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# Fairness Deliberations and Fair Allocations in Symmetric and Asymmetric Bargaining—An Experimental Study on Group Decisions in Germany and China

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## Abstract

The study's primary focus is on examining fairness deliberations of bargainers in Germany and in China under symmetric and asymmetric bargaining power to understand whether they incorporate fairness into their decision process and, if so, how this affects bargaining outcomes. To this end, we conducted an incentivized ultimatum bargaining experiment with symmetric and asymmetric outside options. Groups ( $N=142$ ) of three persons interact as proposers and responders in dyads and decide simultaneously on their offer or which offers to accept or reject. Communication between parties is inhibited. We videotaped in-group discussions; the resulting transcripts were text analyzed by eliciting whether groups make fairness an issue, which fairness norms they discuss, and whether they use fairness-related perspective-taking to overcome the communication constraint. We find that asymmetry of bargaining power in favor of the proposer leads to lower offers relative to the symmetric situation. Not all groups make fairness an issue, and fairness deliberations alone have no significant impact on offers. However, when associated with the equal-payoff norm, and in Chinese groups in particular, discussing fairness increases offers in symmetric but also in asymmetric situations, in which other fairness norms could have been applied, too. Fairness-related perspective-taking is used by German and Chinese groups and is associated with higher offers in the former. Our study makes an epistemological and related methodological contribution: a possibly biased interpretation of bargaining outcomes can be mitigated if information on decision processes and underlying mechanisms were available.

**Keywords** Group decision-making · Fairness and equality · Perspective-taking · Focal points · Tacit bargaining · Ultimatum game · Video experiments · Content analysis

**JEL Classification** C78 · C81 · C91 · C92 · O53 · O57

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Extended author information available on the last page of the article

## 1 Introduction

Fairness<sup>1</sup> is an important driver of human behavior (André and Baumard 2011). It has been suggested as decisive for cooperation in social exchange and bilateral interactions (Van Lange 2006; Messner et al. 2016) and to foster international collaboration. For example, fairness-related equity concerns have been found to be of outstanding importance in political and economic negotiations in the areas of environmental issues (Albin and Druckman 2017), climate-change mitigation (Lange et al. 2007, 2010, 2017; Tavoni et al. 2011; Brick and Visser 2015), territorial disputes (Welch 2017), resource allocation (Sheikhmohammady et al. 2010), or burden-sharing in international refugee redistribution (Owen 2016).

The idea that fairness perceptions influence decisions is also at the heart of experimental and behavioral research. A plethora of empirical findings has motivated an impressive body of theoretical models on social preferences such as inequity aversion (e.g., Fehr and Schmidt 1999; Bolton and Ockenfels 2000) or fairness intentions (e.g., Rabin 1993; Dufwenberg and Kirchsteiger 2004; Falk and Fischbacher 2006). In this context, it seems important to broaden our understanding on how *different decision environments* affect the perception of fairness and, related, its behavioral impact. Our study, therefore, focuses on four important fairness-related topics asking how they affect decision processes and bargaining outcomes. We study (1) asymmetry in the parties' bargaining power, (2) explicitly-stated fairness concerns and fairness norms such as equality of final payoffs, (3) fairness-related perspective-taking as a means to overcome communication constraints among bargaining parties, and (4) potential differences regarding fairness-perceptions and behavior due to bargainers' cultural backgrounds.

To answer these questions, we need a novel research approach providing a data set that allows opening "a direct window into bargainers' thinking and imagination processes" (Cooper and Kagel 2005, p. 497), which is not the case when—as in many studies—merely data on final bargaining agreements are available. While other research approaches such as analyzing self-reports, questionnaires, case studies, text analyzing historical documents or secondary sources on negotiations have been used to retrieve information in addition to bargaining or negotiation outcomes (see, e.g., Yaari and Bar-Hillel 1984; Kahneman et al. 1986; Konow 1996, 2001; Albin and Druckman 2017; Druckman and Wagner 2017), we use data resulting from observed in-group discussions. This specific data set is elicited by means of an incentivized bilateral ultimatum bargaining experiment (UG, Güth et al. 1982) played by German and Chinese proposer and responder groups. We videotaped and coded the spontaneous in-group discussions when making the allocation decision. The resulting text protocols comprise the material on which we base our analyses. Our data allows deeper insights than decisions based on independent individual cognitive processes or group decisions that cannot be observed.

The ultimatum game has played an important role in studying fairness in distributive bargaining (Güth and Kocher 2014). In the standard (i.e., sequential

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<sup>1</sup> We use "fairness" and "justice" synonymously.

and symmetric) version, an individual proposer decides how to split a given amount of money (the pie) between herself and an individual responder who can accept or reject the proposal after having been informed about the offer. In the case of acceptance, both players in the dyad receive the amounts as allocated. In the case of rejection, both receive an outside option of zero. The common interpretation of the empirical results of literally thousands of symmetric UG experiments is that the obvious fairness notion is splitting the pie equally and that fairness considerations are a key factor motivating responders to reject low offers and inducing proposers to offer more than a negligible part of the pie at stake (for overviews, see Camerer 2003; Oosterbeek 2004).

In asymmetric versions of the UG, both players' bargaining power differs in terms of their outside options. Asymmetric situations have been found to shift acceptance towards more unequal distributions (e.g., Hennig-Schmidt et al. 2018). Our experimental design comprises three outside option constellations (treatments), one symmetric and two asymmetric ones. In treatment 1 (T1), both players have an outside option of zero. In treatment 2 (T2), we induce asymmetry by increasing the proposer outside option (OOP) to 40% of the pie, whereas the responder outside option (OOR) stays at 0%. In treatment 3 (T3), OOP remains at 40%, while OOR increases to 10% of the pie.

Our design captures a one-shot simultaneous decision situation without communication between the parties to minimize the influence of strategic considerations related to repeated interactions and communication. This situation of plural separate and interactive decisions (Raiffa et al. 2002), also termed tacit bargaining by Schelling (1960), implies that participants in our experiment face the challenge of synchronizing their demands and offers and coordinating their mutual expectations of what their counterparts may finally accept. Such thought processes are infinitely reflexive in general (Schelling 1960); yet, to come to an agreement, these processes have to stop at a finite level of reasoning. Our design allows us to study how the bargainers deal with this challenge, and whether they spontaneously engage in fairness-related perspective-taking and reflexive thinking processes.

Our study's fourth topic is the potential influence of participants' cultural background on the decision-making process and bargaining outcome. We use a German and a Chinese participant sample from the University of Bonn and from Sichuan University in Chengdu. Culture has been advanced as one important environmental factor influencing behavior (e.g., Camerer 2003; Zhang 2006; Herrmann et al. 2008; Gächter et al. 2010; Mizrahi et al. 2020). The philosophical background of a society's culture is likely to shape its value system, the prevailing norms, fairness perceptions, and thus also peoples' decision-making. Germany is influenced by the Greek/Christian culture and philosophy, and China by Confucianism/Taoism (Jullien 2004). According to Hofstede's six-dimension model that describes the effects of a society's culture on the values of its members (Hofstede and McCrae 2004; Hofstede 2011), German culture can be classified as high on individualism (79 on a scale from 1 to 100) whereas Chinese culture is ranked lower (49), i.e., collectivistic (Hofstede-insights, n.d.). In individualistic societies, people tend to look only after themselves and their immediate family whereas in collectivistic societies, people belong to in-groups that take care of their

members in exchange for loyalty (Hofstede-insights, n.d.). The individualism versus collectivism dimension is thus closely related to the degree of interdependence a society maintains among its members. This may also have a different impact on the role fairness plays in German and Chinese participants' fairness deliberations within the bargaining process. Finally, while Germany does and China does not belong to the WEIRD (Western, Educated, Industrialized, Rich, and Democratic) societies (Baumard and Sperber 2010; Henrich et al. 2010), Bonn and Chengdu appear appropriate for the purpose of our investigation.

Our study makes an epistemological and related methodological contribution. We illustrate that complementary research approaches, which, like ours, allow spotting decision processes and underlying motives, may help to avoid biased interpretations of observed outcomes. Our insights on perspective-taking are informative, for instance, in situations of preparing negotiations when communication with the negotiating partner has not yet taken place. In combination with reflexive thinking, bargainers could anticipate the negotiation process as well as potentially applicable distribution norms, and identify potential conflicts.

