



Children's developing understanding of legitimate reasons for allocating resources unequally



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ABSTRACT

Recent research on distributive justice suggests that young children prefer equal distributions. But sometimes unequal distributions are justified, such as when some individuals deserve more than others based on merit, need, or agreed-upon rules. When and how do children start incorporating such factors in their distributive decisions? Three-, 5-, and 8-year-old children ($N=72$) had the opportunity to allocate several items to two individuals. One individual was neutral and the other provided a reason why she should be favored. Three of these reasons were legitimate (based on merit, need, or agreed-upon rules) whereas a fourth was idiosyncratic (“I just want more.”). We found that with age, children's equality preference diminished and their acceptance of various reasons for privileged treatment increased. It was not until 8 years, however, that they differentiated between legitimate and idiosyncratic reasons for inequality. These findings suggest that children's sense of distributive justice develops from an early equality preference to a more flexible understanding of the basic normative reasons that inequality may, in some cases, be just.

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1. Introduction

Issues of justice are prevalent in all human societies and circle around questions such as how we should treat one another and how we should allocate benefits and burdens on a local or global level. The notion of equality is central to the formal principle of justice which dates back to Aristotle's formula in *Nicomachean Ethics* to treat equals as equals and like cases alike—and thus unequal cases unequally (Aristotle, trans. 1989, 1131a22–b24). At a theoretical level, it is easy for modern scholars to agree that equal treatment and equal respect are key to formal justice (Dworkin, 1981; Feinberg, 1974; Rawls, 1971; Sen, 1992).

In practical terms, however, the challenge is to determine criteria for comparing cases or persons and then decide whether they are equal or unequal in some relevant respect. This issue is most prominent when deciding how to distribute resources among people or within a society (*distributive justice*). Although an equal distribution might be the default case (Tugendhat, 1993), departure from equality is frequently considered necessary to attain a just distribution of goods (Feinberg, 1974; Rawls, 1971; Sen, 1992). And there are different reasons for advocating, or even normatively expecting, an unequal distribution of

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resources. For instance, one person might be needier than another (need principle), or might have contributed more to a collaborative task (merit or equity principle), or might simply be entitled – according to rules, conventions, or agreements – to a certain share, for instance, as the winner of a competition (Deutsch, 1975; Feinberg, 1970, 1974; Lerner, 1977; Rawls, 1971). The current study investigates children's developing understanding of such legitimate reasons that justify an unequal allocation of resources in contexts in which the child does not stand to benefit from the resource allocation.

Classic studies on understanding and exercising distributive justice as a disinterested “judge” typically presented children with hypothetical stories (asking children to decide how to allocate resources between some characters and to justify their decision) and found evidence for a protracted course of stage-like development: children first focus on idiosyncratic preferences and desires (preschool age), then apply an equality rule indiscriminately (early school age), and finally become more flexible and consider things like merit, reciprocity, or need at around 8–10 years of age at the earliest (e.g., Damon, 1977; Peterson, Peterson, & McDonald, 1975; Piaget, 1932; Sigelman & Waitzman, 1991 though see Leventhal, Popp, & Sawyer, 1973, for evidence of some appreciation of merit in preschoolers).

Based on more recent research, three major findings can be distilled that suggest a more intricate picture of children's emerging grasp of distributive justice. First, children at around 3 years of age possess a strong egalitarian preference and in situations when the number of resources is even, allocate items equally between recipients (Baumard, Mascaro, & Chevallier, 2012; Kenward & Dahl, 2011; Olson & Spelke, 2008; Schmidt, Rakoczy, & Tomasello, 2012; Shaw, DeScioli, & Olson, 2012). This preference might be based on fairness expectations that develop early during the second year of life (Geraci & Surian, 2011; Schmidt & Sommerville, 2011; Sloane, Baillargeon, & Premack, 2012), potentially in concert with prosocial motives that involve some concern for the welfare of others (Brownell, Svetlova, & Nichols, 2009; Dunfield & Kuhlmeier, 2013; Paulus, 2014b; Paulus & Moore, 2012; Sommerville, Schmidt, Yun, & Burns, 2013; Svetlova, Nichols, & Brownell, 2010). Second, there is evidence that children appreciate merit and need in distributive contexts at younger ages than previously thought: merit at 3 years (Baumard et al., 2012; Hamann, Bender, & Tomasello, 2014; Kanngiesser & Warneken, 2012), and (material) need at 5–7 years (Kienbaum & Wilkening, 2009; Paulus, 2014a). Third, there is accumulating evidence that by 8 years of age, children's understanding of distributive justice gets more mature and flexible in the sense that children seem to apply justice principles irrespective of whether they stand to benefit from a distribution or not. For instance, children's notion of equality gets more generic and principle-like, as 7- to 8-year-olds, but not younger children, tend to avoid advantageous inequality, that is, unequal resource allocations they would benefit from (Blake & McAuliffe, 2011; Fehr, Bernhard, & Rockenbach, 2008; Shaw & Olson, 2012 but see Paulus 2015 for cross-cultural variation). Eight-year-olds' understanding of equality even extends to equality of opportunity: they not only accept an impartial procedure (50:50 chance) that yields an unequal outcome, but they are also more reluctant than 6-year-olds to use a partial procedure that would lead to the same unequal outcome (Shaw & Olson, 2014). Moreover, 3- to 8-year-olds are aware of others expecting them to share resources equally (and expect others to do so, too); nevertheless, it is not until 7 or 8 years of age that children actually share goods equally (Smith, Blake, & Harris, 2013). In intergroup contexts children at this age descriptively expect that others will favor their in-group and children themselves share less with out-group than with in-group individuals (DeJesus, Rhodes, & Kinzler, 2014; Fehr et al., 2008), suggesting that school-aged children's understanding of distributive justice is driven less by simple preferences and more by considerations of different reasons and contexts that might justify or lead to equality or inequality.

