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Children's understanding of equity in the context of inequality

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In the context of a pre-existing resource inequality, the concerns for strict equality (allocating the same number of resources to all recipients) conflict with the concerns for equity (allocating resources to rectify the inequality). This study demonstrated age-related changes in children's (3–8 years old, $N = 133$) ability to simultaneously weigh the concerns for equality and equity through the analysis of children's judgements, allocations, and reasoning in the context of a pre-existing inequality. Three- to 4-year-olds took equity into account in their judgements of allocations, but allocated resources equally in a behavioural task. In contrast, 5- to 6-year-olds rectified the inequality in their allocations, but judged both equitable and equal allocations to be fair. It was not until 7–8 years old that children focused on rectifying the inequality in their allocations and judgements, as well as judged equal allocations less positively than equitable allocations, thereby demonstrating a more complete understanding of the necessity of rectifying inequalities. The novel findings revealed age-related changes from 3 to 8 years old regarding how the concerns for equity and equality develop, and how children's judgements, allocations, and reasoning are coordinated when making allocation decisions.

Decisions regarding the fair allocation of resources pervade social life, from disputes over toys in childhood, to resolving long-standing, societal inequalities in adulthood; access to resources is a fundamental human concern. Resource allocation has been studied by psychologists, behavioural economists, and philosophers (Fehr, Bernhard, & Rockenbach, 2008; Killen & Smetana, 2015; Sen, 2009). The interdisciplinary focus reveals the complexity of the topic, with research investigating what constitutes a legitimate claim, how to balance the needs of the individual and the group, and concepts of fairness and justice (Blake & McAuliffe, 2011; Cooley & Killen, 2015; Paulus & Moore, 2014; Schmidt, Rakoczy, & Tomasello, 2012; Turiel, 2008, 2014).

Research in developmental science has shown that young children are highly sensitive to concerns about equality, and divide resources according to strict equality – allocating the same number of resources to all recipients – in many contexts. By 3 years old, children allocate resources equally between family members, friends, and strangers (Kenward & Dahl, 2011; Olson & Spelke, 2008), judge equal allocations to be fair, and reason about the concerns for equality (Cooley & Killen, 2015). By 6 years old, children will even throw resources away rather than allocate them unequally (Blake & McAuliffe, 2011; Shaw & Olson, 2012). The aversion to unequal allocations has been documented cross-culturally (Blake *et al.*, 2015; but see Paulus, 2015). There are contexts, however, in which equal

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allocations may not be fair. Contexts with equity-based concerns (e.g., merit, need, pre-existing inequalities), for example, may necessitate unequal allocations to ensure fairness.

In the context of a pre-existing inequality – when one recipient has received fewer resources than another – a strictly equal allocation perpetuates the status quo inequality between recipients. To rectify the inequality, resources have to be divided in such a way so that more are distributed to the recipient who previously had less. Given children's documented concern for strict equality throughout much of childhood, it may not be until later in development that children begin to allocate resources unequally to rectify a pre-existing inequality.

In one study, 3.5- to 7.5-year-olds and 7.5- to 11.5-year-olds were presented with group-level inequalities based on race and were asked to allocate resources (e.g., cookies) to members of each of these groups (Olson, Dweck, Spelke, & Banaji, 2011). In this context, 3.5- to 7.5-year-olds perpetuated the race-based inequality. It was not until 7.5–11.5 years old that children rectified the inequality. Yet, in a related study, when children were shown inequalities of necessary resources (e.g., medicine), 5- to 6-year-olds rectified the inequality (Elenbaas & Killen, 2016; also see Li, Spitzer, & Olson, 2014; Paulus, 2014). Thus, past research on children's responses to inequalities is mixed.

Further, it remains unknown how children's understandings of the normative, prescriptive concerns for equity-based fairness develop cognitively and behaviourally, and how these modalities relate to one another; that is, it is unclear whether children in past research allocated equitably because they were unable to allocate equally, personally preferred the recipient with less, or out of the concern for rectifying an inequality due to the harm to the disadvantaged recipient. A comprehensive assessment of how children evaluate equal, equitable, and unequitable allocations is needed to understand children's understanding of the normative, prescriptive concern for equity.

