RUNNING HEAD: Children's resource distribution

The influence of friendship and merit on children's resource allocation in three cultures

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Abstract

Recent work has suggested that principles of fairness which seem like natural laws to the western mind – such as sharing more of the spoils with those who contributed more – can in fact vary significantly across populations. To build a better understanding of the developmental roots of population differences with respect to fairness, we investigated whether 7 year old children (N = 432) from three cultural backgrounds, Kenya, China, and Germany, consider friendship and merit in their distribution of resources, and how they resolve conflicts between the two. We found that friendship had considerable and consistent influence as a cross-culturally recurrent motivation: children in all three cultures preferentially shared with a friend rather than with a neutral familiar peer. On the other hand, the role of merit in distribution seemed to differ cross-culturally: children in China and Germany, but not in Kenya, selectively distributed resources to individuals who worked more. When we pitted friendship against merit, there was an approximately even split in all three cultures between children who favored the undeserving friend and children who shared with the hardworking neutral individual. These results demonstrate commonalities and variability in fairness perceptions across distinct cultures and speak to the importance of cross-cultural research in understanding the development of the human mind.

Keywords: fairness, friendship, merit, sharing, cross cultural comparison

If humans could survive and thrive entirely on their own, they would not need to concern themselves with questions about what is fair and what is not. From an evolutionary perspective, fairness has likely evolved in the context of human-unique forms of interdependent collaboration as an adaptation designed to regulate cooperative interactions (Henrich, 2016; Tomasello, 2018). One key challenge in sustaining such cooperation lies in distributing collaboratively acquired resources so that everyone is satisfied and motivated to collaborate in the future. In such contexts, the human sensitivity to fairness allows the stabilization of cooperative relationships even in the face of conflicting interests. Fairness represents a cooperative solution to the problem of competition – a kind of cooperativization of competition – as it enables individuals with competing motives to find mutually satisfactory solutions to the demands of interdependent lifeways (Engelmann & Tomasello, 2019). Concerns about fairness seem to be unique to humans, and are not shared by our closest living relatives, chimpanzees (Engelmann et al., 2017). While equality is often regarded as the default principle of fairness (Starmans et al., 2017), what is considered fair in a given context will typically vary along several additional dimensions, such as individuals' relative contributions to the joint effort (merit or equity), individuals' respective level of requirement (need), as well as the social relationships among involved parties (whether they involve authority or friendship, for example).

The extraordinary impact of fairness to human evolution is reflected in findings demonstrating that even human infants possess burgeoning expectations of how resources will be distributed. For example, 15 month old infants looked longer (indicating surprise) at a scene that depicted an unequal distribution of resources compared to one displaying an equal allocation (Geraci & Surian, 2011; Schmidt & Sommerville, 2011; Sloane et al.,

2012). The first behavioral manifestations of a sense of fairness – understood here in terms of the principle of equality – emerge during the preschool years. In contexts where resources have been collaboratively produced, 3 year old children are already averse to two forms of inequality (Ulber et al., 2017): receiving less than others (so-called disadvantageous inequity aversion) and receiving more than others (so-called advantageous inequity aversion). In windfall settings, 4 year old children often reject distributions that place them at a disadvantage relative to a peer, but only 8 year old children sometimes reject allocations that favor themselves (Blake & McAuliffe, 2011). When children are asked to distribute resources among third parties, they show a strong tendency to distribute rewards equally by age 3.5 (Kenward & Dahl, 2011; Olson & Spelke, 2008), and, at age 6, children even prefer discarding an additional resource over creating an unequal split (Shaw & Olson, 2012).

The sense of fairness in young children, however, is not reducible to equality (Elenbaas, 2019; Killen & Smetana, 2015; McAuliffe et al., 2017; Rizzo et al., 2016; Schmidt et al., 2016). Children readily accept and create uneven distributions in contexts where the status of the recipients justifies doing so. One reason that children from around 4 to 5 years of age allocate resources unequally is differential need. In setups where children can distribute resources between two beneficiaries that vary on characteristics related to need – defined either in material or emotional terms – they selectively pass resources to the needier recipient (V. Li et al., 2014; Malti et al., 2016; Paulus, 2014). Merit is a second consideration that motivates children to share resources unequally. When one potential recipient has worked harder than a second recipient or has contributed more to a common endeavor, even 3 year old children match contribution and distribution and favor

the deserving individual in their resource allocation (Baumard et al., 2012; Hamann et al., 2014; Kanngiesser & Warneken, 2012). A third reason that may lead children to prefer unequal over equal sharing of resources stems from their social relationships to the involved parties. One set of findings suggests that children are partial towards their friends in sharing contexts: 4 year old children share a greater proportion of goods with their friends than with strangers or non-friends (Birch & Billman, 1986; Moore, 2009; Paulus & Moore, 2014). A second line of research presents evidence that dominance relations structure infants' and children's resource allocation (Charafeddine et al., 2015; Enright et al., 2017). Even 17 months old infants are surprised when a subdominant individual is favored over a dominant individual in a distributive context, but not when the payoffs are reversed.