In sum, previous research has shed some light on children's equality preference and their understanding of merit and need. Besides the finding that 8-year-olds endorse equality of opportunity more than 6-year-olds in the context of procedural justice and outcome inequality (Shaw & Olson, 2014 see also Grocke, Rossano, & Tomasello, 2015), to our knowledge, there is no systematic investigation of children's developing understanding of more arbitrary, yet legitimate, reasons for unequal resource distribution that are essentially based on agreement. For instance, arbitrary agreed-upon rules of a game might entitle someone to a reward irrespective of moral considerations like deservingness (Feinberg, 1970, 1974; Rawls, 1971)—and by entering a game, one accepts its rules, even if they are arbitrary or lead to asymmetries in resource allocation. Understanding the validity of such rule-based reasons is an important developmental achievement, because besides prototypically moral contexts, children experience, and need to make sense of, many situations in which resources are allocated according to some rules, laws, or conventions.

More generally, we lack a systematic investigation of the developmental trajectory of children's understanding of justified inequality and how this interacts with children's equality preference—hence, the crucial context is one in which both an even and an uneven allocation of resources is possible. Important questions that have not been systematically addressed by prior research are when and how children start considering different reasons for justified inequality and depart from an egalitarian allocation, whether they appreciate some reasons more than others, and whether their understanding changes with age.

Of particular interest is the question of whether children's responsiveness to various justifications for unequal allocations is indeed based on their evaluation of the validity of the reasons given or on simply accepting any verbal justification irrespective of its validity or legitimacy. Recent research has found that when confronted with opposing assertions (e.g., as to which direction a dog went), 4- and 5-year-olds favor an assertion backed by a circular (completely uninformative) explanation (“because he went in this direction”) over an assertion backed by no explanation (Mercier, Bernard, & Clément, 2014). And there is evidence that even adults fall prey to “placebic reasons” such that they accept requests accompanied by circular reasons (“May I use the Xerox [copy] machine, because I have to make copies?”) more than requests accompanied by no reason (Langer, Blank, & Chanowitz, 1978). In the case of distributive justice, it is possible that a young child who gives more resources to one individual “because she has worked more” (supposedly based on appreciation of merit) would be just

as likely to favor an individual “because she just wants more”—especially if the other one provides no reason at all. One of the aims of the current study was thus to investigate children’s appreciation of *legitimate* (normative) reasons for inequality and their ability to differentiate them from *idiosyncratic* (non-normative) reasons.

Finally, there is no study that has specifically assessed children’s ability and motivation to actually enforce norms of distributive justice, for instance, that people “should” give more to those who are in need, meritorious, or entitled (according to rules) than to those who are not. This is surprising given that issues of distributive justice are first and foremost normative issues (Feinberg, 1970; Rawls, 1971; Tugendhat, 1993). Given the research reviewed above – in particular, the findings that 3-year-olds start to consider merit when distributing an odd number of resources, and that 8-year-olds show a sophisticated understanding of distributive justice situations – our questions may be addressed most effectively by testing children between 3 and 8 years of age.

Therefore, in the current study, we investigated 3-, 5-, and 8-year-old children’s understanding of legitimate and idiosyncratic reasons for allocating resources unequally when equal allocation was an option. In the main task (*distribution task*), children had the opportunity to allocate resources (six wooden “food” items) to two individuals (puppets), one of whom (*target puppet*) had provided a reason for why she could get more resources than the other, while the other (*neutral puppet*) had uttered a neutral phrase about the resources, thus serving as a “straw man” across situations. In four conditions, we varied the target puppet’s reason either being legitimate (*need, merit, rule*) or idiosyncratic (*demand* based on personal desire). An analogous additional task (*intervention task*) was designed to assess children’s understanding of the normative dimension of distributive justice. We again used the four conditions. Children had the opportunity to intervene as a third party allocated one item (thus excluding an egalitarian option) to the neutral puppet.

Regarding developmental patterns, we predicted that between 3 and 8 years of age, children’s equality preference would diminish and, in turn, that their appreciation of reasons for (justified) inequality would increase, albeit not equally across conditions: we hypothesized that consideration of legitimate reasons should differ from that of an idiosyncratic reason.

2. Method

2.1. Participants

Seventy-two children participated in the study: 24 three-year-olds ($M = 3$ years, 2 months; range = 36–40 months; 12 girls), 24 five-year-olds ($M = 5$ years, 2 months; range = 60–64 months; 12 girls), and 24 eight-year-olds ($M = 8$ years, 2 months; range = 96–100 months; 12 girls). Children came from mixed socio-economic backgrounds from a mid-size German city and were recruited via urban daycare centers (in which testing took place). Parents provided written informed consent. Five additional children were excluded from the final sample due to experimenter error (3) or uncooperativeness (2).

