behavior might be better served to examine children from this age on.

Is children's behavior consistent across situations?

Both the Dictator and Prosocial Games are intended to index children's relative preference for fairness in resource distribution. They both utilize the same resource, and theoretically pose the same question: should this resource be distributed equitably, or should it favor one player or another? Despite these similarities, however, our analyses revealed no

significant relation between a child's behavior in one game and the other. Children who selected egalitarian distributions in one game did not necessarily select an egalitarian distribution in the other. This result was counter to our hypothesis, and was especially surprising in the case of the 7 year-olds, who displayed somewhat stable behavior across time.

In order to better understand this finding, we first considered the possibility that the more complex design of the Prosocial Game was more difficult for children to understand. Whereas the Dictator Game is built around a fairly simple and intuitive design in which children simply relocate tokens in order to distribute them, the Prosocial Game involves a more complicated procedure. In order to play the game properly, after all, children must engage in a kind of mental super-position, considering two options and weighing the cost and benefit of each one against the other. The greater cognitive demand might have caused confusion in their choices, causing their behavior to vary based on random factors. However, before beginning and after completing each condition of the game, children were asked several control questions to verify that they had fully grasped the game set-up as well as the consequences of their choice. Children who were unable to correctly answer these questions after being asked three times were excluded from the analyses. Thus, it is safe to assume that the data included was collected from children who understood the game procedure, and that differences between game results could not be due to different understanding of the games themselves.

Instead, I believe that several important factors regarding the design of Prosocial Game itself, and not a lack of understanding on participants' part, contributed to the dissimilarity of players' behavior between games. These factors include the Prosocial Game's forced-choice design and the uniqueness of the 'Prosocial Game' and 'Envy Game' conditions.

The Dictator Game offers children a large problem space in which to answer the question: how will I distribute these resources? Over the course of the two rounds we included, children were given an opportunity to distribute 16 total token units (for a list of all possible unit

distributions, see TABLE 3). In addition, though we did not elect to include the qualitatively different nature of the 'Special' token in our analyses, the presence of this token gave children an even larger number of possible ways to resolve the problem depending on their personal degree of inequity aversion and fairness preference. In contrast, the Prosocial Game presents children with only two possible distributions in each round. One distribution is predictably always equitable, but the other varies in the extent to which it favors one or another player, and the magnitude by which that player is favored. The authors theorize that this forced-choice scenario places a heavy constraint on the number of possible resolutions children are offered, thus preventing children from expressing their natural propensity toward fairness, generosity, or selfishness. The forced-choice scenario of the Prosocial Game does not match the open-ended distribution situation present in the Dictator Game, and the authors believe that different children resolve this dissimilarity in different ways, resulting in a lack of consistency in their behavior.

In addition to the crucial differences in general game design, it should be noted that two of the three conditions in the Prosocial Games have no equivalent in the Dictator Game. In the aptly named 'Prosocial Game' condition, children choose between two distributions: one equitable, in which both players receive 1 token, and one inequitable, in which the child receives 1 token and the experimenter receives none. In this condition, children receive the same payoff regardless of their choice – no matter which distribution they select, they are guaranteed to receive 1 token. The real choice they have to make then is how many tokens they want the experimenter to have, either 1 or none. A similar set-up is inherent in the design of the 'Envy Game' condition, in which the inequitable choice offers the child 1 token and the experimenter 2. Here, children are once again forced to choose not based on the number of tokens they want to receive, but how many they would like to give their partner.

When children distribute tokens in the Dictator Game, their distribution takes on the nature of a zero-sum game. There is a finite and unchanging number of tokens to distribute, and a

token given to one player is necessarily a token that the other player will not receive. In these two rounds of the Prosocial Game, however, the number of possible tokens to distribute changes based on which distribution is chosen. In the 'Prosocial Game' for example, a token is lost from the total allotment if the child selects the inequitable option. This would be equivalent to a child taking a coin from a Dictator Game and putting it back into the pot instead of distributing it.