Theoretical framework

The theoretical perspective guiding this study stemmed from moral development and social cognition, referred to as social domain theory (Turiel, 1983, 2008). Social domain theory has argued that many social contexts are multifaceted, involving multiple relevant concerns. In the context of pre-existing inequalities, children may think about the equality (ensuring that all involved parties receive the same share) or equity (ensuring that individuals who were disadvantaged in the past are fairly compensated). Each of these concerns is constructed throughout development and informs children's allocation decisions differently in different contexts.

Social domain theory has shown that judgements, behaviour, and reasoning represent distinct, yet increasingly coordinated processes throughout development (Turiel, 2008). In resource allocation contexts, allocation assessments provide information regarding which concern children appear to give priority to (e.g., equality or equity). Judgement assessments provide necessary information regarding children's developing understanding of each of the multiple relevant concerns (e.g., equity, equality). Additionally, reasoning assessments allow for an assessment of children's underlying motivations for their allocations, and can provide converging evidence that children's judgements of multiple concerns influence how they decide how to allocate resources.

This study investigated children's developing ability to evaluate resource allocation decisions across judgements, behaviour, and reasoning for different moral concerns (i.e., equity, equality). Social domain theory postulates that children construct knowledge through their interactions and inferences, which informs their judgements and reasoning

(Killen & Rutland, 2011; Turiel, 1983). From this approach, coordination refers to the process of how judgements and reasoning are integrated into a child's decisions and the extent to which each modality reflects the same set of moral considerations. Research to date has not conducted analyses that compare children's allocations, judgements of allocations, and their reasoning for their allocations. This was a central and novel goal of this study.

In many resource allocation contexts, multiple moral concerns may conflict (e.g., equality and equity). In these situations, children may recognize that both equality and equity are important – by judging them both to be fair means of allocation – but nonetheless must give priority to one of these concerns when allocating. As children construct a more advanced understanding of equity, they may come to see strict equality as an unfair allocation practice in the context of inequalities. A mature understanding of equity involves not only allocating resources equitably, but also recognizing that a strictly equal allocation would be unfair and *why* it would be unfair. Documenting the developing coordination of children's early moral judgements and reasoning with their allocations is critical to understanding the broader picture of moral development (Dunn, 2006; Killen & Smetana, 2015).

Present experiment

The present experiment investigated age-related changes in children's developing allocations, judgements, and reasoning in a context of inequality. Three age groups (younger: 3- to 4-year-olds; middle: 5- to 6-year-olds; older: 7- to 8-year-olds) were assessed. No study to our knowledge has examined age-related changes from 3 to 8 years old for children's judgements, reasoning, and allocation responses regarding three distinct allocation contexts, equality, equity, and inequity, when a pre-existing inequality regarding resources was made explicit and salient.

Children were presented with a vignette about two recipients, one from a wealthy town with a lot of resources and another from a poor town with no resources. To control for perceptions of merit in the present study, children were explicitly told that both recipients worked, and produced, the same amount. Children were asked to make decisions about their allocation, reasoning, and judgements of *equal* (the same to both recipients), *equitable* (more to the recipient with no resources), and *unequitable* (more to the recipient with an excess of resources) allocations.

It was hypothesized that: (1) the younger age group would demonstrate an emerging understanding of equity in their judgements and reasoning, but a preference for strict equality when allocating and judging equal allocations. Based on research demonstrating 3-to 4-year-old children's proclivity for equal allocations (Cooley & Killen, 2015; Olson & Spelke, 2008), we hypothesized that these children would allocate resources equally in the present study and judge equal allocations to be fair. Further, based on research demonstrating that children's concern for equity develops early, specifically when equal allocations are not possible (Li, Spitzer, & Olson, 2014), we hypothesized that the emerging concern for equity would lead 3- to 4-year-old children to judge equitable allocations to be more fair than unequitable allocations.

