Weltzien, S., Marsh, L., Kanngiesser, P., Stuijfzand, B., & Hood, B. (2019). Considering self or others across two cultural contexts: How children's resource allocation is affected by self-construal manipulations. *Journal of Experimental Child Psychology*, *184*, 139-157. https://doi.org/10.1016/j.jecp.2019.04.002

Journal of Experimental Child Psychology 184 (2019) 139–157

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Considering self or others across two cultural contexts: How children's resource allocation is affected by self-construal manipulations

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ARTICLE INFO

Article history:
Received 4 September 2018
Revised 27 March 2019
Available online 3 May 2019

Keywords:
Societal differences
Self-construal
Sharing development
Priming
Self-focus
Generosity

ABSTRACT

Most humans share to some degree. Yet, from middle childhood, sharing behavior varies substantially across societies. Here, for the first time, we explored the effect of self-construal manipulation on sharing decisions in 7- and 8-year-old children from two distinct societies: urban India and urban United Kingdom. Children participated in one of three conditions that focused attention on independence, interdependence, or a control. Sharing was then assessed across three resource allocation games. A focus on independence resulted in reduced generosity in both societies. However, an intriguing societal difference emerged following a focus on interdependence, where only Indian children from traditional extended families displayed greater generosity in one of the resource allocation games. Thus, a focus on independence can move children from diverse societies toward selfishness with relative ease, but a focus on interdependence is very limited in its effectiveness to promote generosity.

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https://doi.org/10.1016/j.jecp.2019.04.002
0022-0965/

Introduction

Sharing of resources is vital and common in all human societies (Henrich et al., 2010). Yet, young children across societies tend to maximize their own outcomes and only from middle childhood begin to conform to the sharing norms of their respective societies (e.g., Cowell et al., 2017; House et al., 2013; Rochat et al., 2009). Children's sharing behavior is influenced by social information such as explicit normative instructions (House, 2018; McAuliffe, Raihani, & Dunham, 2017) and demonstrations by adult models (Blake, Corbit, Callaghan, & Warneken, 2016; Over & Carpenter, 2013). Whereas children from different societies behave more selfishly if selfish behavior is modeled by an adult, Western children appear to be less flexible in adopting more generous behavior (Blake et al., 2016; Weltzien, Marsh, & Hood, 2018). For example, children in both urban United States and rural India reduced their giving when stingy behavior was modeled, but only Indian children increased their giving when generous behavior was demonstrated (Blake et al., 2016).

Children's abilities to copy others and follow instructions have been widely documented (Blake et al., 2016; House, 2018; McAuliffe et al., 2017; Over & Carpenter, 2013). What remains puzzling is why children from Western societies respond less to social influences aimed to increase generosity compared with children from other populations. An emphasis on child autonomy and independence in Western middle-class families (Blake et al., 2016; Grossmann & Na, 2014; Keller, Borke, Chaudhary, Lamm, & Kleis, 2010) may make children more reluctant to go against their self-interest. In contrast, children from societies that emphasize child obedience and interdependence (Clegg & Legare, 2016; Keller et al., 2010) may respond more readily to social influences even when they contravene children's self-interest. Recent studies applying priming of self-construals in children offer tentative support for these claims. Experimentally manipulated self-focus reduced British children's willingness to relinquish personal possessions (Hood, Weltzien, Marsh, & Kanngiesser, 2016) and their sharing and helping behavior (Weltzien et al., 2018), whereas focusing on others or close friends was ineffectual. These findings may reflect a relative strength of independent versus interdependent self-construals in British children. Yet, cross-cultural evidence from populations with predominantly interdependent self-construals is lacking.

The United Kingdom and India are two countries that have traditionally differed along the dimension of individualism versus collectivism (Santos, Varnum, & Grossmann, 2017; Verma, 1999). The consensus across the cross-cultural literature is that Western middle-class families socialize their children toward autonomy, individuality, and self-sufficiency (Greenfield, Keller, Fuligni, & Maynard, 2003; Kärtner, Crafa, Chaudhary, & Keller, 2016; Keller et al., 2010). Indian middle-class families, on the other hand, emphasize interpersonal responsibilities, interdependence, and shared experiences to a larger degree (Kärtner et al., 2016; Keller et al., 2010; Miller, Bersoff, & Harwood, 1990). These differences also manifest in the extent to which the self is defined in relation to others. Arguably, in individualistic societies, people have more independent self-construals, defined largely in terms of internal attributes such as attitudes and abilities (Grossmann & Na, 2014; Markus & Kitayama, 1991). Conversely, in collectivistic societies, people have more interdependent self-construals, mainly defined in terms of group membership and close relationships (Markus & Kitayama, 1991). Although independent and interdependent self-construals coexist in all individuals, their prominence and accessibility vary due to different cultural conventions and socialization practices (Singelis, 1994). Across societies, middle childhood has been identified as an important phase in prosocial development where children begin to conform to societal norms (Cowell et al., 2017; House et al., 2013; Rochat et al., 2009). Therefore, the current study investigated the influence of independence and interdependence priming on the sharing behavior of 7- and 8-year-old children from urban locations in the United Kingdom and India.

In the current study, children took part in one of three self-construal manipulations in the form of semistructured interviews: independence focus, interdependence focus, or a control condition. Sharing was subsequently assessed in a task that is commonly used to explore sharing behavior in the current age group (e.g., Fehr, Bernhard, & Rockenbach, 2008; House et al., 2013; Sheskin, Bloom, & Wynn, 2014). Each child completed four repetitions of three different sharing games. In each game, the child needed to choose between two mutually exclusive options that distributed stickers between the child

and an anonymous recipient. We used a forced-choice sharing procedure with preset ratios to reduce the problem of individual biases in decision making (Green & Swets, 1966). Moreover, retaining the anonymity of the recipient avoided possible confounds due to reputation management, reciprocity, and/or differing relationships between the participant and the recipient.

In the "other-advantage" game, the choice was between an equal split and an unequal split favoring the recipient: low stake (1:1 vs. 1:2) or high stake (2:2 vs. 2:4). In the "self-advantage" game, the choice was between an equal split and an unequal split favoring the participant: low stake (1:1 vs. 2:0) or high stake (2:2 vs. 4:0). The other-advantage and self-advantage games have been used to measure disadvantageous inequity aversion and advantageous inequity aversion, respectively (Blake et al., 2015; Fehr et al., 2008; Sheskin et al., 2014). In addition, we introduced a new game category, termed "that's life," where no fair option was available and self-advantage was pitted directly against other-advantage: low stake (1:0 vs. 1:2) or high stake (2:0 vs. 2:4). Specifically, a child could either maximize or minimize the other child's payoff without incurring a cost to himself or herself. This dilemma has not previously been studied but presents an ecologically valid predicament given that inequality in real life is often difficult to avoid.