## 2 Related Literature, Theoretical Background and Hypotheses

### 2.1 Behavioral Impact of Symmetric and Asymmetric Outside Options

In economic distribution conflicts, an amount of money is often to be distributed between two or more parties. In case parties have the same bargaining power in terms of their options outside the deal, the equal split (ES) is a reasonable prospective outcome. If, however, bargaining power is asymmetric because bargainers have different options outside the deal, offers and demands should at least guarantee the counterpart's respective outside option. Therefore, outside options play an important role regarding bargaining outcomes, and allocations different from ES may attract the parties' attention.

Literature provides ample evidence that bargaining partners do not only strive for the amount guaranteed by their outside option but make substantially higher claims and are willing to risk non-agreement. For standard ultimatum games with an outside option equal to zero for both players, Camerer (2003) and Güth and Kocher (2014), for instance, report that the probability of rejecting an offer is high when responders are offered less than 20–30% of the amount at stake. This also holds when stakes are high (e.g., Slonim and Roth 1998; Cameron 1999; Munier and Costin 2002; Andersen et al. 2011).

Regarding the impact of asymmetric outside options, three behavioral regularities emerge from the literature on the basis of data from various countries (e.g., Hennig-Schmidt et al. 2018). First, when the proposer gains more bargaining power, she tends to demand a higher share of the pie, i.e., the proposer's offer decreases. Similarly, when the responder gains more bargaining power, he tends to demand a higher share of the pie, i.e., the lowest amount he is willing to accept (LAL) increases. Second, the proposer tends to make a higher offer when the responder's bargaining power increases. Likewise, the responder is more willing to accept a

lower offer when the proposer's bargaining power increases. Third, in UGs with asymmetric outside options, rejections become more frequent compared to standard UGs with zero outside options because players tend to interpret the game differently. One possible underlying mechanism is that they form reference points for fairness going beyond ES in situations with asymmetric outside options (see Sect. 2.2.2), as reported by, e.g., Knez and Camerer (1995); Buchan et al. (2004); Schmitt (2004); Fischer (2005); Kohnz and Hennig-Schmidt (2005); Fischer et al. (2007); Hennig-Schmidt et al. (2018).

Given the literature and the structure of the experiment, we hypothesize that bargainers' outside options and associated bargaining power will influence their decisions in both participant pools as formulated in:

**Hypothesis 1** Impact of asymmetry on behavior.

**H1a** Increasing the outside option of the proposer (while keeping the outside option of the responder constant) leads to a lower offer by the proposer and a lower acceptance level by the responder.

**H1b** Increasing the outside option of the responder (while keeping the outside option of the proposer constant) leads to a higher offer by the proposer and a higher acceptance level by the responder.

## 2.2 Fairness Concerns and Bargainers' Decisions

### 2.2.1 Prevalence of Fairness Concerns

Justice and fairness in the sense of impartiality and lack of bias towards everybody are of central and universal concern in Western thinking (see Konow 2003, for an overview, and the literature quoted in the introduction). We, therefore, expect that fairness is made an issue in nearly all groups when German participants discuss the allocation decision. In Chinese societies, however, the notion of fairness has to be viewed from a different perspective. How an allocator distributes a reward is strongly influenced by the nature of social interactions within interpersonal relationships (*guan xi*/关系) among, for instance, family members, friends, colleagues, or unrelated others (e.g., Zhang 2006). Justice is conceived as the fulfillment of role expectations (Chiu and Hong 1997), and different justice standards apply for different social relations (Zhang and Yang 1998). Thus, fairness concerns should be of less universal importance for the Chinese compared to the German participants in a situation where participants have only limited information about their opponents.

Also, from the perspective of cultural value dimensions (Hofstede et al. 2010), we expect that fairness concerns are of less importance for the Chinese than for the German participants given the findings of Lund et al. (2013). The authors report that *Uncertainty avoidance* (the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity, for instance regarding the future), where Germany scores higher than China (65 vs. 30, see Hofstede insights, n.d.),

enhances the importance of fairness. *Power distance* (the extent to which less powerful members of organizations and institutions accept and expect that power is distributed unequally), where Germany scores lower than China (35 vs. 80), decreases the importance of fairness. Based on these arguments, we formulate:

**Hypothesis 2** Prevalence of fairness concerns.

**H2** More German than Chinese groups discuss fairness and they do so earlier.

### 2.2.2 Fairness Norms in Symmetric and Asymmetric Bargaining Situations

We now combine our deliberations about asymmetry and fairness perceptions. In situations where players have the same outside option, equality in payoffs seems the natural reference point for a fair outcome (see, for instance, the literature on inequity aversion, e.g., Fehr and Schmidt 1999; Bolton and Ockenfels 2000; see also Güth and Kocher 2014). In asymmetric situations involving different outside options for both players, other divisions of the pie may be perceived as fair. From an equity theory perspective (e.g., Homans 1961; Adams 1965; Deutsch 1985), there are several allocations that might attract the bargainers' attention and award the stronger party a larger share of the pie. Prominent equitable allocations besides ES are, for instance, *split the difference* (SD) and *proportional split* (PS) suggested in the theoretical literature (e.g., Nash 1950; Konow 2003). They have been found to also guide decision makers' choices in bargaining and negotiation experiments (e.g., Güth et al. 1982; Hennig-Schmidt 1999, 2002; Hennig-Schmidt and Walkowitz 2015, 2017; Hennig-Schmidt et al. 2018).

ES entails splitting the pie equally. SD involves each bargaining partner/negotiator receiving his/her outside option and, in addition, the amount that results from dividing the remainder of the pie equally. PS divides the pie in proportion to the bargaining/negotiation partners' outside options. Both, SD and PS, comprise elements of fairness: SD combines the asymmetry in outside options with an equality point of view by sharing the surplus equally; PS keeps the relation in outside options and thus complies with fairness notions based on the equity principle (e.g., Selten 1978, 1987, in particular, his general definition of the equity principle; see also Appendix A).

Based on previous findings (Cappelen 2007; Kagel et al. 1996; Hennig-Schmidt et al. 2018), we expect—beyond the prominence of ES—the equitable allocations SD and PS to also become fairness-related reference points in the group discussions in asymmetric bargaining treatments and in both countries. It is not clear, however, whether group members do relate these allocations directly to fairness or whether they use them just as prominent reference points for bargaining goals. This question is particularly interesting for ES, as ES can be applied in all three treatments. We therefore differentiate Hypothesis 3 regarding our expectation concerning ES, and ES in connection to fairness ( $ES_{\text{fair}}$  henceforth).

**Hypothesis 3** Equal split and fairness in symmetric and asymmetric bargaining situations.

**H3a** The equal split is discussed by more groups in symmetric than in asymmetric bargaining situations.

**H3b** The equal split in connection with fairness is discussed by more groups in symmetric than in asymmetric bargaining situations.

### 2.2.3 Association Between Fairness Concerns and Behavior

Many studies report that fairness-concerned, pro-social attitudes and preferences are positively associated with pro-social behavior. For instance, Falk et al. (2018) find in a study involving 80,000 people in 76 countries, that pro-social preferences such as altruism or positive reciprocity are related to other-regarding behavior. De Dreu and Van Lange (1995) observe in negotiation experiments that pro-socially motivated participants exhibit lower levels of demand, make greater concessions, and ascribe greater levels of fairness and considerateness to their counterparts, compared to individualistic and competitively motivated persons. Lönnqvist et al. (2013) find in the dictator game (DG)—where a dictator splits a given amount of money among herself and a passive receiver—that personal values such as commitment to equality and justice—i.e., the universalism-concern subtype of the universalism value (Schwartz et al. 2012)—can be relevant in explaining the theoretical causes of pro-social behavior. In a similar vein, Walkowitz (2021)—also analyzing the DG—reports that generosity is significantly correlated, e.g., with social value orientation, donations to charity, and the personality factor of agreeableness. From a theoretical perspective, generosity in the DG, as well as in the UG can be explained, among other things, by the fact that players are inequality-averse, i.e., they suffer a disutility when they perceive inequality to their disadvantage, but also to their advantage, which they can mitigate through their behavior (e.g., Fehr and Schmidt 1999; Blanco et al. 2011).

One may wonder why proposers typically offer less than the ES even in the symmetric UG; see, e.g., Camerer (2003); Güth and Kocher (2014). For one thing, an *inherent* asymmetry exists in UG in terms of power distribution between both players in that the proposer has the right to decide how the pie is distributed (Kirchsteiger 1994; Van Dijk and Vermunt 2000; Güth and Kocher 2014). This is robustly reflected in proposers' average offers of between 40 and 50% of the pie. Responders almost always accept such offers. Moreover, in the case of *induced* asymmetry by increasing the difference between both players' outside options in favor of the proposer, offers have been found to shrink below the level of symmetric UGs (e.g., Kohnz and Hennig-Schmidt 2005; Hennig-Schmidt et al 2018) meaning that offers are further away from ES.