Further, these rounds of the Prosocial Games ask children to distribute tokens not based on absolute number, but instead based on relative payoff: if a child receives the same number of coins no matter what, the only difference in outcomes then is how their payoff compares to that of their partner. Though relative payoff is a factor children are also free to address in the Dictator Game, as at any point they can compare the number of tokens they give themselves to the number they give their partner, this relative payoff cannot be separated from absolute payoff. A child who proposes an even split can only propose an 8:8 split, and a child who wants to keep three times as many tokens as their partner can only do so by keeping 12 tokens and giving away 4. In contrast, the Prosocial Game separates relative and absolute payoff, thus changing the question from, 'How many tokens would you like to keep?' to, 'How many tokens would you like to keep relative to your partner?'

These elements, both the mutable number of tokens to distribute and the shift in emphasis from absolute to relative payoff, make the central questions of two rounds of the Prosocial Game essentially different from the question posed to children in the Dictator Game. This difference might, in addition to the forced-choice constraints of the game, partly account for the apparent dissimilarity in children's behavior between games.

Are individual or parental factors related to children's fairness behavior?

Another main goal of the study was to examine possible relationships between the interindividual differences in children's behavior and both individual and parental factors. We

collected data regarding child temperament, maternal mind-mindedness, and parental attitudes and behavior regarding fairness and generosity. Counter to our predictions, we found only one relationship between these variables, with higher scores for parents' principled/other-regarding motivations negatively correlating with their children's level of self-allocation in the Dictator Game.

Child temperament is used to index a child's enduring pattern of reactivity and self-regulation, and should maintain relative stability across a variety of situations and contexts. We were especially interested in the possible relationship between Effortful Control and fairness, as effortful control had previously been shown to relate to children's development of conscience. However, it's possible that our insignificant results are more reflective of methodological or material shortcomings of the present design, as opposed to an actual lack of correlation between children's temperament and fairness behavior. For instance, it's possible that the materials we used to assess temperament we simply not fine-grain enough to detect existing and appropriate interindividual differences. We selected to use the Very Short Form of the CBQ, which calculates scores for three main temperament subscales based on parents' answers to 12 questions for each subscale. This means that each subscale score is based on a small number of responses, and that only three scores could be collected for each child. Future research should incorporate a more extensive measure of temperament, such as the long form of the CBQ, as well as additional subscales more appropriate to the phenomenon being studied, such as the Empathy and Shame/Guilt subscales. Including these measures would allow for researchers to make more delicate distinctions between the temperaments of individual children in order to better understand how those distinctions might relate to children's' behavior in distributive justice tasks.

The results regarding Mind-Mindedness might also be due to similar factors. Intended to index the extent to which a parent views their child as a mental agent, Mind-Mindedness was first developed for use with parents of infants (Meins & Fernyhough, 1999). Though the measure

we utilized has been validated for older children, the authors remain unsure about how adequately it really captures important elements of the parent-child relationship for this older age group (Meins et al., 2003). Our main assumption in measuring Mind-Mindedness was that mothers with higher scores, in being more likely to view their children as mental agents, would further be more likely to talk to their children about the mental states of others. This assumption was partially supported by evidence that Mind-Mindedness can be used to predict children's later Theory of Mind performance, with higher Mind-Mindedness scores related to better theory of mind skills (Meins, et al., 2003). We further hypothesized that the higher proportion of mental attributes these mothers used to describe their children would correspond to the number of mental attributes and mental state terms mothers used in conversation in general, attuning their children to the needs, desires, and mental states of others. This attunement would in turn result in a greater propensity for those children to demonstrate other-regard in their behavior. However, future research might benefit from finding a more precise measure of the mental state words mothers use in actual conversation with their children.

Finally, findings regarding the relationship of parental attitudes and behaviors to children's behavior offer a more complicated picture. On the one hand, we found no relationship between more straightforward behavioral (tipping) or attitudinal (Prisoner's Dilemma) measures and children's behavior. There are two possible reasons for this. First, as with any self-report measure, there is a possibility that some parents were not entirely truthful when they disclosed their tip amount. Even if they were not outwardly dishonest, there is a chance they might have over-estimated the amount, or listed a greater amount than would be representative of their typical tip. Such an artificial inflation of *some* but not all the data could have caused introduced random noise into the data, contributing to our insignificant findings. Second, though we conceived of tipping as a convenient real-world analog to the Dictator Game that we had children play, it might be that the large number of uncontrolled and unaccounted variables inherent in such