(2) The middle-age group would demonstrate an emerging preference for equity over strict equality, but would still maintain the concern for strict equality. Based on research finding that 5-, but not 3-year-old children share more with poor than rich individuals (Paulus, 2014), we hypothesized that 5- to 6-year-olds would allocate resources equitably, and judge equitable allocations to be fair. Further, based on research finding that 5- to

6-year-old children evaluate equal allocations positively (Cooley & Killen, 2015), we hypothesized that 5- to 6-year-old children would also judge equal allocations to be fair.

(3) The older age group would demonstrate an increasing concern for equity and would begin to recognize the obligation to rectify unjustified inequalities by no longer judging equal allocations to be fair. Based on research finding that 7- to 8-year-old children act to rectify inequalities (Blake *et al.*, 2015; Fehr *et al.*, 2008), we hypothesized that 7- to 8-year-old children would allocate equitably and judge equitable allocations to be fair. Further, research has documented that children become more rigid in their conceptions of fairness during this period, reporting that only one allocation is fair, and deviations from that allocation are unfair (Damon, 1977; Sigelman & Waitzman, 1991). Based on these findings, we hypothesized that 7- to 8-year-old children would not judge equal allocations to be fair.

Further, based on theoretical and empirical accounts documenting the interrelation between children's judgements, behaviours, and reasoning (Killen & Rutland, 2011; Turiel, 2008), we had two additional hypotheses regarding the interrelation between children's judgements, allocations, and reasoning for their allocations. It was hypothesized that (4) children who allocated equitably would reference the concern for rectifying the inequality, whereas children who allocated equally would reference the concern for equality; and (5) children's allocations would be predicted by their judgements of equal and equitable allocations.

Methods

Participants

Participants were 3- to 8-year-old children (N = 133), divided into three age groups: younger (3–4 years; n = 55, 29 females; M = 4.30, range: 3.22–4.99), middle (5–6 years; n = 53, 19 females; M = 5.76, range: 5.01–6.84), and older (7–8 years; n = 25, 11 females; M = 7.82, range: 7.12–8.99). Participants were from schools serving low- to middle-income families in the Mid-Atlantic region of the United States. All children in the age range were invited to participate. Differences in sample sizes between groups reflected enrolment at the participating schools. Written parental consent and children's verbal assent were obtained for all participants. Participant race/ethnicity reflected the US distribution with 70% ethnic majority (European American) and 30% ethnic minority (Latino, Asian American, African American, Other).

Procedure

Research assistants interviewed participants in the participant's school. Cardboard cut-outs of characters and resources were used to illustrate the stories and allowed children to allocate resources. Children were first trained on how to use the Likert-type scale (see Appendix S1 for the training script). Story characters were present throughout the experiment, and resources were given to children during resource allocation questions, and were aligned underneath the characters during judgement questions. Interviews took approximately 20 min to complete.

Participants heard vignettes about two characters, Nug and Thump, who worked to acquire resources ('blickets') (as with previous research with children, novel characters and resources have the advantage of serving as a control across participants in terms of recipient demographics). The recipients were introduced as being from fictional towns

that have either a history of having or not having resources, providing a reason for the inequality beyond the control of the recipients. One recipient was described as having a lot of resources and being from a town with many resources, whereas the other recipient was described as having no resources and being from a town with few resources. Pilot testing yielded no order effects between the tasks; thus, assessments were administered in a fixed order: *Resource Allocation*, *Judgements of Allocations*.

The merit of the two characters was controlled for given research on young children's understanding of merit (Baumard, Mascaro, & Chevallier, 2012). Participants were explicitly told that both recipients worked the same and found the same amount.

Manipulation check

Participants were asked two memory questions: (1) to identify which character had a lot of resources and which character had none. (2) To identify whether one character worked harder, or whether both characters worked the same amount. If a participant failed a question, the vignette was repeated up to two additional times and both memory questions were reassessed. Less than 10% of participants failed either memory question. All participants ultimately answered both memory questions correctly; thus, none were excluded from the sample.