Based on the literature, we expect that proposer groups discussing fairness increase their offers shifting the suggested distribution of the pie towards ES. For responders, the argument of structural asymmetry also applies. Given that the

reference for LALs is lower than ES, responders discussing fairness are expected to increase their LALs in order to attain a fairer share of the pie.

We do not anticipate differences between the two participant pools concerning the impact of fairness deliberations on behavior. Although Chinese culture differs from German culture in terms of the social regulatory principles of human behavior, the equal split appears to be a significant reference point for a fair allocation of resources also in China (e.g., Leung and Bond 1984; Zhang 2006). We, therefore, formulate:

#### **Hypothesis 4** Behavioral impact of fairness concerns.

**H4a** Proposer groups concerned with fairness make higher offers compared to proposer groups that do not discuss fairness.

**H4b** Responder groups concerned with fairness set higher LALs compared to responder groups that do not discuss fairness.

### **2.3 Fairness and Perspective-Taking**

A feature of our experiment is that proposer and responder groups cannot communicate with each other to come to an agreement. They, therefore, have to form beliefs about their bargaining partners to get a feeling, which potential decisions their counterparts might take, which desires and intentions they might have, and whether fairness concerns would matter to them. From a game-theoretic perspective, when players are fully rational and selfish, building beliefs about the counterpart's strategy is a well-recognized tool for generating bargaining agreement and a standard procedure for finding Nash equilibria, i.e., best responses to each other's strategies. From a bounded-rationality view, however, players cannot deduct the counterparts' strategy as they do not have full information about the counterparts' preferences. They have to find ways to solve the challenge of lacking communication and coordinating their demands by coordinating their expectations of what their counterpart may finally accept as well as what his/her intentions and motives are. These thought processes are complicated as they are infinitely reflexive in principle (Schelling 1960).

Transcripts of group discussions are an ideal database for perspective-taking analyses in our setting as participants can talk spontaneously about their counterpart group and interact with the other members of their own group. Arguments and counterarguments during discussions are a natural part of the implemented experimental group task and are likely to advance the complex deliberations. Reflexive thought processes involve reasoning at higher levels, which is complicated and needs time to develop.

Own research based on transcripts from other experiments has shown that participants not only spontaneously form beliefs about their counterparts. They also apply different types of perspective-taking in that (1) participants reflect on their counterparts' actions, motives, and intentions and (2) they explicitly

put themselves into the counterparts' shoes viewing the situation as if they were the counterpart (Hennig-Schmidt and Geng 2006; Geng and Hennig-Schmidt 2007). The former type of perspective-taking has been termed "imagine-other-perspective" (IOP), while the latter is known as "imagine-self-perspective" (ISP); see Batson et al. (1997). Our previous research also revealed that participants apply reflexive thought processes and argue in each of the two perspective-taking modes in up to three levels of reasoning. See Nagel (1995); Mauersberger and Nagel (2018) for levels of reasoning and Crawford et al. (2013) for level- $k$  reasoning). Linking these two streams of the literature—perspective-taking and levels of reasoning—with fairness seems a natural approach for analyzing behavior in a distributive task because fairness is concerned with at least two parties, self and the counterpart(s), between whom a given resource has to be shared. This perspective has—to the best of our knowledge—not been dealt with in the bargaining literature so far.

The literature above suggests that group members reason in the imagine-other- and in the imagine-self-perspective when discussing fairness concerns. Given that arguing in ISP is more difficult than in IOP and that reasoning in higher levels is more complex than doing so in lower levels, we hypothesize that in both participant pools, more groups reason in IOP at level 1 than in ISP or at higher levels in both modes. We, therefore, state:

**Hypothesis 5** Interplay between levels of reasoning, fairness-related perspective-taking, and behavior.

**H5a** When arguing in perspective-taking mode, more groups reason in imagine-other-perspective at level 1 compared to imagine-self-perspective mode or other levels of reasoning.

Regarding the effect of perspective-taking on behavior, the literature provides no conclusive evidence. Tyler and Blader (2004), for instance, report that parties in a conflict strive for a fair distribution of outcomes and are motivated to take the counterpart's perspective when they want to be treated with respect (see also Ledgerwood et al. 2006). However, participants are faced with a tradeoff between financial incentives and other-regarding behavior. In this vein, Lönnqvist and Walkowitz (2019) report that being induced to think about others via a perspective-taking task had no significant impact on participants' generosity. Further, taking others' perspectives has been found to activate egoistic motivations (Batson et al. 1997) and behavior (Epley et al. 2006). Note, however, that in the latter literature, researchers have primed participants by asking them to explicitly take the imagine-other-perspective or the imagine-self-perspective. This approach is different from ours where participants mentalize spontaneously being motivated by an internal impulse compared to an external priming. We, therefore, argue that perspective-taking in our context leads to higher offers and lower LALs, as proposers' and responders' empathy increases by taking the counterparts' needs and feelings into account. Further, self-induced perspective-taking may help in

overcoming the self-serving bias in bargainers' fairness perceptions and aspirations (Drolet et al. 1998, see also Whiteside and Barclay 2016) and can lead to other-regarding effects in the sense that "[...] putting oneself into the opponent's shoes' [may] help to walk toward an agreement" (Trötschel et al. 2011, p. 771).

In view of how members of different cultures deal with the complexity of perspective-taking thought processes, people in collectivistic cultures are said to have interdependent selves, whereas people in individualistic cultures are described as independent selves, meaning that the former are likely to be more effective in taking the perspective of others compared to the latter (Wu and Keysar 2007). The Chinese are famous for high-level strategic thinking involving both types of perspective-taking. Strategic deliberations are of great importance in China since more than 2000 years (von Senger 2021; in warfare, see Sunzi 2021) and are still essential in everyday life, particularly in business (Sui Pheng and Lee 1997; von Senger 2006; Chiao 2008; Wee 2008). The literature is inconclusive, however, on differences regarding the effect of perspective-taking on behavior across both cultures. Despite the finding that the Chinese are good perspective-takers and better mentalizers concerning communication than, for example, Americans (Wu and Keysar 2007), Wang et al. (2018) found the opposite when studying the effect of perspective-taking on stereotype reduction.

Given our above argumentation, we state for the German and Chinese participant pools:

**H5b** Perspective-taking leads to higher proposer offers and lower responder LALs.

### 3 Experimental Measures, Participants, Procedures, and Text Analysis

#### 3.1 Measures

The proposer has to decide how to divide a given pie  $a=20$  tokens between herself and the responder. The proposer decides on the amount  $x \in \{0, 1, \dots, 20\}$  to offer to the responder. Simultaneously and independently, the responder indicates acceptance or rejection for any possible offer  $x$ . In the case of accepting  $x$ , the proposer receives the payoff of  $20-x$  and the responder gets  $x$ . In the case of rejection, both receive a predefined outside option.

Our experiment is based on a  $3 \times 2$  between-subject design comprising three different outside option constellations—namely T1: OOP 0 (0% of the pie  $a$ ); OOR 0 (0%); T2: OOP 8 (40%), OOR 0 (0%); and T3: OOP 8 (40%); OOR: 2 (10%)—and two locations (Bonn University, Germany; Sichuan University, Chengdu, P.R. China), see Table 1. The outside option constellations were chosen to study the influence of increasing the bargaining power of the proposer in the asymmetric treatment T2, compared to the symmetric baseline treatment T1, as well as the influence of raising the bargaining power of the responder in treatment T3, compared to

**Table 1** Experimental treatments, observations, and equity norms

Treatment	Outside option		Independent observations				Equity norms		
			# Proposers		# Responders				
	OOP	OOR	Bonn	Chengdu	Bonn	Chengdu	ES	SD	PS
T1	0 (0%)	0 (0%)	12	12	12 <sup>a</sup>	12	10	–	–
T2	8 (40%)	0 (0%)	12	12	12	12	10	6/14	
T3	8 (40%)	2 (10%)	11	12	11	12	10	7/13	4/16
Total:			35	36	35	36			

OOP (OOR): proposer (responder) outside option displayed in experimental currency “token” (percentages of the pie in parentheses)

Equity norms: ES = equal split, SD = split the difference, PS = proportional split

<sup>a</sup>Due to a technical defect, we did not videotape one responder team in T1. We therefore have 142 observations for behavior but only 141 observations for the text analysis

T2. Furthermore, from our outside option parameters, the equity norms SD (T2 and T3) and PS (T3) can be theoretically derived in the asymmetric treatments T2 and T3 (see Appendix A). The size of the pie (20 tokens) is constant over all treatments.

