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Effort or outcome? Children's meritorious decisions



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ABSTRACT

How individuals determine what is fair and just when allocating resources is a fundamental aspect of moral development. Decisions about fairness involve considerations such as merit, which includes effort (one's own exertion to achieve a goal) and outcome (one's product). Previous research has described merit in terms of both effort and outcome (e.g., a meritorious individual is both hard-working and productive). Crucially, no research has documented whether children give priority to being hard-working (high effort) or to being productive (high outcome or product) when allocating resources. This gap in the literature obscures two constructs that reflect how individuals allocate resources. The current study examined this process by which children (3- to 10-year-olds, $N = 100$; $M_{age} = 7.27$ years, $SD = 2.39$) weighed these two different aspects of merit in their fairness decisions in several situations where levels of effort and outcome were varied. When there was a discrepancy between effort and outcome, children increasingly prioritized effort over outcome with age and allocated more resources to hard-working peers than to productive peers. Effort and outcome were also examined. In situations where only effort varied (i.e., outcome was controlled), with age children were more likely to incorporate effort into their fairness decisions; however, in situations where only outcome varied (i.e., effort was controlled), with age children were less likely to incorporate effort into their fairness decisions. Taken together, the findings suggest that as children get older, they increasingly focus on effort of individuals rather than on their productivity when distributing resources.

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Introduction

Prior research has provided evidence that children's understanding of distributive justice reflects cognitive and social cognitive developmental changes (Blake & McAuliffe, 2011; Damon & Killen, 1982). For instance, young children advocate for strict equality at an early age (e.g., 3 years) and judge that equal allocations are fair in most contexts (Olson & Spelke, 2008; Warneken, Lohse, Melis, & Tomasello, 2011). However, children gradually understand that unequal allocations are necessary to ensure fairness in some situations and develop the understanding that "equity-based concerns," such as merit, need, and preexisting inequalities, are more fair than strict equality (Rizzo & Killen, 2016). Thus, with age children are more likely to deviate from strict equality in their allocating of resources by distributing more resources to someone who deserves more due to merit, need, or disadvantaged status (Kenward & Dahl, 2011; Kienbaum & Wilkening, 2009; Li, Spitzer, & Olson, 2014; Rizzo & Killen, 2016; Sigelman & Waitzman, 1991). More research is needed, however, for what constitutes *merit* when children are making decisions. For example, when children take merit into account in a distributive context, do children differentiate effort (how hard one works) from products (what one actually produces independent of effort)?

The current study aimed to focus particularly on how children incorporate merit into their fair distribution decisions and how they construct merit in this process. A number of prior studies provided converging evidence that as children's fairness thinking becomes more sophisticated with age, children develop the ability to allocate resources based on others' contribution to the work (Baumard, Mascaro, & Chevallier, 2012; Kanngiesser and Warneken, 2012; Rizzo, Elenbaas, Cooley, & Killen, 2016; Schmidt, Svetlova, Joffe, & Tomasello, 2016).

An important thing to note here, however, is that the construct of merit includes the components of effort (i.e., how hard someone works) and the outcome of one's effort (i.e., the product), which are not the same (Anderson & Butzin, 1978; Carson & Banuazizi, 2008; Kienbaum & Wilkening, 2009). For example, meritorious individuals are often portrayed as hard-working *and* highly productive (Kanngiesser & Warneken, 2012; Liénard, Chevallier, Mascaro, Kiura, & Baumard, 2013; Melis, Altrichter, & Tomasello, 2013; Rizzo et al., 2016). Therefore, one of the main goals of the current study was to determine whether children are capable of differentiating "effort" and "outcome" in their understanding of merit.