Resource allocation

Participants completed two assessments: (1) *Resource Allocation* and (2) *Reasoning for Resource Allocation.* In the *Resource Allocation* assessment, participants were asked, 'Can you show me how many blickets you think Nug and Thump should each get?' Participants were given six resources to allocate between the recipients. All participants allocated all six resources. The number of resources allocated to the recipient with no resources was recorded on a scale from 0 to 6.

In the *Reasoning for Resource Allocation* assessment, participants were asked, 'Why do you think Nug should get [X] and Thump should get [Y]?' Participants gave their answer verbally while the research assistant recorded it for content coding. Reasons were coded for quantitative analyses into four categories drawn from past research (Damon, 1977; Sigelman & Waitzman, 1991): (1) *Others' Welfare* (references to the welfare of the characters; e.g., 'They'll be sad'), (2) *Strict Equality* (references to the equal treatment of individuals; e.g., 'they should get the same amount'), (3) *Rectifying Inequality* (references to the inequality between the characters; e.g., 'she doesn't have any and she has a lot'), and (4) *Other* (statements that contradict the story and other undifferentiated or global statements). Reasoning was coded as 1 = full use of the category; .5 = partial use; 0 = no use and analyses were conducted on proportional usage. Less than 5% of the participants used more than one code. Two research assistants, blind to the hypotheses of the study, conducted the coding. On the basis of 25% of the interviews (n = 34), Cohen's κ = .84 for inter-rater reliability.

Judgements of allocations

The *Judgements of Allocations* task consisted of three assessments: (1) *Judgement of Equal Allocation*, (2) *Judgement of Equitable Allocation*, and (3) *Judgement of Unequitable Allocation.* In the *Judgement of Equal Allocation* assessment, participants were asked about another, hypothetical, gender-matched, child's decision to allocate

three resources to each recipient ('How Okay or not Okay is it for Sam to give Nug and Thump the same amount?'). Participants then indicated their evaluation on a Likert-type scale (1 = really not OK, 6 = really OK) by either pointing or saying their response aloud. This same format was used for the *Judgement of Equitable Allocation* (five to the recipient with no resources and one resource to the recipient with a lot of resources) and *Judgement of Unequitable Allocation* (one resource to the recipient with no resources and five resources to the recipient with a lot of resources) assessments.

Resource type

Given that some research has found differences in children's allocations based on the resource being allocated (Chernyak & Sobel, 2015; Shaw & Olson, 2013), while other research has not (Warneken, Lohse, Melis, & Tomasello, 2010), we conducted analyses to determine whether children would differ in their allocations of luxury and necessary resources in an inequality-based context. Half of the participants were told that the resources, blickets, were luxury resources (enjoyable to have, but not needed to avoid harm) and the other half were told that they were necessary resources (needed to avoid harm).

Data analytic plan

Analyses testing hypotheses regarding differences by age group were conducted using univariate ANOVAs. Analyses testing hypotheses, regarding reasoning and the interrelation between allocations, judgements, and reasoning, were conducted as repeated-measures ANOVAs. The use of repeated-measures ANOVAs for reasoning data is a widely used approach (for a review see, Wainryb, Shaw, Laupa, & Smith, 2001). ANOVAs were used over other statistical approaches (e.g., regression-based analyses) to allow for the assessment of the interrelations between children's allocations, judgements, and reasoning for each age group. This data analytic approach enabled the documentation of the developing patterns of interrelations across and within age groups. To interpret effects, post hoc, independent-samples *t*-tests with Bonferroni adjustments were conducted. Preliminary analyses revealed no significant differences for gender or resource type; thus, gender and resource type were excluded from further analyses.