We predicted that both British and Indian children would be less generous in the independence condition (as compared with the control condition) in all three games (e.g., Blake et al., 2016; Hood et al., 2016; Weltzien et al., 2018). In other words, we expected an increase in 1:1 (2:2) choices in the other-advantage game, an increase in 2:0 (4:0) choices in the self-advantage game, and an increase in 1:0 (2:0) choices in the that's life game. Moreover, based on the differences in self-construal orientation that exist between these two societies, we predicted that Indian children, but not British children, would be more generous in the interdependence condition (as compared with the control condition) in all three games (Blake et al., 2016). That is, we predicted an increase in 1:2 (2:4) choices in the other-advantage game, an increase in 1:1 (2:2) choices in the self-advantage game, and an increase in 1:2 (2:4) choices in the that's life game.

Method

Participants

The Indian sample consisted of 90 7- and 8-year-old children enrolled in an English-speaking middle- to upper-class private school in Pune, India (M_{age} = 97.29 months, SD = 3.86, range = 91–105; 51 boys). The British sample consisted of 90 7- and 8-year-old children enrolled in middle- to upper-class schools in Bristol, United Kingdom (M_{age} = 92.68 months, SD = 6.46, range = 94–107; 40 boys). The sample size was specified a priori in accordance with previous research that used a similar design and procedure (Weltzien et al., 2018). An additional 12 Indian children and 15 British children were tested but excluded from the analyses because they failed to pass one or more of the control trials. All Indian participants had a high level of English language proficiency. Testing in both societies, therefore, was conducted in English by the first and second authors. All children were tested individually in suitable locations at their respective schools. Informed consent was obtained in written form from the parents of all children who participated in this study. All children provided verbal agreement that they wished to partake in the research.

Procedure

Interview procedure

Each child took part in one of three interview conditions: an independence interview, an interdependence interview, or a control interview. Questions asked during independence and interdependence interviews were constructed and adapted for children based on the list of independent and interdependent self-construal primes developed by Kühnen and Hannover (2000).

During the independence interview, the experimenter asked a series of questions about the child himself or herself, aimed at focusing attention on the child's uniqueness and individuality (e.g., "What makes you special?" and "How are you different from other people?"). The experimenter also used second-person singular pronouns (e.g., *you, your, yours,* [child's name]) whenever apt in order to

further steer the child's attention toward his or her self. During the interdependence interview, the experimenter asked questions about the child's relationships with family and friends to focus attention on relatedness and closeness to others (e.g., "Is there anyone in your life that you feel close to?" and "Why is it important to have a family?"). In addition, the experimenter used second-person plural pronouns (e.g., *you, your* [together]) whenever apt in order to further steer the child's attention toward relationships with and dependence on others. In the neutral control interview, the experimenter asked questions about animals and was careful to avoid the use of personal pronouns (see Appendix A for full interview scripts).

Distribution game

The experimental design was adapted from previous studies (Fehr et al., 2008; House et al., 2013; Sheskin et al., 2014). Across 12 trials, children decided between two mutually exclusive options for distributing tokens to the self and to "another child" (recipient). First, two opaque boxes were presented: one for the participant and one for "another child from a different school" (recipient). Next, the experimenter explained that tokens would be used in the task and that at the end of the task the tokens would be exchanged for stickers. The child was then introduced to two identical boards. On each board, there were two circles with arrows. The boards were placed so that one arrow pointed toward the child's box, illustrating that the tokens in that circle would go to the child, whereas the other arrow pointed to the recipient's box, illustrating that the tokens in that circle would go to the recipient (see Fig. B1, top and bottom, in Appendix B).

Training

Each child was given two training trials. The first training trial presented the child with a 1:1 versus 2:2 decision. Thus, one board delivered only one coin to the participant and one coin to the recipient, whereas the second board delivered two coins to each of them. This trial functioned as a control and assessed how often the child would choose the highest payoff when both options provided equal outcomes for both the participant and the recipient. The second training trial presented the child with a 1:0 versus 2:0 decision and assessed how often the child would choose the highest self-benefit. The two training trials were designed to introduce children to two important features of the game, namely that payoffs are influenced by the child's decision and the recipient does not always need to obtain payoffs. Additional control questions ensured that all children had fully understood the training trials (see Appendix C for full testing script).

Test trials

The next 12 test trials were split into three games with two identical low-stake trials and two identical high-stake trials for each game:

1. *Other-advantage game (1:1 vs. 1:2 or 2:2 vs. 2:4):* This game explored children's propensity to choose a fair distribution over a distribution that provides a benefit to the recipient at no cost to the self.
2. *Self-advantage game (1:1 vs. 2:0 or 2:2 vs. 4:0):* This game explored children's propensity to choose a fair distribution at a cost to the self.
3. *That's life game (1:0 vs. 1:2 or 2:0 vs. 2:4):* This game explored whether children would opt to maximize or minimize the recipient's payoff when there was no difference to the child's own payoff.

The 12 test trials were divided into two blocks that contained two repetitions of each game. Within each block, three low-stake trials were followed by three high-stake trials presented in a random order. After the first block, the control trial (1:1 vs. 2:2) was repeated to ensure that the child was still paying attention to the task (see Table D1 in Appendix D). The entire procedure lasted approximately 20 min per child (interview: approximately 4 min; distribution game: approximately 15 min).

Data coding and statistical analyses

Time spent on the interviews did not differ significantly across societies or interview conditions (see Appendix E and Table E2 for analysis and summary statistics). Therefore, this factor was not

considered further. All sessions were videotaped, and children's behavior was coded live and from videotape.

Sharing data

Statistical analyses of sharing behavior were run in R Version 3.0.2 (R Development Core Team, 2013), using the lme4 package (Bates, Maechler, Bolker, & Walker, 2013) and the lsmeans package (Lenth, 2016). Because there were multiple trials per participant, observations could not be considered independent of each other. To account for this, the data were analyzed using generalized linear mixed models (multilevel logistic regressions), permitting the inclusion of random effects to model the nested structure of the data (Baayen, 2008; Bates, Maechler, Bolker, & Walker, 2013).

Data from the three games were analyzed separately. In all models, sharing decision was entered as a binary response variable (other-advantage trials: fairness = 1, other-advantage = 0; self-advantage trials: fairness = 1, self-advantage = 0; that's life trials: self-advantage = 1, other-advantage = 0). All full models included the predictor variables of interest (society and condition), their two-way interaction, and the control variables gender (male or female), stake (high or low), block (1 or 2), and age in months (Z transformed) as fixed effects. Reduced models were identical to the full models but without the interaction term. Null models included only control variables and random effects.

Initially, likelihood ratio tests were used to explore to what extent including random effects to model between participant variation would significantly improve each of the model's fit to the data. We compared three types of models: no random effects, only random intercepts, and random intercepts and random slopes for block and stake. For all three games, the inclusion of random intercepts significantly improved the model fit, whereas the inclusion of random slopes did not. Consequently, all analyses reported contain random intercepts but no random slopes.

