Children’s fairness in two Chinese schools: 
A combined ethnographic and experimental study

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Abstract
Recent research has shown that children’s sense of fairness is shaped in part by cultural practices, values, and norms. However, the specific social factors that motivate children’s fairness decisions remain poorly understood. The current study combined an ethnographic approach with experimental tests of fairness (the Inequity Game) in two Chinese schools with qualitatively different practices and norms. In the “University school,” children received explicit moral instruction on fairness reinforced by adults when supervising children’s activities. By contrast, in the “Community school,” children received less formal moral education and little adult supervision during play time, but norms of cooperation and fairness emerged through informal interactions with peers and other members of the community. Contrary to our predictions, children in both schools (N = 66) rejected both disadvantageous and advantageous allocations of resources in the test trials. However, in the very first practice trials, children from the Community school tended to reject all inequalities, whereas children from the University school tended to accept inequalities. We draw on the ethnographies of the schools to interpret these results, concluding that, despite the similarities in the experimental results, different motivations and social factors likely underlie the rejection of inequality in the two schools.

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Introduction

The development of fairness behaviors varies across societies, suggesting that cultural norms and values shape children’s sense of fairness (Henrich, 2006; Henrich, Heine, & Norenzayan, 2010; Keller, Poortinga, & Scholmerich, 2002). Recent work has demonstrated that even simple responses to inequality vary widely for children beyond typical Western samples (Blake, McAuliffe et al., 2015; House et al., 2013; Rochat et al., 2009). Using an established economic task, the Inequity Game, it has been found that children respond differently to the same unequal allocation of resources depending on whether they receive less (disadvantageous inequity) or more (advantageous inequity) than a peer (Blake & McAuliffe, 2011). A recent comparison of children in seven societies (United States, Canada, India, Mexico, Peru, Senegal, and Uganda) found that children in all societies were willing to pay a cost to avoid getting less than a peer (disadvantageous inequity) but that children in only three societies (United States, Canada, and Uganda) were willing to pay a cost to avoid getting more than a peer (advantageous inequity) and only at older ages (Blake et al., 2015). In fact, both responses to inequality varied by society, with differences in the age of emergence as well as the strength of the effects. Although these results strongly suggest the role of cultural learning in shaping responses to unfair outcomes, the particular social influences that affect this basic sense of fairness remain speculative.

Although broad cross-cultural comparisons are valuable for identifying potential cognitive and behavioral universals, these approaches are often inadequate for identifying the precise factors that shape the development of particular behaviors. Assessing these factors requires focused contrasts within a society and the use of more in-depth qualitative analyses of the norms and values that may influence children’s behavior (Lancy, Bock, & Gaskins, 2012; LeVine & New, 2008; Montgomery, 2009; Rogoff, 2003). Ethnography offers an established approach for a systematic analysis of the structural, historical, and behavioral differences that characterize “cultures.” Recent research on adults has used a combination of anthropological approaches and experiments to show how differences between populations within the same society can explain differences in local cooperation (Bernhard, Fehr, & Fischbacher, 2006; Lamba & Mace, 2011; Nettle, 2017). In the current study, we applied this approach to compare children’s fairness behavior in two schools in China.

For our experiments, an ongoing ethnographic comparison of the two schools provided a foundation for predicting differences in children’s fairness behavior in the two schools. Specifically, the ethnography revealed differences in pedagogical approaches within the schools and in the broader patterns of socializing in the two communities. These community differences aligned with differences in children’s general patterns of cooperation and competition in the schools, documented by observations in a structured context by the first author (Kajanus, 2018, chap. 2). Based on these ethnographic differences, we hypothesized that children in the two schools would make different decisions in the fairness experiment, reflecting different norms of cooperation and fair behavior. In brief, we predicted that the children at a more competitive school (“University school”) would have a greater focus on their own gains, whereas children at a more cooperative school (“Community school”) would show a more generous orientation, particularly in sacrificing their own rewards to endorse an equal outcome. We next provide a brief history of changes within Chinese society that make it an interesting test case for fairness and summarize the results of the ethnographic research at the two schools.

Moral norms and social change in China

China represents a unique society that remains quite different from Euro-American societies and so has been the focus of much cross-cultural research (e.g., Chen et al., 1998; Dunham, Chen, & Banaji, 2013; Tobin, Hsueh, & Karasawa, 2011; Wang, 2004; Whiting, Whiting, & Longabaugh, 1975). In line with Confucian values that emphasize the collective and the family over individual interests, China is often broadly described as a “collectivist” society, in contrast to the “individualistic” Western societies where self-reliance, the ability to act on personal interests, and the relative breaking off from the family are prerequisites for full-fledged adulthood (Hsu, 1981; Nisbett & Masuda, 2003; Oyserman,
Although this overall characterization has rightfully been criticized as simplistic, it has motivated much of the comparative work on the development of children’s altruism and fairness behaviors between China and the United States (Cowell et al., 2017; Rao & Stewart, 1999; Rochat et al., 2009; Yu, Zhu, & Leslie, 2016). However, during the past decades, China has undergone a major sociomoral change that has been characterized by the dismantling of the cultural, social, and political systems that used to orient the individual toward the collective. This transformation has taken place in the context of new opportunities for wealth and social mobility that are not equally accessible to all. As a result, there are two current trends that may influence the development of fairness norms and behaviors in children: (a) the rise of individualism and (b) the rise of competitiveness (see online supplementary material for more details) (Kleinman et al., 2011; Rofel, 2007; Stafford, 2013; Yan, 2009, 2013). Both factors vary by local context and can affect the development of fairness in different ways.

