
When Getting Something Good is Bad: Even Three-year-olds React to Inequality

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Abstract

Fairness is central to morality. Previous research has shown that children begin to understand fairness between the ages of four and six, depending on the context and method used. Within distributive contexts, there is little clear evidence that children have a concept of fairness before the age of five. This research, however, has mostly examined children's explicit verbal responses to questions about unequal distributions—a method that often underestimates children's knowledge. In the current study, we instead examined emotional and behavioral signs that children notice and dislike inequality. We distributed an unequal number of rewards (stickers) among pairs of children (the ages of three to five years) and probed their responses to the inequality. Both implicit and explicit measures revealed that children as young as three years old notice and react negatively to an unfair distribution, particularly when they receive less than their partner. The few age trends that were found involved verbal (explicit) responses, providing evidence that although children do not explicitly talk about fairness until the age of five or six, this talk is an effort to explain emotional reactions that emerged earlier in development.

Keywords: fairness; reciprocity; equality; moral development

Introduction

Children love to receive toys, candy, or other rewards. But sometimes, a gift can trigger disappointment or even anger when other children have been given more gifts or better ones. Becoming upset upon receiving a gift shows a concern for *relative* rather than absolute outcomes, which is an essential component of a sense of fairness. Along with sympathy, fairness is one of the most important foundations of morality in older (e.g., Kohlberg, 1969; Piaget, 1932/1965) and newer (Haidt & Graham, 2007; Hauser, 2006) theories of moral psychology. Fiske (1991) argues that 'equality matching' is one of the four innate 'relational models' through which all social relationships are understood and enacted. Based on his informal observations, Fiske hypothesized that equality matching emerges and begins to influence behavior around the age of four. However, few studies have reported evidence of fairness before the age of five.

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In the current experiment, we set out to explore the emergence of fairness systematically. We asked: At what age do children become unhappy about receiving a gift when someone else has received a larger one? What are the precursors and first signs of this reaction?

Share Share, That's Fair

Some researchers have suggested that children's willingness to share is one of the earliest precursors of a sense of fairness, and that it is visible at an early age (Rheingold, Hay, & West, 1976). Children as young as eight months have been observed to share toys with parents, other infants, siblings, and even strangers by showing or giving them toys and engaging them in co-operative play (Hay, 1979; Hay & Murray, 1982; Rheingold et al., 1976). Infants have even been shown to share with others when resources are low. Hay, Caplan, Castle, and Stimson (1991) studied groups of three one- and two-year-old children in a group play session, and observed whether the children spontaneously shared toys. In one condition, the groups of infants were given an ample number of toys for the group. In a second condition, only a few toys were provided. Both the one- and two-year-old infants demonstrated sharing in both conditions, with very few age effects, indicating that infants have the capacity to share, even when resources are scarce. There is no reason to think, however, that this early sharing is motivated by some sort of proto-fairness (i.e., a recognition that the other children have a right or claim to the toys), rather than by a desire for affiliation, or by some other concern.

Research with older children suggests that sharing and possession become major areas of moral dispute between siblings (Dunn & Munn, 1987; Ross, Ross, Stein, & Trabasso, 2006). Parents are attentive to addressing issues of sharing and possession within the household (Ross, Filyer, Lollis, Perlman, & Martin, 1994). Dunn and Munn found that three-year-olds were very concerned over issues of property when fighting with their siblings. The notion that a child has some sort of 'right' or control over some objects, but not all objects, coupled with a tendency to get upset when others take or use those objects without permission, suggests an early sense of fairness. However, Dunn and Munn reported that the justifications given by three-year-olds in these disputes were based on the children's own desires, and only occasionally did they use fairness-related language (Dunn & Munn). Thus, the ability to talk about fairness may follow years after the first signs of concerns about fairness.

Unfair Treatment

In a related vein, there is research showing that by the age of four, children can judge situations to be wrong or unacceptable based on concerns with fairness or the well-being of others, and can use moral language to explain their judgments (Wainryb & Brehl, 2006; for reviews, see Helwig & Turiel, 2003; Smetana, 2006; Turiel, 2006). For example, Song, Smetana, and Kim (1987) found that Korean children from kindergarten onwards used fairness-related language to justify the wrongness of hypothetical situations. Similarly, in a study conducted in the United States, four- and five-year-olds were interviewed about whether it is right or wrong to exclude children from gender-stereotyped activities simply based on gender. All children evaluated exclusion based solely on gender as wrong, and they often provided moral reasons to support their

judgments, including reasons regarding fairness (Killen, Pisacane, Lee-Kim, & Ardila-Rey, 2001).

In a similar study, Konstantareas and Desbois (2001) presented four- to eight-year-old children with five vignettes describing disciplinary practices used by parents and asked them to judge the fairness of the parents in each vignette. The results were that children judged situations where parents treated siblings differently as more unfair than public humiliation or threat of physical punishment. These results demonstrate that children from four years old onwards are aware that arbitrary distinctions in interpersonal treatment are unfair.

Unfair Distributions

Based on the research reviewed so far, and consistent with Fiske's (1991) speculation, it seems that some precursors or early signs of fairness should be found in four-year-old children. However, research on children's emerging sense of distributive justice has shown little evidence of understanding before the age of five. For example, Damon (1975) gave a series of hypothetical dilemmas to four- to seven-year-old children. In these dilemmas, fictional children were described as making different contributions to a group project (such as making crafts to sell). For example, one child worked harder than another, or one did better work. The participants were asked to decide how rewards should be distributed among these fictitious children.