2.2. Design

In a within-participants design, all children first participated in the distribution task (four trials) followed by the intervention task (four trials). Both tasks were preceded by a warm-up session (playing with a ball and a puzzle game, respectively). The order of condition (demand, merit, need, rule) was systematically varied. Moreover, the target and neutral puppet’s position (left vs. right from the child’s viewpoint) was alternated within and varied between children (LRLR, RLRL), the puppet introduced first (left vs. right) and the puppet speaking first were counterbalanced across children, and the order of the type of resource (see Section 2.3) was systematically varied.

2.3. Materials

In both the distribution and intervention task, four pairs of puppets (giraffe and elephant; zebra and horse; rabbit and hippo; cow and camel) and two plates were used. In the distribution task, the resources were four types of wooden “food” (six items each): bananas, apples, plums, and strawberries. In the intervention task, the resources were four different toy “food” items: a pear, a tomato, an orange, and a cucumber. Furthermore, a human-like hand puppet was used as the “third-party” *distributor* in the intervention task. Three stands (plastic tubes, vertically attached to a base) were used in the intervention task, one for holding the distributor (while the pair of puppets acted), and two for holding the two recipient puppets (while the distributor acted).

2.4. Procedure

Two experimenters conducted the study, which lasted roughly 20 min: E1, the coordinator, and E2, who operated the puppets in both tasks. The child, E1, and E2 sat at a table. E1 sat to the child’s left, and E2 sat vis-à-vis to the child (thus the child faced the two recipient puppets in the distribution task, and the third-party distributor was located between the two recipient puppets in the intervention task).

Table 1
Puppets' phrases and expressive attitudes for each condition.

	Condition			
	Demand	Merit	Need	Rule
Target puppet	T "I could get more [resources],"			N "Now we play the [target puppet]- game, ok?"
	T "because only I just want it like that!"	T "Yes, ok. Then I could get more [resources]," T "because only I cleaned up our room!"	T "because only I am so hungry!"	"because in this game, only [target puppets] get more!" N "Ok."
Neutral puppet	N "[Resources] are normally quite alright."			
Expressive attitude	T appears defiant and determined	T appears proud (via upright posture)	T appears sad and suffering (holding its belly)	Puppets shake hands after T's "Yes, ok."

Note. The order of target/neutral puppet speaking first was counterbalanced (see Section 2.2). The structure of the rule condition was different from the other conditions (in that the neutral puppet was involved in the target puppet's part) to make clear that the neutral puppet voluntarily agrees to play a game in which it will be disadvantaged. In German, the target puppet's phrase ("I could get more [resources]") was "Ich könnte mehr [Ressourcen] bekommen" and the neutral puppet's phrase was "[Ressourcen] sind normalerweise ganz ok." T = target puppet, N = neutral puppet.

2.4.1. Distribution task

In the first warm-up session, the child, E1, and the third-party distributor puppet (from the intervention task) played together with a ball. The distributor acted clumsily (to encourage the child's critical evaluation of his actions in the later intervention task). In each trial of the distribution task, the two recipient puppets appeared simultaneously facing the children, and E1 first introduced each puppet successively to the child, "Look, this is [animal 1], hello [animal 1]! And look, this is [animal 2], hello [animal 2]!" Each puppet replied with "Hello!" Then, E1 placed two plates in front of the puppets, saying to the child, "They each get a plate", and put the resources (e.g., six bananas) in the middle of the table, saying, "And look, here I brought [resource]. They eat [resource]. And you will get to decide who gets how many [resource]. On the plates, ok? But first, listen what they say!" Then, the two puppets spoke to the child. The target puppet explained the reason why she was expecting more resources; the neutral puppet expressed a general positive attitude toward the resources. Table 1 provides an overview of the target and neutral puppet's phrases and expressive attitudes in each condition. After the puppets' phrases, E1 moved the plates closer to the child (and each puppet stayed close to its plate) and prompted the child to allocate the resources, "On the plates, and remember what they have said." E1 looked away while the child distributed the resources.

2.4.2. Intervention task

In the second warm-up task, the child, E1, and the distributor puppet played a puzzle game. The distributor, again, made a mistake (put a puzzle piece vertically onto the board, so it did not fit). Children had the opportunity to intervene and to correct the distributor. This warm-up task was to make children feel comfortable interacting with the distributor.