Despite this shift toward more individualistic values, a collectivist orientation continues to play a role in the moral life of the individual. The current political economy renders the individual very reliant on family support, and the weakening of ancestral lineages has to some extent been coupled with the strengthening of the nuclear family (Kajanus, 2015; Liu, 2000; Wang & Fong, 2009). In education, increasing emphasis is being placed on cooperative pedagogical techniques that have been imported from Euro-American education and moral education that focuses on prosocial behavior. This is part of the general concern over raising generations of spoiled and egotistic singletons, which has preoccupied parents and educators since the launching of the one-child policy (Kajanus, 2016, 2018, chap. 2; Kuan, 2015; Xu, 2014, 2017; Zhao, 2015).

When investigating children’s fairness norms and behaviors in China, therefore, we should keep in mind two things. First, decades of political turmoil, including direct campaigns to change culturally central norms and values, have resulted in a moral environment where the individualistic, collectivist, and competitive orientations come together in complex ways. Second, this transformation has not encompassed the Chinese society as a whole but rather results in diverse patterns of norms and behavior along regional, rural–urban, and class lines. Understanding this variance in local-level norms within a society can enhance our understanding of how cultural and social factors shape children’s understanding of fairness.

The current study compared two urban communities, located within 5 miles of each other, in Nanjing, China. The general transformation of the Chinese society has had a profound impact on both communities, and the aspects of that transformation that are arguably most characteristic of childhood in contemporary China, the standard of single-child families and the extremely demanding school system, are shared. However, other factors, such as differences in the educational pedagogies of the schools and the patterns of social life in the communities, also play a role in the development of the children’s moral norms and behaviors. Through the focus on these two communities that are both similar and different in important ways, and the use of a combination of in-depth ethnographic and experimental methods, we were able to capture some of the complexity in the individualistic, communal, and competitive orientations in children’s moral behaviors. We used the results from 9 months of ethnographic fieldwork by the first author, an anthropologist, to plan an experiment to assess fairness behaviors, make predictions, and interpret the results. We next provide brief ethnographic outlines of the two communities (for more details, see Kajanus, 2018, chap. 2).

The two communities

One of the communities is located in an affluent part of the city, the university district. The parents of the children are generally highly educated, and many have studied and worked abroad. Their children attend the “University school” that has an excellent reputation and resources. The second community is located in a former rural area that was added to the city boundaries a decade ago. The families moved from farms to the apartment buildings that were built around a square that now hosts a supermarket, banks, restaurants, and the “Community school” that their children attend. The first author carried out 9 months of ethnographic fieldwork in the two communities and these schools, focusing on 8- and 9-year-old children (second graders). She taught physical education at the schools and spent the rest of her time in one classroom in each school. She lived in both
communities and carried out participant observation with the children and their families also outside school.

In the University school, the encouragement of children's cooperative and prosocial orientations is clearly visible in the pedagogical practice. Alongside traditional rote learning, teachers use a range of methods that encourage child-led cooperative learning and peer responsibility. Children also receive constant explicit moral education in being virtuous children, diligent students, and good persons. However, this emphasis on prosociality is coupled with an overwhelming emphasis on competition. Children take part in various individual competitions, and in everyday classroom practice children are routinely set in an explicit comparison against each other and are publicly praised, shamed, or criticized on the basis of their performance.

The everyday atmosphere and classroom practice at the Community school is very different, marked by the lack of explicit emphasis on both prosociality and competition. Teaching is carried out in a straightforward teacher-centered manner, and teachers rarely organize group work or other joint activities during the course of their routine teaching. In comparison with the University school, individual feedback, moral lectures, and prosocial rhetoric are seldom used as motivational or disciplinary techniques. However, although pedagogical techniques that would explicitly encourage cooperation and teamwork are sparse, the children are often left to work without adult supervision and, therefore, are used to working together and helping each other.

To characterize these differences between the schools more systematically, the first author counted and coded disciplinary and motivational interventions made in class by the teachers at each school. Over the course of 9 weeks, eight classes at each school were observed one time; thus, overall there was the same amount of observation time at each school. In the University school four teachers were observed, and in the Community school five teachers were observed. The interventions were categorized into three types: moral, action, and peer comparison oriented. Moral praise or criticism included lectures on how to be good children and appeals to the children's moral conscience and character. Action interventions included feedback on children's actions, for example, telling the class to be quiet or complementing a correct answer with a simple “very good.” Peer comparison interventions explicitly compared individuals or groups with each other, for example, by giving smiley face stickers on a public board or making children who have answered incorrectly stand by their desks while a correct answer is given by another child (see supplementary material for complete details on the observation and coding procedures).

