Equal But Not Always Fair: Value-laden Sharing in Preschool-aged Children

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Abstract

Prior work has shown that preschoolers divide resources fairly and expect others to do the same. The majority of research, however, has focused on how children make distributions with respect to number. Here we explore whether preschoolers attend to the value of the objects being shared. We presented four-year-olds and five-year-olds with two puppets and four stickers of different values to split between them. Our central question was whether children would share more valuable stickers with their preferred puppets. In Experiments 1–2, value was induced by making one sticker rarer than the others. In Experiments 3–4, value was measured subjectively (by asking the child which sticker s/he personally preferred). Across all experiments, children made fair numerical splits, but showed favoritism according to value. This work supports the hypothesis that young children coordinate number and value to show both fairness and favoritism when making resource distributions.

Keywords: prosocial behaviour; social cognition; theory of mind

The ability to share resources is critical to cooperating with others and our survival in social groups. Many recent studies have found that young children share resources fairly and expect others to do the same (e.g., LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011; McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013; Schmidt & Sommerville, 2011; Shaw & Olson, 2012, 2013; Sloane, Baillaergeon, & Premack, 2012; Smith, Blake, & Harris, 2013). Although the ability to share fairly at a cost to oneself is thought to develop through middle childhood (Blake & McAuliffe, 2011; Fehr, Bernhart, & Rockenbach, 2008), understanding fairness may be present as early as the first to second year of life (e.g., Geraci & Surian, 2011; Sommerville, Schmidt, Burns, & Young, 2013). Further, preschoolers can share fairly when there is no cost to themselves (Li, Spitzer, & Olson, 2014).

There are, however, important variations in how children decide what is and is not fair. Preschoolers share more with friends over acquaintances (Moore, 2009), with those who have exerted effort over those who have not (Baumard, Mascaro, & Chevallier, 2012; Kannagiesser & Warneken, 2012), with those who are kind over those who are not (Kenward & Dahl, 2011), and with those who are in their social groups over those who are not (Dunham, Baron, & Carey, 2011). Alongside an understanding of fairness, children also develop an understanding of favoritism (see e.g., Li et al., 2014; Shaw, DeScioli, & Olson, 2012).

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A critical component of both fairness and favoritism, and of resource distribution in general, is the understanding of not only number (how many resources each recipient must receive), but also value. For example, the fairest way to divide two toy trucks between two children is to give one to each of them. It is less clear how to divide fairly when one is high-value (e.g., a large truck) and one is low-value (e.g., a small, broken-down truck). We know relatively little about how preschoolers integrate the value of objects in their sharing.

To appreciate value when sharing, children must recognize that some objects are valued over others, but that the value one holds for an object can be agreed on by all members of a group or be unique to a single individual. Kochanska, Casey, and Fukumoto (1995) showed that toddlers personally preferred objects that were whole instead of broken, presumably because they appreciated the greater value of functional toys. In other work, 15-month-olds who understood fair sharing were also more likely to share a high-value toy (as measured by a personal preference for the toy) with an adult experimenter (Schmidt & Sommerville, 2011). Chernyak and Kushnir (2013) found that three- to four-year-olds distinguished between a condition in which they were induced to give away a high-value toy (e.g., a toy frog) from one in which they gave away a low-value item (e.g., a crumpled piece of paper). Finally, three- to six-year-old children gave away more high-value stickers (as measured by their personal preference) than low-value stickers to anonymous recipients (Blake & Rand, 2010). These findings suggest that children may appreciate both objective properties (i.e., value established and agreed upon by others) and subjective properties (i.e., value unique to each individual) when dividing resources. Children may agree that a working toy is worth more than a broken one (objective value), but the broken toy may also be more uniquely valuable to one child due to sentimental attachment (subjective value). Splitting resources according to value involves recruiting a host of social cognitive knowledge about not only fairness and equity, but also personal preferences.