The structure of the intervention task was analogous to the distribution task. E1 explained that they will "continue playing with the animals", but that this time, the third-party distributor "gets to do it". E1 said that she had only one item and that only one of the puppets could get the item from the distributor. E1 then told the distributor (positioned on a stand) and the child "You both listen to what the animals say!" Then, the puppets spoke to the child (see Table 1; since there was only one item, the puppets used the singular form [resource] where appropriate). After the puppets' phrases, E2 put the two puppets onto the stands (located close to the respective plates), and operated the distributor. E1 said to the child "Only one can get the [resource]", and then to the distributor "[Distributor], remember what they have said. And do it right, ok?" Then, E1 turned away from the table and there were three consecutive test phases: (i) in the *spontaneous protest phase*, children's spontaneous interventions (verbal and behavioral) were measured. The distributor took the item and uttered "Hmm" thoughtfully twice. Then, the distributor moved slowly toward the neutral puppet's plate, paused briefly, looked at the plate, looked at the child, uttered "Hmm", then put the item on the plate, and moved back centrally. After approximately 3 s, the next phase began. (ii) In the *elicited protest phase*, children had the opportunity to accept or reject the distributor's act when the distributor asked children the polar question "To the [neutral puppet]?" This question was omitted in case children put the item on the target puppet's plate themselves (behavioral prevention), as the question then became obsolete. (iii) In the *reasoning phase*, children were prompted to justify their elicited answer or behavioral prevention—that is, the distributor asked "And why?" (if children answered the polar question positively) or "And why to the [target puppet]?" (if children answered the polar question negatively or put the item on the target puppet's plate; see next section). If a child did not respond at all (neither in the elicited protest phase, nor by behavioral prevention), children's reasoning could not be measured, since the question "And why?" would not be relevant.

2.5. Coding and dependent measures

All sessions were recorded, transcribed, and coded from videotape by a single observer. A second independent observer, blind to the hypotheses and conditions of the study, transcribed and coded a random sample of 25% of all sessions for reliability.

2.5.1. Distribution task

The number of items participants put on each plate (neutral vs. target puppet discerned from left vs. right plate) were coded. Interrater reliability was very good, Cohen's $\kappa = 1$. For the statistical analyses, the following outcome variables based on children's allocation were created for each child per condition: a binary preference for the target puppet (yes or no; i.e., the target puppet received four or more of the six items vs. three or fewer items) and a binary equality preference (yes or no; i.e. each recipient puppet received three items). Three trials were excluded due to experimenter error (2) or because a child explicitly favored one puppet before listening to the puppets' phrases (1).

2.5.2. Intervention task

In the *spontaneous protest phase*, children's verbal and behavioral interventions were classified into one of three mutually exclusive and jointly exhaustive categories (hierarchically ordered):

- (i) *normative protest*, that is, protest, critique, and tattling¹ (to E1) making use of normative vocabulary (e.g., "That's wrong", "You have to give it to him!", "He gave it to the wrong one!");
- (ii) *non-normative protest*, that is, imperatives (e.g., "Give it to him!"), behavioral prevention (child puts item on target puppet's plate), and more indirect forms of protest (e.g., saying "No!" or "Uh-uh!", head-shaking, pointing at the target puppet's plate, signs of disagreement like "I would have given it to [target puppet].", and suggestions, such as "Come on, let's give it to [target puppet].");
- (iii) *no protest* (i.e., no or irrelevant utterances and behaviors).

For each condition, each child received as the final code the highest code that was assigned (e.g., if both normative and non-normative protest occurred, normative protest was assigned). Interrater reliability was very good, Cohen's $\kappa = .97$. For the statistical analyses, a composite binary outcome variable (0 = no protest, 1 = normative or non-normative protest) and an ordinal outcome variable (0 = no protest, 1 = non-normative protest, 2 = normative protest) were generated for each child per condition.

In the *elicited protest phase*, children's responses to the distributor's polar question ("To the [neutral puppet]?") were assigned one of the following two mutually exclusive codes:

- (i) *explicit elicited protest*, that is, negative answers, such as "No!", head-shaking, and imperative or normative phrases (e.g., "Wrong!");
- (ii) *implicit elicited protest*, that is, the child points at the target puppet or makes indirect suggestions (e.g., "The [target puppet] could eat that.").

Interrater reliability was very good, Cohen's $\kappa = .94$. For the statistical analyses, a composite binary outcome variable (0 = no answer or other utterances, 1 = explicit or implicit elicited protest) was computed for each child per condition.

In the *reasoning phase*, children's responses to the distributor's question "And why?" (i.e., their justification of their elicited answer) were considered a valid justification if they directly referred to the reason given by the target puppet (e.g., "Because he cleaned up.") or to a meaningful relation between the puppets (e.g., "Only he cleaned up, the other one did not.", "He is hungrier than the other one."). Other responses not considered valid were, for example, references to preferences, desires, unspecific justifications (e.g., "Because he said so."), or irrelevant reasons (e.g., "Because his fur is soft.").

Interrater reliability was very good, Cohen's $\kappa = .97$. For the statistical analyses, a composite binary outcome variable (valid reason provided: 0, 1) 0 given that a child performed elicited protest or had performed behavioral prevention (giving the item to the target puppet) in the spontaneous protest phase (so that the distributor directly asked the child for justification). In the intervention task, 10 trials were excluded due to inattentiveness of the participant during the puppets' phrases (4), experimenter error (5), or technical error (1).