Taken together, this body of evidence has revealed many previously unsuspected abilities of young children to make sophisticated fairness decisions, guiding their resource allocations along a variety of dimensions such as equality, merit, need, and social relationships. But the majority of the studies have two aspects in common, one theoretical and one methodological. The theoretical aspect is that nearly all recent studies have asked whether children consider principles of fairness in their decision-making in situations where potential recipients differ along one relevant dimension only, for example when one potential recipient has worked harder or is needier than another recipient (but see Damon, 1977 and Piaget, 1932). But in many real-world decisions, the question is not whether to apply a principle of fairness, but what principle to apply in a given situation or how to moderate among different, competing principles (W. Li et al., 2019; McAuliffe & Dunham, 2017; Paulus, 2016; Xiao et al., 2019; Zhang, 2020). In these circumstances, the specific

behavior that fairness requests of us is not apparent; instead, different fairness considerations can pull in opposite directions. Some of the deepest moral conflicts result from the fact that we are concurrently under the sway of distinct, and sometimes conflicting, principles of fairness. Should I employ the more qualified candidate or should I hire my relative? Should I give extra resources to my friend or to a needier individual? Very little is known about how children resolve dilemmas that result from the simultaneous operation of different principles of fairness, and how this differs across cultures (Carson & Banuazizi, 2008; Damon, 1977; Rizzo & Killen, 2016). Some insight into this question comes from classic early interview studies by Damon and colleagues. One key finding from this literature is that when authority considerations and fairness considerations pull in opposite directions, children show a strong preference for the latter (see, e.g. Damon, 1977).

The methodological aspect is that almost all of the findings are based on investigations of so-called WEIRD children, that is, children who were socialized in western, educated, industrialized, rich, and democratic cultural settings (Henrich et al., 2010; Nielsen et al., 2017). The few exceptions to this general pattern suggest that fairness represents a dimension of human behavior that shows significant cross-cultural variation (Blake et al., 2015; Corbit et al., 2017; Huppert et al., 2019; Kajanus et al., 2019; Rochat et al., 2009; Schäfer et al., 2015; Shaw & Olson, 2012; Zeidler et al., 2016). For example, the work of Blake, McAuliffe and colleagues (2015) revealed that whereas disadvantageous inequity aversion shows uniform emergence in middle childhood across seven diverse societies, advantageous inequity aversion emerges later in development and only in a subset of societies. And Schäfer and colleagues (2015) present evidence that 4-

11 year old children from a gerontocratic pastoralist society in East Africa do not take prior productivity into consideration in their allocation decisions (whereas children from a modern Western society do). In the same study, children from a partially hunter-gatherer, egalitarian African culture were most concerned with equal distributions (with productivity only playing a minor role).

The Current Studies

The present studies were designed with these two limitations of previous work in mind. In addition to investigating whether children consider two central principles of fairness - merit and friendship - when presented separately, we also studied how children resolve conflicts between them. We thus examined how children would distribute a resource in three conditions: a *merit* condition, in which two unfamiliar recipients differed in terms of how hard they had worked; a *friend* condition, in which the two potential recipients differed with respect to their relationship to the participant; and, finally, a *friend vs. merit* condition, in which the two dimensions were opposed and children had to decide between giving an extra resource to a lazy friend or to a hard-working neutral peer.

To draw conclusions that go beyond WEIRD psychology, we studied not only western children (Germany), but also children from two non-western cultures: Kikuyu and Chinese. These three cultures were selected given that they occupy different positions on the individualist-collectivist dimension of cultural variation, which has been shown to be relevant to considerations of fairness (Huppert et al., 2019; Miller & Bersoff, 1992). Since social relationships and interdependence are highlighted in collectivist cultures (represented by Chinese and Kikuyu children in our sample), while individual-level

166 attributes, e.g. how hard someone worked, tend to be emphasized in more individualist
167 cultures (represented by Germany in our sample), these three samples present an ideal test
168 case of how the effects of friendship and merit vary across cultures (for our specific
169 predictions, see below). In the following, we provide short descriptions of the three
170 samples.