To examine these issues, we presented preschoolers with two recipients (two puppets) and four resources (stickers). We manipulated the value of the stickers, either more objectively, by making one sticker uniquely colored and thus more rare (Experiments 1–2) or more subjectively, by asking the child which type of sticker s/he preferred (Experiments 3–4). We also asked children to indicate which recipient (puppet) they liked more in order to measure their potential favoritism for one recipient. Because prior work has documented that young children are fair, at least in third-party contexts (e.g., LoBue et al., 2011; Olson & Spelke, 2008), we expected children to make even numerical splits. We were interested in how children considered value—whether they would use value to show favoritism to one recipient over another.

**Experiment 1**

We presented preschoolers with two puppets (‘Doggie’ and ‘Ellie’), and asked them to choose their favorite. We then showed children four resources (dinosaur stickers): Three were one color, and one was uniquely colored, and therefore unique). We asked children to divide the resources between the puppets (Figure 1). Prior work has shown that children can distinguish the relative probabilities of objects (e.g., Xu & Garcia, 2008), infer that rare objects are more highly preferred (Kushnir, Xu, & Wellman, 2010), and are affected by the relative scarcity of objects when making...
distribution decisions (Kenward & Dahl, 2011). Therefore, young children appear to appreciate that rarity creates value. An open question is whether children will use the rareness of objects to show value-based favoritism.

**Method**

**Participants**

Twenty children (14 male, 6 female) were recruited and tested at preschools or a local children’s museum (Mean age = 4.74 years, SD = 0.58 years; range: 3.44–5.82 years). Across all studies, we recruited children either through (1) approaching parents at a local children’s museum, or (2) distributing consent forms and flyers through local preschools. Children whose parents indicated interest and signed a consent form were then invited to participate in a short session with the experimenter either at the local museum, the preschool, or in the laboratory. Four additional children were tested but excluded due to experimental error (N = 1), parental interference (N = 2), or because the child refused to choose a favorite puppet after repeated prompts (N = 1). Results remained consistent when analyzing the full sample. For all reported experiments, we sought a minimum of N = 20, but continued testing until we achieved counterbalancing.

**Materials**

Materials were two plush animals and four small dinosaur stickers (either three yellow and one brown or vice versa). See Figure 1 below.
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Procedure

Puppet Preference Assessment

Children were initially shown two puppets labeled as ‘Doggie’ and ‘Ellie’ and encouraged to interact briefly with each one. After the introduction, children were asked which puppet they liked more (‘Which one do you like more – Doggie or Ellie?’).

Value Manipulation

The experimenter then showed four dinosaur stickers—three that were the same color and one that was uniquely colored (three yellows and one brown or vice versa)—and said, ‘I have these dinosaur stickers, let’s count them’ and counted them along with the child to ensure that the child understood that there were four.

Resource Allocation

The experimenter then prompted the child to distribute the stickers ['Whichever ones you want to give to Ellie, you can put right here (pointed in front of Ellie), and whichever ones you want to give to Doggie, you can put right here (pointed in front of Doggie). Go ahead!]'. If the child left any stickers in front of the puppets, the experimenter prompted the child to continue distributing by saying ‘And what do you want to do with this/these sticker/s?’ until the child had allocated each sticker to a puppet.

Follow-up Questions

After the child divided the stickers between Ellie and Doggie, the experimenter pointed to the rare sticker and said ‘So you gave this one to Ellie/Doggie – why did you do that?’, then pointed to one of the stickers given to the other puppet and asked the same question. Finally, the experimenter pointed to the rare sticker, and one of the common stickers, and asked ‘And which sticker do you like more – this one or this one?’

The side that the puppets were presented on (left or right), the color of the unique sticker (yellow vs. brown), and the side on which it was presented (left or right) were counterbalanced across participants.

Coding

All data was videotaped with the exception of two children whose parents did not provide video consent. Their answers were transcribed by a research assistant. Videos were coded by two researchers (one hypothesis-blind) for (1) the child’s preferred sticker, (2) the child’s preferred puppet; (3) what kind of split the child made (2/2; 3/1; or 4/0), (4) which puppet the child gave the uniquely colored sticker to. Inter-rater reliability was 100 percent.