Table 1 shows three key differences between the schools. First, teachers used more than three times as many disciplinary and motivational interventions at the University school \((n = 187)\) compared with the Community school \((n = 49)\) over the same amount of time of observation. Second, explicit peer comparison was used to a greater extent in the University school \((40\% \text{ of observations})\) compared with the Community school \((24\% \text{ of observations})\). Lastly, explicit moral comments were rarely made at the Community school \((2 \text{ instances})\) but were more common at the University school \((26 \text{ instances}, 14\% \text{ of observations})\). Combined, these findings support our general characterization of the two schools. At the University school, teachers actively intervened in a variety of ways to motivate and control the children and promoted competition, peer comparison, and moral character. At the Community school, teachers took a less active role, mainly intervening to manage classroom behavior with less emphasis on character or competition.

Differences between the schools were also found in observations of the children conducted in a structured context—a competitive ball game between two teams, resembling dodgeball, that the first author introduced to the children (Kajanus, 2018, chap. 2). The game was played during a weekly physical education class over the course of 5 consecutive weeks. For the first 2 weeks, the first author supervised the games and enforced the rules. During the final 3 weeks, the children played without adult rule enforcement and the first author counted and coded the incidents of cooperation and conflict during the games. Eight classes were observed in each school during the final 3 weeks, giving equal observation time. Four codes were used to characterize the children's interactions. Conflicts between the teams playing the game were coded as either (a) verbal arguments, such as disagreements over the rules and arguments over who should have the ball, or (b) physical struggles, which escalated from verbal arguments into pulling, kicking, and pushing (at which point adult intervention was required). Cooperative incidents were coded as either (c) cooperation to win, defined as
cooperation that helped the team win such as passing the ball to a good player or supporting a team member in an argument, or (d) helping, which included prosocial behavior that did not help one’s team win. Examples of helping included giving the ball to a weak player in order to let him or her participate and supporting a member of the opposite team in an argument over a rule breach to the disadvantage of one’s own team (see Table 2).

The observations revealed many more conflicts at the University school and more cooperation, specifically helping, at the Community school. There were more than twice the number of verbal arguments at the University school ($n = 26$) compared with the Community school ($n = 11$). In 11 instances at the University school, these arguments escalated into physical struggles. In the Community school, arguments never became physical. Children at both schools equally used cooperative strategies to help their team win, but only children at the Community school engaged in helping behaviors that weakened their team’s chance of winning. In sum, children at the University school prioritized winning over the more social aspects of the game. Children at the Community school also cared about winning but sometimes prioritized communal participation and the smooth continuation of the game.

Other differences between the communities appear outside of the schools. Compared with the University school, children at the Community school spend less time on schoolwork and other adult-organized activities. Most of the families have lived in the area for generations, and the children observe and take part in a variety of social exchanges with extensive networks of kin and neighbors. The University school children have very little unstructured time and fewer opportunities for joint activities and interactions that are not led and supervised by adults. Their home lives center around the nuclear family because most of the families have moved from around China and lack extensive social networks in the area.

These differences in the home and school environments result in clearly distinct cooperative and competitive behaviors in the two groups of children that are in line with patterns that have been

Table 1
Counts and proportions of teacher statements in the University and Community schools.

<table>
<thead>
<tr>
<th></th>
<th>University</th>
<th>Community</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moral</td>
<td>26 (14%)</td>
<td>2 (4%)</td>
<td>Using moral language in praise/criticism, focusing on character and values</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Speaking when the teacher speaks is a particularly bad habit! That’s why you don’t know anything!”</td>
</tr>
<tr>
<td>Action</td>
<td>86 (46%)</td>
<td>35 (71%)</td>
<td>Disciplining that focuses on actions rather than on values/character</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Sit up straight”</td>
</tr>
<tr>
<td>Peer comparison</td>
<td>75 (40%)</td>
<td>12 (24%)</td>
<td>Singling out individuals or groups for criticism or praise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I’ll see which group finishes first”</td>
</tr>
<tr>
<td>Total</td>
<td>187</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

Table 2
Counts of conflicts and cooperative incidents during the ball games at the University and Community schools.

<table>
<thead>
<tr>
<th></th>
<th>University</th>
<th>Community</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal arguments</td>
<td>26</td>
<td>11</td>
<td>Verbal arguments between members of opposing teams (e.g., over rule breaches)</td>
</tr>
<tr>
<td>Physical struggle</td>
<td>11</td>
<td>0</td>
<td>Verbal arguments escalating into a physical conflict between teams</td>
</tr>
<tr>
<td>Cooperation to win</td>
<td>11</td>
<td>12</td>
<td>Cooperation between players within teams intended to help the team win (e.g., passing the ball to a better player)</td>
</tr>
<tr>
<td>Helping</td>
<td>0</td>
<td>7</td>
<td>Helping between players either within or between teams that does not help the team win (e.g., passing the ball to a worse player to allow him or her to participate)</td>
</tr>
</tbody>
</table>
found with some consistency across a range of cultural–historical contexts (Lancy et al., 2012; Rogoff, 2003). In societies where children have plenty of opportunities to tag along in multiage communal activities, observing and learning through participation, children tend to be highly skilled cooperators. Their moral behaviors are grounded by a subtle alignment of interests and activities with those of others rather than by explicit shared norms (Paradise & Rogoff, 2009; Rogoff, 2003; Schieffelin & Ochs, 1986; Whiting et al., 1975). By contrast, in societies where children spend most of their time in age-graded groups, receiving explicit instruction and engaged in activities that have been specifically designed for children, they tend to rely more on explicit rules and norms and on authority to regulate conflicts (Fasulo, Loyd, & Padiglione, 2007; Goodwin, 2007; Ochs & Izquierdo, 2009; Rogoff, 2003).