2.6. Statistical analysis

Statistical analyses were run in R, version 3.0.2 (R Core Team, 2013). To account for the non-independence of the data (i.e., repeated observations per child), we used mixed models that allow for the inclusion of both fixed and random effects. For binary outcome variables, we used Generalized Linear Mixed Models (GLMMs) with binomial error structure (Baayen, 2008; Bates, Maechler, Bolker, & Walker, 2013). Odds ratios (ORs) and their 95% confidence intervals (CIs) were computed to estimate effect sizes. For the analysis on children's spontaneous protest (with the ordinal outcome variable: 0–2), we used an Ordered Logistic Regression (Christensen, 2013b). Since the proportional odds assumption is frequently not met (Peterson & Harrell, 1990), effect sizes (adjusted ORs and their 95% CIs) were estimated by relaxing the proportional odds assumption in a partial proportional odds model including age as a nominal effect (Agresti, 1989; Christensen, 2013a). Initial models included as fixed effects the predictor variables and interaction terms of interest as well as the control variables:

¹ Protest was considered spontaneous if the child performed it autonomously and proactively without being asked by the distributor. Therefore, normative tattling was also counted as spontaneous, although it could occur at the end of a trial when E1 turned back to the table.

target puppet's position (left or right), puppet speaking first (left or right), puppet introduced first by E1 (left or right), trial, and gender. Participant ID, type of food, and the random slope of trial were included as random effects.² In all analyses, none of the control variables were significant except for puppet introduced first by E1 (distribution task) and trial (intervention task: follow-up analysis on elicited protest). All control variables were kept in the models to control for confounding effects. For all initial models, the procedure was as follows: first, the combined significance of the predictor variables (i.e., main and interaction effects) was tested by comparing the fit of the full model (including the predictor variables, control variables, and random effects) with the fit of a null model that only contained the control variables and random effects using a likelihood ratio test (LRT; Dobson, 2002). Second, in case this full-null model comparison was significant, effects of interest were tested (using LRTs for interaction and main effects where appropriate, and unstandardized parameter estimates (b) from the respective full model for age effects within conditions or for differences in age effects between conditions). All full-null model comparisons were significant. The approach of testing the overall full model against a null model helps to protect against Type I error inflation arising from models comprising more than one predictor variable (Forstmeier & Schielzeth, 2011).

3. Results

3.1. Distribution task

Across age and condition, the target puppet was favored by children in 58% of trials (and received on average 3.56 out of 6 items), the neutral puppet was favored in 10% of trials (and received on average 2.44 out of 6 items), and neither puppet was favored (i.e., items were allocated equally) in 32% of trials. The neutral puppet was favored by 3-year-olds in 19% of trials, and by 5- and 8-year-olds in 5% of trials. Across ages, 56% of children favored the demanding target, 61% the meritorious target, 54% the needy target, and 61% the rule target.

Our main question was whether children's consideration of legitimate (merit, need, rule) – but not of idiosyncratic (demand) – reasons for unequal resource allocation would increase with age. Therefore in our first analysis, the dependent measure was children's preference for the target puppet (yes, no) and we compared 3- versus 5-year-olds and 5- versus 8-year-olds to identify developmental trajectories.³

Fig. 1 depicts the proportion of children favoring the target puppet in each condition as a function of age. For 3- and 5-year-olds, there was no significant interaction between age and condition, $\chi^2(3)=3.8$, $p=.28$, no effects of condition for 3-year-olds, $\chi^2(3)=4.07$, $p=.25$, or 5-year-olds, $\chi^2(3)=3.48$, $p=.32$, but a significant effect of age, $\chi^2(1)=10.81$, $p=.001$. Thus, on average, across conditions, 5-year-olds ($M=.64$, $SD=.44$) favored the target puppet significantly more often than 3-year-olds ($M=.31$, $SD=.28$).

For 5- and 8-year-olds, there was a significant interaction between age and condition, $\chi^2(3)=10.0$, $p=.019$, and a significant effect of condition for 8-year-olds, $\chi^2(3)=8.13$, $p=.04$, suggesting that whereas 8-year-olds were more likely than 5-year-olds to favor the target puppet in the merit, need, and rule conditions, the two age groups did not differ in their preference for the target puppet in the demand condition (see Fig. 1). This developmental pattern was confirmed when comparing the non-significant age effect in the demand condition ($b=-.60$, $SE=1.17$, $z=-.51$, $p=.61$; $OR=1.81$, $CI=0.18-17.82$) with the age effects in the merit ($b=3.87$, $SE=1.52$, $z=2.55$, $p=.01$; $OR=48.09$, $CI=2.44-945.47$), need ($b=2.18$, $SE=1.30$, $z=1.68$, $p=.09$; $OR=8.81$, $CI=0.69-111.82$), and rule ($b=2.99$, $SE=1.35$, $z=2.22$, $p=.03$; $OR=19.87$, $CI=1.42-277.59$) conditions (see Fig. 1).

Our second question was whether children's equality preference would decrease with age. Fig. 2 depicts the proportion of children allocating the items equally in each condition as a function of age. We found no significant interaction between age and condition, $\chi^2(6)=4.42$, $p=.62$, no significant main effect of condition, $\chi^2(3)=1.56$, $p=.67$, but a significant main effect of age $\chi^2(2)=13.57$, $p=.001$. Thus, on average, across conditions, 3-year-olds ($M=.50$, $SD=.38$) distributed the resources equally more often than 5-year-olds ($M=.32$, $SD=.43$) who, in turn, distributed equally more often than 8-year-olds ($M=.15$, $SD=.21$).