Our everyday lives provide many instances of hard work garnering few rewards and scarce effort being richly rewarded. Because it is ingrained in our lives that hard work brings desired outcomes, as reflected in popular sayings such as "no pain, no gain," individuals in the society pursue a balance between effort and outcome (Kim, Kim, & Lee, 2017; Lee, Puig, & Lee, 2012; Schrift, Kivetz, & Netzer, 2016). In the adult world, distributions of resources involve complex, multifaceted decision-making processes in which multiple variables are weighed and considered. Throughout childhood, contexts in which resources are distributed become increasingly varied (Goulding & Friedman, 2018). For example, distributing toys at home has different expectations from distributing toys at school, where ownership is not personal (as it is at home) but rather communal (Huh & Friedman, 2017). Thus, a developmental analysis of the emergence of how children weigh effort and outcome in the context of resource allocation decision making is warranted. In the current study, the specific context was a school-based one in which participants allocated rewards to children for their contributions to a school project.

Theoretical framework

This study was motivated by social domain theory, which has demonstrated how children differentiate moral (fairness), conventional (traditions), and psychological (personal) aspects of decision making (Turiel, 1983, 2006). With age, children increasingly give priority to intentions that are based on fairness over intentions that are based on conventions in situations where these considerations conflict (Killen & Smetana, 2015; Smetana, Jambon, & Ball, 2014).

Understanding intentions is a central issue in fairness decisions regarding resource allocation (D'Esterre, Rizzo, & Killen, 2019; Smetana et al., 2012; Turiel, 2006; Zelazo, Helwig, & Lau, 1996).

For instance, when children claim that they deserve a needed resource, it is necessary to know whether they make this request with positive intentions (they know they need it) or negative intentions (they know they do not need it) (D'Esterre et al., 2019). A central facet of social domain theory has been to demonstrate children's social cognitive abilities, which include their priority of one concern over another (Killen, Elenbaas, & Rutland, 2015). This requires assessments of (a) whether and how children can differentiate the various related constructs and then (b) how each construct is weighed in situations of conflict.

Using detailed analyses of the components of different contexts, the current study provides an understanding of the two different constructs that are relevant for judgments about merit, a core principle that guides resource allocation decisions. When allocating rewards for performing a task, children make decisions about individuals' *effort* (did they work hard or were they lazy?) as well as the *outcome* of their effort (did they produce a lot or a little?). The degree of effort was described as the intentional state of the protagonist (hard-working or lazy) to achieve a goal. The degree of outcome was described as the consequences of the act (how much was produced?) as distinct from the intentional state.

The current study

The current study analyzed how children allocated, made judgments, and provided reasoning for situations involving high and low effort (one's intentions to work or to not work) and of high and low outcomes (one's high or low product). The following resource allocation contexts were examined: (a) when *effort and outcome were confounded*, where one worked hard and produced more versus one did not work hard and produced less (Baseline Story 1); (b) when *only effort varied*, where one worked hard versus one did not work hard and outcomes were the same (Story 2); (c) when *only outcome varied*, where one produced more versus one produced less and efforts were the same (Story 3); and (d) when there was a *discrepancy between effort and outcome*, where one worked hard but produced less versus one did not work hard but produced more (Story 4).

Based on the theoretical approach, it was expected that children's judgments would focus on one's intentions in a situation (to be fair or equal toward others) rather than on the concrete outcomes (such as the consequences of an action). It was hypothesized that with age children would increasingly consider *effort* as an important criterion for making fairness distribution, given that effort refers to one's intentions to complete a task, and that with age children would be much less likely to prioritize *outcome* in their fairness decisions, given that outcome refers to the concrete product of one's effort. Thus, in the story where effort and outcome were not aligned, it was expected that with age children would be more likely to give priority to effort over outcome in making fairness decisions because children's equity thinking becomes more sophisticated as they get older. To capture children's processes of coordination, it was also expected that children's responses to the different dependent measures would be correlated, reflecting our social domain theoretical approach (Turiel, 1983) toward children's social cognitive processes regarding complex decisions.