The following analytical procedure was carried out for each game. First, the fit of the full model was compared with the null model with a likelihood ratio test to determine whether the inclusion of the complete set of predictor variables (main effects and interaction) significantly improved model fit. Second, the fit of the full model was compared with that of the reduced model. Subsequent analyses were conducted on either the full or reduced model, conditional on whether inclusion of the two-way interaction significantly improved model fit (for all model comparisons, see Appendix F). To assess the significance for the remaining predictors in the model with the best fit to the data (either full or reduced model), likelihood ratio tests were used. Interpretation of predictors was done by examining model coefficients and, in the case of categorical predictors with more than two levels, by conducting pairwise comparisons using the lsmeans package.

An exploratory analysis of the family structure data was also included for a subset of the data (self-advantage game, Indian sample; see Results for rationale). The procedure for this analysis was identical to the procedure described above. However, instead of including society as a predictor variable, this analysis included family structure (joint or nuclear).

Interview data

To explore children's verbal responses to independence and interdependence questions, interviews were transcribed verbatim. From the British population, 4 independence interviews could not be transcribed due to faulty video recordings. From the Indian population, 12 independence interviews and 9 interdependence interviews could not be transcribed due to poor audio quality. All remaining scripts were coded by the first author using two coding categories: self-references and social relationship references. The self-reference category included the words *I, me, mine, myself,* and *my own.* In addition, the word *my* was included when related to personal possessions (i.e., my car, my house) but not when related to personal relationships (i.e., my mum, my friend). The social relationship reference category included the words *he, him, himself, she, her, herself, his, hers, we, us, our, ourselves, they, them, their, each other, dad, mum, sister,* and *brother* as well as name(s) of friend(s). See Table G3 in Appendix G for mean self-references and social relationship references by condition and society. For reliability, a second coder, blind to the purpose and predictions of the study, coded 25% of the transcripts (balanced by gender, condition, and society). Agreement between the first and second coders was excellent (κ = .96). The responses from the control interview were not included in this analysis because the questions were specifically designed to steer children away from speaking about themselves or their

social relationships. Indeed, the authors intended to exclude data from children who made such references in the control interview, although this was not necessary because no references to self or social relationships were made in this condition.

To account for individual variability in the overall number of self-references and social relationship references used by children, a proportional self-reference score was calculated for each child. This was done by calculating the proportion of self-references from the total number of self-references and social relationship references. Self-reference scores were analyzed in SPSS using an analysis of covariance (ANCOVA) with condition (independence or interdependence) and society entered as between-participant factors and age in months entered as a covariate.

Results

Sharing data

Other-advantage game (1:1 vs. 1:2 or 2:2 vs. 2:4)

Children predominantly selected the fair option (72.9%) over the generous option (27.1%). Model comparisons showed that the reduced model had the best fit to the data (see Table H4 in Appendix H for model outputs). This model revealed that sharing decisions were significantly predicted by society, $\chi^2(1) = 29.64$, $p < .001$ (see Fig. 1). Irrespective of condition, British children were more likely to choose the fair (1:1 or 2:2) option (predicted probability = .90) compared with Indian children (predicted probability = .64), odds ratio = 4.85, 95% confidence interval (CI) = 2.86–9.03. In addition, sharing decisions were significantly predicted by condition, $\chi^2(2) = 6.17$, $p = .046$, although pairwise comparisons revealed no significant differences between the conditions after Tukey corrections for multiple comparisons ($p_s > .058$). Sharing decisions were also significantly predicted by block, $\chi^2(1)$

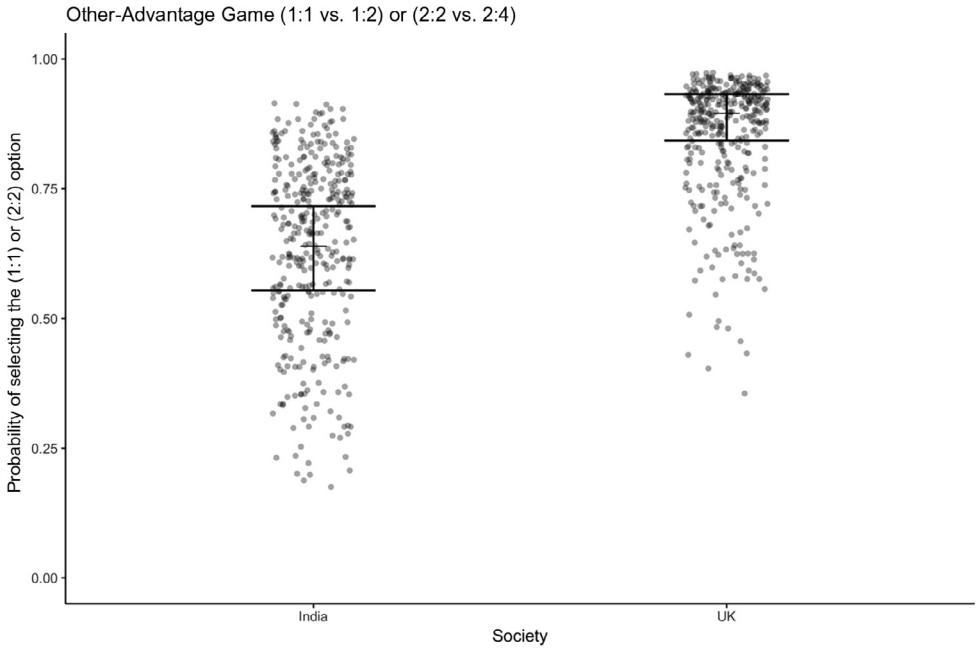

Fig. 1. Probability of selecting the (1:1) or (2:2) option in the other-advantage game as a function of society. Gray points represent the model predictions for a new dataset given the observed data. Black bars indicate the model-predicted means and 95% confidence intervals.

= 8.85, p = .003. Specifically, children were more likely to choose the generous (1:2 or 2:4) option in the first block (predicted probability = .26) compared with the last block (predicted probability = .16), odds ratio = 1.78, 95% CI = 1.23–2.59. This pattern is consistent with previous findings showing that repeated trials reduce generosity over time, although the reasons for this remain unknown (Kogut, 2012).

Self-advantage game (1:1 vs. 2:0 or 2:2 vs. 4:0)

Children predominantly selected the selfish option (75%) over the fair option (25%) in this game. The full model had the best fit to the data (see Table H5 in Appendix H for model outputs). First, the results revealed a significant interaction between society and condition, $\chi^2(2) = 6.90$, p = .031 (see Fig. 2). Pairwise comparisons (Tukey corrected) showed that British children were significantly more likely to choose the selfish (2:0 or 4:0) option in the independence condition (predicted probability = .99) than in the control condition (predicted probability = .82), odds ratio = 16.63, $Z = 2.93$, p = .038. Conversely, Indian children were significantly more likely to choose the fair (1:1 or 2:2) option in the interdependence condition (predicted probability = .39) than in the control condition (predicted probability = .03), odds ratio = 0.05, $Z = -3.31$, p = .012. In other words, British children were nudged toward selfishness after talking about their independence, whereas Indian children were nudged toward costly sharing after talking about their connectedness with others.