3.2. Intervention task

Our main question was whether children's normative understanding of legitimate reasons for unequal resource allocation would increase with age. Since we measured two types of protest behavior – spontaneous protest and elicited protest – we examined this question in our main analysis by using children's protest (0, 1) as the dependent measure, and type of protest (spontaneous, elicited), condition, and age as predictors. We found no significant interaction between age and condition, $\chi^2(6)=3.33$, $p=.77$, but a significant interaction between type of protest and age, $\chi^2(2)=10.63$, $p=.005$, suggesting that, across conditions, with increasing age children performed more elicited protest ($M_{3\text{-year-olds}}=.08$, $SD=.25$; $M_{5\text{-year-olds}}=.26$, $SD=.36$; $M_{8\text{-year-olds}}=.38$, $SD=.40$), but that 5-year-olds ($M=.44$, $SD=.38$) performed most spontaneous protest followed

² The random slope of trial was included for the distribution task only to reduce model complexity and avoid overfitting in the other analyses.

³ Three- and 8-year-olds would only be compared in case no age effects were found for the two main age comparisons.

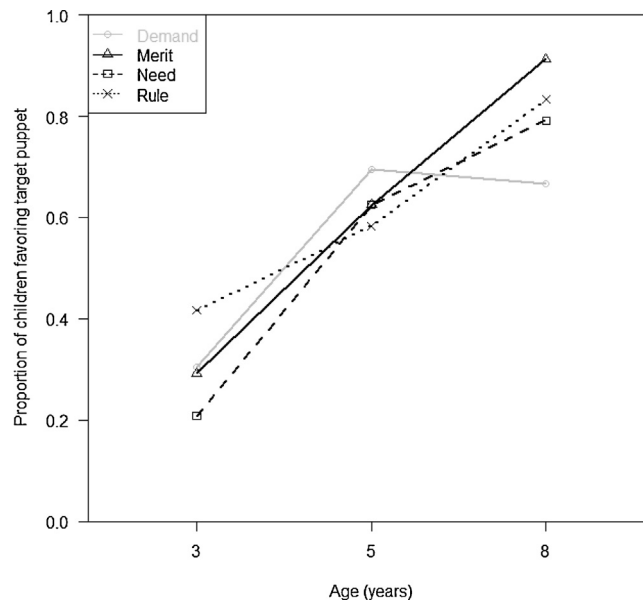


Fig. 1. Proportion of children in the distribution task favoring the target puppet in each condition as a function of age.

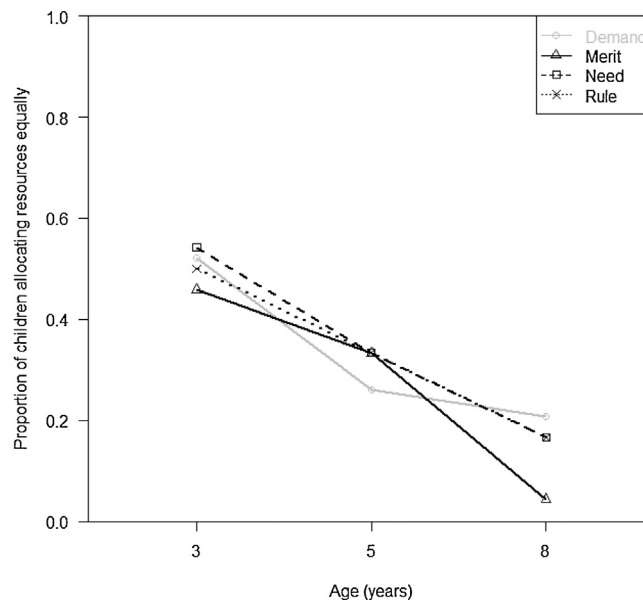


Fig. 2. Proportion of children in the distribution task allocating the resources equally in each condition as a function of age.

by 8-year-olds ($M = .31$, $SD = .38$) and 3-year-olds ($M = .13$, $SD = .38$). To get a more detailed picture of children's differential protest behavior, we conducted separate analyses for children's spontaneous and elicited protest.

3.2.1. Spontaneous protest

The dependent measure was ordinal (0–2: no protest, non-normative protest, normative protest). Fig. 3 illustrates the proportion of children performing spontaneous protest (non-normative, normative) in each condition as a function of age. We found no significant interaction between age and condition, $\chi^2(6) = 3.73$, $p = .71$, no main effect of condition, $\chi^2(3) = 1.04$, $p = .79$, but a significant main effect of age, $\chi^2(2) = 13.49$, $p = .001$, suggesting that regardless of condition, 5-year-olds were more likely to perform spontaneous protest than 3-year-olds, with 8-year-olds falling in between. Follow-up age comparisons revealed that the effects were different for the different types of spontaneous protest: for 5- versus 3-year-olds, the odds of 5-year-olds performing any kind of protest (vs. no protest) were significantly higher than those of 3-year-olds ($OR = 20.51$, $CI = 3.3–126.8$, $p < .01$), and the odds for normative protest (vs. non-normative or no protest) showed the same significant pattern ($OR = 27.29$, $CI = 2.72–273.91$, $p < .01$). Five- and 8-year-olds, on the other hand, were equally likely to protest at