In sum, the University school children were found to be more individually competitive and individually oriented. The children are well versed in the moral discourse of how to be good persons and good children but are lacking in the practical skills of cooperation when not directed by adults. This was noticeable, for example, in the conflicts that quickly emerged on the rare occasions when children were left to work and play together without adult direction. The Community school children, in contrast, received much less of the explicit moral discourses of being fair, helpful, and generous but were more skilled at coordinating peer group activities and managing conflicting interests and various personalities in their group. In competitive games and events, they emphasized the communal aspects of participation over winning the contests.

This analysis highlighted key differences between the schools that we used to generate predictions for the experimental task. Specifically, children at the University school showed a greater orientation toward individual achievement and competition. However, this was balanced by explicit moral instruction in how to behave fairly. By contrast, children at the Community school lacked this kind of moral instruction but showed a more communal orientation and consideration for their classmates.

Fairness and inequity aversion

To assess the impact of these local norms and values on children’s sense of fairness, we conducted experiments using the Inequity Game, an intuitive paradigm developed for children to determine their reactions to unfair resource allocations. Responses to inequality form a foundation for fairness considerations and have been central to various theories of fairness—psychological (equity theory: Adams, 1963; social utility theory: Loewenstein, Thompson, & Bazerman, 1989), economic (inequity aversion: Fehr & Schmidt, 1999), and evolutionary (Brosnan & de Waal, 2014). Recent developmental theories have emphasized a distinction between disadvantageous inequity (receiving less than a partner) and advantageous inequity (receiving more than a partner) (Blake & McAuliffe, 2011; McAuliffe, Blake, Steinbeis & Warneken, 2017). Drawing on experimental and cross-cultural evidence, this view posits separate mechanisms for these two forms of inequality. Specifically, disadvantageous inequity aversion (rejecting a disadvantage at a cost to oneself) emerges early in development (~4 years of age) and is less susceptible to, but not immune to, cultural influences. Advantageous inequity aversion (rejecting an advantage at a cost to oneself) emerges later in development (~8–10 years of age) and varies widely by society. Several empirical studies support the separate mechanism account, including a cross-cultural study of seven societies that found disadvantageous inequity aversion in all samples and advantageous inequity aversion in only three societies (Blake & McAuliffe, 2011; Blake et al., 2015; Corbit, McAuliffe, Callaghan, Blake, & Warneken, 2017; McAuliffe, Blake, & Warneken, 2014; McAuliffe, Blake, Kim, Wrangham, & Warneken, 2013). Notably, disadvantageous inequity aversion also varied by society, with much weaker effects in one culture (the Maya in Mexico). That is, children were more likely to accept a disadvantage and allow a peer to have more, a signal of a more prosocial orientation. Given that the variation in both disadvantageous and advantageous inequity aversion emerged by 8 or 9 years of age, the current study focused on this age group. This age range also represents the onset of middle childhood and has been proposed as a point in life history during which children begin to adopt local norms and values and adjust their behavior accordingly (House et al., 2013).

We predicted that the different norms and values in the two schools and communities would result in different behaviors when children were faced with unfair allocations of resources. Specifically, given the more communal orientation of the Community school, children would be more likely to
accept a disadvantage, allowing a peer to receive more, and likely to deny themselves an advantage. Given the more individualistic orientation of the University school, we predicted that children would be more likely to reject resource allocations that placed them at a disadvantage relative to a peer; this decision could also be justified in terms of explicit moral rules of fairness given the equal outcome. However, how these children would respond to an advantage was less clear; they might accept the advantage over the peer, or they might deny themselves this advantage based on their more explicit moral training. Thus, rejections of advantageous offers in the two schools might occur for different reasons.

The Inequity Game

In the game, two children sit facing each other on either side of the apparatus. One child is assigned to the role of actor, and the other child is assigned to the role of recipient. The experimenter places allocations of candy on the two trays designated for the children. The actor is the decision maker in this task and can either accept the allocation or reject it by pulling different handles. Accepting the allocation tilts the trays toward each child and delivers the candy to them. Rejecting the allocation tilts the trays inward so that the rewards drop into a central bowl and neither child gets the candy. Thus, rejections create an equal outcome of 0–0, but this is a costly decision for the actor and denies rewards to both children. The actor’s decisions when faced with a disadvantage (1 candy for the actor, 4 candies for the recipient) and an advantage (4 candies for the actor, 1 candy for the recipient) were tested in separate sessions with different pairs of children. Each session also included equal trials (1–1) as a control to ensure that children would accept positive equality and that they were not pulling the handles randomly. Thus, the difference between rejections of the unequal trials and the equal trials for each session constitute our primary measure of sensitivity to that form of unfairness.