We modified the standard protocol of the UG experiment in several ways: First, a group of three participants each acted in the role of proposers and responders. Second, we use a variant of the strategy method (Selten 1967) in which proposers decide on their offer, and simultaneously responders state acceptance or rejection for the full strategy space. Although the evidence on the behavioral effects of the strategy method compared to the direct-response approach in economic experiments is mixed with a tendency of increasing rejection rates under the latter due to responders’ higher emotional involvement (Güth and Kocher 2014), we used the former. For one thing, the strategy method is an acknowledged experimental tool if one needs information on the full strategy space (e.g., Bellemare et al. 2008; Hennig-Schmidt et al. 2008; Bahry and Wilson 2006; Güth and Kocher 2014), i.e., to retrieve information for each of the possible allocations on whether responders accept or reject the proposed division. Moreover, for any allocation, we wanted to get the information on whether the responders perceive it as fair. Had we used a sequential direct-response design, responders most likely would have discussed only the actual offer and would not have commented on the full strategy space. Third, given that we used the strategy method, the responder group’s behavioral variable is the lowest amount the group is willing to accept (LAL), see, e.g., Knez and Camerer (1995). While the proposer has to precisely state the allocation involving the offer and the share of the pie she wants to keep, LAL is the lower bound of a range of acceptable offers, with the offer the responder actually wants/hopes to receive being (usually) higher. This lower bound is likely to be noisy (e.g., due to risk considerations), and therefore may induce less strong behavioral effects compared to the offer the proposer has to make.

### 3.2 Participants and Procedures

We conducted 71 paper-and-pencil sessions: 35 in Bonn with 200 students, 36 in Chengdu involving 208 students,<sup>2</sup> in 2001 and 2002. In each session, one proposer and one responder group interacted, with each session comprising either the symmetric or one of the asymmetric treatments. In total, 142 groups participated. Each group is one independent observation (Table 1) when analyzing the verbal material. Almost all participants were male or female undergraduates majoring in economics/business, law, natural sciences, or humanities.

The experimental protocol was as follows: We recruited participants by campus advertisements promising a monetary reward for participation in a decision-making task. At registration, we assigned participants acting together in a proposer group to a room separated from that of the responder group, thus guaranteeing full anonymity between both types of players. We randomly assigned the player role to the groups. All experimental sessions began with an introduction by native experimenters in the respective languages, who then read the German/Chinese instructions<sup>3</sup> aloud and answered participants' questions. All members in both groups received the same information, not only regarding their own and the counterpart groups' task, but also on all features of the experimental design and the procedure.

Groups had 15 min to decide either on their offer  $x$  (proposers) or whether to accept or reject any possible offer (responders). They had to make a unanimous decision to be recorded on a decision form and signed by all group members. We did not predetermine any mechanism to come to an agreement.

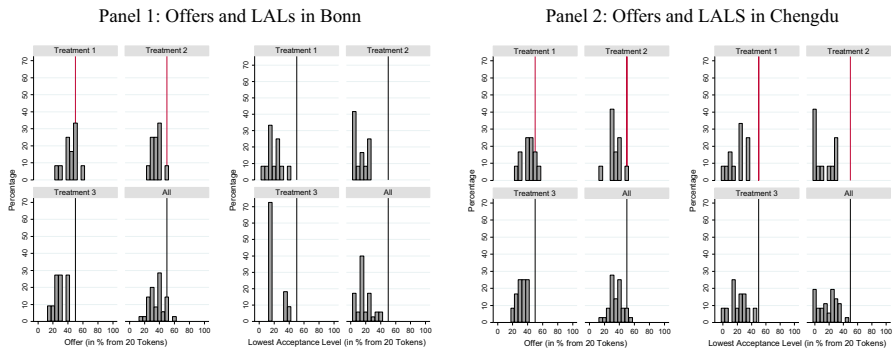
At the end of the experiment, the experimenters randomly matched offers by the proposer group and acceptance or rejection by the corresponding responder group and informed the groups about their payoff. Finally, participants were paid and dismissed. Most groups made their decision quite before the provided 15 min had passed. The total sessions (including introduction, potential clarifications, and disclosure of results) lasted for about 35 min.

We calculated the expected total monetary reward to equal the hourly wage at a typical student job of about 10 EUR in Germany and 35–45 RMB in China (approximately 4.70–6 EUR). We paid each group member 0.60 EUR (2 RMB) for each token his/her group earned. In addition, we paid each participant a show-up fee of 4 EUR (10 RMB) independently of the earnings in the experiment. Participants on average received 9.76 EUR in Germany and 28.67 RMB (3.83 EUR) in China, including the show-up fee.

We followed standard experimental procedures when dealing with human participants. The incentivized experiments were conducted according to the ethics standards of the experimental economics profession that do not allow deception. Given these standards and that our decision experiments do not involve any medical

<sup>2</sup> Due to no-shows, in China (Germany) 8 (10) of the 72 (70) groups consist of only two people.

<sup>3</sup> Instructions were translated into Chinese by a former co-researcher, Chaoliang Yang, who is a native Chinese speaker, linguistically and culturally fluent in German, and a certified translator. In addition, we used the back-translation method. See Appendix B for the English translation of the instructions and decision sheets.



**Fig. 1** Offers and lowest acceptance levels in Bonn and Chengdu. Frequencies (percentages) of offers and lowest acceptance levels in percentages of pie  $\alpha$  in Bonn (Panel 1) and Chengdu (Panel 2) in treatments T1 (OOP, OOR=0%), T2 (OOP=40%, OOR=0%) and T3 (OOP=40%, OOR=10%) and in all treatments. Vertical lines mark the equal split

treatment or alike, the approval by an ethics committee or institutional review board was waived at the institutions where the experiments were run.

### 3.3 Transcription and Text Analysis

Our analyses are based on intra-group discussions videotaped during the experiment. Native German and Chinese graduate students transcribed the videotapes verbatim into text protocols after being carefully trained and instructed for this task. All Chinese transcripts were translated into German. Our method of eliciting the participants' focal points, their fairness perceptions, and perspective-taking processes is content-analyzing the verbal data; see Appendix C for details. Besides developing the coding procedures, preparing the final verbal data set for our study was rather elaborate and time-consuming. Transcribing the 35 h of videotaped bargaining discussions, translating the Chinese video protocols into German and applying the coding procedures to 575 pages of transcripts was done by about 30 German/Chinese students supervised by the authors.

## 4 Results

In presenting the results, we follow the structure of our hypotheses and study patterns in Bonn and Chengdu in each step of our investigation. We start with an overview of the behavioral data.

With very few exceptions, proposers' offers exceed the outside options of the respective responders. Likewise, responders' LALs leave more than their outside option to the respective proposers, see Fig. 1. Table 2 shows that average offers decrease across treatments (from T1 to T3) in both locations: from 43.75 to 29.09% of pie  $\alpha$  in Bonn, and from 41.25 to 32.08% in Chengdu. LALs in T1 and T3 are nearly the same in both locations (around 20%) but lowest in T2

**Table 2** Offers, LALs, and Rejections

Treatment	Bonn (Germany)				Chengdu (China)			
	Offer ( <i>SD</i> )	LAL ( <i>SD</i> )	# Obs	# Rej. (%)	Offer ( <i>SD</i> )	LAL ( <i>SD</i> )	# Obs	# Rej. [%]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
T1	43.75 (9.56)	20.00 (9.53)	24	[0]	41.25 (9.08)	20.42 (12.15)	24	1 [8.33]
T2	35.83 (6.69)	13.33 (8.62)	24	[0]	33.75 (8.56)	12.50 (13.40)	24	2 [16.66]
T3	29.09 (8.31)	20.91 (10.20)	22	3 [27.27]	32.08 (6.56)	21.67 (12.67)	24	1 [8.33]
Total	36.43 (10.04)	18.00 (9.79)	70	3 [8.57]	35.69 (8.88)	18.19 (13.05)	72	4 [11.11]

Mean offers and LALs in percentages of pie  $a$ . Standard deviations (*SD*) in parentheses. Columns (4) and (8) show the number of rejections in Bonn and Chengdu, with percentages related to the number of observations in the respective treatment and in total in brackets. # Obs. indicates the number of independent observations. # Rej. [%] provides the frequencies [percentages] of rejections

(around 13%) when asymmetry is highest regarding the difference between proposer and responder outside options. We do not observe significant differences between Bonn and Chengdu in offers ( $p=0.791$ , Fisher-Pitman permutation test for two independent samples, Cohen's  $d=0.08$ ; denoted as *FPPT* and  $d$  in the following) and LALs ( $p=0.987$ , *FPPT*,  $d=0.02$ ). Table 2 also shows that in Bonn, only in T3 three sessions ended with responders rejecting the proposers' offers. In Chengdu, responders did not accept the proposers' offers in T1 and T3 in one session each, while this occurred two times in T2. Note that in T1 and T2, Chinese responders stated non-monotone or unsystematic acceptance strategies, see Hennig-Schmidt et al. (2006).