a real-world situation made it a poor experimental measure. Further, it is not clear that all parents treat a tipping situation in the same way, while all participants in actual Dictator Game play are given an identical framing. This factor holds true for the Prisoner's Dilemma as well. While we had originally decided to include the question as a straightforward, dichotomized measure of parents' inclination to cooperate or compete with a partner, there is no way to guarantee that all parents saw the choice framed in those terms. It's possible, for instance, that some parents viewed the game as something to be 'won' as an individual rather than a unit, or that others read it as a logic puzzle to be solved. These additional possible readings could have caused some parents to respond based on aspects other than their inclination toward other-regard or cooperation.

For these reasons, it is reasonable to think that exploration of connections between parental and child behavior on similar distributive justice or economic decision-making tasks should not be dismissed. Instead, we thus propose that further work on this topic should utilize a battery of age-appropriate yet comparable experimental tasks for both groups. By controlling the precise framing, presentation, and interpretation of each task in a laboratory setting, as well as maintaining as close an equivalence between adult & child versions as possible, one would be able to ascertain the exact extent, if any, to which parent and child fairness behavior relate.

Our last finding, however, was significantly more promising. While the tipping and Prisoner's Dilemma questions were both based on concrete situations intended to address the possibility that parental behavior might provide a model for children to follow, the giving motivation questions inquired about much more intangible information. They only asked parents to disclose the relative strength of various possible motivating factors during recent acts of generosity, and were fairly non-specific. Despite the more abstract nature of the questions, however, we did find a significant relationship between parents' responses and children's behavior at age 5, showing that parents who reported greater relative principled/other-regarding motivation had 5 year-olds who allocated fewer coins to themselves during the Dictator Game.

Though this finding cannot indicate any causal relationship, it does suggest that socialization does play some role in shaping children's behavior, as generally hypothesized. Rather unexpectedly, this is the only evidence collected here. Based on such evidence, as timid as it might be, it would be interesting to investigate further possible reasons for the relationship between these variables. For example, are parents who are more motivated by these factors more likely to communicate with children about the needs of others, provide more instances of behavioral modeling, or engage in some other behavior?

The fact that this relationship was no longer present for participants at age 7 might be an indicator of the different social milieus of these age groups. By the time the majority of children are 7, they have experienced several years of schooling, have started to create more meaningful relationships with their peers and non-familial adults (such as teachers), and spend less day-to-day time in general with parents. This changing role of the parent for 7 year-olds might be reflected in this finding. This also indicates a fruitful direction for future research, framing questions regarding older children's fairness behavior in terms of the behavior of their peers or school culture rather than the culture of their parents/family and investigating links between children's behavior and the behavior of friends, siblings, or other important figures.

Summary and Conclusions

This research presents us with important findings as well as directions for future research. Overall, we found that children at age 5, though they do demonstrate significant levels of fairness and other-regard in their behavior, are fairly inconsistent in the expression of that behavior over time. This was in contrast to 7 year-olds, who demonstrated significantly greater levels of stability across both the Dictator and Prosocial Games at session 1 and session 2. Further, we found no signification connection between children's behavior in both games, leading us to explore possible design differences between the two games that might bias children's behavior in

one way or another. Finally, we found no significant relationships between child temperament, maternal Mind-Mindedness, parental tipping behavior, parental responses to the Prisoner's Dilemma, and children's behavior. The only relationship we did find was between parental giving motivations and 5 year-olds token allocation behavior. In all, our findings demonstrate no evidence of a relationship between temperamental factors and fairness behavior, and weak evidence of a relationship between parental factors and young children's variable propensity to be fair. However, the latter significant correlation between parental giving motivations and 5 year-olds' token allocation should be investigated further if we want to measure the role that parents, teachers, and peers play in the socialization of fairness behavior.

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TABLE 1

Prosocial Game behavioral profiles based on child's choice in each condition of the prosocial games.