Sharing decisions in the self-advantage game were also significantly predicted by age, $\chi^2(1) = 5.88$, p = .015, suggesting that older children were more likely to choose the fair (1:1 or 2:2) option compared with younger children, odds ratio = 1.99, 95% CI = 1.13–4.14. Moreover, sharing decisions were predicted by block, $\chi^2(1) = 7.47$, p = .006. Children chose the fair (1:1 or 2:2) option more often in the first block (predicted probability = .10) compared with the last block (predicted probability = .05), indicating that children in both societies gradually increased their selfishness over the course of the

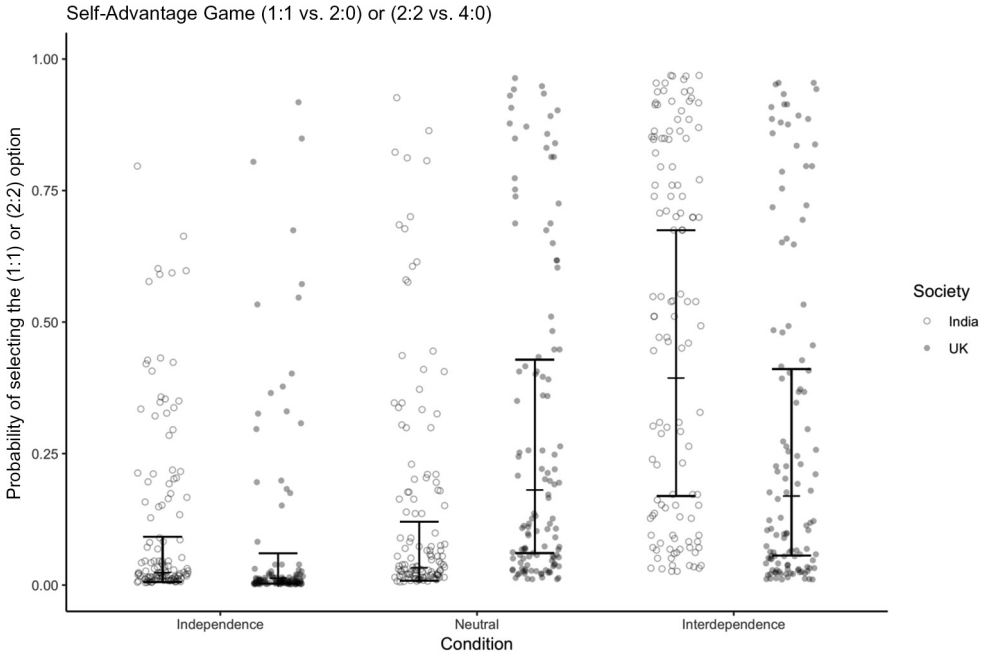

Fig. 2. Probability of selecting the fair option in the self-advantage game as a function of condition and society. Gray points represent the model predictions for a new dataset given the observed data. Black bars indicate the model-predicted means and 95% confidence intervals.

experiment, odds ratio = 0.50, 95% CI = 0.28–0.82. Finally, sharing decisions were significantly predicted by stake, $\chi^2(1) = 15.56$, $p < .001$. Specifically, children chose the fair (1:1 or 2:2) option more often in low-stake trials (predicted probability = .12) than in high-stake trials (predicted probability = .05), odds ratio = 2.72, 95% CI = 1.67–5.16, suggesting that across societies children found it harder to resist a self-benefit when the payoffs were higher.

That's life game (1:0 vs. 1:2 or 2:0 vs. 2:4)

Children predominantly chose the selfish option (61%) over the generous option (39%) in this game. The reduced model had the best model fit (see Table H6 in Appendix H for model outputs). In this game, there was no effect of society, $\chi^2(1) = 2.55$, $p = .11$. However, sharing decisions were significantly predicted by condition, $\chi^2(2) = 23.11$, $p < .001$ (see Fig. 3). Pairwise comparisons (Tukey corrected) showed that children were more likely to choose the selfish (1:0 or 2:0) option in the independence condition (predicted probability = .83) than in the control condition (predicted probability = .59), odds ratio = 0.30, $Z = -3.57$, $p = .001$. Thus, activating children's independent self-construals reduced generosity in both British and Indian children. There was no significant difference in sharing behavior between children in the control condition and children in the interdependence condition (predicted probability = .50). Sharing decisions were again predicted by block, $\chi^2(2) = 21.49$, $p < .001$. An examination of the model coefficients revealed that children were more likely to choose the generous (1:2 or 2:4) option in the first block (predicted probability = .44) compared with the last block (predicted probability = .25), odds ratio = 2.36, 95% CI = 1.62–3.60. Finally, sharing decisions were predicted by stake, $\chi^2(1) = 10.28$, $p = .001$, such that children chose the selfish (1:0 or 2:0) option more often in high-stake trials (predicted probability = .72) compared with low-stake trials (predicted probability = .59), odds ratio = 0.55, 95% CI = 0.39–1.25.

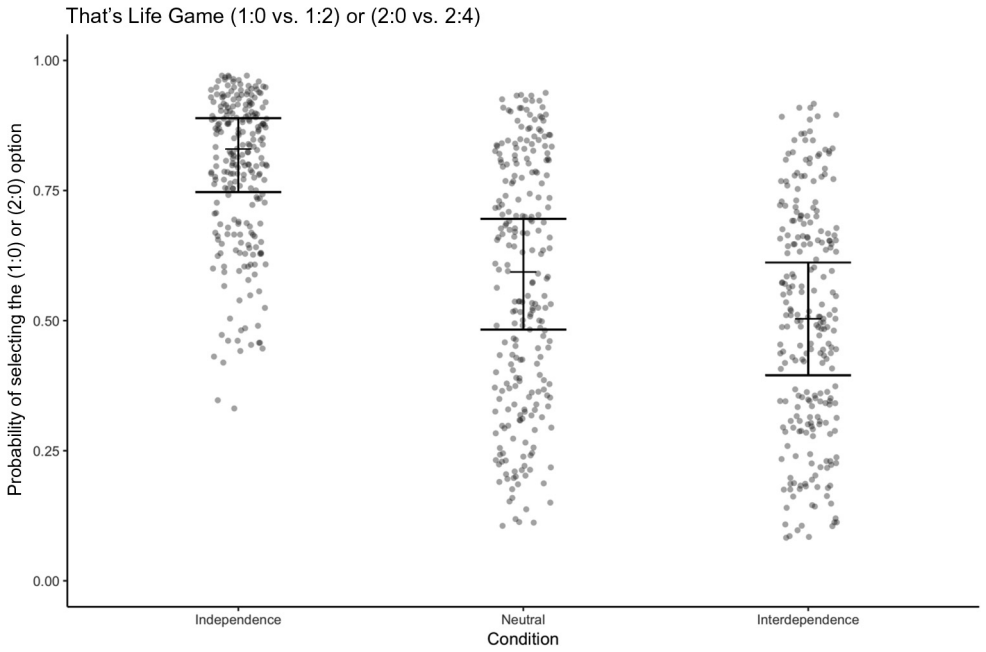

Fig. 3. Probability of selecting the (1, 0) or (2, 0) option in the that's life game as a function of Condition. Grey points represent the model predictions for a new dataset, given the observed data. Black bars indicate the model predicted mean and 95% confidence interval.