**Table 3** The impact of outside options on offers and LALs in Bonn and Chengdu

Location/treatment comparison	Bonn		Chengdu	
	Change in offer	Change in LAL	Change in offer	Change in LAL
	(1)	(2)	(3)	(4)
T1 versus T2	-7.92**	-6.67	-7.50*	-7.92
T2 versus T3	-6.74*	7.58*	-1.67	9.17
T1 versus T3	-14.65***	0.91	-9.17**	1.25

This table shows results from Fisher-Pitman-Permutation tests for independent samples. Columns (1)–(4) show the changes in proposers' offers and responders' LALs in the respective treatments (in percentages of pie  $a$ ) in Bonn (Columns 1 and 2) and in Chengdu (Columns 3 and 4). Treatment constellations are: T1: OOP = 0 (0%), OOR = 0 (0%); T2: OOP = 8 (40%), OOR = 0 (0%); T3: OOP = 8 (40%), OOR = 2 (10%)

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 4.1 Impact of Asymmetry on Behavior

We test H1 in a between-subject analysis using FPPT comparing the behavior of proposer/responder groups in T2 vs. T1 (H1a) and in T3 vs. T2 (H1b).

**Result 1a** *When the proposer outside option increases in T2 compared to T1 (while the responder outside option is kept constant), proposers make lower offers and responders state lower LALs in both locations, as expected by H1a. The only significant changes are offer reductions in Bonn.*

**Support** We expected in H1a that proposers make lower offers and responders state lower LALs in T2 compared to T1. This is what we find, see Table 3. Offer reductions in Bonn are 7.92 percentage points (pp) ( $p=0.039$ ,  $d=0.96$ ). In Chengdu they amount to 7.50 pp ( $p=0.065$ ,  $d=0.85$ ), see Columns 1 and 3 in Table 3. LALs in Bonn decrease by 6.67 pp ( $p=0.110$ ,  $d=0.73$ ) and in Chengdu by 7.92 pp ( $p=0.560$ ,  $d=0.62$ ) pp (Columns 2 and 4). We thus observe that only offer reductions in Bonn are significant at conventional statistical levels.

**Result 1b** *When the responder outside option increases in T3 compared to T2 (while the proposer outside option is kept constant), in both locations, proposers make lower offers and responders state higher LALs. Proposer behavior is contrary to H1b while responder behavior is in line with H1b. All behavioral changes are not significant.*

**Support** Hypothesis H1b predicted that proposers make higher offers and responders state higher LALs in T3 compared to T2. This prediction holds for LALs in both locations (Bonn: +7.58 pp; Chengdu: +9.17 pp). Offers in Bonn and in Chengdu, however, decrease by 6.74 pp and 1.67 pp in T3, respectively, see Table 3. All behavioral changes are not significant according to conventional levels of statistics (offers: Bonn:  $p=0.061$ ,  $d=0.90$ ; Chengdu:  $p=0.691$ ,  $d=0.22$ ; LALs: Bonn:  $p=0.085$ ,  $d=0.81$ ; Chengdu:  $p=0.114$ ,  $d=0.70$ ).

We also compare the decisions in T1 with decisions in T3, where the outside options of *both* players rise relative to T1. Table 3 shows that proposers reduce their offers in both locations significantly by 14.65 pp and 9.17 pp, respectively (Bonn:  $p=0.002$ ,  $d=1.63$ ; Chengdu:  $p=0.015$ ,  $d=1.16$ ). Likewise, we observe an increase in LALs by 0.91 and 1.25 pp, respectively, which is not significant in both participant pools (Bonn:  $p=0.905$ ,  $d=0.09$ ; Chengdu:  $p=0.872$ ,  $d=0.10$ ).

## 4.2 Prevalence of Fairness Concerns

Mentioning fairness/justice during the groups' 15 min discussion time, we regard as an explicit signal that fairness is an important issue for the participants in our experiment. We, therefore, investigate in a first step whether participants spontaneously mention fairness and/or justice during the group discussions. We check the verbal material of 141 groups<sup>4</sup> (69 in Bonn, 72 in Chengdu, see Table 1) for explicitly mentioning the words *fair* and *just* (in German, "*gerecht*," "*fair*") in all word combinations, such as *fairness*, *justice* using the text analysis software ATLAS.ti (n.d.). In Chinese, the corresponding words are 公平 (*gong ping*), 平等

<sup>4</sup> Due to a technical defect, we did not videotape one German responder group.

(*ping deng*), and 合理 (*he li*). For the sake of simplicity, in the following, we will use the term ‘fairness’ for both fairness and justice.

We assess the importance of fairness by counting the number of groups making fairness an issue. We then test H2 by comparing the relative frequencies of German and Chinese groups discussing fairness at least once, and when this happens for the first time in the course of discussions. We use a Chi-square test and FPPT.

**Result 2** *Although more German than Chinese groups make fairness an issue, this difference is not significant. German groups discuss fairness earlier than Chinese groups. H2 is supported for the timing of fairness discussions only.*

**Support** We expected that fairness would be of higher importance in Bonn than in Chengdu and that discussions about fairness come up earlier in the former location. Although we find that 14.25% more German groups discuss fairness (Chengdu 61.11%; Table 7 in Appendix D, Column 1), this difference is not significant at conventional levels of statistics ( $\chi^2=3.29$ ,  $p=0.070$ ;  $d=0.31$ ). Regarding the timing of fairness-related discussions, participants in Bonn talk about fairness significantly earlier than those in Chengdu—on average after 46 versus 83 discussion units, respectively ( $p=0.003$ ,  $d=0.63$ ), with a discussion unit comprising a group member’s articulation until another person starts to talk. When we account for the total length of the discussions by dividing the number of the first fairness discussion unit by the total number of discussion units, the difference remains significant ( $p=0.015$ ,  $d=0.52$ ).

We also expected that fairness is made an issue in nearly all German groups when their members discuss the allocation decision. Our analysis of how many German groups spontaneously mention fairness shows that only 75.36% of them do so (Table 7, Column 1, in Appendix D).

### 4.3 Fairness Norms in Symmetric and Asymmetric Bargaining Situations

Next, we study whether group members discuss the previously derived equity norms ES, SD, and PS. To this end, we content-analyzed the transcripts regarding these allocations. We also assessed whether participants explicitly relate these norms to fairness arguments (see Appendix C2 for the coding procedure). In particular, we measure the importance of ES in symmetric and asymmetric treatments by counting the number of groups discussing ES and/or ES<sub>fair</sub>. We test H3a and H3b by Chi-square tests comparing between T1 and T2/T3 the relative frequencies of groups discussing ES (ES<sub>fair</sub>) in both participant pools.

**Result 3a** *In the symmetric bargaining situation T1, significantly more groups than in the asymmetric situations T2 and T3 discuss the equal split in Chengdu. This does not hold for Bonn. H3a is supported for the Chinese, but not for the German participant pool.*

**Support** We expected that in T1, relatively more groups than in T2/T3 refer to ES in both locations (H3a). We find that in Bonn, on average, nearly all groups refer to ES (T1: 95.65%, T2/T3: 93.48%). In Chengdu, on average, 100% of the groups do so in T1 and only 70.83% in T2/T3 (not reported for both locations). Chi-square tests support H3a for Chengdu ( $\chi^2=8.690$ ,  $p=0.003$ ;  $d=0.78$ ), but not for Bonn

( $\chi^2=0.133$ ,  $p=0.716$ ;  $d=0.09$ ). See also Table 7, Columns 2 and 3, in Appendix D, showing statistics for ES and  $ES_{\text{fair}}$  respectively.