171 *Kenya*. The Kikuyu are Kenya's largest ethnic group, living in the central part of
172 the country. Their language (Kikuyu) is part of the Bantu family. Traditionally, they have
173 been small-scale farmers, cultivating maize, beans, and other vegetables and practicing
174 animal husbandry for their subsistence. Recently, trade and wage work have become more
175 and more important, and a number of Kikuyu have become part of Kenya's middle or upper
176 class. Children in our sample however, came from rural, low-SES households. Although
177 the nuclear family typically forms the basic economic unit, kin will be readily supported in
178 times of need. Cooperation beyond the family is often organized by church or local
179 initiatives (Maathai, 2010). Older members of the communities are highly respected
180 (Whiting, 1996), but positions in other institutions such as church or government are also
181 causes for respect. Decisions are usually made by the official political bodies, although
182 local councils of elders might be consulted for family or community issues. Many Kikuyu
183 have moved out of their original homelands, but their strongest relations are still within
184 their own cultural group.

185 Although children are highly valued, many families nowadays decide to restrict
186 their number due to economic reasons (Price, 1996). However, children still typically grow
187 up surrounded by siblings, cousins, and friends of various ages. Children have few or no
188 possessions of their own. Many children attend the local nursery school from about 4 years

of age, and almost all of them will go to school once they are five or six years old. Outside school, children typically help with various tasks in and around the house, attend to younger siblings, or look after animals. Children are expected to be quiet and obedient at home, although cleverness and self-confidence are increasingly valued in school settings (Whiting, 1996).

China. Children spoke Chinese as their native language and were of the Han ethnicity. The schools were located in three different districts in Beijing (inside the 5th Ring Road). Students typically come from the residential areas in which the school is located. One of the schools is affiliated with the Chinese Academy of Sciences. Parents of about one fourth of the children from this school worked at the Chinese Academy of Sciences and thus had high levels of education. Besides that, Chinese children were from mixed socioeconomic backgrounds. Since Beijing fully implemented a "two-child-per-family" policy in 2016 (in 2014, a more restricted "two-child-per-family" policy was introduced), parents are allowed to give birth to a second child. This was previously forbidden according to the "one-child-per-family" policy, implemented in the late 1970s. However, current birth rates in Beijing suggest that new "two-child-per-family" policy did not significantly increase birth rates and that the majority of families have one child (Beijing Municipal Bureau of Statistics, 2020).

In China, where Confucianism prescribes strong parents-child ties throughout life and emphasizes the importance of family harmony, it is a strong tradition for grandparents to be involved in grandchildren care and household tasks (Nyland et al., 2009). In big cities, such as Beijing, the involvement of grandparents in grandchild care is especially common. Chinese parents emphasize interpersonal relatedness from an early age (Keller

et al., 2007). Although China has undergone profound cultural and economic changes over the last few decades, accompanied by ever-increasing adherence to individualistic values (Sun & Ryder, 2016; Zeng & Greenfield, 2015), traditional cultural values (e.g., Confucianism) persist and increasingly inspire the public's interest (Binah-Pollak, 2014; Sun & Ryder, 2016; Xu & Hamamura, 2014).

Germany. Children were from mixed socio-economic backgrounds. German children typically grow up with their parents and one or two siblings. Other family members often live in other parts of the country and are not part of the children's daily lives. Parents in Germany and other Western, industrialized societies typically emphasize their children's psychological autonomy up from an early age (Kärtner, 2018; Keller, 2007), and children receive high levels of direct, child-centered pedagogy. Children grow up with many toys and own possessions. From early age on the majority of children are cared for in nurseries and kindergartens and by six years of age children attend primary school.

In each culture, we focused our investigation on 7 year old children. The reason for this choice was as follows. We were primarily interested in whether children from the three cultures show differences with regard to fairness, and previous research has revealed that cross-cultural differences in sharing behaviors emerge most robustly in middle childhood. At this age, children's sharing decisions begin to be systematically influenced by local social norms. More specifically, a number of recent investigations have revealed that children's resource allocation decisions show little variation across diverse societies during early childhood. At around 6 to 7 years of age, however, children's allocation decisions begin to vary across societies and to reflect what adults of the respective population judge

to be the appropriate sharing norm (House et al., 2013, 2019; House & Tomasello, 2018). We formulated three predictions. First, based on previous anthropological work (Hruschka, 2010), we predicted that friendship would guide children's resource allocation in all three cultures (but see Scharpf, Paulus, & Wörle, 2017). Second, based on previous work in a Western sample (Baumard et al., 2012), Chinese sample (Chevallier et al., 2015) and a Samburu sample (Schäfer et al., 2015), which has been shown to share certain distributive strategies with our Kikuyu sample (Zeidler et al., 2016), we hypothesized that differences with regard to merit would mediate children's distribution in China and Germany, but not in the Kikuyu sample (see also Friedman et al., 1995). And third, we expected cross-cultural differences in the resolution of conflicts between friendship and merit. Specifically, we hypothesized that friendship would trump merit in the two collectivist populations (Chinese and Kikuyu), but that children in the individualist sample (Germany) would prioritize merit over friendship (Hui et al., 1991; Leung & Bond, 1984; Sun & Ryder, 2016).