Results

Resource allocation task

To test the hypothesis that children would allocate resources more equitably with age, a univariate ANOVA by age group (3–4, 5–6, 7–8 years) was conducted (see Figure 1). Consistent with our hypotheses, a main effect for age was found, $F(2, 130) = 21.30$, $p < .001$, $\eta_p^2 = .25$; with age, children allocated more resources to the recipient with no resources. The older age group ($M = 5.04$, $SD = 1.14$) and the middle-age group ($M = 4.40$, $SD = 1.52$) allocated more resources to the recipient with no resources than did the younger age group ($M = 3.15$, $SD = 1.21$), ps $< .001$. No difference was found between the older and middle-age groups ($p = .15$).

One-sample *t*-tests were conducted for each age group to test hypotheses regarding when children would begin to deviate from an equal allocation (three resources to each recipient). Consistent with our hypotheses, 5- to 6-year-olds, $t(52) = 6.67$, $p < .001$,

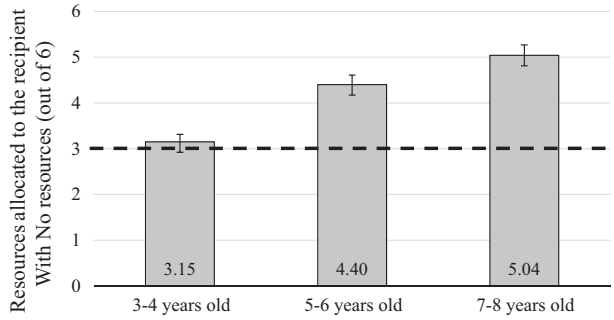

Figure 1. Mean number of resources allocated to the recipient with no resources (out of six). *p* values reported in text. Standard errors are represented in the figure by the error bars attached to each column.

$d = 0.92$, and 7- to 8-year-olds, $t(24) = 8.98$, $p < .001$, $d = 1.79$, but not 3- to 4-year-olds, $t(54) = 0.89$, $p = .38$, $d = 0.12$, allocated significantly different from equal, giving more to the recipient with no resources.

Reasoning for resource allocation

The proportion of use for each form of reasoning used by children in explaining their resource allocation were *Strict Equality* ($M = 0.24$), *Rectifying Inequalities* ($M = 0.43$), and *Others' Welfare* ($M = 0.14$).

To test the hypothesis that children would use different reasoning to justify their allocations based on how they allocated resources a 3 (Age Group: 3–4, 5–6, 7–8 years) × 3 (Allocation: Equal, Equitable, Unequitable) × 3 (Reasoning: Strict Equality, Rectifying Inequalities, Others' Welfare) ANOVA with repeated measures on the last factor was conducted (see Table 1). Consistent with our hypotheses, a main effect for Reasoning was found, $F(2, 250) = 11.51$, $p < .001$, $\eta_p^2 = .08$, which was explained by an Allocation by Reasoning interaction, $F(4, 250) = 43.55$, $p < .001$, $\eta_p^2 = .41$. Children who allocated resources equitably were more likely to reference the concern for rectifying the inequality than were children who allocated equally ($p = .006$) and unequitably ($p < .001$). Further, children who allocated resources equally were more likely to reference the concern for equality than were children who allocated equitably and unequitably ($ps < .001$). No differences were found for references to others' welfare ($ps > .95$) No effect for age was found ($p = .17$).

Table 1. Means (and standard deviations) for reasoning by children's allocations

		Strict equality		Rectifying inequality		Others' welfare	
Participant's allocation	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Equitable allocation	65	0.02	0.14	0.82	0.35	0.08	0.22
Equal allocation	55	0.55	0.50	0.00	0.00	0.23	0.42
Unequitable allocation	13	0.00	0.00	0.35	0.47	0.04	0.14

Note. *p* values reported in text.

Judgements of equitable, equal, and unequitable allocations

To test the age-related hypotheses for children's judgements of equitable, equal, and unequitable allocations, a 3 (Age Group: 3–4, 5–6, 7–8 years) × 3 (Allocation: Equitable, Equal, Unequitable) ANOVA with repeated measures on the last factor was conducted (see Figure 2). To test hypotheses regarding whether children would judge specific allocations to be 'OK' or 'not OK', one-sample *t*-tests were conducted for each age group on children's judgements of equitable, equal, and unequitable allocations (range: 1–6) against a neutral evaluation (3.5).