Damon (1975) reported a six-level progression in children's responses. Four-year-olds were exclusively at the two lowest levels (0-A and 0-B). They often confused fairness with their own wishes and desires, and they justified their choices in an arbitrary and *post hoc* fashion. Some understanding of fairness was found after the 5th birthday, when children began to focus on strict equality, insisting that each child receive the same reward, regardless of their individual contributions (Level 1-A). However, the central notion of fairness—the idea that people should in some sense get what they *deserve* (Level 1-B)—was not clearly present before the age of six. At this point, children advocated distributing rewards based on individual contributions to the project.

Studies in which children themselves made real distributions of rewards reveal the same pattern. Lane and Coon (1972) found that four-year-olds who were asked to distribute a reward—a set of 20 colorful stickers—between themselves and a fictitious partner generally made very selfish distributions, whereas most five-year-olds distributed the stickers more equally. Any ability to go beyond equality and consider more complex notions such as relative contribution or relative need did not appear until even later in development. Gerson and Damon (1978) report similar findings when asking groups of children to distribute candy among themselves. It is probably for this reason that most research on fairness has focused on children the age of six and above (e.g., Nisan, 1984).

A more recent study yielded similar results, suggesting that children under the age of six behave primarily based on selfish desires and not based on any knowledge or concern about fairness. In three different 'treatments', Fehr, Bernhard, and Rockenbach (2008) asked three- to eight-year-old Swiss children to allocate candy to themselves and an anonymous partner. In the 'prosocial' treatment, participants chose between giving themselves and their partner each one piece of candy (1, 1), or giving themselves one piece and the partner none (1, 0). In the 'envy' treatment, participants chose between giving each person one piece of candy (1, 1), or they could give

themselves one piece of candy and their partner two pieces (1, 2). Finally, in the 'sharing' treatment, participants chose between giving each person one (1, 1) or giving themselves two and the partner none (2, 0). In all three treatments, the majority of children under the age of five behaved selfishly and showed little concern for equality or fairness. But by the age of seven, egalitarian responses became the norm.

Only one study that we know of suggests that children under five years of age have a direct preference for fair distributions. Olson and Spelke (2008) asked children (the ages of 3.5–4) to direct a doll to distribute stickers, sea-shells, and other small objects among several other dolls who varied in their relationship to the target doll and in their prior generosity to the doll. When the number of objects to distribute was equal to the number of doll recipients, children showed a strong preference for giving one object to each doll. However, we cannot be certain whether these children were guided by a concern for fairness or by a simple perceptual preference for one-to-one matching of objects. When a one-to-one match was not possible, children preferred to give rewards to dolls described as siblings and friends, compared to dolls who were strangers.

Thus, fairness research to date has mostly relied on explicit measures, such as interviews, questionnaires, and other techniques that require verbal responses from children (Premack, 2007). However, verbal reports may underestimate what children actually know. Further, in much of the research described above, experimenters used interviews about hypothetical situations to probe children's concepts of fairness (Damon, 1980; Kohlberg, 1969).

Two Kinds of Inequality Aversion

Economists have found it useful to specify two simple fairness-related constructs that can be measured without recourse to verbal reports: *disadvantageous inequality aversion* is a negative reaction to divisions or distributions in which a person gets less than others, and *advantageous inequality aversion* is a negative reaction to divisions or distributions in which a person gets more than others (Fehr & Schmidt, 1999; Loewenstein, Thompson, & Bazerman, 1989). Using this approach makes it possible to study fairness in non-human primates, where there is some ambiguous evidence suggesting the existence of disadvantageous inequality aversion, but no evidence at all of advantageous inequality aversion (Brosnan & de Waal, 2003).

Both kinds of aversion are responses to distributions that are not equal. It is important to note that 'inequality aversion' is a specific form of 'inequity aversion,' both of which are discussed by Fehr and colleagues (Fehr & Schmidt, 1999; Fehr et al., 2008). Equity refers to proportionality—the ratio of each person's inputs to outcomes should be the same for all members of a joint enterprise, according to equity theory (Walster, Walster, & Berscheid, 1978). The simplest form of equity, computationally, is equality—each person gets the same outcome, which is equitable when each person is assumed to have made the same contribution, or to have the same claim on a pool of resources. We think that equality is the only form of equity that young children might notice and care about (see Gummerum & Keller, 2008, for a review of recent research in economics that relates to this topic). Research by Sigelman and Waitzman (1991) supports this idea: the researchers found that children as young as five are not sensitive to contextual information associated with unequal distributions such as equity, and instead only focus on equality.

Might children show an *aversion* to disadvantageous inequality, or even to advantageous inequality, well before they can *talk* about fairness or *carry out a fair*

distribution on their own? The research reviewed above suggests that children can carry out equal distributions by the age of five years, and in interpersonal treatment by the age of four. Further, a study by Birch and Billman (1986) suggests that children as young as three years old might notice and be averse to disadvantageous inequality in distributions. In the study, the experimenter distributed 'special snacks' to pairs of children (the ages of three to five years) who were either friends or acquaintances. One child received ten of his/her favorite snack items and ten least preferred items (based on individual pre-testing). The other child received just one of the same two items. The experimenter then left the children alone for 5 minutes with a video camera recording what ensued. Birch and Billman found very little spontaneous sharing by the child who had more, although the child with less frequently asked to be given some of the bounty ('gimme some!'). The request was often honored with a few pieces, but never with an even split. Further, there was little or no talk of fairness by either child, and there were no age differences.