Results

A series of binary logistic regressions on our two primary dependent variables (likelihood of making an equal number split, likelihood of giving the favorite sticker to
the favorite puppet) revealed no effect of age (both $p's > .25$). We therefore report results collapsed across ages.

The data across experiments is shown in Figure 2 below. We show the percentage of children displaying favoritism either according to number or value. Almost all (18 of 20; 90 percent) children made equal numerical splits (i.e., gave each puppet two stickers). The overall distribution of 4/0, 3/1, and 2/2 splits was different than chance expectations (defined as what would occur if children divided each sticker at random to each puppet), $\chi^2(2, N = 20) = 23.60, p < .001, V = 1.09$. The number of fair (2/2) splits specifically differed from chance expectations, Binomial test, $p < .001, g = .53$.

The critical question was whether children gave the uniquely colored (rare) sticker to their stated favorite puppet. The majority of children (15 of 20; 75 percent) did so, significantly higher than would be predicted by chance, Binomial test, $p = .04, g = .25$. Therefore, although almost all children tended to be act fairly with respect to number, they strategically showed favoritism with respect to value.

Children never explicitly referred to value (only one child ever referenced the color of the uniquely colored sticker in relation to the other colors: ‘because it’s two colors for Doggie’) or even to their own preference for the uniquely colored sticker in their explanations. Children who provided explanatory responses either referred to puppet’s desire (e.g., ‘because she likes that kind’; ‘because that’s his favorite color’) or gave a non-explanation (e.g., ‘because I just did’, ‘because it’s a dinosaur’; ‘because I gave the other one to Ellie’). Moreover, children themselves did not indicate preferring the uniquely colored sticker (only 12 of 20; 60 percent answered that they preferred the uniquely colored sticker, Binomial test, $p > .25, g = .10$).

Figure 2. Percentage of Children Who Made Unfair Number (non 2/2 split) and Unfair Value Splits across the Four Experiments.

Note: Fair Value Splits in Experiments 1 and 2 Were Impossible. Across All Experiments, We Show Final Splits.
Discussion

Experiment 1 found that preschoolers made equal numerical splits, but showed favoritism by giving their favorite puppet the rare resource. Notably, children did not use value to show fairness: Children could have coordinated number and value by giving three common stickers to one puppet, and the one rare sticker to the other. However, this was an uncommon response (only 10 percent of the time).

Children rarely appealed to value when describing the rationale for their division of resources. Only one child ever referenced value in his/her explanation ('this one is special'), and children did not indicate having a personal preference for the rarer item. This suggests the possibility that the present results are explained by children’s attention being drawn to the uniquely colored sticker (due to its salience) and their favorite puppet (due to their preference). On this account, children were not showing favoritism, but simply matched where their attention was most drawn.

In Experiment 2, we presented children with the same procedure, but reduced the value of the uniquely colored sticker by making a small tear in it. If children’s attention is simply drawn to the unique sticker due to its salience, we should see the same pattern of results as in Experiment 1. If, however, children are making favoritism splits based on understanding the rare sticker’s value, then decreasing that item’s value should decrease their likelihood of giving that item to their favorite puppet.

Experiment 2

Method

Participants. Twenty-four children (10 male, 14 female) were recruited and tested at a local children’s museum or in the laboratory (Mean age = 4.92 years, SD = 0.66 years; range = 3.39–5.97 years).

Procedure. The procedure followed that of Experiment 1, except that the uniquely colored sticker had a small tear in it. All other materials, questions, and prompts were identical. Inter-rater reliability for coding was 100 percent.

Results

A series of binary logistic regressions on our two primary dependent variables (likelihood of making an equal number split, likelihood of giving the favorite sticker to the favorite puppet) revealed no effect of age (both p’s > .25). We therefore collapsed our results across ages. Almost all (19 of 24; 79 percent) children made equal numerical splits (i.e., gave each puppet two stickers). The overall distribution of 4/0, 3/1, and 2/2 splits was different than chance expectations (defined as what would occur if children divided each sticker at random to each puppet), $\chi^2(2, N = 24) = 18.19, p < .001, V = 0.87$. The number of fair (2/2) splits specifically differed from chance expectations, Binomial test, $p < .001, g = .37$.