Method

Participants

Participants were 3- to 10-year-olds ($N = 100$) ranging from 3.48 to 10.87 years ($M = 7.27$ years, $SD = 2.39$). Participants were approximately evenly divided by gender (48 girls). Children were recruited from preschools/kindergartens, elementary schools, and Sunday schools in the mid-Atlantic region of the United States serving a majority of families with middle socioeconomic status (ethnicity reflected the U.S. population, with 70% European American and 30% ethnic minority).

Procedure

Participants were tested in a quiet room at their school. Children were presented with four hypothetical stories accompanied by pictures, followed by questions regarding their resource allocation

decisions, peer preference, and justifications. This study used a resource allocation framework, which allows children to distribute resources to peer recipients. Because of children's language ability discrepancy with age, interviews were conducted for the 3- to 6-year-olds, whereas surveys (which were identical to the interviews) were administered for the 7- to 10-year-olds. The survey for older children was administered in a small group.

Design

Participants were presented with four hypothetical stories regarding peers who received a packet of sunflower seeds from their school and were told to grow the seeds for a school project. Stories were accompanied by brightly colored drawings. Each story had a comparison of two peers whose levels of effort and outcome were varied. For abbreviation, peers are denoted a pair of letters first describing their effort (H = high effort, L = low effort) and then their outcome (H = high outcome, L = low outcome) (e.g., HL refers to a character with high effort and low outcome). In this study, the four possible peer characters were (a) high effort and high outcome (HH), (b) high effort and low outcome (HL), (c) low effort and high outcome (LH), and (d) low effort and low outcome (LL). Each story had a different combination of two peers; Story 1 compared HH and LL, Story 2 compared HL and LL; Story 3 compared LH and LL, and Story 4 compared HL and LH. After each story, children distributed six star stickers between the two peers in what they believed was the fairest way. The presentation of the four stories was counterbalanced; approximately half of the participants received stories in the order of 4–3–2–1, whereas the other half of the participants received stories in the order of 1–2–3–4. The gender of protagonists in the stories was matched to the participant's gender. The entire survey can be found in the Appendix A. Details of each story are as follows.

Children's understanding of merit: effort and outcome confounded

Story 1 served as a baseline story where effort and outcome were confounded for a meritorious peer. One peer had high effort and high outcome (HH), whereas the other peer had low effort and low outcome (LL). The full protocol for Story 1 is described below:

"This is Chris and this is Jordan. They are children your age. Their school gave everyone a package of sunflower seeds so that children can grow many sunflowers. Chris and Jordan each planted all of their seeds in a pot. Chris worked very hard to grow plants and gave them water every day. Jordan did not work hard to grow plants and did not give them any water. One month later, Chris grew 10 sunflowers because she worked very hard to water them. Jordan only grew 2 sunflowers because she did not work hard to water them."

Children's understanding of merit: Effort varied

This story was designed to have only the level of effort vary. Thus, one peer had high effort and low outcome (HL), whereas the other peer had low effort and low outcome (LL).

Children's understanding of merit: Outcome varied

This story was designed to have only the level of outcome vary. Thus, one peer had low effort and high outcome (LH), whereas the other peer had low effort and low outcome (LL).

Children's understanding of merit: Preference for an effort-focused or outcome-focused peer

Finally, Story 4 described an instance where there was a choice to pick an effort-focused or outcome-focused peer for a new project. One peer had high effort and low outcome (HL), whereas the other peer had low effort and high outcome (LH).

Measures

Following each story, participants responded to several assessments derived from social domain theory and research on resource allocation (D'Esterre et al., 2019; Rizzo & Killen, 2016; Turiel, 2006). Specifically, four dependent measures (within participant) were assessed: (a) children's own

allocation of six resources, (b) children's justifications regarding their allocation decisions, (c) children's own allocation of one extra resource (only for Story 4 where there was a discrepancy between effort and outcome), and (d) children's preference for an effort-focused or outcome-focused peer.