'Prosocial Game' (1,0) v (1,1)	'Sharing Game' (2,0) v (1,1)	'Envy Game' (1,2) v (1,1)	Behavioral Profile
(1,1)	(1,1)	(1,1)	Strongly Egalitarian
(1,1)	(2,0)	(1,1)	Weakly Egalitarian
(1,1)	(1,1)	(1,2)	Strongly Generous
(1,1)	(2,0)	(1,2)	Weakly generous
(1,0)	(2,0)	(1,1)	Stingy
(1,0)	(2,0)	(1,2)	Ambiguous 3
(1,0)	(1,1)	(1,2)	Ambiguous 1
(1,0)	(1,1)	(1,1)	Ambiguous 2

TABLE 2

Prisoner's dilemma payoff matrix based on the combined choices of player and their partner; player's choices are listed in the columns and partner's choices are listed in the rows.

	You Testify	You Stay Silent
Partner Testifies	Your Sentence = 3 months Partner's Sentence = 3 months	Your Sentence = 0 months Partner's Sentence = 12 months
Partner Stays Silent	Your Sentence = 12 months Partner's Sentence = 0 months	Your Sentence = 1 month Partner's Sentence = 1 month

TABLE 3

Possible distributions of token units across two rounds of the Dictator Game. The first round included 8 'plain' tokens, while the second round included 6 'plain' and 1 'special' token. 'Plain' tokens were counted as 1 unit, while 'special' tokens were counted as 2. Thus there were 16 possible units to distribute across both rounds of the game, with all possible distributions between both players listed below.

Units to Child	Units to Experimenter
16	0
15	1
14	2
13	3
12	4
11	5
10	6
9	7
8	8
7	9
6	10
5	11
4	12
3	13
2	14
1	15
0	16

FIGURE CAPTIONS

FIGURE 1: *7 Year-Olds' Allocation in Dictator Game Session 1 & 2.* In each experimental session, children played two rounds of the Dictator Game, during which they were presented with a total of 16 token units to distribute between themselves and their partner. Here we see the relationship between the number of tokens 7 year-old participants allocated to themselves in session 1 and session 2.

FIGURE 2: *5 Year-Olds' Allocation in Dictator Game Session 1 & 2.* In each experimental session, children played two rounds of the Dictator Game, during which they were presented with a total of 16 token units to distribute between themselves and their partner. Here we see the relationship between the number of tokens 5 year-old participants allocated to themselves in session 1 and session 2.

FIGURE 3: *Level of Consistency in Prosocial Profile as a Function of Age.* Comparing children's Prosocial Profile at session 1 and session 2, children were either consistent or inconsistent in their classification. Here we see age differences in the percentage of children assigned to the same profile, with 7 year-olds being much more likely to maintain the same profile across both sessions than the 5 year-olds.

FIGURE 4: *Relationship Between Prosocial Profile and Token Allocation.*. We found no significant group differences in children's token allocation based on their Abbreviated Prosocial Profile. Here we see all three groups still have an average distribution either right around or slightly above an even split.

FIGURE 5: *Relationship of Other-Regard in Parent's Giving to Child's Token Allotment.* Parental scores for principled/other-regarding motivation are plotted along the X-axis, while their corresponding child's token allocation is plotted along the Y-axis. There is an inverse correlation between the two measures, indicating that as parents demonstrate greater principled/other-regarding giving, their children allocate fewer tokens to themselves.

FIGURE 1


7 Year-Olds' Allocation in Dictator Game Session 1 & 2
R2 Linear = 0.618
Tokens Allocated to Child (Session 2)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
.00
.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Tokens Allocated to Child (Session 1)