However, with the value reduced, only about half (10 of 24; 42 percent) of children gave the uniquely colored sticker to their preferred puppet, no different than chance, Binomial $p > .25, g = .08$, and did so at lower rates than in Experiment 1 (when the uniquely colored sticker was not ripped), Fisher's Exact test, $p = .04$. This effect continued to hold even when considering only the subsample of children...
who made equal numerical splits: only half (9 of 18; 50 percent; Binomial $p > .25$) gave the sticker to their favorite puppet.

Children almost never referred to value or their own preference for the uniquely colored sticker in their explanations. One child stated that s/he liked the sticker more. Two children referenced the value of the sticker: one stated that the unique color was positive (‘Because it’s gold and it’s a lot different from the other ones’) while the other stated the unique sticker was negative (‘because it’s ripped’). Only 7 of 24 (29 percent) children answered that they preferred the uniquely colored sticker, Binomial test, $p = .06$, $g = .21$, with the majority stating that they preferred the stickers that were undamaged, which was marginally lower than the proportion of children who preferred the uniquely colored sticker in Experiment 1 (12/20; Fisher’s Exact test, $p = .07$).

**Discussion**

While children continued to make even numerical splits, when the value of the unique sticker was reduced, children did not give it to their favorite puppet. This suggests that distributions were not based on simply attending more to the uniquely colored sticker. Such chance responses could indicate that children did not know how to balance the value of the rareness of the sticker with the damage of the rip, but subsequent investigations are necessary to determine if preschoolers make such strong inferences about value or if children default to chance responding in light of a clear advantage in value.

Thus far, children were never given opportunities to split resources fairly according to value, as only one sticker was unique. In Experiment 3, children could split resources evenly according to value—we gave children four stickers of equal objective value (two brown, two yellow), but measured value subjectively by asking children which sticker they personally liked the most.

**Experiment 3**

**Method**

**Participants.** Twenty-two children (8 male, 16 female) were recruited and tested a local children’s museum or in the laboratory (Mean age = 4.72, $SD = .93$; range = 3.03–5.98 years). One additional child was tested but excluded because he refused to answer which sticker was his favorite.

**Procedure.** The procedure followed that of Experiments 1 and 2 with one critical modification: We presented children with two stickers of each color (Figure 1). As in the previous two experiments, the sides of the sticker colors and the sides of the puppets were counterbalanced. All other materials, questions, and prompts were identical. Coding followed that of Experiments 1 and 2 with the addition of coding for whether children made equal value splits. Inter-rater reliability was 100 percent.

**Results**

A series of binary logistic regressions on our primary dependent variables (likelihood of making an equal number split, likelihood of making an equal value split,
likelihood of giving the favorite sticker to the favorite puppet) revealed no effect of age (all p’s ≥ .25). We therefore collapsed our analyses across ages.

Almost all (21 of 22; 96 percent) children made equal numerical splits (i.e., gave each puppet two stickers), more than expected to by chance alone, $\chi^2(2, N = 22) = 31.55, p < .001, V = 1.19$. The proportion of children who made equal numerical splits, once again, differed significantly from chance expectations, Binomial test $p < .001, g = .58$.

Our critical question, however, was whether children would then split fairly according to the subjective value of the stickers. Children could give each puppet one of each type of sticker. Nonetheless, they did not do so: Only five children split fairly according to value (23 percent), which was less likely than chance, Binomial test $p = .017, g = .27$. Of the children who made unfair value splits, almost all (14 of 16; 87.5 percent) gave their favorite stickers to their preferred puppet, Binomial test $p = .004, g = .38$. Therefore, children tended not to make fair value splits, and tended to prefer their favorite puppet in their value distributions.

Only two children ever referenced value considerations in their explanations, and both referred to subjective value (‘because I liked that one’).