Children's own allocation of six resources

After each story, children allocated six star stickers between the two peers. Children were asked, "Based on what you just heard/read, here are six stars for you to give out. Can you show me how many stars [Peer 1] and [Peer 2] should each get?" This question was asked for all four stories.

Children's justifications

Following children's allocation decisions, children's justifications for their star allocation decisions were assessed. The question "Can you tell me why you gave out stars like this?" was asked for all four stories. The open-ended responses were coded into four different categories: (a) emphasis solely on *effort* (e.g., "Sam should get more stars because she worked a lot harder and hard work is important"), (b) emphasis solely on *outcome* (e.g., "Because she grew a lot more flowers than her"), (c) emphasis/tension on both *effort* and *outcome* (e.g., "Chris deserved more stars because she put more work into it and plus grew more flowers," "I would give Casey and Morgan the same stars because Casey tried harder but Morgan's results were better"), and (d) strict abidance to *equality* (e.g., "Because if everyone gets equal, then neither of them will be sad"). Uncodable responses were dropped (the range for each story of uncodable responses was between 11% and 14%).

Categories that were used were assigned a score of 1, and those that were not used were assigned a score of 0. Two coders blind to the hypotheses of the study completed the coding. Interrater reliability was determined using a subset of 20% of the data (Cohen's $\kappa = 0.86$).

Children's own resource allocation of one extra resource

For Story 4 only (i.e., vignette where there is a discrepancy between effort and outcome), children were prompted with a follow-up question: "I just found one more star here! If you can give this star to [Peer 1] or [Peer 2], who would you give this to?" This was asked in order to assess which factor—effort or outcome—children prioritized in their allocation decisions when framed in a forced-choice context.

Children's preference for an effort-focused or outcome-focused peer

Across all four stories, children were asked to choose an effort-focused or outcome-focused peer for a hypothetical future flower-growing task. This measure was implemented to test for generalization as well as the role of self-gain (e.g., children could earn extra stars). Thus, children were asked the following: "Let's say it is your turn to grow sunflowers and you have a chance to get some extra stars! You can ask one of these two children to grow flowers with you. Who would you want to grow flowers with, [Peer 1] or [Peer 2]?"

Plan for data analysis

The study used a set of linear regression analyses, logistic regressions, and Fisher's exact tests of independence to test the hypotheses as well as correlational tests to measure coordination of responses. Specifically, linear regression analyses were conducted to examine age-related change in children's allocation decisions; logistic regressions were conducted to test age-related change in children's responses from two choice options (e.g., choosing a preferred peer for a further task, choosing a peer for one extra star); Fisher's exact tests of independence were conducted to examine children's reasoning data; and correlations were conducted to assess relationships between the different dependent measures.

Results

Correlations between measures

Correlations between children's allocation strategy and their partner choice were conducted for each story, and the results are displayed in [Table 1](#). Significant correlations were found for three of

Table 1
Correlations between measures in Stories 1, 2, 3, and 4.

	Measure	Choice of merit peer
Story 1	Allocation to merit peer (HH > LL)	0.30 ^{**}
Story 2	Allocation to merit peer (HL > LL)	0.24 [*]
Story 3	Allocation to merit peer (LH > LL)	0.07
Story 4	Allocation to merit peer (HL > LH)	0.30 ^{**}

Note. HH, high effort and high outcome; LL, low effort and low outcome; HL, high effort and low outcome; LH, low effort and high outcome.

* $p < .01$.

** $p < .05$.

the four stories (Stories 1 and 4: $ps < .05$; Story 2: $p < .01$; Story 3: $p = .07$), supporting the social domain theoretical approach that emphasizes children's coordination throughout moral judgments (Turiel, 1983, 2006, 2008).

Story 4 included an additional measure, children's allocation of an additional resource, and correlations were conducted between this measure and both of the others. Each of these correlations were found to be significant (original allocation and extra allocation: $r = 0.28, p < .05$; choice of partner and extra allocation: $r = 0.32, p < .05$), further supporting the ability of children to coordinate their social and moral judgments.