Exploratory analyses of self-advantage game, Indian sample (1:1 vs. 2:0 or 2:2 vs. 4:0)

Why did we find an effect of interdependence focus only in Indian children in the self-advantage game? One possibility that became apparent from the demographic data was that, unlike the British sample, many of the Indian children lived in joint (extended) families. Traditional Indian families typically harbor three or more generations, including members of the extended family. In such families, "collective responsibility" is highly valued, with the needs of the family superseding the needs of the individual (Chadda & Deb, 2013). Living in a large family unit also fosters the pooling of resources, with family members sharing everything from food to property (Chettiar, 2015). Self-construals begin to form during early childhood (Singelis, 1994). Children from joint families, as opposed to Western-style nuclear families, may have more salient interdependent self-construals and, thus, may be more susceptible to the interdependence manipulation. Of the current Indian participants, 54 children lived in joint families, whereas 36 children lived in nuclear families. This allowed us to carry out an exploratory analysis to investigate whether family structure might influence Indian children's sharing decisions in the three conditions in this game.

The full model had the best fit to the data (see Table H7 in Appendix H for model outputs). There was a significant interaction between family structure and condition, $\chi^2(2) = 9.69$, $p = .008$ (see Fig. 4). Pairwise comparisons (Tukey corrected) revealed that in the interdependence condition Indian children from joint families were significantly more likely to choose the fair (1:1 or 2:2) option in the interdependence condition (predicted probability = .73) than in the control condition (predicted probability = .07), odds ratio = 37.55, $Z = 4.07$, $p < .001$. Conversely, Indian children living in nuclear families were significantly less likely to choose the fair (1:1 or 2:2) option (predicted probability = .13) than children living in joint families (predicted probability = .73) in the interdependence condition, odds ratio = 0.06, $Z = -3.05$, $p = .027$.

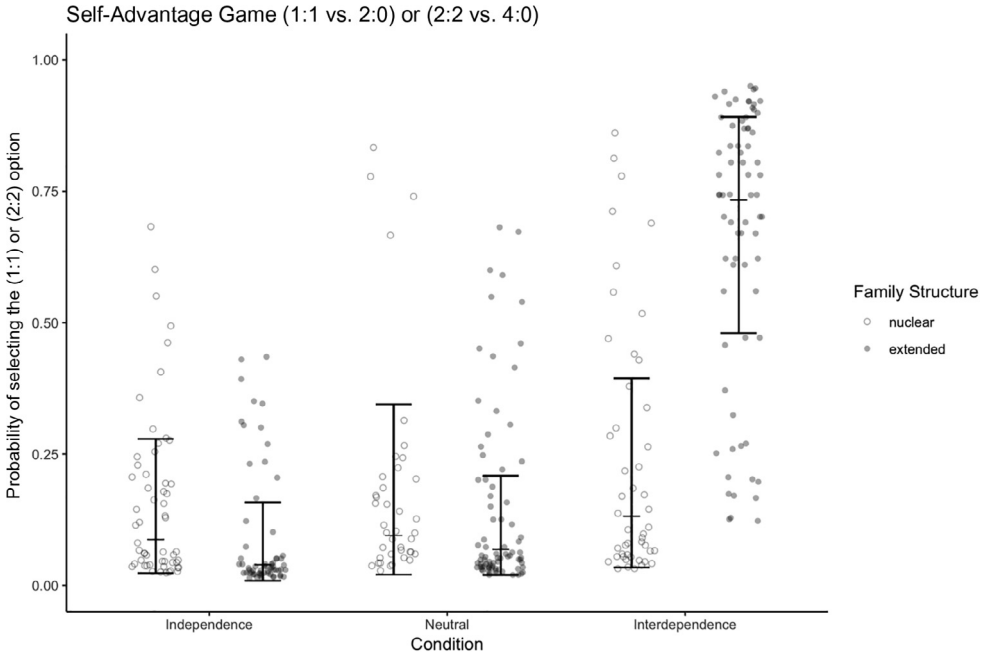

Fig. 4. Probability of selecting the fair option in the self-advantage game as a function of priming condition and family structure (Indian sample only). Gray points represent the model predictions for a new dataset given the observed data. Black bars indicate the model-predicted means and 95% confidence intervals.

Interview data

There was a significant effect of condition on the proportion of self-references used during the interview, $F(1, 90) = 874.16$, $p < .001$, $\eta_p^2 = .907$. Specifically, across both societies, children made a higher proportion of self-references in the independence condition ($M_{independence} = .882$), compared with the interdependence condition ($M_{interdependence} = .295$), $t(93) = 28.86$, $p < .001$, $d = 5.92$. There was no main effect of society, $F(1, 90) = 1.39$, $p = .242$, $\eta_p^2 = .015$. However, a significant interaction between condition and society, $F(1, 90) = 6.14$, $p = .05$, $\eta_p^2 = .064$, indicated that in the interdependence condition British children made a larger proportion of self-references ($M_{UK} = .328$) compared with Indian children ($M_{India} = .249$), $t(49) = 3.17$, $p = .006$, $d = 0.91$ (Bonferroni corrected). There was no difference in the proportion of self-references used in the independence condition, $t(42) = 0.63$, $p = .54$. Taken together, these results indicate that the priming tasks effectively served their purpose of focusing attention on the self rather than others in the independence condition and focusing attention on social relationships rather than the self in the interdependence condition. Moreover, these findings suggest that British children find it harder to avoid self focus even in tasks that are specifically designed to reduce attention on the self.

Discussion

Here, for the first time, we demonstrated that children from two societies with different self-construal orientations varied in their sharing behavior following a focus on independence or interdependence. In both societies, activating children's independent self-construals reduced their generosity in two games (other-advantage and that's life), where they could provide a benefit to recipients at no cost. This is consistent with previous findings that children from diverse societies will readily adjust their behavior toward selfishness following stingy modeling by adults (Blake et al., 2016). Moreover, the current results extend previous evidence of reductions in trading, sharing, and helping behavior following self-priming in British children (Hood et al., 2016; Weltzien et al., 2018) to a different population.

Interdependence priming had an effect on Indian children in the self-advantage game (1:1 vs. 2:0 or 2:2 vs. 4:0) exclusively. In comparison with the other two games, sharing in the self-advantage game came at a cost to participants. Past work has shown that societal differences in sharing behavior are pronounced in costly sharing contexts (House et al., 2013). Here, we expanded on this finding by demonstrating societal differences in susceptibility to interdependence primes within these contexts. Enhanced reactivity of Indian children to interdependence primes is likely attributable to a relatively greater societal emphasis on interpersonal responsibilities (Kärtner et al., 2016; Keller et al., 2010; Miller et al., 1990).