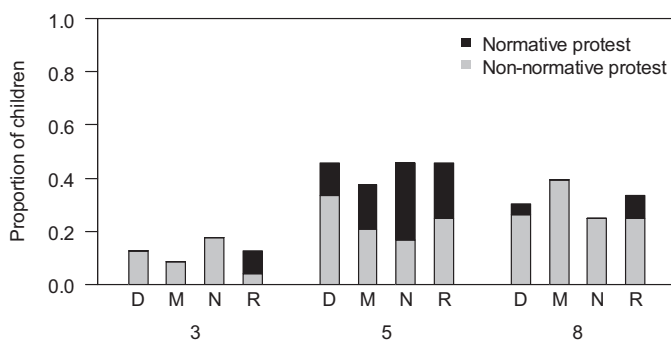


Fig. 3. Proportion of 3-, 5-, and 8-year-olds in the intervention task performing spontaneous protest (normative, non-normative) in each condition (D = demand, M = merit, N = need, R = rule).

all (OR = 3.0, CI = 0.58–15.43, $p = .19$), but the odds of 5-year-olds performing normative protest (vs. non-normative or no protest) were significantly higher than those of 8-year-olds (OR = 23.22, CI = 2.49–216.72, $p < .01$). Finally, the comparison between 8- and 3-year-olds revealed significantly higher odds of performing any kind of protest for 8-year-olds (OR = 6.81, CI = 1.16–40.26, $p < .05$), but there was no significant difference between these two age groups regarding normative protest versus non-normative or no protest (OR = 1.18, CI = 0.09–16.09, $p = .91$).

3.2.2. Elicited protest

The dependent measure was binary (elicited protest: 0, 1). We found no main effect of condition, $\chi^2(3) = .05$, $p = .99$, but a significant main effect of age, $\chi^2(2) = 12.15$, $p = .002$, confirming the linear increase in elicited protest (from age 3 to 8) found in the main analysis above.

3.2.3. Reasoning

In the reasoning phase, children had the opportunity to justify their rejection of the distributor giving the item to the neutral puppet. Children who neither responded to the distributor's question in the elicited protest phase nor performed behavioral prevention (putting the item on the target puppet's plate) could not be asked for justification. Therefore, the following analysis is based on 4 three-year-olds, 11 five-year-olds, and 15 eight-year-olds. Valid justifications were, for instance, references to the reason given by the target puppet (e.g., "Because he cleaned up.," see Section 2.5 for details). The dependent measure was binary (valid reason given: 0, 1) and our analysis focused on children's justification of their disagreement with the distributor's decision to favor the neutral puppet. We found no significant effect of condition, $\chi^2(3) = 5.12$, $p = .16$, but a significant effect of age, $\chi^2(2) = 8.25$, $p = .016$, suggesting an age trend similar to children's elicited protest behavior: valid reasons were given by 11 of 15 eight-year-olds (69% of trials), 7 of 11 five-year-olds (53% of trials), and 1 of 4 three-year-olds (18% of trials).

4. Discussion

The present study was the first to investigate children's developing understanding of legitimate (merit, need, rule) and idiosyncratic (egocentric demand) reasons for allocating resources unequally. At the same time, our study allowed us to assess the developmental trajectory of children's equality preference when confronted with these valid and invalid reasons for inequality.

We found, as predicted, that 3-year-olds possess a strong preference for equality. Between 3 and 5 years of age, children's equality preference decreased significantly, such that 5-year-olds indiscriminately favored the target individual for both legitimate and idiosyncratic reasons. Importantly, we found that the acceptance of legitimate reasons – but not of idiosyncratic demands – increased between 5 and 8 years, suggesting that between preschool and early school age, children develop a more flexible, adult-like understanding of distributive justice: they come to appreciate some reasons for unequal distribution more when they pertain to valid claims or entitlements than when they are personal and idiosyncratic and thus less persuasive to warrant privileged treatment. Lastly, in the intervention task, we found evidence that by 5 years of age, children start understanding the normative dimension of distributive justice such that they intervene and correct a distributor who does not respond to a recipient's request for more resources. However, children in this task did not differentiate between valid and invalid reasons for inequality, which will be discussed further below.

These findings are important in two ways. First, they suggest that children's understanding of distributive justice extends to rule-based reasons (that are based on agreement), and that by 8 years of age children not only depart from outcome equality when rule-based reasons are given, but also show a tendency to accept such reasons more than idiosyncratic demand. The appreciation of rule-based reasons is crucial for developing an understanding of entitlement, law, and social institutions more generally (Deutsch, 1975; Feinberg, 1970, 1974; Lerner, 1977; Rawls, 1971; Searle, 2010). Second, our findings provide an overview of how the attenuation of children's equality preference goes hand in hand with children's

increasing understanding of justified inequality, with 8-year-olds being competent at evaluating different kinds of reasons in terms of their legitimacy. This finding is consistent with recent research suggesting a more differentiated notion of distributive justice at around 8 years of age (Blake & McAuliffe, 2011; DeJesus et al., 2014; Fehr et al., 2008; Shaw & Olson, 2012; Smith et al., 2013).

At first glance, our finding of 3-year-olds not considering merit seems to contradict prior work that found that young children take merit into account (Baumard et al., 2012). However, our study used an even number of resources (distribution task) from the start, thus measuring children's ability to overcome their deeply rooted equality preference (Geraci & Surian, 2011; Schmidt & Sommerville, 2011; Sloane et al., 2012). In contrast, Baumard et al. (2012) used items of different sizes (Experiment 1) or an uneven number of items (Experiment 2); in addition, they found that when prompted to allocate the remaining item in Experiment 2, children's allocations were mostly egalitarian.