Children's own allocation of six resources

Across each of the four stories, children were asked to reward the characters involved in the flower-growing task by distributing six resources between the two characters in each scenario. For each story, a linear regression was conducted with the child's allocation decision regressed on age. The first three stories found that, when compared with a character who was low on both effort and productivity (LL), age was a significant predictor of children's allocation behavior. Importantly, this pattern of results held whether merit was shown through high effort and high productivity (HH, Story 1), $F(1, 99) = 16.435, p < .001$, through high effort but equally low productivity (HL, Story 2), $F(1, 99) = 20.440, p < .001$, or through equally low effort but high productivity (LH, Story 3), $F(1, 99) = 4.651, p = .033$.

For Stories 1 and 2 children gave more to the meritorious peer with age ($\text{age} = 0.185$ and $\text{age} = 0.190$, respectively), but for Story 3 children gave less to the peer who was low on effort but high on productivity as they got older ($\text{age} = 0.075$). With age, children were increasingly likely to reward a peer who worked harder than others; simply being more productive was valued less with age. For Story 4 (choosing a peer who was high on effort but low on productivity [HL] or one who was low on effort but high on productivity [LH]), a linear regression was conducted with the participant's allocation strategy regressed on age, and again age was found to be a significant predictor, $F(1, 99) = 11.941, p = .001$. With each increasing year in age, there was a corresponding increase in the number of resources allocated to the hard-working peer over the productive peer ($\text{age} = 0.209$).

A binomial logistic regression was conducted on the extra reward allocation and revealed significant age effects, $\chi^2(1) = 9.878, p = .002$. The likelihood of a child to give the additional resource to the peer with high effort increased with each year in age by 1.43 times. Children increasingly prioritized the effort of their peers over their productivity with age.

Children's preference for an effort-focused or outcome-focused peer

For each of the four stories, children were also asked to indicate which of the two characters they would like to pick as a partner in a hypothetical future flower-growing task. Binary logistic regressions were run on children's partner choices for each of these stories in order to determine the way in which these responses changed with age. Two of the first three stories found a significant preference for the peer where age was a significant predictor of children's resource allocation behavior. Specifically, age was a significant predictor when the peer who was low on both effort and productivity (LL) was compared against a peer who was high on both effort and productivity (HH) in Story 1, $\chi^2(1) = 5.548$,

$p = .018$, and when compared against a peer who was high on effort but low on productivity (HL) in Story 2, $\chi^2(1) = 31.559$, $p < .001$, but age was not found to be a significant predictor of preference when the LL peer was compared against a peer who was low on effort but high on productivity (LH) in Story 3, $\chi^2(1) = 1.169$, $p = .280$.

More specifically, for every 1 additional year of age, the likelihood of a child to select the HH peer over the LL peer increased by 1.43 times (Story 1) and the likelihood of a child to select the HL peer over the LL peer increased by 2.55 times (Story 2). With age, children were increasingly likely to select a peer who worked harder than others. Again, simply being more productive was not valued as much as effort with age.

The binomial logistic regression for Story 4 (choice of two peers) was conducted with the participant's allocation strategy regressed on age, and again age was found to be a significant predictor, $\chi^2(1) = 8.554$, $p = .003$). Results suggest that with every 1-year increase in age, the likelihood of a child to select the HL peer over the LH peer increased by 1.36 times. This provided further support for the idea that with age children increasingly emphasized the effort of their peers but that a comparable increase in emphasis on productivity was not found.

Children's justifications for allocation of six resources

We used a Fisher's exact test of independence and a follow-up Bonferroni correction test to determine whether children's reasoning differed across different ages (Beasley & Schumacker, 1995), which has been a widely used test to examine children's justifications (see Elenbaas & Killen, 2016). To use this set of analyses and to better compare reasoning of preschool children and school-aged children, participants were evenly divided into two age groups of 3- to 6-year-olds ($n = 50$; 25 girls; $M_{age} = 5.13$ years, $SD = 0.84$) and 7- to 10-year-olds ($n = 50$; 23 girls; $M_{age} = 9.43$ years, $SD = 1.20$) (see Table 2).