Moreover, our exploratory analysis revealed that the effect of interdependence primes in the Indian sample was qualified by family structure. Specifically, Indian children living in traditional extended families were significantly more likely to choose the fair option over the selfish option than children living in Western-style nuclear families. This suggests that growing up in an extended family may lead children to be more susceptible to interdependence primes. Over the past few decades, the sociocultural milieu of India has been going through a rapid change, with a gradual disintegration of the traditional extended family system and a corresponding increase in nuclear families, particularly in urban areas (Singh, 2014). This transformation has led to changes in family functions and values, with a growing emphasis on privacy and independence (Singh, 2014). As a consequence, parents in nuclear families may be more likely to instill individualistic values in their children. This could explain why no effects of interdependence primes were found for Indian children from nuclear families, who responded similarly to the British children.

Our findings have implications for cross-cultural researchers because they suggest that it is critical to consider the appropriate level of analysis. Here, societal differences were apparent, but a closer look at family structure within our Indian sample provided a more nuanced picture. There are many other factors that could covary with family structure in India. These include but are not limited to parental income, level of education, and degree of foreign travel. Future work could be more informative not

only by considering societal differences but also by paying attention to family-level factors. This could include a focus on measuring independent and interdependent beliefs at the family level.

The results also revealed some societal differences in sharing behavior irrespective of priming condition. Specifically, in the other-advantage game (1:1 vs. 1:2 or 2:2 vs. 2:4), Indian children were more likely than British children to benefit the recipient even though a fair option was available. This finding contradicts previous research showing that children from the United States and India display similar levels of generosity (Blake et al., 2016) and are equally averse to receiving less than others (Blake et al., 2015). Instead, the current results support evidence that children from more collectivistic societies tend to share resources more generously than children from more individualistic societies (e.g., Scharpf, Paulus, & Wörle, 2016; Stewart & McBride-Chang, 2000).

Previous studies using the self-advantage game have found an aversion to receiving more than others (advantageous inequity aversion) from 7 or 8 years of age in children from Switzerland, the United States, Canada, and Uganda (Blake et al., 2015; Fehr et al., 2008) but not in children from rural India (Blake et al., 2015). We found, however, that neither British nor Indian children showed such an aversion (control condition of self-advantage game). These divergent findings may be due to methodological differences between studies. It is well documented that the presence of a recipient or sharing with a known other influences sharing behavior (e.g., Leimgruber, Shaw, Santos, & Olson, 2012; Martin & Olson, 2015; Schäfer, Haun, & Tomasello, 2015). Whereas previous studies used either peer-to-peer encounters or a photograph of in-group recipients (e.g., Blake et al., 2015; Fehr et al., 2008), children in the current study shared with an unidentified child "from a different school."

Virtually all cross-cultural sharing studies, including the current study, have used tasks where sharing takes place in view of the experimenter (e.g., Blake et al., 2015; House et al., 2013; Rochat et al., 2009; Schäfer et al., 2015). There is evidence that both adults and children employ reputation-enhancing strategies and behave more generously when others witness their sharing (Alpizar, Carlsson, & Johansson-Stenman, 2008; Haley & Fessler, 2005; Leimgruber et al., 2012). In addition, reputational concerns may differ between societies (Callaghan & Corbit, 2018; Gächter & Herrmann, 2009). In the current study, the experimenter's presence may have influenced both sharing decisions in general and the effects of the focus manipulations. For example, interdependence primes may have triggered a stronger awareness of being observed in the Indian participants than in the British participants. Future studies could investigate this possibility by using the current paradigm and comparing sharing in a fully anonymous sharing task that also controls for the presence of the experimenter.

In conclusion, the current findings reveal that subtle self-construal manipulations have striking effects on children's sharing in different societies. A focus on independence easily moved children in the United Kingdom and India toward selfishness, but a focus on interdependence was very limited in its effectiveness to promote generosity. Specifically, a focus on interdependence increased generosity only in Indian children living in traditional joint families during a costly sharing game. Our findings indicate the importance of considering other levels of analysis beyond broad societal comparisons.

Acknowledgments

This research was supported by an Economic and Social Research Council grant (ES/K010131/1). The third author was supported by a Freigeist Fellowship from the Volkswagen Foundation (89611). We thank Jahnavi Sunderarajan for helpful discussions and assistance with school recruitment in Pune, India. We also gratefully acknowledge the children and parents who participated, as well as the schools that participated, and made this research possible.

Appendix A

Full interview scripts

Each participant began the testing session by taking part in one of three priming conditions in the form of semistructured interviews. The interviews were designed to take approximately 4 min to com-

plete. A watch was used to ensure that this time limit was observed as closely as possible (i.e., asking the child to elaborate if necessary or appropriate).

Independence interview

Experimenter: "First, I am going to ask you some questions. In my job, I am interested in how children talk about themselves. So I want you to think about yourself, and I am going to ask you lots of questions about you."

1. What are you good at?
   Follow-up questions (if needed) adapted to child's answer:
   - Okay, how long have you been doing that for?
   - Do you score a lot of goals? (e.g., if child talks about being a good football player).

2. Do you have a favorite toy?
   - Have you had it for a long time?
3. What do you like to do when you are at home?
4. Can you tell me about something you can do independently (without anyone else)?
5. What do you like to do when you are completely alone?
6. What makes you special (unique)?
7. What is your favorite subject in school?
   - Why do you like it so much?
8. What do you want to be when you grow up?
   - Why?
9. How are you different from other people?
   - Is there maybe something that you really like that other people might not like, or something that you are good at that other people might not be so good at?
10. What are you most proud of?
    - When have you been proud of yourself?

Interdependence interview

Experimenter: "First, I am going to ask you some questions. In my job, I am interested in how children talk about their relationships with others. So I'm going to ask you lots of questions about your relationships with your friends and family."

1. Is there anyone in your life that you feel close to (have a close connection with)?
   - Why do you think the two of you have such a close relationship?
   - Is there anyone else that you have a close connection with?
2. Do you have a big family?
   - Are you close with your family?
3. Why is it important to have a family?
4. Do you have a lot of friends?
5. Do you have a best friend?
   - What is the name of your best friend?
6. What is it that makes the two of you such good friends?
   - What do you like to do together?
7. Why do you think it is important to have good friends?
8. Can you tell me about a time you had to cooperate (work together) with someone else?
9. Is there anyone in your life that you depend on (or feel that you need)?
   - Why do you depend on/need _____?

10. Are you part of a group or a club or a team?
    - Why do you think it's nice to be part of a group/club/team?

Control condition

Experimenter: "First, I am going to ask you some questions. In my job, I am interested in how children describe different things. Today I want you to think about different animals. Can you please list *all* the animals you can think of?"

Once the child is done: "Okay, great. One of the animals you mentioned was a [dog]. Can you please describe a [dog] for me in as much detail as you can?"

The experimenter moved on to the next animal until approximately 4 min had passed.

Appendix B

See Fig. B1.