In the Birch and Billman (1986) study, the fact that some children asked for more indicates that they noticed the difference in the size of the piles. However, in the absence of any other sign of concern about fairness, we cannot tell if the children were objecting to inequality or were simply seeking a larger share of the snacks. Furthermore, it was not clear that equality was a relevant standard; the piles of unequal treats were simply given to the children with no explanation. The children may not have known that the experimenter had intentionally created the disparity.

In the current experiment, we had three goals. Firstly, we examined reactions to *both* advantageous inequality and disadvantageous inequality in distributions. There are no studies to our knowledge that have examined advantageous inequality aversion in young children.

Secondly, we examined children's verbal *and* emotional reactions. Most fairness research to date has focused on cognitive or conceptual aspects of fairness, rather than emotional aspects. We thought that children's emotional responses might reveal a concern for fairness earlier than their verbal behavior.

Finally, we placed children in a real distribution situation rather than using hypothetical stories or dolls as has primarily been done in research on fairness. We thought children were most likely to reveal their abilities if they themselves were the victims—or even the beneficiaries—of an obviously unfair distribution.

In the study reported here, we created a simple and unambiguous case of inequality in the distribution of stickers to pairs of children from the ages of three to five years, ostensibly as a reward for cleaning up. We examined verbal and emotional negative reactions, both by the children who received fewer stickers (disadvantageous inequality aversion), and those who received more stickers (advantageous inequality aversion). We expected that the youngest children would be happy to get two stickers, even when their partner got four, but that disadvantageous inequality aversion would become increasingly visible as children got older. We had no prediction about advantageous inequality aversion, except that it would not be present in three-year-olds.

Method

Participants

The participants were 142 typically developing children divided into three age groups: 44 three-year-olds ($M = 3.55$ years, $r = 2.92$ – 3.98 years), 64 four-year-olds ($M = 4.54$

years, $r = 4.00$ – 4.99 years), and 34 five-year-olds ($M = 5.29$ years, $r = 5.01$ – 5.82). Sixty-two of the children were male and 80 were female. All children were recruited from four preschools, and they were predominantly White and middle-class. Three female experimenters tested all available children at each of the preschools.

Parental consent was obtained for all participants prior to testing. Approximately 20 percent of parents who were asked to consent agreed to allow their children to participate. At each school the experimenters assigned participating children to pairs, matching most pairs by sex and age. This resulted in a total of 71 pairs, 59 of which were same-age (within six months) same-sex pairs. Because of constraints on participant availability, two of the child pairs were same-sex mixed-age (greater than one year apart), and 10 were same-age mixed-sex. Once paired, each child was assigned at random to receive either four stickers (hereafter referred to as ‘advantaged’) or two stickers (‘disadvantaged’) in the distribution phase of the experiment. All of the following procedures were approved by the Institutional Review Board for Behavioral Sciences at the University of Virginia.

Materials and Procedure

Warm-up Phase. Pairs of participants were invited away from the main group at each preschool to play a game with the experimenter. They were seated in a quiet area where a video camera recorded the session. The children were given a bag of blocks to play with for 5 minutes, and the experimenter joined in the play. The purpose of this warm-up phase was to allow the children to become comfortable with each other and the experimenter. After the play period, the experimenter asked the children to help her clean up the blocks. Children sat side by side on the floor.

Distribution Phase. Once the blocks from the warm-up phase were removed from view, the experimenter prepared the children for the distribution by saying: ‘Since you helped me clean up, I’m going to give you some stickers’. The stickers were thus presented as a reward for cleaning up the blocks.

The goal of this phase was to create a blatantly *unequal* distribution of a desired reward (stickers). Accordingly, the experimenter counted out a set of stickers from a paper bag, one at a time, resulting in four stickers for one child (advantaged), and two stickers for the other child (disadvantaged). As she distributed the stickers, the experimenter called the children’s attention to what she was doing: ‘One sticker for Mary [name of the first child], one sticker for Sally [name of the second child], two stickers for Mary, two stickers for Sally, three stickers for Mary, four stickers for Mary’. Each sticker was placed directly in front of the designated child in clear view of both children.

After the distribution of the stickers, the experimenter paused for approximately 7 seconds without making eye contact with either child in order to give them a chance to respond spontaneously to the unequal distribution of stickers. The experimenter then gave the children a series of prompts to probe their reactions:

Prompt 1: Is that okay? (If a child responded to any of the prompts by indicating that the distribution was ‘not okay’ or ‘unfair,’ the experimenter always asked for a reason [usually by saying ‘why is that not okay?’] If the child responded with an answer of ‘okay’, the experimenter moved on to the next prompt).

Prompt 2: How many stickers do you have (advantaged child)? How many stickers do you have (disadvantaged child)? Do you have the same number of stickers?

Prompt 3: Is that okay?

Prompt 4: Is that fair?