Consistent with our hypotheses regarding children's judgements of allocations, a significant effect for Allocation was found, $F(2, 260) = 79.77$, $p < .001$, $\eta_p^2 = .38$, which was explained by an interaction between Age Group and Allocation, $F(4, 260) = 8.89$, $p < .001$, $\eta_p^2 = .12$. First, age-related results are presented to allow for a developmental account of the judgements of the allocations. Then, results describing the patterns of judgements, within each age group, are presented to allow for an analysis regarding the developing coordination between judgements.

Equitable allocations

Children judged equitable allocations more positively with age. Children in the older ($M = 5.36$; $SD = 1.11$, $p = .01$) and middle-age groups ($M = 5.04$; $SD = 1.71$, $p = .02$) judged equitable allocations more positively than did children in the younger age group ($M = 4.07$; $SD = 2.21$). No difference was found between the older and middle-age groups ($p = .99$). Further, the middle-age, $t(52) = 6.55$, $p < .001$, $d = 0.90$, and older, $t(24) = 8.35$, $p < .001$, $d = 1.67$, age groups judged equitable allocations significantly different from neutral, judging them to be 'OK'. The younger age group's judgements, however, were only marginally different from a neutral judgement, $t(54) = 1.92$, $p = .06$, $d = 0.26$; that is, while 5- to 6-year-olds and 7- to 8-year-olds judged equitable allocations to be 'OK', 3- to 4-year-olds did not significantly judge equitable allocations to be fair.

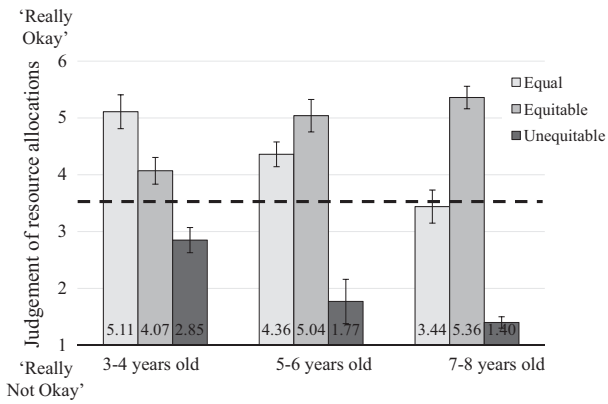

Figure 2. Mean judgement of equal, equitable, and unequitable allocations by age. 6 = 'Really Okay', 1 = 'Really Not Okay'. *p* values reported in text. Standard errors are represented in the figure by the error bars attached to each column.

Equal allocations

Children judged equal allocations less positively with age. Children in the younger age group ($M = 5.11$, $SD = 1.62$) judged an equal allocation more positively than did children in the older age group ($M = 3.44$, $SD = 1.94$; $p = .001$). Significant differences were not found, however, between the middle ($M = 4.36$, $SD = 2.08$) and the younger ($p = .12$) or older ($p = .14$) age groups. Further, the younger, $t(54) = 7.38$, $p < .001$, $d = 0.99$, and middle-age groups, $t(52) = 4.36$, $p = .004$, $d = 0.41$, judged equal allocations significantly different from neutral, judging them to be 'OK'. The older age group's judgements, however, did not differ from a neutral judgement, $t(24) = -0.155$, $p = .88$, $d = 0.03$; that is, while 3- to 4-year-olds and 5- to 6-year-olds judged equal allocations to be 'OK', 7- to 8-year-olds did not judge equal allocations to be fair.