FIGURE 2

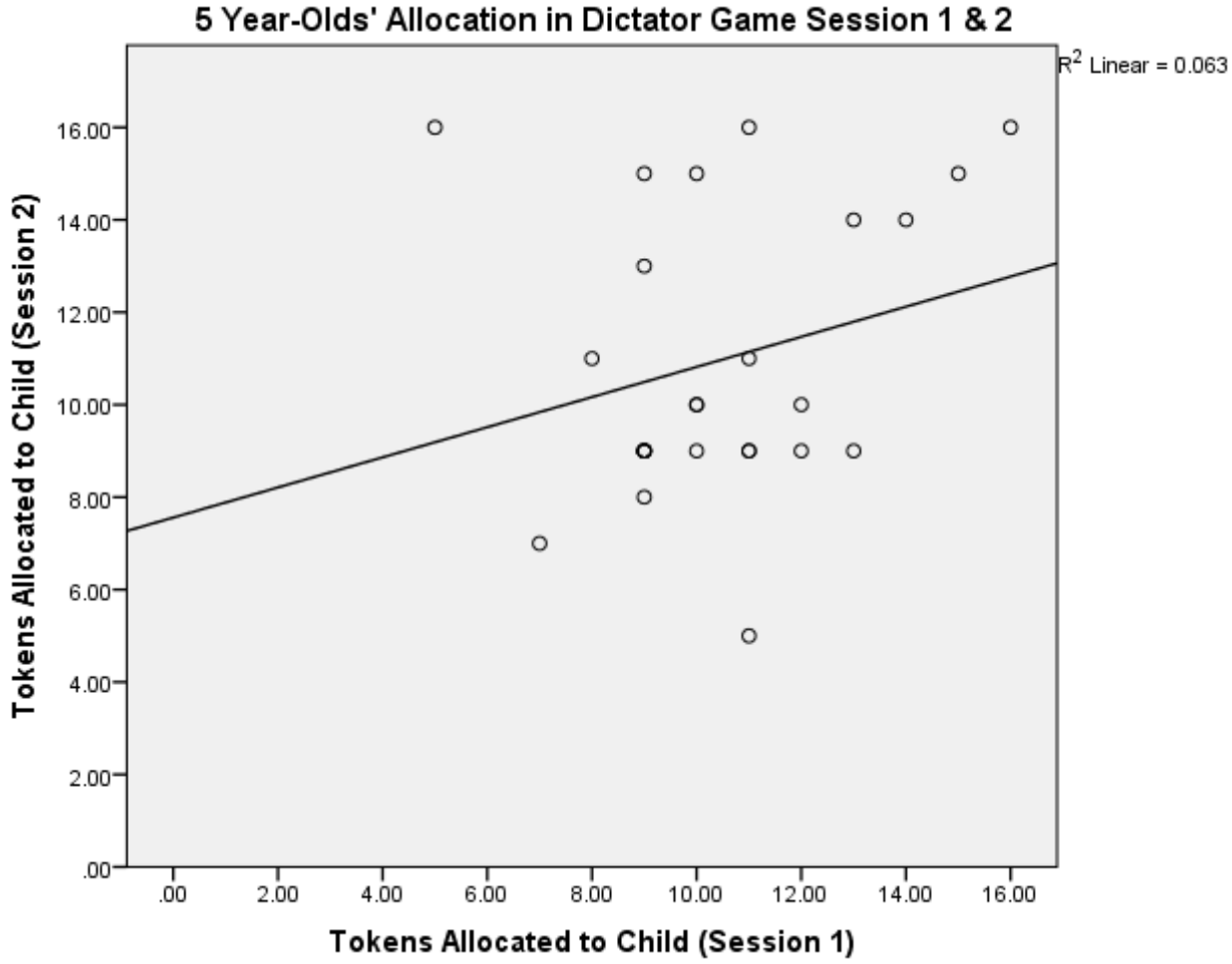

5 Year-Olds' Allocation in Dictator Game Session 1 & 2
R2 Linear = 0.063
Tokens Allocated to Child (Session 2)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
.00
.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Tokens Allocated to Child (Session 1)