Methods

Participants. We tested 144 seven-year-old Kikuyu children (72 girls) from four schools near Nanyuki, Kenya. In addition, we tested 144 seven-year-old Chinese children (72 girls) from four elementary schools in the urban area of Beijing, China. 5 additional children from the Chinese sample had to be excluded (3 children because of experimenter mistake and 2 children because they couldn't name their best friend). Finally, we tested 144 seven-year-old German children (72 girls) from five different schools in a mid-sized German city with around 600,000 inhabitants. 5 additional children from the German sample had to be

excluded (2 children because of experimenter mistake, 2 children because they couldn't name their best friend, and 1 child because they didn't want to finish the distribution).

Across groups, children's ages were recorded as a single whole number (7), as we did not have reliable information about the Kikuyu children's dates of birth, and we did not wish to bias the analyses by only entering precise ages for the other two groups. At all sites, children were tested in a quiet room in their local school. Given that a number of other behavioral studies had previously been run at the local schools, children in all three cultures were familiar with such situations. Participation was fully voluntary, and children were usually eager to participate. Informed written consent was obtained from the school guardians of the children who participated in this study (Kenya), or from the parents of the children (China and Germany).

Materials and Design. For a schematic drawing of the setup, please refer to Figure 1. Participants sat at a small table. The table contained three sets of objects: 1) a big, transparent bowl holding a large number of differently colored beads; 2) two narrow, see-through tubes which were filled with red beads - depending on condition, the two tubes either contained an unequal amount of beads (Figure 1a: *merit condition* and *friend versus merit condition*) or an equal amount of beads (Figure 1b: *friend condition*) – and 3) two envelopes, each belonging to one potential recipient. In the course of the test, participants were given three stickers, one for each recipient and an additional one to hand to either recipient.

In a between-subjects design, children participated in one trial in one of the three conditions. At each testing site, 48 children participated in each condition. Instructions were given in the respective local language. All sessions were videotaped for later coding.

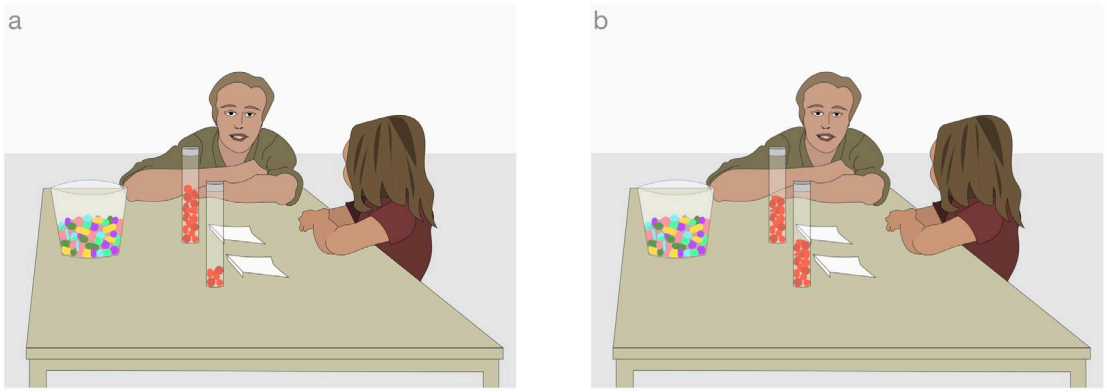

Figure 1. Schematic representation of the setup. In each condition, the participant – located on the right – could choose to give a reward to one of two recipients: (a) depicts the *friend versus merit* condition in which children chose between an undeserving friend and a deserving peer and the *merit condition* in which children chose between a deserving stranger and an undeserving stranger, (b) depicts the *friend condition* in which children chose between a deserving friend and a deserving peer. Note that the experimenter (to the left of the participant) was present only for the instruction, but retreated when the child made her decision.

Procedure. The experimenter (E) entered the testing room with the participant, and asked her to sit down on a chair next to the table. The procedure consisted of two stages: an interview phase during which participants were questioned to determine friendship relationships (for the friend condition and the friend versus merit condition); and an allocation phase during which participants distributed resources between two potential recipients (in all three conditions). In the following, the procedure is described for each condition separately.