Unequitable allocations

Children judged the unequitable allocation less positively with age. Children in the in the middle ($M = 1.77$, $SD = 1.44$; $p = .003$) and older ($M = 1.40$, $SD = 0.50$; $p = .001$) age groups judged an unequitable allocation to be less fair than did children in the younger age group ($M = 2.85$, $SD = 2.16$). Significant differences were not found between the middle-age and the older age groups ($p = .99$). However, the younger age, $t(54) = 2.22$, $p = .031$, $d = 0.30$, middle-age, $t(52) = 8.75$, $p < .001$, $d = 1.20$, and older, $t(24) = 21.00$, $p < .001$, $d = 4.20$, age groups all judged unequitable allocations significantly different from neutral, judging them to be 'not OK'.

Patterns of judgements of equitable, equal, and unequitable allocations

Children in the younger age group judged equal allocations more positively than equitable ($p = .015$) and unequitable ($p < .001$) allocations, and judged equitable allocations more positively than unequitable ($p = .002$) allocations. Children in the middle-age group did not differ in their judgements of equal and equitable allocations ($p = .20$), and judged both equal and equitable allocations more positively than unequitable allocations ($ps < .001$). Finally, children in the older age group judged equitable allocations more positively than equal ($p = .001$) and unequitable ($p < .001$) allocations, and judged equal allocations more positively than unequitable ($p < .001$) allocations.

Relation between judgement and allocation

To test hypotheses regarding the relation between children's judgements of allocations and their actual allocations, participants were grouped on their patterns of judgements of allocations. Three major patterns of judgements emerged: (1) children who judged equitable allocations to be more fair than equal and unequitable allocations (*Equitable*; $n = 46$), (2) children who judged equal allocations to be more fair than equitable and unequitable allocations (*Equal*; $n = 30$), and (3) children who judged both equitable and equal allocations to be more positive than unequitable allocations, but provided the same judgement score for equitable and equal allocations (*Same Judgement*; $n = 36$). Less than 10% of participants evidenced any other pattern of judgements of allocations; thus, alternative patterns of judgements were dropped from analyses.

A 3 (Age Group: 3–4, 5–6, 7–8 years) × 3 (Pattern of Judgements: *Equitable*, *Equal*, *Same Judgement*) ANOVA was conducted and revealed a significant effect for Pattern of Judgements, $F(2, 103) = 10.98$, $p < .001$, $\eta_p^2 = .18$. Children who judged the equitable

allocation to be the most fair (M = 5.02, SD = 1.36; $p < .001$) and those who provided the same judgement for the allocations (M = 4.11, SD = 1.33; $p = .027$) allocated more resources to the recipient with no resources than did children who judged equal allocation to be the most fair (M = 3.27, SD = 0.828). No differences were found between children who judged equal to be the most fair and those who provided the same judgement for the allocations ($p = .16$). An Age Group by Pattern of Judgement interaction was not found ($p = .57$).

Discussion

The novel findings of this study were that children's allocations, judgements, and reasoning developed from 3 to 8 years old, evidencing a developing understanding of both equity and equality, as well as increased coordination of children's allocations, judgements, and reasoning. Research on young children's allocations in the context of pre-existing inequalities has been mixed, with some studies finding that children will perpetuate an inequality (Olson *et al.*, 2011) and others finding that children will rectify it (Elenbaas & Killen, 2016; Li *et al.*, 2014; Paulus, 2014). Consistent with our hypotheses, the present results demonstrated that, while 3- to 4-year-old children recognized the concern for equity in their judgements, they still gave preference to strict equality in their allocations. By 5–6 years old, however, children rectified inequalities and judged equitable allocations to be fair. Finally, by 7–8 years old, children prioritized the concern for equity in their allocations and judgements, and no longer judged equal allocations to be fair.