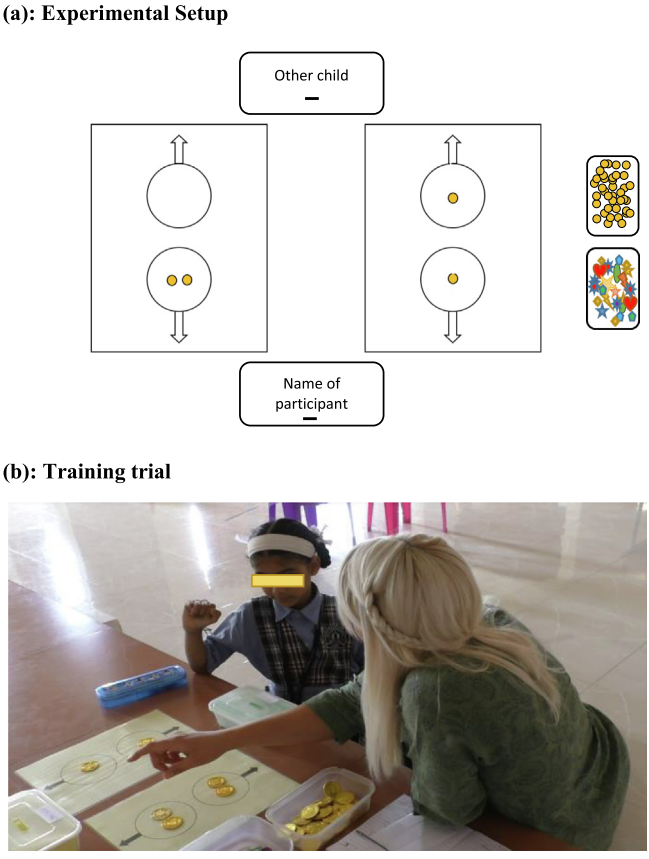

Fig. B1. Top: Experimental setup. Bottom: Training trial.

Appendix C

Distribution game: Full testing script

Following the interview, the experimenter said, "Thank you for answering my questions. Now we are going to have a look at these two boxes" [the experimenter shows the child two opaque plastic boxes with a slot in the lid for inserting coins].

"This box is yours. Let's write your name on it. I have also prepared a box for another child. But we don't know the name of that child. All we know is that it is a child from a different school than yours. I have written 'other child' on it".

"Okay! Let's look at these coins" [the experimenter shows the child a box full of plastic coins].

"We are going to use coins like these in our task. At the end of the task you can exchange your coins for stickers. I have some really nice stickers with me, and for each coin you get one sticker" [the experimenter shows the child a box full of stickers].

"Okay! I also have two boards. Can you see that they're the same? On each board there are two circles with arrows. These arrows point to your box, and these arrows point to the other child's box" [the experimenter points while explaining].

"On the first board [moves board in front of child] I'm now putting one coin in the circle which points to the other child's box, and I'll put one coin in the circle which points to your box".

"On the second board [moves board in front of child] I'll put two coins in the circle which points to your box and two coins in the circle which points to the other child's box".

"Now your task is to choose one of the two boards. If you choose this board [points to the first board], then you get the coin in this circle (i.e., the circle closer to the child) where the arrow points to your box. The other arrow on this board points to the other child's box, so this means that the coin in this circle will go to the other child. Do you understand?"

"Good, now, if you choose this board [points to the second board], then you get the coins in this circle and the child from the other school gets the coins in that circle, right?"

We included the following control questions to check children's comprehension of the payoff implications of the different choices:

"Okay, just to check that everything is clear, I'll ask you some questions":

"If you choose the first board, what does the other child get?"

"And what do you get?"

"What does the other child get if you choose the other board?"

"What do you get?"

"All right, now you can choose a board".

"Okay, now you can put your coins in your box and the other coins in the other child's box."

The control questions were asked only for the first training trial. Following the training trials, the experimenter moved directly on to the 12 test trials in the following format:

"Okay, this time I'm placing [number] coin(s) here and [number] coin(s) here on this board. And on this board, I'm placing [number] coin(s) here and [number] coin(s) here.

"Which board would you like?

"Okay, now you can put your coins in your box and the other coins in the other child's box."

Appendix D

See Table D1.

Table D1
Experimental setup of test trials and control trial.

	Block 1			Block 2	
Trial category	Low stake	High stake		Low stake	High stake
Other-advantage	1:1 vs. 1:2	2:2 vs. 2:4	Control (1:1 vs. 2:2)	1:1 vs. 1:2	2:2 vs. 2:4
Self-advantage	1:1 vs. 2:0	2:2 vs. 4:0		1:1 vs. 2:0	2:2 vs. 4:0
That's life	1:0 vs. 1:2	2:0 vs. 2:4		1:0 vs. 1:2	2:0 vs. 2:4

Note. The two blocks contained two repetitions of each game. Three low-stake trials were always followed by three high-stake trials, but the three trials were presented in a random order. The control trial (1:1 vs. 2:2) was repeated after the first block to ensure that the child was still paying attention to the task.

Table E2
Mean interview times (in seconds) and 95% confidence intervals for India and the United Kingdom as a function of condition and society.

	Independence	Interdependence	Control	Total
India	240.33	247.33	239.67	242.44
[95% CI]	[235.86, 244.81]	[238.90, 255.77]	[236.55, 242.78]	[239.15, 245.74]
UK	239.47	238.93	240.30	239.57
[95% CI]	[236.58, 242.36]	[234.56, 243.30]	[233.21, 247.39]	[236.74, 242.39]

Note. CI, confidence interval; UK, United Kingdom.

Appendix E

Analysis of time spent on interviews

Average time spent on the interview did not differ significantly across societies, $F(1, 178) = 1.73$, $p = .19$, $\eta_p^2 = .01$. Moreover, time spent on the interview did not differ significantly across conditions in the Indian population, $F(2, 87) = 2.24$, $p = .11$, $\eta_p^2 = .049$, or in the British population, $F(2, 87) = 0.08$, $p = .93$, $\eta_p^2 = .002$. Therefore, this factor was not considered further (see Table E2).

Appendix F

Model comparisons

Other-advantage game (1:1 vs. 1:2 or 2:2 vs. 2:4): The full model had a significantly better fit to the data compared with the null model (including only the control predictors), $AIC_{null} = 799.56$, $AIC_{full} = 770.56$, $\chi^2(5) = 38.99$, $p < .001$. Next, a comparison between the full and reduced models revealed that the interaction term did not significantly improve the model fit, $AIC_{reduced} = 771.25$, $\chi^2(2) = 4.68$, $p = .096$, and, thus, that the reduced model had the best fit to the data.

Self-advantage category (1:1 vs. 2:0 or 2:2 vs. 4:0): The full model had a significantly better fit to the data compared with the null model, $AIC_{null} = 639.38$, $AIC_{full} = 620.56$, $\chi^2(5) = 28.82$, $p < .001$. Moreover, the full model had a significantly better fit to the data than the reduced model, $AIC_{reduced} = 623.46$, $\chi^2(2) = 6.90$, $p = .032$, indicating that including the two-way interaction significantly improved the model's fit to the data and, thus, that the full model had the best fit.