Prompt 5: What should we do about it? (This prompt was only given if one or both children had answered 'no' to Prompt 4. No other prompts were given if both children responded with 'yes'.)

Post-distribution Phase. Finally, the experimenter looked in a bag, and produced two more stickers: 'Look what I found! Two more stickers! The experimenter then gave the disadvantaged child the two stickers. Afterwards, she repeated Prompt 2, demonstrating that each child now had an equal number of stickers.

Coding

Two coders who were always blind to the experimental hypotheses and to the ages of the children separately coded all key parts of the videotaped sessions.

Emotional Responses. To ensure that raters were not influenced by the actual distribution of the stickers (and their own feelings of inequality aversion), we created short video clips that began right after the experimenter finished each distribution and that showed the children's initial reactions to the distribution. Editing software was used to place a blurred spot over each child's pile of stickers, so that the coders could not see how many stickers each child received.

Each coder rated the overall emotional positivity of each child during the initial 7 or so seconds after the distribution was finished and before the experimenter asked the first probe question ('is that okay?'). Coders made ratings for each child on a five-point scale: 1 = clearly unhappy; 2 = slightly unhappy; 3 = no visible affect; 4 = slightly happy; and 5 = clearly happy. These positivity ratings provided our most direct measure of inequality aversion. (Raters achieved an overall alpha reliability of .79.)

Looking Behavior. Coders counted the number of times each child looked at his/her own stickers, at the other child's stickers, at the other child, and at the experimenter during and after the distribution. Looking behavior was coded from the beginning of the distribution until the experimenter began prompting the children. Children who seemed happy often began playing with their stickers immediately, so we interpret frequent looking away from one's own stickers as a sign of dissatisfaction or envy, and therefore as an indirect behavioral measure of inequality aversion. (Raters achieved an overall reliability of .72.)

Verbal Behavior. Children's responses to the questions 'Is it okay?' and 'Is it fair?' were recorded. In addition, the children's verbal justifications as to why the distribution was not okay or not fair were transcribed and then coded with respect to the following (non-exclusive) codes:

- (1) *Fairness*—child used the words 'fair' or 'equal', or explicitly indicated that the relevant issue was fairness (e.g., 'Because it's not fair.' or 'We need to have the same amount!').
- (2) *Desire*—explicitly stated desire for stickers (e.g., 'Because I want four.' or 'I want more!').
- (3) *Implicit Comparison*—child pointed out either the number of his/her own stickers, or how many the other child had, without making an explicit statement about

fairness. (e.g., ‘Because she has four.’ or ‘I only have two.’ or ‘I don’t have enough.’). These responses are implicit objections to the inequality of the situation, and therefore seem likely to mark inequality aversion.

- (4) Unsure or Nonsense—(e.g., ‘I don’t know.’ or ‘Because my mom wants a sticker.’) (Across all four codes, raters achieved alpha reliability of .88, with individual alphas per category of responses ranging from .86 to .93).

Results

The analyses focused on behaviors coded during the distribution phase of the experiment and immediately afterward that might reveal inequality aversion: emotional reactions, looking behaviors, and verbal responses. For statistical purposes, we treated each child as an independent entity, even though the children in the dyad could have affected each others’ responses. The most important measure of inequality aversion comes from the first several seconds after the unfair distribution was made. During this time, the children’s responses were relatively independent—they rarely interacted or even looked at each other. They primarily looked at their own stickers, at the other child’s stickers, and at the experimenter.

Three Examples

To illustrate the nature these interactions, we first describe three cases that exemplify the range of responses we observed, from no hint of inequality aversion (example 1) to instant and explicit protest (example 3).

Example 1: Happy to Get Stickers (Four-year-old Girls). After the unequal distribution of the stickers, both children looked down at their own stickers and began to touch them. The advantaged child then said, ‘I have four!’ The experimenter asked, ‘Is that okay?’ The advantaged child responded, ‘Yes’. The experimenter then asked the disadvantaged child the same question. ‘Yes!’ she exclaimed. When the children were asked to count their stickers, they did so correctly and agreed that they did not have the same number. However, when asked again if the distribution was okay and if it was fair, they both gave an enthusiastic ‘Yes’.

In terms of their emotional ratings, both children received a 4, indicating that the coders judged them to be slightly happy throughout the distribution phase of the experiment. There was no discernable sign—in word, deed, or emotional expression—of inequality aversion, nor was there any talk of fairness.

Example 2: Silent but Unhappy (Five-year-old Girls). After the distribution of the stickers, the disadvantaged child immediately looked up at the experimenter and said, ‘I’ve got two . . .’ When the experimenter asked, ‘Is that okay?’ neither child responded. The advantaged child looked at the disadvantaged child, while the disadvantaged child looked down at her stickers. When prompted for a second time, after a pause, the disadvantaged child answered, ‘Yes’, while still looking at her stickers, displeased. The experimenter then asked, ‘Do you have the same amount of stickers?’ The disadvantaged child silently shook her head, still looking down at her stickers, while the advantaged child immediately responded, ‘No’. When asked for a third time by the experimenter, ‘Is that okay?’ the advantaged child again looked to the disadvantaged child, and again the disadvantaged child looked unhappily at her own stickers, responding, ‘Yes’. Finally,

when asked directly, 'Do you think that's fair?' the disadvantaged child answered, 'No', while the advantaged child simply looked at her partner.