We noted that the presentation of the stickers may have promoted equal value sharing in young children (see Figure 1 for reference). That is, because the experimenter placed both valued stickers on one side, children may have been primed to think about dividing based on value. This is particularly at issue when considering that the experimenter prompted children to continue distributing stickers if they left any on the table (because children might have simply moved a sticker to the puppet to which it was closest). Several children split two stickers and were then prompted by the experimenter to continue. Such splits may reflect children’s true distribution desires. We therefore looked at children’s initial distributions, or distributions made prior to any experimenter prompting. Only six children were ever re-prompted. Children’s initial splits were identical to their final ones: 21 of 22 children made equal numerical splits prior to prompting, and only five made fair value splits. Therefore, even prior to be prompted by the experimenter to continue splitting stickers, children made unfair value splits.

Discussion

Even when fair value splits were possible, preschoolers rarely made them. However, to investigate whether children’s distributions were influenced by the initial presentation of the stickers (i.e., because stickers of one color were placed together), in Experiment 4 we presented the stickers in a way that promoted fair value splitting. Moreover, in Experiment 4, we asked children which sticker they liked more prior to making the distribution. We did this to rule out the possibility that in Experiment 3, children developed a preference for the sticker once they saw that their favorite puppet now possessed it.

Experiment 4

Method

Participants. Twenty-four children (10 male, 14 female) were recruited and tested at a local children’s museum or in the laboratory (Mean age = 4.35 years,
SD = 0.86; range = 3.0–5.75 years). Two additional children were replaced due to experimental error.

Procedure. The procedure followed that of Experiments 3 with two modifications: We arranged the stickers in a way that promoted fair value splits (see Figure 1). Moreover, we asked children which sticker they liked the most prior to making distributions. All other materials, questions, and prompts were identical. Coding followed that of Experiment 3, but we also coded for initial splits (whether they were equal number and whether they were equal value). Inter-rater reliability was 98 percent. Disagreements were resolved over discussion.

Results

A series of binary logistic regressions on our primary dependent variables (likelihood of making an equal number split, likelihood of making an equal value split, likelihood of giving the favorite sticker to the favorite puppet) revealed no effect of age (all p's ≥ .13). We therefore collapsed our analyses across ages.

As with Experiment 3, we coded children's initial and final distributions. Figure 2 above shows children's final distributions. Almost all children split fairly according to number in both their initial (21 of 24; 87.5 percent) as well as final (23 of 24; 96 percent, χ^2(2, N = 24) = 34.86, p < .001, V = 1.21) splits. Even with this new arrangement, most children did not share fairly according to value: Only six split fairly according to value (25 percent; Binomial test p = .02, g = .25) initially, and half of the children spontaneously rearranged the display in the final split. Of the children who split unfairly according to value, the majority gave their favorite sticker to their favorite puppet, both in their initial (12 of 18; 67 percent) as well as final (9 of 12; 75 percent) distribution. Pooling data from Experiments 3 and 4, 23 of 28 children gave their favorite stickers to their favorite puppets (Binomial test p < .001, g = .32). Therefore, even with the new arrangement, half of the children spontaneously rearranged the configuration and continued to show favoritism.

Once again, children did not articulate their reasons for having done so: only one child referenced a personal preference when asked why she made the distribution ('I like these two and I like Doggie').

Discussion

When stickers were presented in a manner that promoted fair value splits, children did not tend to make them, and children tended to give their preferred stickers to their favorite puppets. This result suggests that children strategically distributed stickers in a way that assured they coordinated the dimension of value.