That's life category (1:0 vs. 1:2 or 2:0 vs. 2:4): The full model had a significantly better fit to the data compared with the null model, $AIC_{null} = 880.32$, $AIC_{full} = 862.36$, $\chi^2(5) = 27.96$, $p < .001$. Next, a comparison between the full and reduced models revealed that the interaction term did not significantly

Table G3
Mean self-references, social relationship references, and proportion of self-references as a function of society and priming condition.

Condition	Society	Self-references	Social relationship references	Proportional self-references
Independence	United Kingdom	22.96 (11.84)	3.58 (3.19)	.87 (.11)
	India	12.78 (7.65)	2.06 (2.75)	.89 (.10)
Interdependence	United Kingdom	11.87 (5.49)	23.37 (8.82)	.33 (.09)
	India	10.05 (5.92)	28.48 (9.13)	.25 (.08)

Note. Standard deviations are in parentheses.

improve the model fit, $AIC_{reduced}$ = 860.92, $\chi^2(2) = 2.57$, $p = .28$. In other words, the reduced model had the best fit to the data.

Self-advantage category, Indian sample (1:1 vs. 2:0 or 2:2 vs. 4:0): The full model had a significantly better fit to the data compared with the null model, $AICc\_^{a}_{null}$ = 358.92, $AICc\_^{a}_{full}$ = 339.53, $\chi^2(5) = 29.91$, $p < .001$. Moreover, the full model had a significantly better fit to the data than the reduced model revealed, $AICc\_^{a}_{reduced}$ = 344.98, $\chi^2(2) = 9.69$, $p = .008$, indicating that the interaction term was a significant predictor and, thus, that the full model had the best fit.

Note. AIC, Akaike's information criterion.

[a]*AICc* is used for model comparisons when the Indian sample is analyzed independently because the number of observations falls below the recommended sample size for use with AIC (i.e., n/K 40).

Appendix G

See Table G3.

Appendix H

Model outputs for each sharing game

See Tables H4–H7.

Table H4
Other-advantage game, reduced model.

	Odds ratio	*SE*	95% Confidence interval		χ^2	*df*	*p*
Intercept	0.88	1.38	0.41	1.70			
Condition: Independence[a]	2.10	1.39	1.09	4.10	6.17	2	.046
Condition: Interdependence[a]	1.09	1.36	0.61	2.05			
Society: United Kingdom	4.85	1.35	2.86	9.03	29.64	1	<.001
Gender: Male	1.60	1.31	1.00	2.86	3.07	1	.080
Age (*Z*)	1.14	1.16	0.85	1.57	0.76	1	.383
Stake: Low	0.82	1.21	0.54	1.17	1.13	1	.288
Block: 2	1.78	1.22	1.23	2.59	8.85	1	.003

Note. Odds ratios represent the odds of selecting the fair option over the generous option. Chi-square and *p* values refer to likelihood ratio tests between a model including and excluding the relevant predictor. The 95% confidence intervals are obtained through bootstrapping.

[a] Due to the likelihood ratio test approach, there is only one *p* value for condition, which refers to the complete factor.

Table H5
Self-advantage game, full model.

	Odds ratio	*SE*	95% Confidence interval		χ^2	*df*	*p*
Intercept	0.03	2.25	<0.01	0.10			
Condition: Independence[a]	0.72	2.44	0.12	4.44			
Condition: Interdependence[a]	19.37	2.46	5.05	311.06			
Society: United Kingdom[a]	6.55	2.51	1.31	46.06			
Gender: Male	1.00	1.68	0.32	3.22	0.00	1	>.999
Age (*Z*)	1.99	1.34	1.13	4.14	5.88	1	.015
Stake: Low	2.72	1.30	1.67	5.16	15.56	1	<.001
Block: 2	0.50	1.30	0.28	0.82	7.47	1	.006
Society (UK) × Condition (Independence)[b]	0.08	3.71	<0.01	1.11	6.90	2	.031
Society (UK) × Condition (Interdependence)[b]	0.05	3.46	<0.01	−0.47			

Note. Odds ratios represent the odds of selecting the fair option over the selfish option. Chi-square and *p* values refer to likelihood ratio tests between a model including and excluding the relevant predictor. The 95% confidence intervals are obtained through bootstrapping.

[a] Due to the inclusion of the interaction effect of Society × Condition, significance of the main effects has limited interpretation and, furthermore, cannot directly be assessed through likelihood ratio tests.

[b] Due to the likelihood ratio test approach, there is only one *p* value for the Society × Condition interaction, which refers to the complete interaction effect.

Table H6
That's life game, reduced model.

	Odds ratio	*SE*	95% Confidence interval		χ^2	*df*	*p*
Intercept	1.01	1.35	0.58	1.77			
Condition: Independence[a]	3.33	1.40	1.80	6.62	23.39	2	<.001
Condition: Interdependence[a]	0.70	1.38	0.35	1.32			
Society: United Kingdom	1.59	1.34	0.89	2.89	2.55	1	.110
Gender: Male	0.75	1.31	0.45	1.26	1.15	1	.283
Age (*Z*)	0.81	1.16	0.59	1.07	2.16	1	.141
Stake: Low	0.55	1.21	0.39	0.80	10.28	1	.001
Block: 2	2.36	1.21	1.62	3.60	21.49	1	.000

Note. Odds ratios represent the odds of selecting the selfish option over the generous option. Chi-square and *p* values refer to likelihood ratio tests between a model including and excluding the relevant predictor. The 95% confidence intervals are obtained through bootstrapping.

[a] Due to the likelihood ratio test approach, there is only one *p* value for condition, which refers to the complete factor.

Table H7
Self-advantage game, Indian sample, full model.

	Odds ratio	*SE*	95% Confidence interval		χ^2	*df*	*p*
Intercept	0.08	2.51	0.01	0.45			
Condition: Independence[a]	0.92	2.83	0.10	9.78			
Condition: Interdependence[a]	1.45	2.89	0.14	16.78			
Family Structure: Joint[a]	0.70	2.69	0.09	8.67			
Gender: Male	1.29	1.75	0.43	3.90	0.20	1	.652
Age (*Z*)	1.37	1.31	0.84	2.48	1.42	1	.233

(*continued on next page*)

Table H7 (*continued*)

	Odds ratio	*SE*	95% Confidence interval		χ^2	*df*	*p*
Stake: Low	1.76	1.39	0.96	3.56	3.03	1	.082
Block: 2	0.70	1.39	0.37	1.36	1.21	1	.271
Condition (Independence) × Family Structure (Joint)[b]	0.61	3.97	0.02	13.60	9.69	2	.008
Condition (Interdependence) × Family Structure (Joint)[b]	25.91	3.97	1.95	713.37			

Note. Odds ratios represent the odds of selecting the fair option over the selfish option. Chi-square and *p* values refer to likelihood ratio tests between a model including and excluding the relevant predictor. The 95% confidence intervals are obtained through bootstrapping.

[a] Due to the inclusion of the interaction effect of Condition × Family Structure, significance of the main effects has limited interpretation and, furthermore, cannot directly be assessed through likelihood ratio tests.

[b] Due to the likelihood ratio test approach, there is only one *p* value for the Condition × Family Structure interaction, which refers to the complete interaction effect.

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