Although the disadvantaged child responded 'Yes' for many of the prompts, the emotional ratings reveal that she was displeased with the distribution. For their emotional coding, the disadvantaged child received a 2 indicating that she was slightly unhappy. The advantaged child received a 4, indicating that she was slightly happy, although she also seemed to be aware that something was wrong. In this case, the emotional ratings revealed the disadvantaged child's inequality aversion, whereas the verbal coding did not.

Example 3: Instant Protest (Advantaged, Five-year-old Girl; Disadvantaged, Four-year-old Girl). In the 2 seconds after the end of the distribution, the disadvantaged child looked at the advantaged child's stickers, then back at her own, and then asked the experimenter, 'And I get two?' The experimenter replied, 'Is that okay?' The disadvantaged child responded, 'Well, I think we could get the most amount. Both of us can get the *most* amount, together.' The experimenter responded, 'Is it okay that she has more stickers than you?' The disadvantaged child responded, 'Well why don't we both have the same amount?' The experimenter then asked, 'Is it fair that you both have different amounts of stickers?' The disadvantaged child responded, 'Ummm, no'.

The experimenter then addressed the same questions to the advantaged child. 'Is it fair that you have more stickers than [the disadvantaged child]?' The advantaged child shook her head. The experimenter asked, 'How many stickers should [the disadvantaged child] have?' Before the advantaged child could answer, the disadvantaged child said, 'As much as her', tilting her head toward the advantaged child. The advantaged child immediately nodded in agreement, and when asked for a verbal response, said that the disadvantaged child should receive four.

In this case the advantaged child received an emotional rating of 2, indicating that she was slightly unhappy during the distribution (although this may have been due more to her partner's reaction than to the inequality itself). The disadvantaged child received a 1, indicating that she was clearly unhappy. Judging by both the verbal and emotional responses, the disadvantaged child in this case showed clear evidence of disadvantageous inequality aversion and an understanding that the distribution was unequal and unfair.

Emotional Responses

The most basic finding is that the advantaged children were, on average, neutral or happy about having received stickers (mean rating = 3.3, significantly above 3.0 on our five-point scale by one sample *t* test, $t(70) = 7.08$, $p < .001$). In fact, only three advantaged children received a rating below 3.0. In contrast, the disadvantaged children were, on average, unhappy about their stickers (mean rating = 2.3, significantly below 3.0, $t(70) = 7.99$, $p < .001$). Only nine disadvantaged children received a rating above 3.0. In a 3 (age-group) \times 2 (outcome: advantaged vs. disadvantaged) \times 2 (sex) analysis of variance (ANOVA) on these emotional response ratings, there was a large effect of outcome, $F(1, 141) = 63.93$, $p < .001$; the advantaged children were happier than the disadvantaged ones. There was also a marginal sex by age interaction, $F(1, 141) = 3.16$, $p < .05$, indicating that the three-year-old boys were generally rated as more unhappy (rated as 1.9) than the three-year-old girls (rated as 3.1). But contrary to our prediction, we did not find a main effect of age.

These results give us a preliminary indication that *children in all three age groups showed disadvantageous inequality aversion*. However, the emotional ratings provided no evidence of advantageous inequality aversion in any age group.

Looking Behaviors

The children mostly looked at the piles of stickers rather than at their partners or the experimenter, and their looks varied by outcome. Figure 1 shows that advantaged children looked more often at their own pile ($M = 8.5$ looks) than at the other child's pile ($M = 5.6$) (paired samples $t(70) = 9.63, p < .001$). Results show some evidence that the disadvantaged children did the opposite, looking marginally more often at the advantaged child's pile ($M = 7.8$) than at their own ($M = 7.2$) ($t(70) = 1.90, p = .061$). There were no differences in number of looks to the experimenter or to the other child.

To further analyze the children's looking behavior, a summary variable was created by subtracting the number of looks at the other child's pile from the number of looks at one's own pile. This difference score is taken as a reflection of the child's degree of satisfaction (vs. envy): positive values indicate greater relative focus on one's own pile, often in the process of playing with one's own stickers. In a 3 (age group) \times 2 (outcome: advantaged vs. disadvantaged) \times 2 (sex) ANOVA on this summary variable, there was the expected significant effect of outcome, $F(1,141) = 51.68, p < .001$, revealing that disadvantaged children's looking behavior showed a lower level of satisfaction. There was also a marginal interaction of outcome and sex, $F(1,141) = 3.84, p = .052$, with boys somewhat more likely to show dissatisfaction than girls. As with the emotion ratings, there were no age effects.

Verbal Behaviors

Because the coding of verbal behavior is binary (presence vs. absence of a code for each child), we used logistical regressions to analyze these data. Firstly, we examined the children's initial 'yes' or 'no' response when they were asked 'Is it okay?' and 'Is it fair?' For the 'Is it okay?' question, the results of a 2 (outcome: advantaged vs.