**Result 3b** *We find no support for H3b in both locations that in the symmetric bargaining situation T1, relatively more groups discuss  $ES_{\text{fair}}$  compared to the asymmetric situations T2 and T3.*

**Support** We hypothesized that in both locations relatively more groups discuss  $ES_{\text{fair}}$  in T1 than in T2/T3 (H3b). The data show that in Bonn, on average, 60.87% of the groups mention  $ES_{\text{fair}}$  in T1 and 50% in T2/T3. In Chengdu, on average, 41.67% of the groups refer to  $ES_{\text{fair}}$  in T1 and 29.17% in T2/T3 (not reported for both locations). Chi-square tests do not support H3b for both locations (Bonn:  $\chi^2=0.729$ ,  $p=0.393$ ,  $d=0.22$ ; Chengdu:  $\chi^2=1.125$ ,  $p=0.289$ ,  $d=0.26$ ).

The transcripts also reveal that fairness discussions in both locations mainly relate to ES also in the asymmetric treatments T2 and T3. SD (PS) plays almost no role in the fairness discussions. SD in relation to fairness is only mentioned two (four) times in Bonn (Chengdu), PS is not related to fairness at all. Nevertheless, proposers actually offer these allocations (SD: three German and eight Chinese groups; PS: one group in each location in T3). Reevaluating the transcripts, we find that of the eleven groups offering SD, seven have something like the SD concept in mind, but do not refer to the way the pie is to be divided applying SD. Instead, when going through the list of possible allocations, group members find out that when offering six (seven) tokens in T2 (T3), both player groups receive the same additional payment of six (five) tokens. The other two German and two Chinese groups discuss the allocation but without ever referring to SD. Of the proposer groups offering PS (4 tokens) in T3, the Chinese one does not and the German one does refer to PS. They also do not specify that the pie is divided proportionally but discover that both players' outside options would be doubled.

It is our verbal material that allows these additional clarifications, as we most likely would have misinterpreted the offers of the five groups not referring to SD or PS as (fair) equitable allocations had we had to rely on decision data only. Moreover, we might even have assessed that all 13 groups had a fair offer in mind because offers corresponding to equitable allocations have been stated as fair in other studies that could not rely on supporting verbal material (see, for instance, Hennig-Schmidt et al. 2018).

Beyond these findings, we observe that about one fourth of all groups (24.64% in Bonn, 27.78% in Chengdu) discuss ES without ever mentioning fairness. Group members also rarely talk about fairness without ever referring to ES (2.86% of all groups in Bonn, 8.33% in Chengdu). Finally, we find no systematic differences between the relative frequencies of proposer and responder groups when discussing fairness, ES or  $ES_{\text{fair}}$  (*Fair*—Bonn:  $p=0.529$ ,  $d=0.22$ ; Chengdu:  $p=0.047$ ,  $d=0.23$ . *ES*—Bonn:  $p=0.589$ ,  $d=0.25$ ; Chengdu:  $p=0.136$ ,  $d=0.43$ ;  $ES_{\text{fair}}$ —Bonn:  $p=0.070$ ,  $d=0.50$ ; Chengdu  $p=0.455$ ,  $d=0.23$ ).

**Table 4** The impact of fairness and ES discussions on offers in Bonn and Chengdu

Variables	Offer Bonn (1)	Offer Bonn (2)	Offer Chengdu (3)	Offer Chengdu (4)	Offer Chengdu (5)
Fairness	5.600 (4.051)		2.245 (2.569)		
ES				9.500** (4.451)	
ES <sub>fair</sub>		3.769 (2.964)			7.674*** (2.457)
OOP	-1.048*** (0.369)	-0.990** (0.402)	-1.008** (0.443)	-0.740* (0.426)	-1.017** (0.404)
OOR	-3.329* (1.643)	-3.314* (1.636)	-0.459 (1.491)	-0.833 (1.382)	-0.514 (1.375)
Constant	39.550*** (4.568)	41.237*** (3.705)	40.128*** (2.996)	31.750*** (5.186)	39.331*** (2.720)
Observations	35	35	36	36	36
R <sup>2</sup>	0.412	0.394	0.222	0.317	0.361

This table shows results from ordinary least squares regressions. The dependent variables are proposer offers in Bonn (Models 1 and 2) and Chengdu (Models 3–5). Independent variables are dummy variables for Fairness, ES and ES<sub>fair</sub> discussions, as well as proposer (responder) outside option OOP (OOR). For Bonn, we cannot estimate a model testing the effect of ES on offers because almost all proposer groups discuss ES (94.20%). Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 4.4 Behavioral Impact of Fairness Concerns

We test H4a (H4b) by FPPT, comparing in both participant pools offers of proposer groups (LALs of responder groups) that are concerned with fairness with offers (LALs) of those who are not. For OLS-regressions, we pool the data for offers (LALs) over all treatments and analyze the impact of proposer (responder) groups' fairness concerns on both player groups' behavior in Bonn and Chengdu while controlling for asymmetry by outside options.

**Result 4a** *Discussing fairness has no robust behavioral effect on offers in both locations. H4a is not supported.*

**Support** We hypothesized that in both locations proposer groups concerned with fairness make higher offers compared to proposer groups that do not discuss fairness (H4a). Although offers of the former in Bonn and Chengdu increase by 4.46 and 1.81 pp, respectively, these differences are not significant (Bonn:  $p = 0.349$ ,  $d = 0.45$ ; Chengdu:  $p = 0.613$ ,  $d = 0.20$ ). OLS-regressions confirm these findings (see Table 4, Models 1 and 3).

Our analyses in Sect. 4.3 have shown that participants associate fairness almost exclusively with ES. We, therefore, also test whether mentioning ES or ES<sub>fair</sub> is related to offers. We find that discussing ES increases offers by 1.47 and 12.03 pp in Bonn and Chengdu, respectively. For Bonn, we cannot conduct an FPP-Test as nearly all proposers (97.14%) discuss ES. For Chengdu, the difference is significant

( $p=0.013$ ,  $d=1.48$ ), yet the result is not robust because only four of the 36 proposer groups (11.11%) do not mention ES (see Table 7 in Appendix D). OLS-regressions confirm our non-parametric test for Chengdu (Table 4, Model 4), but see our caveat above. For Bonn, we cannot estimate a respective model (Table 4, Model 2) for the same reason that an FPP-Test does not produce a result.

Mentioning  $ES_{\text{fair}}$  increases offers in Bonn and Chengdu by 4.08 and 7.35 pp, respectively, compared to those groups that do not. For Bonn, the difference is not significant ( $p=0.296$ ,  $d=0.41$ ), but it is significant for Chengdu ( $p=0.032$ ,  $d=0.88$ ). Again, OLS-regressions confirm our results; see Table 4 (Models 2 and 5).

**Result 4b** *H4b is not supported as LALs are not affected by fairness discussions in both locations.*

Regarding responders, our expectation was that in both locations, responder groups concerned with fairness set higher LALs. And this is what we find: LALs increase by 5.45 (2.29) pp when groups make fairness an issue; yet these differences are not significant (Bonn:  $p=0.134$ ,  $d=0.61$ ; Chengdu:  $p=0.671$ ,  $d=0.17$ ). OLS-regressions (Table 5, Models 1 and 4) also show that fairness concerns per se have no robust behavioral effect in both locations.

Like with Hypothesis 4a, we test whether mentioning ES has an impact on LALs. We observe an increase of LALs in Bonn, but a decrease in Chengdu with both differences not being significant (Bonn:  $p=0.380$ ,  $d=0.68$ ; Chengdu:  $p=0.251$ ,  $d=0.46$ ). For  $ES_{\text{fair}}$ , we find the same pattern in both locations (Bonn:  $p=0.137$ ,  $d=0.57$ ; Chengdu:  $p=0.219$ ,  $d=0.45$ ). OLS regressions support our results (Table 5, Models 2–3 and 5–6).

#### 4.5 Interplay Between Fairness-Related Perspective-Taking, Levels of Reasoning, and Behavior

We test H5a using McNemar's Chi-square tests (MNT in the following), comparing the relative frequencies of groups reasoning in IOP1 with those groups using ISP or other levels of reasoning in the German and in the Chinese participant pools. Using FPPT, H5b is tested by comparing offers (LALs) of proposer (responder) groups that use perspective-taking with offers (LALs) of those who do not. In these analyses, we pool the data for offers (LALs) over all treatments and investigate the impact of fairness-related perspective-taking on both player groups' behavior in Bonn and Chengdu.