These results also support theoretical accounts of social and moral development arguing that children's ability to simultaneously weigh multiple relevant concerns undergoes significant development during the childhood years (Damon, 1977; Turiel, 1983). Consistent with our hypotheses, children's developing ability to simultaneously weigh the concerns for equality and equity was demonstrated in their judgements of allocations. Three- to 4-year-olds recognized the concern for equality, judging it to be fair, while simultaneously evidencing an emerging understanding of equity, differentiating it from an unequitable allocation. By 5–6 years old, however, children demonstrated the simultaneous concern for both equity and equality, judging both means of allocations to be fair. Finally, with age, 7- to 8-year-olds recognized the conflict between equity and equality in their judgements, judging equal allocations less positively. Thus, children's ability to simultaneously weigh the concerns for equality and equity undergoes significant development throughout the childhood years.

Further, the present study documented children's ability to coordinate their judgements, reasoning, and allocations. Past research on this topic is mixed, with some researchers providing evidence for the coordination between judgement and behaviour (Turiel, 2008), and others finding contexts in which discrepancies arise (Blake, McAuliffe, & Warneken, 2014). Regarding resource allocation, past studies using first-person resource allocation paradigms have documented that, while children will report that they should share equally with peers, they often take more for themselves (Smith, Blake, & Harris, 2013).

The present results support theoretical accounts for the interrelation between children's moral judgements and their allocation behaviours in third-person contexts (Turiel, 2008). As children's understanding of the moral concerns for equity and equality develops, their allocations, judgements, and reasoning regarding allocations were

coordinated accordingly; children who were primarily concerned with rectifying the inequality judged equitable allocations to be the most fair, allocated equitably themselves, and explained their rationale for their allocations by referencing the need to rectify inequalities. Future studies examining the type of resource, whether it is necessary (medicine, school supplies) or a luxury (candy, stickers, stars), would provide new insights into the varied contexts when children rectify or perpetuate social inequalities (Elenbaas & Killen, 2016; Rizzo, Elenbaas, Cooley, & Killen, 2016).

Additionally, research has documented other cognitive and social-cognitive skills (e.g., theory of mind) that may help explain the present findings. Mulvey, Buchheister, and McGrath (2016) argue that children's developing theory of mind abilities enable them to better understand the mental states of individuals disadvantaged by inequality, thus helping them to recognize the harmful impact to the victims of inequality. Other research, however, has found negative relations between children's theory of mind and their tendency to share (Cowell, Sarnek, List, & Decety, 2015).

Foundational research has also found that proportional reasoning (Adams, 1965), and other forms of mathematical reasoning (Hook, 1978; Hook & Cook, 1979) can help account for the development of equity concerns. It is likely that multiple social and cognitive processes influence children's conceptions of fairness simultaneously throughout development. Thus, future research should examine how children's social-cognitive (theory of mind) capacities, along with their cognitive (numerical and mathematical) abilities, interact with their developing understanding of principles of fairness (e.g., equality, equity, and merit).

Based on past research documenting the early emerging concern for merit (Baumard, Mascaro, & Chevallier, 2012), the present study explicitly controlled for merit-based equity. It is possible that children were primed to think about the equal levels of merit between the characters, leading to increased instances of equal allocations and positive judgements of equal allocations. Future research should examine this possibility by manipulating the merit and need of the recipients involved in the inequality.

The current study assessed children's resource allocations and judgements of allocations in a fixed order. While extensive pilot testing was conducted, yielding no order effects, it is important for future research to consider potential carry-over effects when assessing multiple measures of a specific construct. Further, a limitation of the present study was the relatively small sample size for the oldest age group. To ensure sufficient power for the patterns of judgements analyses, future studies should be conducted with a larger 7- to 8-year-old group to determine whether an age by judgement type interactions exist.

In summary, the present study demonstrated developmental patterns of children's resource allocations, judgements of allocations, and reasoning regarding allocations in the context of a pre-existing inequality. Across the three age groups, children's concern for equity developed, while children recognized the unfairness of strict equality in this context. By investigating children's developing social-cognitive judgements and reasoning, in addition to their allocation behaviours, the present study provides an important insight into children's conceptions of fairness, equity, and equality.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Appendix S1. (1) Script for 6 point Likert-type scale training, (2) Script for vignette, and (3) Photograph of experimental setup.