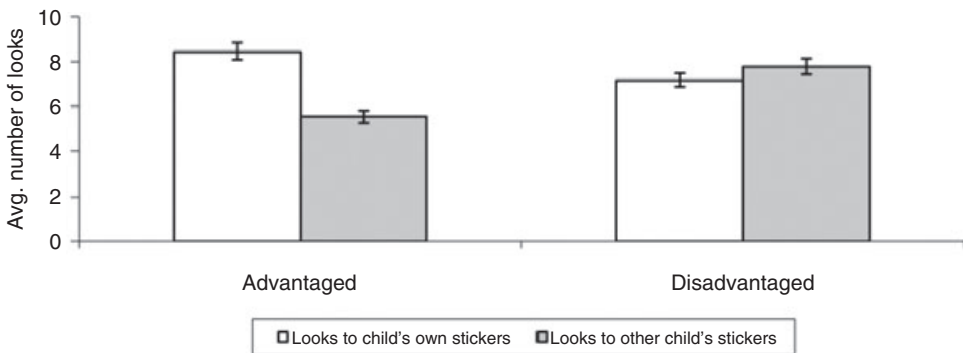


Figure 1. Looking Behavior.

Note: Looking to own or other's stickers, by outcome condition. The advantaged children looked significantly more to their own pile of stickers than at the other child's stickers, whereas the disadvantaged children did the opposite.

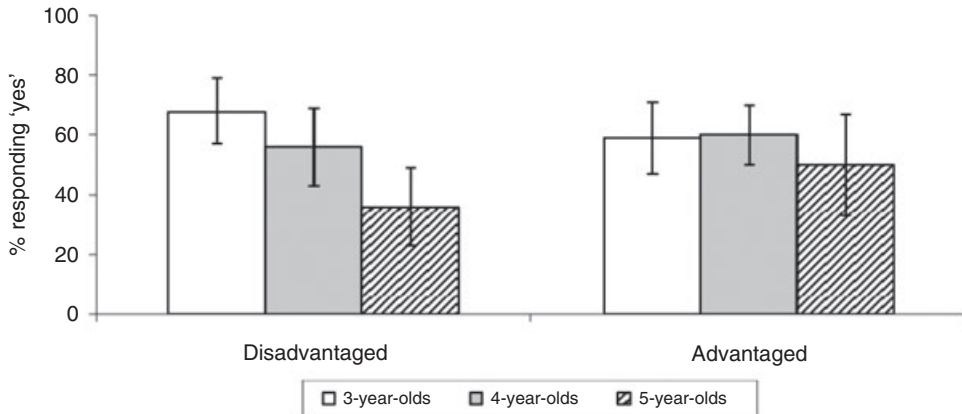


Figure 2. Percentage of Children who Answered 'Yes' to the Question, 'Is It Fair?'
Note: Results revealed a significant age trend for the disadvantaged, but not for the advantaged children.

disadvantaged) \times 2 (sex) \times 3 (age group) logistic regression revealed a marginally significant effect of sex, $\chi^2 = 3.41$, $p = .065$; boys responded 'No' (38 percent) more often than girls (20 percent). In response to the 'Is it fair?' question, there were no significant effects for any of the independent variables. A closer look at this non-significant finding reveals that the advantaged children were equally likely in all age groups to say that the distribution was fair (57 percent said it was). However, looking at the disadvantaged children only, 68 percent of the three-year-olds, 56 percent of the four-year-olds, and 36 percent of the five-year-olds said that the distribution was fair (see Figure 2). This age trend was significant in a 3 (age-group) \times 2 (sex) logistic regression, $\chi^2 = 3.87$, $p < .05$.

Next, we analyzed children's comments and justifications in response to our two initial questions and the follow-up questioning by the experimenter. As described earlier, we coded the frequency with which children explicitly talked about *fairness*, compared their own stickers to the other child's stickers, used language that implied *desire*, or replied with *unsure or nonsense responses*, including responses of 'I don't know'. For each of these codes, we ran 2 (outcome: advantaged vs. disadvantaged) \times 2 (sex) \times 3 (age: three-, four-, or five-year-olds) logistic regressions.

Fairness. The children rarely mentioned fairness—only five times overall (two boys and three girls, two disadvantaged, and three advantaged). The average age of these five children was 4.8 years, with none below 4.5 years. The absence of references to fairness in the younger half of our sample suggests that children's explicit awareness of fairness increases with age; however, there were too few cases to analyze.

Comparison. The older children (five-year-olds) were more likely to compare their stickers to the other child's stickers (61 percent) than were the younger children (three- and four-year-olds, 26 and 30 percent, respectively), $\chi^2 = 3.96$, $p < .05$.

Desire. The disadvantaged children mentioned desiring/wanting more than the advantaged children did, $\chi^2 = 5.61$, $p < .02$, (39 and 13 percent, respectively) and boys

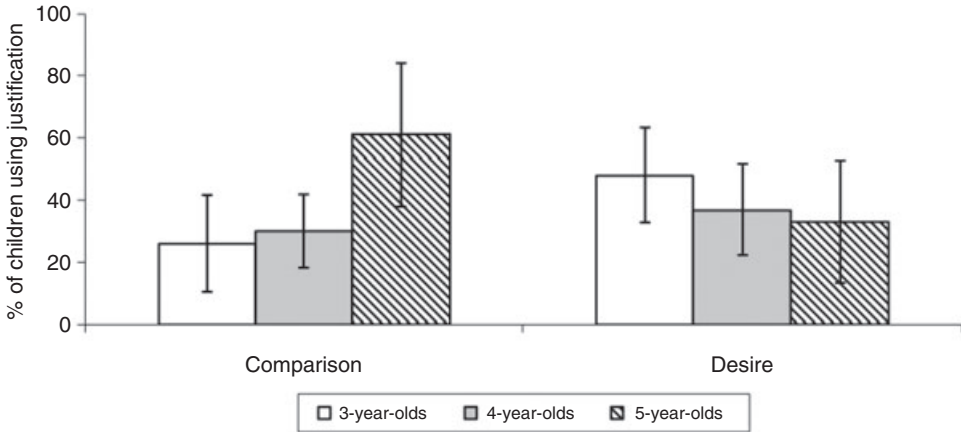


Figure 3. Age Trends in use of Justification Categories.