299 *Friend versus merit condition*. The general setup for this condition is depicted in
300 Figure 1a. During the interview phase, E posed three questions to the participant in order
301 to identify the 2 children to whom the participant could choose to allocate rewards during
302 the second stage: the friend and the neutral individual. These questions were: (i) which
303 boy/girl do you like playing with most in your class? (ii) which boy/girl don't you like
304 playing with in your class? (iii) which other boys/girls are in your class? In response to
305 each question, E aimed to elicit two names. If the child only mentioned one name, E
306 followed up by asking *who else?* The identity of the friend and the neutral peer for the
307 allocation phase were determined as follows: the friend was the first individual that was
308 mentioned in response to question (i), independent of whether she/he was of the same
309 gender as the participant or not. The neutral peer was the first individual that was mentioned
310 in response to question (iii) and who was of the same gender as the friend. Note that, to
311 determine friends, we asked children who they most liked playing with, rather than directly
312 asking who was their friend, since we did not want to influence children's behavior (for
313 example, using the term friend might prime children to share more with that individual).
314 When determining neutral individuals, we selected children from the same class as
315 participants to make some effort to control for familiarity (i.e. we wanted participants to
316 have a certain level of familiarity with neutral peers as well).

317 After the interview phase, the second phase began, during which participants could
318 allocate rewards to the friend or the neutral peer. E informed the participant that the friend
319 and neutral peer had previously helped her to sort the beads in the large bowl and,
320 specifically, to collect all the red beads. E drew the participant's attention to the tube on
321 the left which contained the beads that had been collected by the friend (small number of

beads) and then to the tube on the right which contained the beads that had been collected by the neutral peer (large number of beads). Location of tubes was counterbalanced across subjects. Because they had helped her, E continued, the friend and the neutral peer would both get a reward. E presented two envelopes to the participant, one for each recipient, and wrote the respective names on the front side of the envelope. E then handed the first reward (a sticker) to the participant and asked her to place it in the friend's envelope. The same procedure was repeated with a second reward which was placed in the neutral peer's envelope. Next, E drew the participant's attention to the two tubes, commenting that "*[neutral peer] has worked really hard and has collected many beads*" and that "*[friend] has not worked so hard and has not collected so many beads*". E asked two comprehension questions: "*Which of the beads did [neutral peer] collect?*" and "*Which of the beads did [friend] collect?*" Once the participant had correctly answered the two questions, E saliently placed her hand in one of her pockets, and, acting surprised, told the participant that she had found one additional reward. E told the participant that she could decide whether to give it to the neutral peer or to the friend and that she should place the reward in the respective envelope. E added that the participant should inform her once she had placed the reward in either envelope and moved away from the table, turning her back to the participant. The trial ended once the participant informed E that she had made a decision.

Friend condition. The general setup for this condition is depicted in Figure 1b. This condition was identical to the *friend versus merit condition*, except for one modification. E asked the participant to distribute the additional sticker between a friend and a neutral peer,

but this time both potential recipients had worked equally hard and had collected an identical number of beads.[1]

Merit condition. The general setup for this condition is depicted in Figure 1a. This condition was also identical to the *friend versus merit condition*, except for one modification. The merit condition did not involve the interview phase. Instead, the experimenter informed the participant that she had been at a different school before, where 2 children had helped her pick all the red beads from the container. One of the children had collected a large number of beads and the other child had collected a small number of beads. The participant was then asked to give the additional sticker to one of these 2 unknown children.

Coding and Analysis. The first, second, and third author coded the participant's allocation decision live as well as later from video. At each site, a research assistant, who was unaware of the study design and hypothesis, independently coded 20% of all trials. Interrater agreement was excellent in Kenya (Cohen's $\kappa = 1$), China (Cohen's $\kappa = 0.87$), and Germany (Cohen's $\kappa = 1$).

Results

Table 1 and Figure 2 present the choices made by children in the friend, merit, and friend vs. merit condition in the three cultures.

[1] Due to a misunderstanding, children in China in the *friend condition* were not presented with two tubes that contained an equal number of red beads, but with two tubes that contained an equal amount of green or yellow beads, respectively.

Table 1. Number of children across cultures who chose the friend (in the friend condition and the friend versus merit condition) and the deserving individual (merit condition). Sample size in each condition was N=48.