FIGURE 3

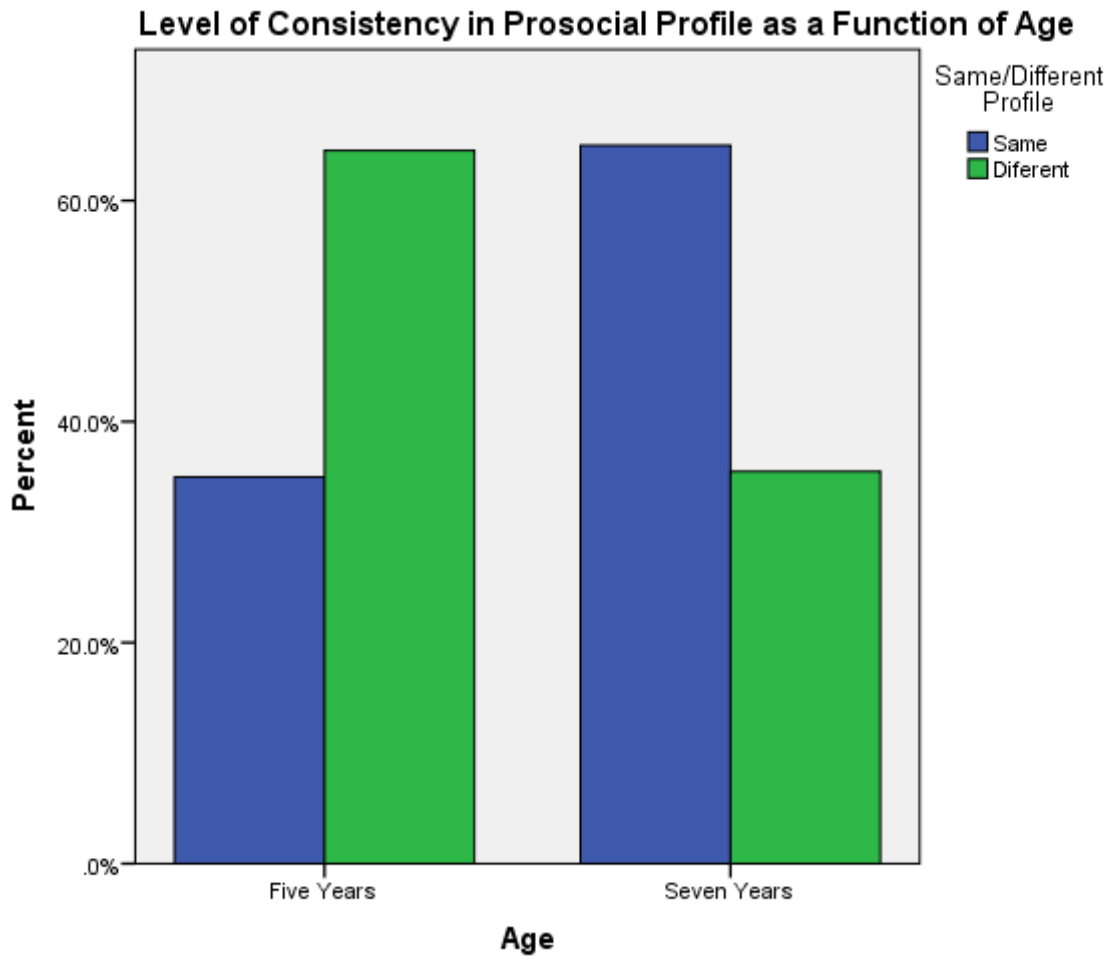

Level of Consistency in Prosocial Profile as a Function of Age
Same/Different Profile
Same
Diferent
60.0%
40.0%
20.0%
.0%
Percent
Five Years
Seven Years
Age