The actors for each school did the Inequity Game twice, once with disadvantageous allocations and once with advantageous allocations, with different recipients for each condition. This within-participants design allowed for an analysis of each actor’s combined decisions for both conditions. These data were combined with individual-level data on children’s relative status among their peers and their self-reports of prosociality from standard assessments used by both schools. These analyses were exploratory and intended to lend insight into individual differences between the schools on this task.

Method

Ethical approval

All research was conducted under the approval of the London School of Economics and Political Science (LSE) Research Ethics Committee. Parental consent and assent from the children were obtained separately for the ethnographic and experimental parts of the project.

Participants

A total of 66 children were tested: 32 at the University school (20 girls) and 34 at the Community school (15 girls). All children were in second grade and were 8 or 9 years of age, although exact individual ages were not documented. Each sample of children was divided into a group of actors (University school: \( n = 16 \); Community school: \( n = 17 \)) and a group of recipients.

Materials and procedures

All consent materials and the testing script were translated into Mandarin by a local research assistant and backtranslated into English by the first author to ensure the integrity of the translation. Testing at each school occurred during one day. Children were tested by a local research assistant trained in all of the procedures; the first author helped to organize the sessions and observed and
filmed them. Children’s decisions were live coded and then checked against the videos by two research assistants.

Within each school, the actors were paired with different recipients for two conditions of the Inequity Game: disadvantageous and advantageous. Each condition was conducted during a separate session, and the actor was paired with a different recipient for each condition. The order of the conditions (disadvantageous or advantageous first) was counterbalanced within each school. In the disadvantageous condition, the pair received 6 equal trials (1 candy each) and 6 unequal trials (1 candy for the actor, 4 candies for the recipient). The order of the equal and unequal trials was randomized before the testing began. The advantageous condition was similar except that in the unequal trials the actor received 4 candies and the recipient received 1 candy.

Each session began with instructions, a demonstration, and a set of practice trials. Children were told that there was no talking during the task and that they could not touch or eat their candy during the game but that they could take it with them at the end. To demonstrate the apparatus, the experimenter placed one candy on each tray and pulled the accept or reject handle (order counterbalanced), explaining how the candy either was distributed to the children or fell into the center bowl and nobody received candy. The experimenter demonstrated the other handle using another equal (1–1) allocation in order not to bias children’s later decisions. Next, children received 3 practice trials so that they could experience the consequences of pulling each handle. The experimenter provided no feedback during this phase but simply stated the outcome. The first practice trial was always equal (1–1), and the next two trials were counterbalanced: 1 for the actor, 0 for the recipient; and 0 for the actor, 1 for the recipient. If a child pulled the same handle for all of the trials, the experimenter placed another equal allocation on the trays and instructed the child to pull the handle he or she had not used “just to see how it works.” The prompt for all practice and test trials was “Which handle do you want to pull?” Thus, the practice trials constitute an additional set of data allowing a comparison of rejections of equal, disadvantageous, and advantageous trials. Note that the practice trials were conducted in both sessions, providing two sets of repeated measures per child.

For the 12 test trials, the experimenter placed equal or unequal allocations on the trays in a predetermined random order. The experimenter held a flat piece of wood on the trays to set them level, placed the allocation, and then lifted the stick, at which point the child could pull one of the handles. If the child did not pull a handle within 5 s, the experimenter placed the stick on the trays again and asked, “Which handle do you want to pull?” and then lifted the stick. After each decision, the experimenter stated the outcome (e.g., “You [actor] get one and [recipient] gets four,” “No one gets any candy that time”). After each accepted allocation, the children moved their candy to a side bowl so that the outcome could be more easily seen by both children. After all the test trials were completed, the experimenter announced that the task was over and that the children could put their candy into a paper bag. Paper bags were used because the children went back to class after the task and we did not want them to see how many candies each child had received.

The actor was then asked why he or she had pulled the accept and reject handles. Finally, the children were asked not to talk about the task with other children in class to prevent those who had not been tested from forming beliefs about the task.

Results

We conducted two main analyses. First, we assessed group-level effects with the test trials, testing for condition effects (disadvantageous and advantageous inequity) for the sample as a whole and by school. Second, we tested the same hypotheses using the practice trial data, as has been done in previous research using this method (Blake & McAuliffe, 2011). In addition, we examined individual differences in children’s decisions by school and for the combined sample using children’s self-reports of prosocial behavior (provided by the schools) and popularity ranks (from the ethnography). Because these latter analyses were exploratory, and no significant results were obtained, they are reported in the supplementary material. All statistical analyses were conducted with R statistical software (Version R 3.5.1; R Core Team, 2016).
Test trials

Following the analytic approach outlined in Blake et al. (2015), children’s decisions were analyzed using generalized linear mixed models (GLMMs) with a binary response term (reject = 1, accept = 0). Mixed models were run using the package lme4 (Bates, Maechler, & Bolker, 2012).