	Friend condition (Choice: Friend)	**Merit condition** (Choice: Deserving individual)	**Friend vs Merit condition** (Choice: Friend)
Kenya	34	30	23
China	45	45	28
Germany	39	42	27

To test the effects of condition and culture (and their potential interaction) on children's sharing behavior, we used a generalized linear model, which we fitted with binomial error structure and log link function (McCullagh & Nelder, 1998). We additionally controlled for gender. To establish the significance of the full model (Schielzeth & Forstmeier, 2009), we used a likelihood-ratio test (Dobson & Barnett, 2018), comparing its deviance with that of the null model containing only gender and the intercept. To test the significance of the interaction between condition and culture, we compared the full model's deviance with that of the corresponding reduced model not containing the interaction. The model was fitted in R (R Core Team, 2015) using the function glm.b of the package MASS (Venables et al., 2002).

Overall, the full model was highly significant as compared to the null model (likelihood ratio test: $\chi^2(9) = 16.08$, $p < .0001$). Specifically, we found an interaction between condition and culture (estimate±SE = 2.241±0.791, $\chi^2 = 18.8$, df = 4, $p < .0001$, 95% CI = [0.7746, 3.9424]). To further investigate the interaction between condition and

culture, we conducted post hoc binomial tests. Children in Kenya ($p = .001$), China ($p < .0001$), and Germany ($p < .0001$) were significantly more likely than expected by chance to pass the resource to their friend rather than the neutral peer in the *friend* condition. We also found that children in China were significantly more likely to favor their friend than children in Kenya (chi-square test: $\chi^2 (1, N = 96) = 8.65, p = 0.003$). It is important to point out that we had not predicted this effect. In addition, children in China ($p < .0001$) and Germany ($p < .0001$), but not children in Kenya ($p = .11$), were more likely to give the extra resource to the hardworking than the lazy individual in the *merit* condition. There was no significant tendency in either of the three cultures to favor the hardworking neutral peer or their lazy friend in the *friend vs. merit* condition. However, children in China (chi-square test: $\chi^2 (1, N = 96) = 16.52, p < 0.001$) and Germany (chi-square test: $\chi^2 (1, N = 96) = 11.59, p = 0.001$) were more likely to pass the resource to the undeserving recipient when the recipient was a friend (in the friend vs. merit condition) compared to when the recipient was a stranger (in the merit condition). No such tendency was observed in the Kenyan sample (chi-square test: $\chi^2 (1, N = 96) = 2.06, p = 0.15$).

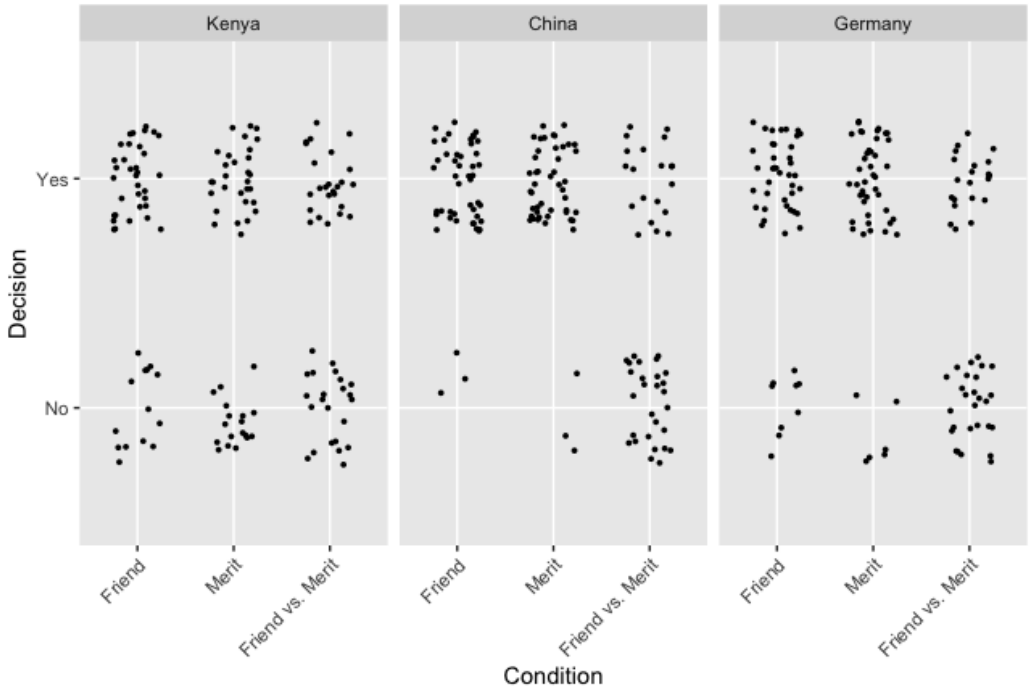

Figure 2. Depiction of each child's decision in the three conditions across the different cultures. Each point represents the choice of one child. Children who gave more to the friend in the friend condition, to the deserving individual in the merit condition, and to the friend in the friend vs. merit condition were coded as "yes".