FIGURE 4

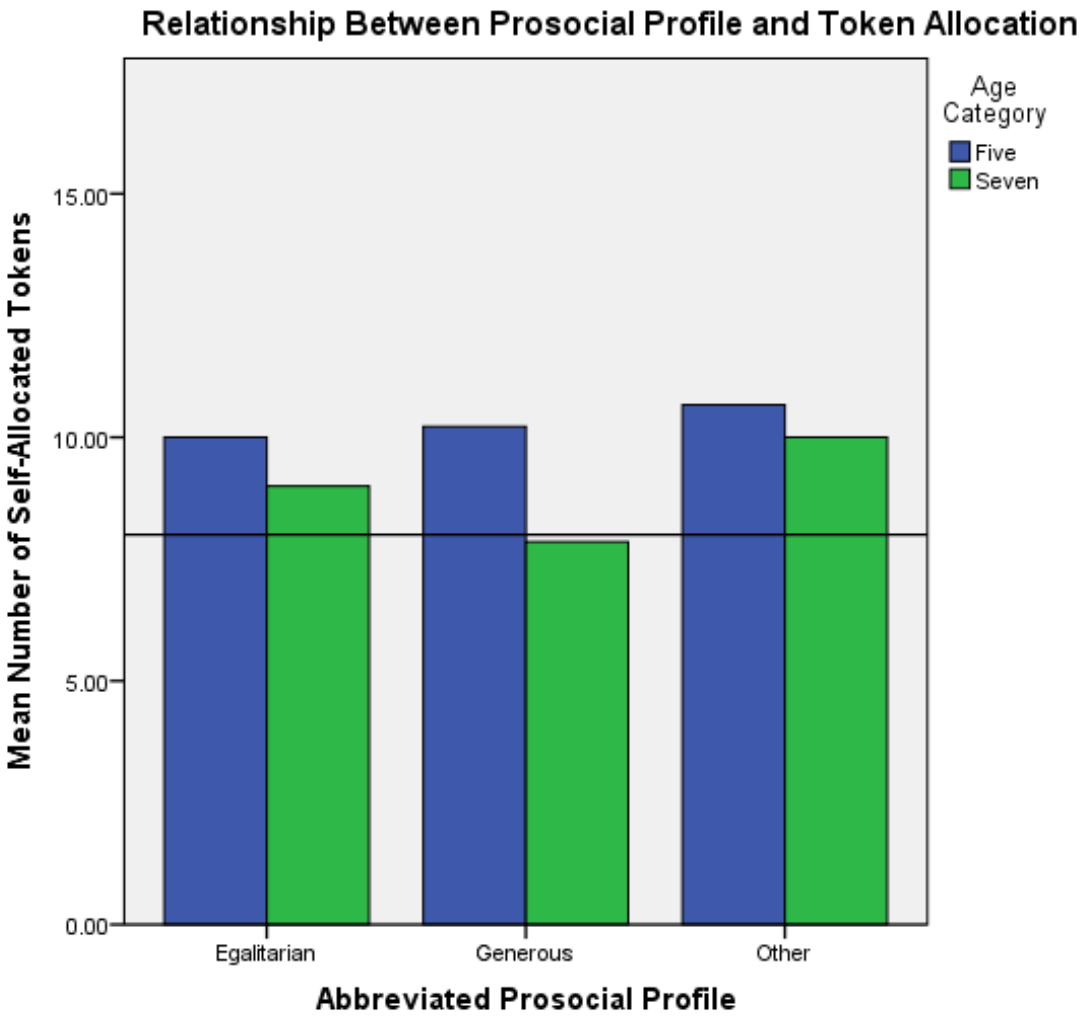
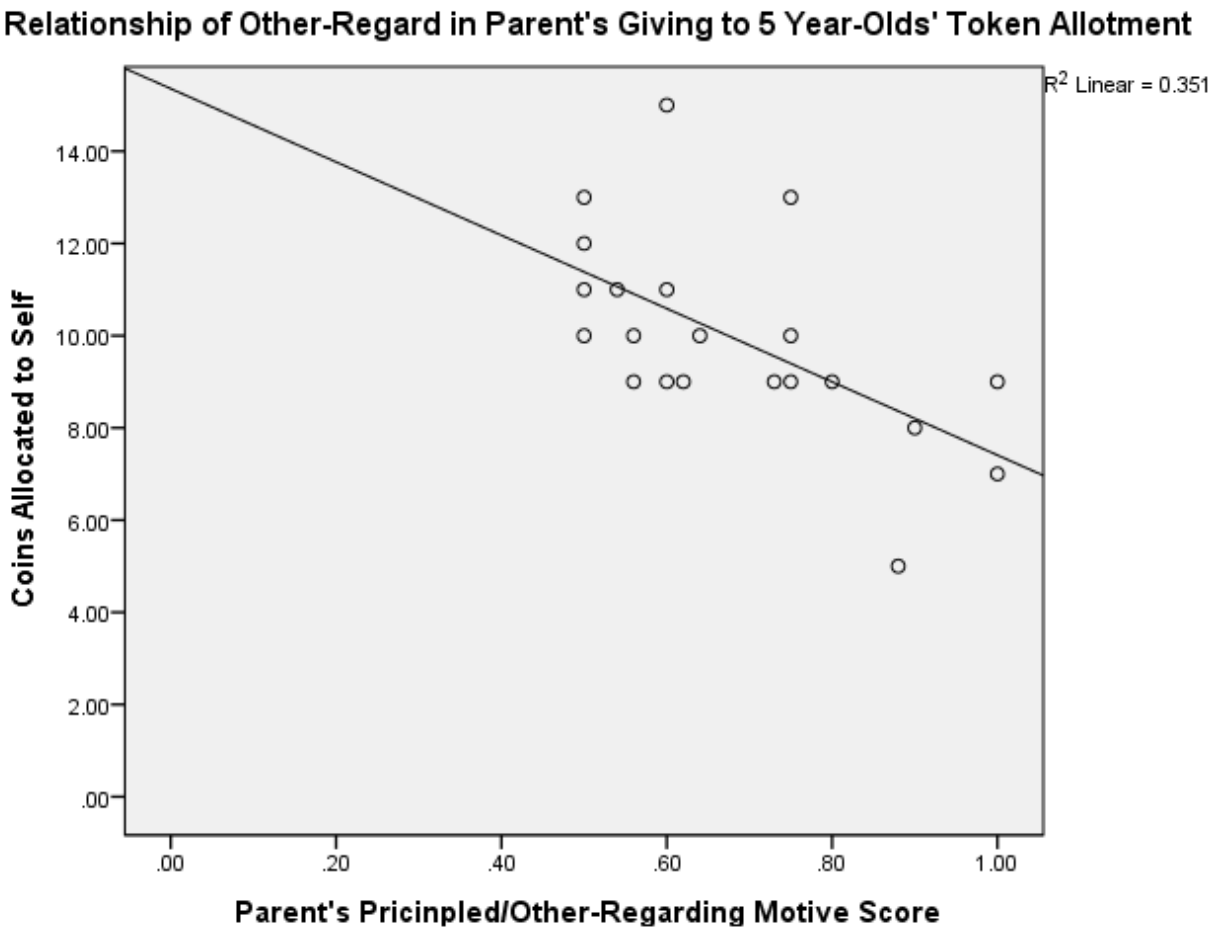