Note: Older children were significantly more likely to make explicit comparisons than were younger children. Younger children were more likely to use desire related language (non-significant).

mentioned a desire for more stickers more often than girls did, $\chi^2 = 9.73, p < .01$ (47 and 10 percent, respectively). There was not a significant age effect, but younger children mentioned desire somewhat more often than older children (48, 37, and 33 percent, for three-year-olds, four-year-olds, and five-year-olds, respectively) (see Figure 3).

Unsure or Nonsense. There were no significant main effects for this variable.

Advantageous Inequality Aversion?

The analyses of emotion ratings, looking times, and verbal justifications offer evidence that children as young as three experience *disadvantageous* inequality aversion, but no evidence of *advantageous* inequality aversion. Other behaviors (described below) by a few of the children did, however, suggest that advantageous inequality aversion might exist, even if it was rarely demonstrated.

Eight of the advantaged children (six girls, two boys; two three-year-olds, four four-year-olds, two five-year-olds) spontaneously tried to repair the inequality by giving the disadvantaged child more stickers or by requesting that the experimenter give the disadvantaged child more stickers. In five of these cases, the advantaged child handed one sticker to the disadvantaged child, after the disadvantaged child had protested to the experimenter about the unequal distribution. We cannot be sure that these advantaged children were feeling ‘aversion’ to the inequality itself; they may have simply been reacting to the protest or unhappiness of their partner. We can, however, be confident that these actions were guided by an understanding of equality, because in all cases they offered one and only one sticker, which made the outcomes equal. In three of these cases, the giving was accompanied by a statement about equality, for example: ‘He can have one of mine . . . now we both have three’. In all five cases, the giving was done spontaneously, quickly, and quite casually.

In the remaining three examples of rectification attempts, the advantaged child asked the experimenter to give more stickers to the disadvantaged child. One of these three requests was made after the disadvantaged child had objected. However, in two cases (both four-year-old girls), the advantaged child objected instantly to the unfair distribution. One girl said 'How come she only got two and I got four? Give her 1, 2, 3, 4!' In the other pair, the advantaged girl said, 'Give that to Martha . . . four stickers.' Both of these responses were made within 5 seconds of the end of the distribution, and in neither case was there any prompt from the experimenter or expression of concern or unhappiness from the partner. These two cases represent the clearest examples of advantageous inequality aversion.

On the other side of the distribution, six of the disadvantaged children (all girls, one three-year-old, five four-year-olds) spontaneously tried to rectify the situation. Four of them directly asked the experimenter for more stickers. Three of the six children (including one who also made a request) spontaneously attempted to take one of the advantaged child's stickers to make the distribution even.

Discussion

We created a blatantly unequal distribution for which there was no justification and then recorded children's emotional, verbal, and behavioral reactions. We found clear evidence of disadvantageous inequality aversion at *all ages*. These results were contrary to our initial expectation: We found *no age trends* in the degree to which disadvantaged children showed an emotional response to inequality. The only age trends we found were in the degree to which disadvantaged children used the word 'fair' and explained their dissatisfaction by pointing out the inequality. These findings indicate the existence of an intuitive, affective response to unfair distributions by the age of three. However, the ability to *talk* about fairness and make requests for redress subsequently increases with age between three and five years, and may only reach a moderate level of competence by the age of six (Damon, 1975, 1980, 1994).

Our procedure allows us to reject the possibility that the disadvantaged children were motivated purely by greed or frustration (at seeing a larger pile of stickers), rather than aversion to inequality. The specificity of the children's responses makes it possible to infer that a sense of fairness was responsible for our results: The children often suggested equalizing. No child ever asked for all of the stickers, or claimed to deserve them all. Further, children made attempts or requests to repair unequal distributions by asking for more stickers or by giving one sticker to the other child. In the 'Instant Protest' example described above, the five-year-old girl did not ask for more stickers or ask for all of the stickers; she simply asked for the same amount of stickers that her partner received.

We also found what is, to our knowledge, the first suggestive evidence for the existence of *advantageous* inequality aversion in young children: Two advantaged children (both were four-year-old girls) instantly objected to being given more than their partners, and five other advantaged children (three girls, two boys; one three-year-old, two four-year-olds, and two five-year-olds) *spontaneously* gave one of their four stickers to their partner, with no prompting. These cases were rare—the more common response of advantaged children was to smile and begin playing with their stickers, or to watch quietly and defer to the partner when the experimenter asked 'is that okay?' 'Is that fair?' But we consider it noteworthy that *any* of these advantaged children, who were all below the age at which children talk reliably about fairness,

objected to, or even tried to rectify an unfair distribution. Because our evidence is weak, more research is necessary to elucidate the cognitive and emotional antecedents—or even the very existence—of advantageous inequality aversion.