A null model was created with actor ID fit as a random intercept to control for repeated measures (following the modeling strategy used in Blake et al., 2015). We compared this with a model with distribution (equal or unequal), condition (advantageous or disadvantageous), and the interaction term. The reference levels were equal for distribution and advantageous for condition. This model substantially improved the fit over the baseline (likelihood ratio test [LRT], \( \chi^2 = 153.58, p < .001 \)) and produced a main effect of distribution (\( B = 1.92, SE = 0.29, p < .001 \)) and a marginal interaction of Distribution × Condition (\( B = 0.69, SE = 0.42, p = .097 \)). Overall, there was a higher probability of rejecting unequal trials in the disadvantageous condition compared with the advantageous condition. Given that this difference was in the predicted direction based on several prior studies, and to test specific predictions by condition and school, we created data subsets for each condition. This analytic approach has been used in cross-cultural research using this method (Blake et al., 2015).

For both the disadvantageous and advantageous subsets, we used a hierarchical model building approach in order to test our main predictors and interactions without overspecifying the models given the small sample size (\( n = 33 \) for each subset). Baseline models were created with distribution only (see Tables 3 and 4). For both subsets, predictors were added in a set order with our main variable of interest added first (school, with reference level = University), followed by design elements (condition order, with reference level = advantageous inequity first; and trial number) and additional variables (actor gender, with reference level = female). For both the disadvantageous and advantageous analyses, school was not a significant predictor and did not improve model fit. Thus, in both schools, children showed disadvantageous and advantageous inequity aversion, with no differences in the size of these effects between schools (Fig. 1). In addition, trial number did not improve model fit and was dropped from subsequent analyses.

For the disadvantageous condition, the final model included main effects for distribution (\( B = 3.53, SE = 0.58, p < .001 \)), condition order (\( B = 1.72, SE = 0.68, p < .05 \)), and gender (\( B = 0.89, SE = 0.39, p < .05 \)), and an interaction of distribution and order (\( B = -1.37, SE = 0.69, p < .05 \)) (Model 4 in Table 3). The main effect of distribution shows that children were significantly more likely to reject disadvantageous trials compared with equal trials. Examination of the interaction revealed that when the disadvantageous condition came first, children were more likely to reject equal trials (\( \chi^2 = 6.42, p < .05 \)), but condition order had no effect on rejections of unequal trials (\( \chi^2 = 0.70, \text{ns} \)). The contrast between

### Table 3

Disadvantageous condition: Logistic regression models.

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.64 (0.32)***</td>
<td>-2.45 (0.42)***</td>
<td>-3.58 (0.59)***</td>
</tr>
<tr>
<td>Distribution</td>
<td>2.67 (0.32)***</td>
<td>2.64 (0.42)***</td>
<td>3.57 (0.59)***</td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution ( \times ) School</td>
<td></td>
<td></td>
<td>0.08 (0.62)</td>
</tr>
<tr>
<td>Order</td>
<td>1.53 (0.69)*</td>
<td>1.72 (0.68)*</td>
<td></td>
</tr>
<tr>
<td>Distribution ( \times ) Order</td>
<td>-1.43 (0.69)*</td>
<td>-1.37 (0.69)*</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.89 (0.39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of groups</td>
<td>33</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Number of observations</td>
<td>396</td>
<td>396</td>
<td>396</td>
</tr>
<tr>
<td>Akaike information criterion</td>
<td>385.1</td>
<td>388.5</td>
<td>383.2</td>
</tr>
<tr>
<td>Bayesian information criterion</td>
<td>397.1</td>
<td>408.4</td>
<td>403.2</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-189.6</td>
<td>-189.2</td>
<td>-186.6</td>
</tr>
<tr>
<td>Deviance</td>
<td>379.1</td>
<td>378.5</td>
<td>373.2</td>
</tr>
</tbody>
</table>

Note. Standard deviations are in parentheses.

* \( p < .05 \).
*** \( p < .001 \).

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rejections of equal and unequal trials remained significant for both orders \((p < .001)\). The main effect of gender resulted from boys being more likely to reject in general compared with girls.

For the advantageous condition, the final model included only a main effect of distribution \((B = 2.07, SE = 0.31, p < .001)\). No other predictors or interactions were significant, and none improved model fit (Table 4). The main effect of distribution shows that children were significantly more likely to reject advantageous trials compared with equal trials.

### Practice trials

Recall that children received 3 practice trials at the beginning of each session. These trials presented lower-cost versions of disadvantageous (0–1) and advantageous (1–0) offers as well as equal offers (1–1). Children made decisions on which handle to pull and received no feedback during these trials, thereby allowing a lower-stake comparison of responses to disadvantageous and advantageous inequity at two time points.

We began the analysis using GLMMs to compare the disadvantageous and advantageous trials with the equal trials including predictors for session (first or second). A null model was created with actor