Relationship Between Prosocial Profile and Token Allocation
Age Category
Five
Seven
Mean Number of Self-Allocated Tokens
15.00
10.00
5.00
0.00
Egalitarian
Generous
Other
Abbreviated Prosocial Profile

FIGURE 5


Relationship of Other-Regard in Parent's Giving to 5 Year-Olds' Token Allotment
R2 Linear = 0.351
Coins Allocated to Self
14.00
12.00
10.00
8.00
6.00
4.00
2.00
.00
.00
.20
.40
.60
.80
1.00
Parent's Pricinpled/Other-Regarding Motive Score

Appendix A: Parental Survey Questions

Tipping Amount

Think of the last time you ate a meal at a restaurant. Please, to the best of your memory, list the price of the meal pre-tip, the tip amount, and the total. If you do not wish to disclose the price in dollars, feel free to include only the percentage of the bill the tip represented.

Giving Motivation

People are motivated to be generous for many different reasons. Below are statements regarding possible motivations for generous actions (financial donations to charitable organizations, volunteer activity, giving to pan-handlers, donating goods and services to charitable organizations, etc.). Thinking of the last several times you engaged in such behavior, please rate each item based on how strongly it motivated you, on a scale from "Not at all Motivating" to "Very Motivating." You may also select "Not Applicable" if a choice does not apply to your specific generous actions.

Others look favorably on generous people.
I will be able to deduct this from my taxes.
Someone prompted me.
Generosity is an important moral value to me.
I feel a sense of personal responsibility when it comes to the welfare of others.
I would like to produce a positive change in society with my gift.

Prisoner's Dilemma

Below is a hypothetical situation. After reading the summary, please answer all the questions regarding how you would respond.

Imagine you are a thief and both you and your partner are arrested. However, the police do not possess enough information to convict either one of you. Once the two of you are separated at the police station, you are both offered the same three-point deal, as described below:

1) If one of you testifies against your partner, and the other remains silent, the testifier goes free and the silent one receives the full 12-month sentence.

2) If both of you remain silent, you will both be sentenced to only 1 month in jail.

3) If you both testify against the other, you will each receive a 3-month sentence.

Each of you must choose to either testify or remain silent without knowing what the other will choose. Would you choose to testify or remain silent?