In Story 1, where the meritorious peer displayed high levels of both effort and outcome, the test was significant, Fisher's exact test = 26.438, $p < .001$. Follow-up z tests with Bonferroni correction for multiple comparisons indicated that older children referenced the emphasis on *both effort and outcome* at significantly higher proportions than younger participants ($p < .001$). In Story 2, when effort was varied, age differences were revealed for three justification categories; younger children referenced emphasis on *outcome* and *strict equality* at significantly higher proportions than older children (both $p < .001$), whereas older children referenced emphasis on *both effort and outcome* at significantly higher proportions than younger participants ($p < .001$), Fisher's exact test = 45.372, $p < .001$. In Story 3, when outcome was varied, older children referenced the emphasis on *effort and outcome* in their reasoning at significantly higher proportions than younger participants ($p < .001$), Fisher's exact test = 28.526, $p < .001$. In Story 4, when effort and outcome were in conflict, the test was significant, with older participants referencing *both effort and outcome* at significantly higher proportions than younger participants ($p < .001$) and younger participants referencing *outcome* at significantly higher proportions than older participants ($p < .001$), Fisher's exact test = 27.335, $p < .001$.

Table 2
Children's reasoning for their evaluations of the resource allocation task.

	Merit based on effort and outcome		Merit based only on effort		Merit based only on outcome		Contrasted merit effort versus outcome	
	3–6 years	7–10 years	3–6 years	7–10 years	3–6 years	7–10 years	3–6 years	7–10 years
Emphasis on effort	0.36	0.32	0.26	0.40	0.26	0.46	0.28	0.48
Emphasis on outcome	0.16	0.08	0.38*	0.12*	0.24	0.08	0.24*	0.08*
Emphasis on both	0.14*	0.58*	0.04*	0.48*	0.10*	0.38*	0.08*	0.34*
Strict equality	0.12	0.02	0.10*	0.00*	0.14	0.04	0.20	0.08

Note. Values in table reflect observed proportions of justifications.

* Age-related difference in the proportion of participants referencing the conceptual category at $p < .05$.

Discussion

The current study investigated children's understanding of two important components that contribute to decisions regarding the fair allocation of resources: effort (how hard one works) and outcome (how much one produces). The novel findings revealed that with age children were more likely to emphasize one's effort and less likely to emphasize outcome as important factors when making fair distribution decisions.

A central question for the research project was to examine children's meritorious fairness decision when there was a conflict between effort and outcome. When one target character had high effort (with low outcome) and another target character had high outcome (with low effort), with age children showed a stronger preference for a hard-working individual over a productive individual in their allocation decisions and peer preference judgments. Children's emphasis on effort over outcome with age was also revealed through their open-ended reasoning; children put more emphasis on *effort and outcome* with age (e.g., "Hard-working deserves more stars. Even though the other girl grew more flowers, this does not earn her more stars without hard work") while having less emphasis on *outcome* as they got older. The findings were aligned with the social domain theory in that children prioritized moral domain (such as issues pertaining to intentions), over other domains.

Similarly, children's increasing emphasis on effort and decreasing emphasis on outcome with age were consistent when outcome and effort were examined in the resource allocation context. When effort was varied (i.e., outcome was controlled), children progressively appreciated one's effort as they got older. In contrast, and as predicted, when outcome was varied (i.e., effort was controlled), the opposite age pattern was found; children were less likely to incorporate outcome in their fairness decisions with age. Furthermore, consistent with previous studies showing that young children prefer equality when distributing resources (Damon, 1975, 1980; McGillicuddy-De Lisi, Watkins, & Vinchur, 1994), younger children in the current study referred to the importance of *equality* (e.g., "I will give everyone the same, and neither of them will be sad") more than older children.