**Result 5a** *Hypothesis 5a is supported as many more groups reason in IOP1 than in IOP2 or ISP in both locations.*

**Support** We expected that group members, when discussing fairness, reason in IOP and ISP at different levels. This we find in the transcripts. We also hypothesized that more groups reason in IOP1 compared to ISP or other levels of reasoning in the German and in the Chinese participant pool (H5a), which is supported for both locations. Of those 35 German groups in which group members use IOP and/or ISP, 68.57% reason in IOP1 only, and the remaining 31.43% use IOP2, or IOP1 and ISP ( $\chi^2=8.76$ ,  $p=0.003$ , MNT). In Chengdu, participants of 31 groups argue in one or

**Table 5** The impact of fairness and ES discussions on LALs in Bonn and Chengdu

Variables	LAL Bonn (1)	LAL Bonn (2)	LAL Bonn (3)	LAL Chengdu (4)	LAL Chengdu (5)	LAL Chengdu (6)
Fairness	5.065* (2.875)			1.556 (4.910)		
ES		3.824 (5.012)			-6.154 (6.101)	
ES <sub>fair</sub>			4.071 (3.237)			-5.061 (5.206)
OOP	-0.568 (0.418)	-0.570 (0.439)	-0.456 (0.459)	-0.941 (0.680)	-1.118 (0.670)	-1.042 (0.663)
OOR	3.634* (1.873)	3.469 (2.054)	3.372* (1.766)	4.583* (2.691)	3.045 (3.020)	3.529 (3.000)
Constant	14.498*** (3.033)	14.706** (5.495)	15.961*** (3.015)	19.120*** (5.554)	26.571*** (7.064)	23.369*** (4.256)
Observations	34	34	34	36	36	36
R <sup>2</sup>	0.189	0.137	0.170	0.103	0.127	0.129

This table shows results from ordinary least squares regressions. The dependent variables are responder LALs in Bonn (Models 1–3) and Chengdu (Models 4–6). Independent variables are dummy variables for Fairness, ES, and ES<sub>fair</sub> discussions, as well as proposer (responder) outside option OOP (OOR). Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

both perspective modes; 90.32% of them take IOP1, and only 9.68% IOP2 or ISP ( $\chi^2 = 20.16$ ,  $p < 0.000$ , MNT).

**Result 5b** *Fairness-related perspective-taking increases offers in Bonn but has no such effect in Chengdu. We also find no effect on LALs in both locations. Thus, H5b is supported for proposers in Bonn.*

We expected that fairness-related perspective-taking would lead to higher proposers' offers and lower responders' LALs in both locations (H5b). This is supported for offers in Bonn ( $p = 0.014$ , FPPT,  $d = 1.07$ ) that increase by 9.81 pp. In Chengdu, H5b is not supported ( $p = 0.954$ , FPPT,  $d = 0.18$ ); offers rise only slightly by 1.66 pp. LALs are not significantly affected in both locations by fairness-related perspective-taking, neither in Bonn ( $p = 0.968$ , FPPT,  $d = 0.08$ ) nor in Chengdu ( $p = 0.470$ , FPPT,  $d = 0.33$ ).

## 5 Discussion

### 5.1 Summary and Contribution to the Literature

The primary focus of this study is on gaining new insights into the decision-making processes of German and Chinese groups in symmetric and asymmetric ultimatum bargaining situations. Our study adds to the literature in several

important ways. Complementing established research methods, we use a novel approach by eliciting verbal material based on videotaped group discussion that does not only enable us to analyze bargaining outcomes, but also allows studying spontaneous arguments during the groups' deliberations. We find the following. (1) Creating asymmetry by increasing the proposer's outside option reduces offers compared to a symmetric situation when both players have zero outside options and equal bargaining power. Reducing asymmetry by increasing the responder outside option does not increase offers, however, which is contrary to what we expected. (2) Three quarters of the groups in Bonn make fairness an issue. Nevertheless, given the emphasis put on the importance of fairness in the respective Western literature, one would have expected that more or less all groups would do so. Fairness concerns per se have no significant impact on increasing offers, which we did not conjecture. Fairness does, however, come into play as participants associate fairness almost exclusively with the equal payoff (ES) in symmetric but also in asymmetric treatments, where alternative equitable fairness norms might have been applied, too. As a result, offers increase when participants relate ES directly to fairness ( $ES_{\text{fair}}$ ). (3) Group members use perspective-taking and reason in IOP and in ISP when discussing fairness. They nearly always do so in the less complicated IOP-mode combined with the lowest reasoning level 1. (iv) We find evidence that fairness is of higher importance for the German participants, whereas it is ES in the Chinese participant pool: more groups tend to discuss fairness in Bonn and such discussions come up significantly earlier. Further, fairness-related perspective-taking increases offers significantly in Bonn, but has no such effect in Chengdu. In Chengdu, offers rise significantly when ES or when  $ES_{\text{fair}}$  is discussed; this we do not observe in Bonn.

## 5.2 Discussion of Non-expected Findings and Additional Analyses

*Behavioral impact of raising the responder outside option* We find that contrary to H1b, increasing the responder outside option in T3 compared to T2 does not raise, but decreases proposers' offers in both locations. These lower offers in T3, despite the responders' power being enhanced, may be explained by findings from Suleiman (1996) and van Dijk and Vermunt (2000) suggesting normative restrictions on the exploitation of those who are rather powerless. The responder's weakness in terms of outside options compared to the proposer is rather salient in T2, which is not the case in T3.

We also compare decisions in T1 with decisions in T3, where the outside options of *both* player groups rise relative to T1. Interestingly, we observe that proposer (responder) groups in T3 (tend to) behave as predicted in H1a and H1b by reducing offers and increasing LALs, respectively. These opposing behavioral tendencies—particularly in the German subject pool—may have been responsible for the relatively high percentage of rejections in T3 in Bonn.

*Importance of the Equal Split* Our data reveal that fairness discussions in both locations mainly relate to ES also in the asymmetric treatments, suggesting that ES captures what participants associate with fairness in all treatments and in

both countries. Although the Chinese make less fairness-related arguments in absolute terms, those groups who do so associate fairness with ES just as often as Germans do. The two most obvious equitable fairness norms SD and PS have (nearly) no importance during the discussions in the asymmetric treatments. This is remarkable as it has been maintained in the literature on self-serving biases in fairness perceptions that in asymmetric situations, participants tend toward fairness notions that give them higher payoffs (see, e.g., Babcock et al. 1995; Babcock and Loewenstein 1997; Hennig-Schmidt et al. 2018).

Why is the equal split so important in our study? The implemented bargaining situation implies that players cannot communicate directly with each other or pick up on their counterparts' reactions to adjust their behavior in the next bargaining round. These systemic features may be one reason why ES is so prominent in our setting. It represents the unanimously salient and "safe" reference point for fairness, where both parties can assume that the other party is also aware of it, refers to it in its deliberations, and proposers can be sure that responders would accept this allocation. In contrast, alternative equitable choice options are ambiguous because counterparts may not even be aware of them, and if so, it is unclear which one they may choose—also taking into account that they may choose self-servingly.

Further, it has been shown that perceptions of what is a fair allocation can be influenced by other features of the experimental setting, such as interaction frequency, sequential decision-making in symmetric and asymmetric settings, and the position-assignment procedure. Studies on repeated bargaining (Hennig-Schmidt 1999; Hennig-Schmidt and Walkowitz 2017) report that a pronounced feeling of endorsed power is induced in a high-outside option player. Working for their position instead of being randomly assigned also appears to create entitlements and evoke moral property rights (Gächter and Riedl 2005; Hennig-Schmidt and Walkowitz 2015; Gantner et al. 2016; Druckman and Wagner 2017) that may change the bargainers' focal points regarding their fairness perception. Repeated bargaining with symmetric and asymmetric outside options in within-subject conditions (Hennig-Schmidt et al. 2018) provides evidence that the predominance of the equal split decreases with increasing power while players apply equity rules inconsistently and self-servingly.

***Fairness discussions*** We find that not all groups make fairness an issue when their members discuss the allocation decision. This relatively low frequency is surprising in our view, given the central and universal concern for fairness, specifically in Western thinking, and the emphasis on fairness in behavioral research.