Discussion

The present cross-cultural empirical examination was conducted with the goal of detecting variation and similarity in how children from three cultures apply the principles of merit and friendship in resource allocation contexts. Children from Kenya, China, and Germany reliably considered friendship in their distributive decisions and selectively shared resources with closely bonded individuals. Children from China and Germany, but not children from Kenya, additionally tracked the extent to which potential recipients differed in terms of how hard they had worked when determining how to share rewards. In a final

condition, we asked: when the two motivations are in conflict, do children give precedence to friendship or to merit? Answer: across cultures, the two considerations carry approximately equal weight, that is, about half of participants favored the more hardworking individual, whereas the other half shared with their less productive friend.

The finding that children in all three cultures reliably displayed partiality towards their friends over neutral peers extends previous work from Western cultures showing that children favor their close social connections in the domain of prosociality and preferentially direct behaviors such as sharing and helping towards them (Engelmann et al., 2019; Paulus & Moore, 2014). Our experimental manipulation involved an especially strong test of partiality towards friends. While previous studies have generally compared how children treat their friends in comparison to how they treat non-friends or strangers (Moore, 2009), here we used neutral but familiar recipients as a comparison group, thereby ensuring that any differential treatment is grounded in friendship and not in other related motivations such as a preference for familiar over unfamiliar individuals or antipathy towards disliked individuals. While a general impetus to treat friends differently was present across the three cultures studied, there was variation in the strength of this motivation. Chinese children showed a stronger tendency to favor their friend over a neutral, familiar individual than Kikuyu children (with German children being in the middle). While it is possible that the weight that is placed on friendship relations in the context of resource allocation differs across cultures, this result should be interpreted with caution; we had not predicted cross-cultural variation in this direction, so we need to await further studies to corroborate it.

438 The second finding was that the extent to which merit is considered as a factor
439 relevant to resource allocation varies cross-culturally. Chinese and German children, but
440 not Kikuyu children, preferentially rewarded more meritorious individuals. While the
441 current set of studies thus suggest that merit has uniform influence in both Chinese and
442 German populations, it is possible that future studies will detect variation in terms of how
443 different aspects of merit are taken into consideration in children from these two
444 populations. What looks like cross-cultural uniformity on the behavioral level might be
445 driven by culturally varying psychological processes. At first sight, distributing resources
446 according to merit appears to follow a straightforward heuristic: allocate preferentially to
447 those who have worked harder. But parsing the concept of merit reveals a suite of distinct
448 components that may carry differential relevance in Chinese and German children. In
449 determining who to reward in the context of merit, we may pay special attention to
450 someone's ability or talent; to the effort or work that someone has put into a task; or to her
451 performance, i.e. the output of her labor. The current results don't allow us to tease these
452 different considerations apart as effort and output reliably correlated in our experimental
453 setup. It is entirely possible, however, that German children for example, value effort over
454 output, whereas Chinese children place greater significance on yield. Talent, effort, and
455 output are all dimensions that are relevant to distributions according to merit and future
456 studies should investigate whether the weight that is placed on each of these components
457 varies across cultures.

458 The null-effect of merit in the Kikuyu sample also warrants further investigation.
459 One hypothesis is that relationship-independent ways of regulating distributions (e.g.
460 considering merit) play an important role in large-scale communities, where economic

transactions among strangers occur frequently; in small-scale societies on the other hand (such as the Kikuyu sample), individuals interact with one another repeatedly and so relationship-specific patterns might regulate the transfer of resources (Gurven, 2004; Gurven & Winking, 2008). Support for this view comes, for example, from a study with children from another small-scale Kenyan population, the Samburu. The authors report, similar to our findings, no effect of deservingness on Samburu children's allocation decisions even in the face of large imbalances of output (Schäfer et al., 2015). Thus, Kikuyu children in our setup might not have reliably considered merit in their distributive decisions since they are not frequently involved in resource transfers that call for impersonal standards of division.