Children's increasing social cognitive abilities, such as the competence to coordinate competing forms of moral reasoning, provide an explanation for the developmental trend revealed in the current study (Killen & Rutland, 2011; Turiel, 1983, 2006). As children get older, they gain better ability to consider multiple concerns (e.g., intentional aspect vs. consequences) and come to prioritize effort over outcome, thereby demonstrating understanding of equity in their fairness reasoning. Social domain theory emphasizes that children gradually come to highlight moral concerns for fairness more than other domains such as societal conventions and norms (Killen & Smetana, 2015; Turiel, 1983, 1998). The current study's findings supported this approach by revealing that with age children focused more on effort (at the expense of outcome) in making distributive justice decisions. Moreover, the correlational data provided further support for the coordination of responses across the dependent measures.

Notably, this developmental trend was revealed even in self-advantageous situations; children increasingly advocated the effort-focused peer with age even when this could eventually be less beneficial to themselves (e.g., peer preference task) (Corbit, McAuliffe, Callaghan, Blake, & Warneken, 2017). Thus, the current findings revealed that children come to better integrate multifaceted issues and gradually come to value effort as a significant moral principle even in situations where their self-serving bias may come through.

This is the first study to our knowledge to examine children's increasing understanding of merit in regard to effort and outcome, and it further extends the developmental literature in a meaningful direction. A recent study by Smith and Warneken (2016) found that whereas young children (4–5 years) judged that equal distributions of both rewarding and aversive jobs is fair (e.g., regardless of whether one person deserves more rewarding work or less aversive work, everyone should have equal work), older children and adults demonstrated deservingness-based allocation. Extending such a line of work, the current study shed light on explaining what deservingness-based allocation reflects when effort and outcome are no longer obfuscated.

Thus, the novel finding that children's concerns for hard work come to outweigh their concerns for productivity with age makes further implications on *which factor of merit* deserves more rewarding

work or less aversive work. As noted earlier, the current study better reflects the real world, where hard-working peers sometimes fail to produce good results and lazy peers may turn out to be highly productive due to luck and other situational factors, compared with previous research that has not disentangled these two factors (e.g., Baumard et al., 2012; Blake, McAuliffe, & Warneken, 2014; Hamann, Bender, & Tomasello, 2014; Kanngiesser & Warneken, 2012). Thus, the current study's finding is important in that it captures the understudied aspect of children's developmental trajectories regarding fair allocation of resources.

In addition, our findings are coherent with the developmental trajectory found for other principles of resource allocation such as children's understanding of *needs* in a distributive justice context. A number of studies have shown that children from early to middle childhood gradually demonstrate an increasing concern for *preexisting inequality* (Baumard et al., 2012; Li et al., 2014; Sigelman & Waitzman, 1991), thereby allocating more resources to someone who does not have a lot than to someone who already has a lot. In fact, a recent study by Rizzo & Killen (2016) found that whereas 3- and 4-year-olds allocated resources equally to two recipients who were rich and needy, 5- and 6-year-olds prioritized the disadvantaged recipient in their own allocations but approved a third party's equal distribution decision. Furthermore, 7- and 8-year-olds not only allocated more to the disadvantaged recipient but only approved a third party's equitable—but not equal—distribution, thereby showing a clear developmental pattern for understanding “needs” in a distributive justice context. Along with the current study, these findings altogether demonstrate that children develop a better understanding of equity with age and that their concept of fairness matures during early to middle childhood.

Study limitations and future directions

Despite the contributions, there are some limitations that can be addressed in future studies. First, only luxury resources were used in this study. The star stickers used in this study were items that children preferred to have but not resources that were necessary to their livelihood. This makes these resources *luxury resources* (i.e., resources that are enjoyable to have such as toys) rather than *necessary resources* (i.e., resources that are needed to avoid harm such as water and food) (Rizzo et al., 2016). A study by Rizzo et al. (2016) found that children prioritized merit when allocating luxury resources more so than when allocating necessary resources. Given that children's consideration of merit could be dependent on the characteristics of the resources being allocated, further research is needed to investigate whether and how the current study's findings on disentangling effort and outcome may be different when examined with necessary resources.