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**Table 4**  
Advantageous condition: Logistic regression models.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.70 (0.36)**</td>
<td>-2.67 (0.49)**</td>
<td>-2.48 (0.46)**</td>
<td>-2.51 (0.41)**</td>
</tr>
<tr>
<td>Distribution</td>
<td>2.07 (0.31)**</td>
<td>2.25 (0.45)**</td>
<td>1.52 (0.41)**</td>
<td>2.07 (0.31)**</td>
</tr>
<tr>
<td>School</td>
<td>-0.05 (0.66)</td>
<td>-0.35 (0.61)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution × School</td>
<td>-0.49 (0.67)</td>
<td></td>
<td></td>
<td>-0.42 (0.49)</td>
</tr>
<tr>
<td>Order</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution × Order</td>
<td></td>
<td></td>
<td></td>
<td>1.16 (0.63)(^\dagger)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td>-0.42 (0.49)</td>
</tr>
<tr>
<td>Number of groups</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Number of observations</td>
<td>396</td>
<td>396</td>
<td>396</td>
<td>396</td>
</tr>
<tr>
<td>Akaike information criterion</td>
<td>372.7</td>
<td>376.0</td>
<td>372.7</td>
<td>374.0</td>
</tr>
<tr>
<td>Bayesian information criterion</td>
<td>384.7</td>
<td>395.9</td>
<td>392.6</td>
<td>389.9</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-183.4</td>
<td>-183.0</td>
<td>-181.3</td>
<td>-183.0</td>
</tr>
<tr>
<td>Deviance</td>
<td>366.7</td>
<td>366.0</td>
<td>362.7</td>
<td>366.0</td>
</tr>
</tbody>
</table>

**Note.** Standard deviations are in parentheses.

\(*\) \(p < .10\).  
\(**\) \(p < .001\).
ID fit as a random intercept to control for repeated measures. We compared this with a model with distribution (equal, disadvantageous inequity, or advantageous inequity), session (first or second), and the interaction term. This model substantially improved the fit over the baseline (LRT, $\chi^2 = 30.01$, $p < .001$). With equal set as the reference level for distribution, the model revealed a marginal main effect of session ($B = -2.27$, $SE = 1.19$, $p = .055$) and significant interactions of Distribution $\times$ Session: disadvantageous ($B = 3.17$, $SE = 1.30$, $p = .015$) and advantageous ($B = 2.70$, $SE = 1.29$, $p = .037$). Thus, as Fig. 2 shows, children were more likely to reject both disadvantageous and advantageous trials compared with equal trials, but this effect varied by session.

We next added interactions with school (University or Community), but this led to model convergence errors due to the structure of the data (zero rejections in some contrasts). Given this limitation and the additional problem of small samples, we are cautious when interpreting the results shown in Fig. 2. We report both nonparametric tests and model results (when possible) for key contrasts in the supplementary material. Here, we use a more qualitative assessment.

The overall pattern from Fig. 2 shows a School $\times$ Session interaction. Children in the Community school rejected both disadvantageous and advantageous trials more than the equal trials in both sessions. By contrast, children in the University school mainly accepted all of the trial types in the first session but rejected the disadvantageous and advantageous trials more than the equal trials in the second session. Thus, by the second testing session, children at both schools showed the same pattern of rejecting unequal practice trials that they did for the test trials. However, in the first session, which was the first time the children made decisions about unequal allocations, children at the Community school tended to enact a norm of equality at a cost to themselves whereas children at the University school tended to accept all of the trials, thereby maximizing their gains as well as those of the peer.

**Discussion**

The current study used a novel integration of ethnography and experiments to examine children’s fairness in two Chinese schools. Our hypotheses were derived from an ethnography of the two schools documenting qualitative and quantitative differences in children’s cooperative behavior and teacher interventions, including explicit moral teaching, between the schools. We predicted that the Community school children would be more likely to accept a disadvantage and deny themselves an advantage in unfair resource allocation. For the University school, we predicted that children would reject a disadvantage, but we did not have strong predictions for the advantageous case. Although our primary predictions for school-level differences in the test trials did not hold, we found some evidence in support of our hypotheses from the practice trial data. In addition, the finding that children in both schools rejected advantageous inequity in combination with the ethnographic differences between
the schools allows us to consider the possibility that different social influences and experiences can lead to a similar outcome. Lastly, this study adds China to the list of countries in which children reject an advantage in order to create an equal outcome, a behavior less common than rejecting a disadvantage at this age.

Ethnographies have been used before to make a priori experimental predictions, but not for fairness and rarely for children. For China in particular, large cross-cultural studies often use simplistic characterizations that ignore local variation in social structures and norms. In this study, we took a more nuanced approach by drawing on fieldwork by the first author to identify both qualitative and quantitative differences between two schools and using these differences to make predictions for an experimental task for fairness. The ethnography documented striking differences in children’s competitive and cooperative behaviors, the school pedagogical practices, the patterns of social life of the communities, socioeconomic status (SES), and parenting styles. We made our a priori predictions based on the ethnographic results. However, given that most of our experimental results differed from our predictions, we draw on the ethnography again to interpret the results. This approach follows that used in other cross-cultural experiments conducted by anthropologists (Henrich et al., 2005; Lamba & Mace, 2011).