Alternatively, the cross-cultural difference on the behavioral level between the Kikuyu sample on the one hand and the Chinese and German sample on the other hand might be explainable not in terms of variation in underlying psychological processes, but in terms of a different construal of the sharing situation. Previous work with diverse populations provides support for the risk-reduction theory of sharing: whether or not resources are shared according to effort depends on the variance in output associated with a given resource. For example, Kaplan and Hill (1985) report that hunter-gatherer communities share resources widely among their group in contexts where effort does not consistently predict foraging success (examples: hunting for meat or searching for honey), but share food in a much more discriminatory manner in contexts where acquisition correlates positively with effort (example: gathered plant foods). For evidence that the same pattern of behavior operates in WEIRD populations, see Kaplan and colleagues (2012). It is conceivable that Kikuyu children, in contrast to Chinese and German children,

viewed success in the current setup as involving other factors rather than effort and consequently showed a lower tendency to distribute to meritorious individuals. Given that the experimenter emphasized in their instructions to participants that differential output resulted from variation in effort (see procedure section), we do not deem this explanation as highly likely, but it is nevertheless worthy of further investigation. Future studies could address this issue by asking children to justify their sharing decisions. This would help to answer the question whether children, like adults, apply different sharing rules in contexts where output varies as a function of input compared to situations where other factors - for instance luck - emerge as decisive in explaining differential production.

Finally, our third condition, which sought to uncover the relative weight that children place on friendship and merit in resource allocation, revealed that in all three cultures about half of the sample favored the lazy friend over the hardworking neutral individual, whereas the other half showed the opposite preference. This pattern of results fails to confirm our prediction that children from more collectivist populations (Chinese and Kikuyu) would give priority to obligations resulting from close interpersonal connections and that children from the more individualist population (Germany) would accord precedence to the impartial notion of merit. What might account for this divergence from our prediction? Since Kikuyu children did not display a robust preference to reward more hard-working individuals in the merit condition, they might not have experienced a true conflict of different fairness considerations here. It is thus difficult to interpret their behavior in the friend versus merit condition. At first glance it seems puzzling that Kikuyu children paid attention to friendship but not to merit in the two first conditions, but then appear to be split between the two factors in the third condition, suggesting that

considerations of deservingness do in fact carry some relevance. One potential explanation for this is that Kikuyu participants showed a relatively weak effect of friendship combined with a potential trend towards significance in the merit condition. For the Chinese and German children, one possibility is that older children and adolescents might show the predicted effect, whereas the relatively young children that we studied might not have internalized locally prevailing norms to the same extent. While this remains a possibility, previous results from a variety of experimental paradigms (House et al., 2013, 2019; House & Tomasello, 2018) present strong evidence that sharing norms vary cross-culturally by age 7. Future work should explore the respective contribution of friendship and merit motivations in distributive contexts across a wider age range. Finally, although friendship did not override merit considerations (or vice versa), we nevertheless found that children in China and Germany were more likely to reward a lazy over a hardworking individual if that individual was a friend compared to a stranger (it should be noted, however, that this comparison does not control for familiarity). Social relationships thus mediate the extent to which children from these two cultural backgrounds consider more impersonal factors, such as potential recipients' relative deservingness, in their allocation decisions (see also Zhang, 2020).

One limitation of the present work is that we cannot explain children's behavior in the friend versus merit condition. Since culture did not emerge as a decisive factor in determining how children resolved this dilemma condition, it would be interesting to relate children's choice – i.e. whether they rewarded the meritorious individual or the friend – to differences on the individual level. One question is whether children who passed the resource to the undeserving friend feel more closely connected to their friend than children

who handed the reward to the deserving neutral peer. The Inclusion-of-Other-in-the-Self Scale (IOS) could be used to measure the degree of closeness between participant and friend in future research (Aron et al., 1992; W. Li et al., 2019). A further limitation of the present work is the fact that we employed a one-shot forced choice task. It is possible that a more sensitive method (using a more continuous measure) would have allowed us to detect differences regarding the respective weight that friendship and merit considerations carry in the different populations. In addition, while our method, which relied on children's behavioral sharing decisions rather than extensive verbal instructions, is especially suited to cross-cultural investigations, future work could incorporate interview questions to confirm the potential motivations behind children's allocation decisions (Elenbaas et al., 2016; Rizzo et al., 2018).

Some of the deepest moral dilemmas, which have seemingly no satisfactory solution, are a result of the fact that humans are simultaneously influenced by diverse and sometimes conflicting moral considerations. Here we have investigated how children from three cultures factor two such considerations - social relationships and equity - into their distributive decisions. We also asked how children mediate between obligations that result from the partiality of friendship on the one hand, and the impartiality of merit, on the other. Our results raise the possibility that children from some cultures, e.g. Kikuyu, potentially do not experience such situations as involving a conflict as they might not (or not yet) operate with merit-based sharing norms. Children's behavior in the two other cultures studied here, Chinese and German, which was split evenly among a preference for friendship over merit and the opposite pattern, provides support for the view that such dilemmas might simply not have a straightforward solution. Taken together, the current

results thus suggest that children's sense of what is fair and what is not shows important commonalities across cultures on some dimensions, but also significant differences on others.

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