General Discussion

Across four experiments, we show that children almost always made fair numerical splits, but showed favoritism according to value. Children appreciated both the more objective (Experiments 1–2) and more subjective (Experiments 3–4) aspects of value: children gave preferred stickers to their preferred puppets, and children gave stickers that were of high value even when they were not necessarily personally preferred. Our results are consistent with past work showing that children are able to appreciate value in resource distribution decisions, and suggest that value...
may be one way through which children resolve conflicts between fairness and favoritism (e.g., Blake & Rand, 2010; Shaw et al., 2013). The concept of value is complex and intricate. Definitions of value vary across the fields of psychology, philosophy, economics, and anthropology. Across our four experiments, we induced value in different ways: through relative scarcity (Experiment 1), through inducing an imperfection (Experiment 2), and through personal preference (Experiments 3–4). We showed that children incorporate each of these dimensions in making their resource distributions, thus calling to question which other types of value-based considerations play into children’s sharing behaviors. Prior work has shown that young children also appreciate the value of authentic objects, of prized possessions, of objects with history, and of objects to which they are sentimentally attached (e.g., Frazier & Gelman, 2009; Gelman, Frazier, Noles, Manczak, & Stillwell, in press; Gjersoe & Hood, in press; Hood & Bloom, 2008). How these other types of value-based considerations develop alongside, and propels, children’s displays of fairness and favoritism is an intriguing empirical question. Another important question concerns whether children generalize their own preference to their favorite puppet, or simply match their own preferences. Our results speak against the latter possibility—that children simply prefer to match their favorite stickers with their favorite puppets without consideration for favoritism: In Experiments 1 and 2, children showed value-based sharing without necessarily appreciating the value of the objects themselves. In Experiments 3 and 4, children gave their favorite stickers to their favorite puppet, but only one child ever gave an explanation that concerned matching behaviors (‘I like this one and I like doggie’). An intriguing open question, therefore, is the specific basis through which children make their decisions. One possibility is that in the absence of information to the contrary, children generalize their own preferences onto the preferences of their favorite puppets. Because infants use preferences as a cue for making inferences about social relationships (e.g., Fawcett & Markson, 2010; Liberman, Kinzler, & Woodward, 2014; Mahajan & Wynn, 2012), it is possible that children also use social relationships to guide inferences about preferences. If this is the case, a child might divide resources not to show favoritism, but to give the resources that s/he believes each individual prefers. Children do recruit a host of social-cognitive understandings in their giving behavior: when distributing objects, they are able to take into account another person’s stated preferences (Repacholi & Gopnik, 1997), their own preferences (Schmidt & Sommerville, 2012 2011), and the higher order goals of the recipient (Martin & Olson, 2013). This work shows that children prioritize preference-related information: they ignore a person’s stated preferences when they contradict higher order goals. A central focus of altruistic giving is the ability to coordinate preferences—both one’s own and others’ and both stated and implied—in making distributions. Our findings build on this work by showing that preschoolers use subjective and objective value to show not only to help others but also to show favoritism and altruism. Further work may disentangle the socio-cognitive mechanisms through which such splits occur. One possibility is that children might split resources evenly by number in order to appear fair (see Shaw, 2013), but use value as a more subtle, subversive way to show favoritism. Another possibility is that children’s early developing notions of fairness only include number, and that equal value splitting appears later in development. Indeed, the majority of work has shown that early
social interactions surrounding fairness largely involve directives such as taking
turns or splitting things evenly (Damon, 2008). Children might also be well prac-
ticed in splitting things evenly by number (e.g., Squire & Bryant, 2002). Fair value
splits may not be encouraged or emphasized in children’s early social interactions,
and as a result children’s early concepts of fairness do not include ideas about
value. Notably, children did not end up ignoring the dimension of value entirely:
across all four experiments, children strategically divided based on value. An open
question therefore remains whether younger children would be unable to incorporate
value into their distributions, just as presumably, younger children may be unable to
split evenly according to number. A similar question is whether as children age,
they begin to use value to show fairness (Shaw & Olson, 2013). In our work, we
found no age-related differences with respect to value-based sharing, but future
work may investigate the shift from value-based favoritism in early childhood to
value-based fairness in adulthood.

To conclude, as adults, we often translate our concept of value (e.g., a new car)
into number (e.g., money), but our findings suggest it is possible (and perhaps
likely) that children view these dimensions as separate. Further work may study the
extent to which children understand folk economic principles more generally, as
well as the extent to which they use value in non-moral interactions (e.g., in their
communications with others). Our work suggests that early interactions of fairness,
favoritism, and moral evaluations, may be laden with appreciations for both the sub-
jective and objective appreciation of the value of objects.

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**Notes**

1. All reported tests are two-tailed.
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