Second, this study focused on resource allocation in a school-based context. Children were allocating resources for contributions to a school project (growing sunflowers). Effort and outcome both are emphasized in school contexts, which was one motivating decision for selecting this context. However, there are many other contexts in which outcome alone, for example, may be given priority (e.g., in some work contexts, generating products—however realized—is valued). Exploring how effort and outcome are evaluated in other contexts of resource allocation will be important for a future study.

Lastly, it would be worthwhile to examine whether independent variables such as one's academic achievement, effortful control, and the overall amount of effort the person puts into her or his school-work may influence how children weigh effort and outcome. Whether a peer is a hard-working person herself or himself could relate to how much the person values effort and, furthermore, how much the person considers this as an important factor in her or his merit-based decision making relative to outcome.

Conclusions

The current study makes a significant contribution to the current literature by examining the process by which children integrate merit into their fairness decisions. In particular, this study sought to answer remaining questions regarding the unclear aspects of children's meritorious allocation decisions such as how children weigh effort and outcome when considering merit. Most important, the

findings revealed that children increasingly prioritized effort over outcome by focusing on the positive intentions of an act rather than the positive consequences in making fair allocation decisions. These findings provide further insight into how children prioritize and understand merit and fairness in distributive justice contexts.

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Appendix. Pictures used for the vignettes.

This is the first story.

This is Chris and this is Jordan. They are children your age.



CHRIS



JORDAN

Their school gave everyone a package of sunflower seeds so that children can grow many sunflowers. Chris and Jordan each planted all of their sunflower seeds in a pot.

Chris *worked very hard* to grow sunflowers and *gave them water everyday*.
 Jordan *did not work hard* to grow sunflowers and *did not give them any water*.



One month later...

Chris grew *10 sunflowers* and she *worked very hard* to water them.
 Jordan grew *2 sunflowers* and she *did not work hard* to water them.



CHRIS



JORDAN

This is the second story.
This is Sam and this is Alex. They are children your age.



SAM

ALEX

Their school gave everyone a package of sunflower seeds so that children can grow many sunflowers. Sam and Alex each planted all of their sunflower seeds in a pot.

Sam *worked very hard* to grow sunflowers and *give them water every day*.
Alex *did not work hard* to grow sunflowers and *did not give them any water*.



SAM

ALEX

One month later...
Sam grew *2 sunflowers* and she *worked very hard* to water them.
Alex grew *2 sunflowers* and she *did not work hard* to water them.



SAM

ALEX

This is the third story.

This is Taylor and this is Dana. They are children your age.



TAYLOR

DANA

Their school gave everyone a package of sunflower seeds so that children can grow many sunflowers. Taylor and Dana each planted all of their sunflower seeds in a pot.

Taylor *did not work hard* to grow sunflowers and *did not give them any water*.

Dana also *did not work hard* to grow sunflowers and *did not give them any water*.



TAYLOR

DANA

One month later...

Taylor grew 10 sunflowers and she *did not work hard to water them*.

Dana grew 2 sunflowers and she *did not work hard to water them*.



Here is the last story. You are doing great!

This is Casey and this is Morgan. They are children your age.



Their school gave everyone a package of sunflower seeds so that children can grow many sunflowers. Casey and Morgan each planted all of their seeds in a pot.

Casey *worked very hard* to grow sunflowers and *gave them water every day*.
Morgan *did not work hard* to grow sunflowers and *did not give them any water*.



One month later...
Casey grew *2 sunflowers* and she *worked very hard* to water them.
Morgan grew *10 sunflowers* and she *did not work hard* to water them.



Note. There were two versions: one for girls and one for boys (the girl version is displayed for the Appendix A).

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