Our primary measures focused on the test trials in the Inequity Game. Contrary to our predictions, children in both schools behaved similarly, rejecting both disadvantageous and advantageous allocations of candy. However, the practice trials revealed some differences between the schools that were in line with our predictions. Specifically, for the practice trials of the first testing session, children at the Community school rejected both the disadvantageous and advantageous trials more often than the equal trials. By contrast, at the University school, children did not reject either the advantageous or disadvantageous trials more often than the equal trials. This result is intriguing because it was the first exposure to unequal allocations; thus, the effects of the different school environments may have been the strongest in this instance. The rich interpretation of these results is that children at the Community school revealed their default internalized norms of behavior by denying themselves an advantage. One factor that may have encouraged these behaviors is the relatively low cost of the outcomes. Children needed to sacrifice only one candy to reject an advantage, and rejecting a disadvantage for the practice trials was not costly. At the University school, children did not show an initial tendency to reject inequality and treated all trials the same. The rich interpretation here is that these children have not internalized strong norms of equality but rather apply the norm only after some experience with the task. Although we believe that these results offer some insight into the differences between the schools in light of the ethnography, this rich interpretation must be viewed in light of the main test trials and second set of practice trials, during which children at both schools rejected both forms of inequality.

One key result from the test trials is that, at both schools, children rejected advantageous inequality. Results from a larger cross-cultural study found that children rejected an advantage in only three of seven societies tested, whereas rejections of a disadvantage occurred in all societies and at younger ages (Blake et al., 2015). Our results show that 8- and 9-year-olds in China will also reject an advantage in the same experimental task. However, based on the ethnography, we propose that within each school tested children rejected an advantage for different reasons. The more individualistic and competitive orientation of the University school children may conflict with the explicit moral education in fairness. In their moral evaluations in the classroom, the University school children tended to fall back on explicit norms such as fairness, helping, and sharing. They were also accustomed to taking part in adult-directed games and activities that were directly aimed at teaching these moral norms. Therefore, it is plausible that the experimental situation, which involved playing a novel game that involved distributing resources under the supervision of adults, encouraged the children to think in terms of these explicit norms.

The results from the practice trials support this interpretation. The University school children applied the norm of equality to the practice trials only the second time they played the game, suggesting that they adapted their behavior on the basis of learning what the game was about. If true, children at the University school might reject an advantage out of concern for their reputation to the adult (Blake & McAuliffe, 2011). Such a motivation could be tested by removing the adult from the situation with the prediction that children at this school would be more likely to accept an advantage in that
situation. For children at the Community school, rejecting an advantage was not likely motivated by a desire to follow “norms from above” (i.e., from teachers and adults) given the lack of emphasis on explicit moral norms. Instead, children's more general communal orientation and experience with finding cooperative solutions without adult supervision may have led to more strongly internalized norms of fairness in peer interactions. Again, the practice trial results support this. The Community school children rejected advantageous allocations from the first time they encountered them. Although this interpretation of the results is plausible, we acknowledge that these claims are tentative and require more investigation.

Because our predictions for the school-level differences were not borne out in the main test trials, we must also consider the possibility that the approach was not sensitive to some of these differences. One limitation of the experimental method is that it is largely focused on an individual decision maker (the actor) who must consider his or her decision to accept or reject only in relation to what the peer receives. Given this individualistic focus of the task, it is possible that other methods that have more social context (e.g., group activity based) would show more differences in the children's behaviors. In addition, the impact of the different school environments on children's fairness behaviors might be balanced by other similarities in their learning environments, which include, for example, the major role that grandparents from similar backgrounds play in early child care and the shared Chinese cultural norms across these communities.

This study contributes to a growing body of research on the development of fairness across societies by using a standard experimental task with children in China. Although other studies have examined Chinese children's altruistic behavior (Cowell et al., 2017; Rao & Stewart, 1999; Rochat et al., 2009), no studies have targeted fairness specifically, which requires a task such as the Inequity Game that dissociates altruism and fairness (Blake, McAuliffe, & Warneken, 2014). In keeping with prior empirical results, we found that, overall, the two groups of Chinese children tested rejected both disadvantageous and advantageous inequality. That Chinese children from qualitatively different local settings will reject an advantage is of particular interest given that this behavior does not appear during childhood in several societies tested so far.

The results and interpretation presented here must be viewed in light of several limitations. First, pragmatic constraints limited the testing to only one grade within each school, thereby limiting the sample size. However, the school-level effects found for disadvantageous and advantageous inequity aversion are of similar magnitude to those found in prior studies. Relatedly, testing only one grade level limits the developmental insights from this particular study. Thus, the results here should be understood within the context of a larger cross-cultural study using this method with a key result of the emergence of an aversion to an advantage at a similar age in three other societies (Blake et al., 2015).

Conclusion

The current study demonstrates how a combined ethnographic and experimental approach can offer insights into children's behavior. This approach enabled us to predict and interpret an experimental test of fairness in light of qualitative differences evident in two Chinese schools from an ethnography. Although the fairness behaviors in the test trials were similar in both schools, the practice trials showed a difference that, together with the ethnography, supports an interpretation that the children in the two schools had different motivations that were shaped by different experiences and practices. At the University school the development of children's fairness norms was likely influenced by the formal moral education, whereas at the Community school it likely originated more from the informal participation in communal activities. This interpretation applies most clearly in the case of advantageous inequity, which would be rejected at the University school in order to follow explicit norms and expectations but would be rejected at the Community school in order to support a more communal orientation among peers. More generally, this interpretation is in line with the proposal that an aversion to advantageous inequity is more malleable than an aversion to disadvantageous inequity and can be shaped by different sociocultural factors (Blake et al., 2015).
Acknowledgments

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jecp.2018.08.012.

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