One might wonder why 5-year-olds were indiscriminate and accepted an idiosyncratic demand as much as legitimate reasons in the present study. Here it is important to note that in all the conditions, the "straw man" (neutral puppet) did not show any particular interest in the resources which might have led many children to favor the target individual that showed strong interest. This appreciation of an idiosyncratic and egocentric demand may even be seen to parallel the recent finding that there is a discrepancy between preschoolers' own egocentric sharing behavior (they follow their idiosyncratic desires) and their knowledge about what others expect from them (Smith et al., 2013). Moreover, 5-year-olds' indiscriminate favoring of any reason over no reason corroborates the recent finding that 4- to 5-year-olds will favor an assertion backed by some explanation (even if it is circular) over an assertion backed by no explanation (Mercier et al., 2014).

Since both 3- and 5-year-olds treated all reasons for inequality the same, it is possible that children younger than 8 understood the target individual's suggestion to get more as a command they should comply with. What speaks against this interpretation – most clearly for 5-year-olds – is that (i) the target individual actually uttered a polite suggestion ("I could get more") rather than an imperative ("Give me more!"), (ii) the "compliance rate" (i.e., the proportion of children favoring the target puppet) was very low for both age groups, and (iii) 5-year-olds protested spontaneously and normatively when the distributor gave the item to the neutral puppet in the intervention task in which children themselves could not comply with any request—they were disinterested observers who formed normative attitudes, as it were (Schmidt & Rakoczy, 2016). If 5-year-olds conceived of these reasons as simple commands they should obey to avoid sanctions, this would only apply to the distribution task in which they could have been the target of sanctions in case of non-compliance. Since in the intervention task, the distributor puppet – not the child – would have been the target of sanctions, it seems unlikely that 5-year-olds construed the target individual's suggestion as a simple coercive command. Therefore, we suggest that 5-year-olds understood the target individual's phrase as a reason that does justify privileged treatment, but that they did not see any difference between genuinely normative (legitimate) and non-normative (idiosyncratic) reasons.

In the current study we sought to obtain a clean measure of children's willingness to accept different reasons for privileged treatment of a target individual as compared to an individual who was neutral toward the resources (a "straw man"). Another interesting, and potentially more ecologically valid, situation is one in which two individuals provide different reasons for privileged treatment. Future work could therefore directly pit different reasons – for instance valid and invalid ones – against each other to determine the developmental course of children's weighing of different reasons. Moreover, issues of distributive justice are interrelated with ingroup favoritism (DeJesus et al., 2014; Fehr et al., 2008) and vary substantially between cultures, for instance, as to how much people value merit (which can influence children's judgments; Schäfer, Haun, & Tomasello, 2015). Thus, future studies could investigate whether it makes a difference for children (at different ages and in different cultures) whether reasons for inequality are provided by members of their own group or of another group.

In the intervention task, we found some evidence for children appreciating the normative dimension of distributive justice. However, there were no condition differences such that 5-year-olds enforced not only legitimate demands, but also an idiosyncratic demand. This could be partly due to the forced-choice nature of the task: There was only one item and the distributor gave it to the neutral individual, although the target individual clearly demanded the item. Even though this demand was backed by a weak reason (normatively speaking), it is not inconceivable to accept this demand since the individual "really wanted it" in contrast to the other individual. Moreover, as our focus lay on children's own distribution of resources, the intervention task always came last. This might have prevented us from finding differences between conditions in this task. Another point which might be relevant here is that in children's social world, distributive justice norms that go beyond equality (e.g., "You should share equally!") might be less prominent, less explicit, and more intricate (e.g., "Those who work more should get more"), so that young children have a harder time learning them than, for instance, simple game rules or behavioral rules that are explicitly introduced by adults or well-known moral norms against harming others (Killen & Smetana, 2006; Rakoczy & Schmidt, 2013; Schmidt & Tomasello, 2012; Turiel, 1998).

We found an interesting decline in spontaneous (normative) protest in 8-year-olds as compared with 5-year-olds. However, 8-year-olds had higher rates of elicited protest. Obviously, this might be explained by 8-year-olds' enhanced inhibitory control and reduced spontaneity (Zelazo & Müller, 2002). More generally, their apparent "wait-and-see" attitude might simply be seen as more "mature" in the sense that only a minority of adults actually punish norm violators outside the laboratory (Balafoutas & Nikiforakis, 2012). Nevertheless, 8-year-olds performed most elicited protest and were more likely to provide adequate reasons for their responses than younger children.

In sum, the present findings suggest that children's understanding of reasons for unequal resource allocation increases strongly between 3 and 8 years of age. First, children's equality preference is weakened between early childhood and preschool age. Second, children's equality preference is again considerably diminished, and their capacity to differenti-

ate between valid (merit, rule, and need) and invalid (idiosyncratic) reasons matures between preschool and early school age. Importantly, children come to appreciate not only merit and need but also rule-based distributive justice despite its arbitrariness, opening the possibility that they recognize these rules as legitimate because they are agreed-upon and thus valid and binding “social facts”.

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