Despite the relative lack of age differences overall, there were a few differences between the three-year-old group and the two older groups that are worth noting. In particular, the three-year-olds never spontaneously mentioned fairness, and only one advantaged three-year-old tried to correct the unfair distribution. Thus, although the ability to recognize and dislike disadvantageous inequality emerges early, only gradually do young children become able to articulate their objections. The mechanism underlying this change is unclear. Between the ages of three and five, children are becoming more advanced both cognitively and socially, and their ability to articulate why they are uncomfortable with an unfair distribution may be the result of development in many different areas. All we can say, from our data, is that between the ages of three and five, children gradually stop talking about their own likes and dislikes, and they begin making more appeals to the objective inequality of the distribution, suggesting that they expect the experimenter to recognize this difference as problematic. We hope that future research will examine the emergence of fairness concurrently with the development of other important social-cognitive abilities known to be developing during this age range, such as children's understanding of intention and desire, as well as theory of mind (Astington, 2001).

Further evidence of increasing sophistication and differentiation of a concept of fairness is the fact that the disadvantaged children were just as likely to say that the distribution was not 'okay' in all three age groups, but were more likely to explicitly say that the distribution was not 'fair' as they got older. This finding strengthens our argument that children are sensitive to unequal distributions before they can explain why, and before they can reason in terms of the word 'fair'.

There were also a few sex differences. Firstly, disadvantaged boys' looking behaviors suggested that they felt less satisfaction (more envy) than girls. Secondly, three-year-old disadvantaged boys showed more negative emotion than the corresponding group of girls. These results are consistent with previous literature examining children's reactions to receiving a disappointing gift. In these studies, researchers have consistently found that boys express more negative emotion than girls upon receiving an undesirable gift after being led to believe that they would receive a desirable one (Cole, 1986; Davis, 1995; Saarni, 1984, 1988). The current results raise the possibility that boys might become sensitive to unfairness earlier, or react to it more strongly, or mask their responses less effectively than girls do. On the other hand, 12 of the 14 children in our study who made a spontaneous effort to rectify the inequality were girls. Further research is needed to examine the causes of these sex differences.

We note several limitations of the current study. Firstly, we did not control for whether the pairs in our study were friends or not. In both the Olson and Spelke (2008) study and the Fehr et al. (2008) study discussed previously, children (who were tested alone) were more likely to share, or endorse sharing, with siblings or friends than strangers. However, we presume that our relatively large sample size allowed variations in friendship patterns to cancel out due to randomization within each age group. Furthermore, we would expect five-year-olds to have *more* friends than three-year-olds, so we do not believe that our failure to find age trends is due to non-random pairings of children.

Another limitation of the current work is that the experimenter was both an adult and a stranger to the participants. It is possible that, had the person doling out the stickers been another child, or had it been a well-known and liked teacher, more children might

have protested. In this way, the children's verbal responses may have underestimated their awareness of fairness. However, in the current study we measured emotional responses as well, and although many of the disadvantaged children did not explicitly protest the unequal distribution, many of them were visibly sulky and unhappy. Thus, we do not believe that using an adult stranger as the experimenter prevented the children from reacting emotionally to the unequal distribution. Nonetheless, future research should investigate unfair distributions generated by lower status or more familiar people.

A third limitation of our study is that, in our quest for ecological validity, we created a situation in which the disadvantaged children generally spoke more and took the lead more often in interacting with the experimenter. We therefore consider our findings about disadvantaged children to be more reliable than our findings for advantaged children. Future work on advantageous inequality aversion might employ a design that separates the two children in order to standardize the degree to which the advantaged child is forced to respond. Furthermore, it would be interesting to run a comparison condition in which all children get four stickers, to establish the baseline of happy responding that occurs when there is no inequality. In the present study we can say confidently that our advantaged children were happier than our disadvantaged children, and that they were slightly happier than neutral, but it is possible that they were less happy than they would have been had they participated in a fully equal distribution.

As a whole, this research has shown that children under the age of five show clear evidence of disadvantageous inequality aversion and scattered instances of what appears to be advantageous inequality aversion. Although the current findings are consistent with Fehr and colleagues' (2008) assertion that young children often behave in accordance with their desires (as our younger children most often did), contrary to Fehr's assertions, we did find instances where children as young as three years old gave one (never two) of their own stickers to a fellow child in order to equalize an unfair distribution. This suggests that children under the age of five are not only capable of recognizing and reacting to an unfair distribution, but that they are also capable of mending it. Such behavior illustrates Fiske's (1991) relational model of 'equality matching', which he hypothesized would emerge around the fourth birthday. Consistent with Fiske's ideas, we provide evidence that an intuitive understanding of inequality is already in place during the year before the fourth birthday.

In conclusion, the current research presents evidence that three-, four-, and five-year-old children have an emerging sense of fairness in distributive contexts. It also illustrates the importance of using implicit and behavioral measures, which may detect aspects of moral development that cannot be found in children's explicit verbal behavior. Taken together, our results suggest that the emotional response to unfairness emerges very early, and the ability to talk and reason about fairness and other moral issues may be a relatively late accomplishment—one that builds on children's earlier ability to notice and dislike inequality. When a child gets upset at being given a smaller gift than her sibling, her anger may seem 'childish', but it is a step on the road to moral maturity.

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