It has been argued that the frequency of discussing fairness or how many group members do so may change Results 4a and 4b regarding the impact of fairness on offers and LALs. When running the same regressions as in Table 4 (proposers) and Table 5 (responders) but substituting the dummy for fairness by the frequency of mentioning it within a group, we find less strong correlations (not reported). Only for German responders, we observe a significant increase by 1.10 pp in LALs when fairness is discussed more often within a group. We also observe that in about 50% of all groups talking about fairness, only one person makes the fairness argument. In another 32%, two group members and in only 18%, all three members do so. The number of group members discussing fairness is not significantly associated with offers and LALs with the exception that offers in Bonn decrease by 7.86 pp when three group members discuss

fairness. Yet, the power of the test is low as only 5 groups in Bonn (13% of the German fairness-concerned groups) do so. These additional results point to the importance of discussing fairness at all and not how often or by how many people. This is in line with findings of Whiteside and Barclay (2016) who found that even persons can be induced to accept a fairer decision who are not predisposed to engage in fairness considerations, for instance, by their personal characteristics. Transferred to our context, these findings suggest that pro-social attitudes and preferences of individual participants can translate into prosocial fairness-motivated group decisions by fairness-concerned group members raising awareness of this issue during the group discussions. This may hold even when only one group member raises fairness concerns.

*Decision processes of fairness-concerned groups* It has been argued that differences in the decision processes may exist between groups that talk about fairness and those that don't. We find, however, that these processes are rather similar, not the least as the decision sheets provided to the participants (see Appendix B) suggest a systematic approach. Most groups start their discussions by arguing that based on their outside options, one of the counterparts would either not accept extreme allocations or would not send a respective offer. Rather early in the decision process, Germans come up with ES as a reference point securing acceptance by the responder group, while Chinese groups are more focused on a middle range including ES to align offers and LALs. And even though ES is seen as an obvious focal point, ES is not defined as fair by everyone. At this stage of the decision process, perspective-taking comes into play. As uncertainty exists for proposers as to making an offer that would be acceptable for the responders, and for responders stating a lowest acceptance level that would match the unknown offer, both player groups use perspective-taking to get a feeling of how their expectations could be aligned. Regarding the allocations, we do not find sufficient statistical evidence that offers (LALs) differ significantly between those groups that mention fairness and those that do not. However, effect sizes indicate that fairness considerations relate to group's decisions. We will draw attention to this point when discussing the limitations of our study and future research avenues.

We cannot answer the question *why* many groups discuss fairness and others don't. What we can say, however, is that fairness does not determine the whole decision process as one might expect. In about half of the groups, it is only one group member that brings up the topic and in 65% of the groups, fairness is mentioned not more than three times. We also do not find that groups not discussing fairness would be only focused on maximizing their own profits and for that reason do not mention fairness. All groups face the same structural uncertainty due to the tacit bargaining situation. And although most groups aim at getting as much money as possible, they stress that they have to take the confines of the experimental design into account.

In contrast to our interpretation of the results, an alternative way of looking at them would be that (1) those who are fair in distributional conflicts, are consistently fair throughout the whole process, both in their discussions and in their decisions, and that (2) fairness is so obvious to them that it needs not to be mentioned. For one thing, this way of looking at our results would be a question of assumption and interpretation the answer of which cannot really be proven to be right or wrong. If we assume that fairness is so important that it is internalized—at least by people in the WEIRD societies (Henrich et al. 2010)—, then not mentioning fairness can always be attributed to the

internalized fairness notion, and we would need no empirical verification. On the other hand, one may have to acknowledge that fairness is not (so) important for all people, as to use it, for instance, as a convincing argument in a discussion. This may apply (a) to particular situations in bargaining/negotiations and/or (b) to different cultures. As for (a), in our study the structure of the decision processes is rather similar for groups that discuss fairness and those that don't, and the fairness discussion as such does not take much space during the decision process. Regarding (b), Hennig-Schmidt and Walkowitz (2015) report that in intercultural negotiations between Germans and Chinese, the Chinese negotiators are rather astonished about the permanent request of the Germans to justify allocations by fairness arguments.

Finally, we find that, on average, fairness and equal split-concerned proposers are willing to face a material loss by offering higher amounts to their counterpart responders. This other-regarding behavior results in significantly lower proposer payoffs in Bonn when discussing  $ES_{\text{fair}}$  (− 1.72 tokens) and further supports our expectation on the importance of fairness arguments in our German participant pool. Again, effect sizes indicate that fairness considerations are behaviorally relevant—also for responders.

*Behavioral effects of perspective-taking* Result 5b shows that taking the other group's potential behavior into consideration increases offers in Bonn, but not in Chengdu and thus appears to be country-specific in our setting. An explanation for the observed difference could be that from a structural point of view, proposers face a riskier decision than responders because the latter can accept or reject a given offer. Germans, who score higher on uncertainty avoidance than Chinese (65 against 30 on a scale of 0–100; see Hofstede-insights), and in our experiment proposers in particular, may want to avoid the structural uncertainty of their decision situation by applying perspective-taking to get a feeling for their counterpart responders' acceptance thresholds.

### 5.3 Limitations and Future Research

Our study exhibits several limitations, some of which are likely to provide viable starting points for future research.

*Experimental design* One potential limitation regarding our experimental design is using the strategy method. We had to weigh the tradeoff between a simultaneous strategy-based design and a sequential game in which first the proposer makes an offer and then the responder reacts by accepting or rejecting it. The latter method is not adequate for our research purpose, however. For analyzing the prevalence and the behavioral impact of fairness discussions, we needed for any possible offer the information on whether the responders perceive the allocation as fair and whether they accept or reject the division. Had we used a sequential design, responders might have discussed the actual offer only, and may not have commented on all possible offers. Using the strategy method also implies a further limitation, namely that the responder's behavioral variable is LAL, the lowest bound of a range of acceptable offers. As this bound is likely to be noisy, the responder's reaction to treatment changes, perceptions, and attitudes may

therefore be less strong compared to the behavioral responses of the proposer. And that is what we found.

It has also been argued that our design does not capture asymmetry in favor of the responder. We have to acknowledge this limitation for the present paper although we analyze the effect of raising the responder's outside option while the proposer's outside option is kept constant (Treatment 3). Still, an ideal study would include a systematic variation of the outside options for both the proposer and the responder (and the asymmetry therein) in a videotaped group setting. In this study, we focused on the proposer, as her behavior is best described in the literature. Further, budgetary constraints did not allow us to conduct additional treatments in favor of the responder as our video design and the necessary transcription and text-analyzing tasks were rather costly, complex, and time-consuming. Systematic studies analyzing the effect of doing so in UGs with individual decision-makers show that offers and LALs increase significantly (e.g., Hennig-Schmidt et al. 2018).

*Group decisions* Another potential concern relates to the fact that we infer our results from verbal material that participants articulate spontaneously. Eliciting motives and perceptions involves a tradeoff. On the one hand, directing participants' attention to the research interest by, for instance, questionnaires or scales may influence their behavior. On the other hand, participants' notions may be less tangible when we avoid the attention impact and build a natural environment for spontaneous discussions. We decided for the group-discussion approach as we analyze authentic and direct information from participants themselves who reveal their motives as a kind of direct window into their thinking and imagination processes. We need not infer from their behavioral data what intentions and conceptions of, for instance, fairness they might have had. We also avoid an experimenter demand effect by refraining from priming participants regarding fairness-related statements (e.g., Almås et al. 2022) or taking the opponents' perspective (e.g., Batson 2008; Lönnqvist and Walkowitz 2019), which might draw their attention to our research question. The spontaneity of statements also permits to investigate whether fairness is mentioned at all without making a lack of fairness concern a salient option. Finally, participants had ample time to discuss their thoughts or state their motives.

*Fairness analysis* It has also been argued that basing our analyses on the identification of the terms fair(ness) and just(ice) does not capture all terms that *might* represent fairness considerations. We believe that mentioning these terms explicitly in the group discussions and stating them as decision motives are a reliable signal that participants are actually concerned about fairness. This is the more plausible given that participants must convince other group members of their arguments (Whiteside and Barclay 2016). Including other words that might have a similar meaning involves the researcher's own interpretation and might not capture what the participants actually have in mind, also considering that the connotations of these words may differ between languages. In this respect, our approach and the presented results are conservative as we avoid interpreting the participants' statements in a potentially biased way.

A further limitation may be seen in another feature of our hierarchical coding process. In the first step, fairness is counted whenever it is mentioned during the group discussions. We thus use an unspecified fairness notion. For instance, we do not differentiate

between relating the fairness argument to the own group or to the counterpart. From this perspective, a reason for the partially existing association between fairness discussions and behavior can be found in our all-encompassing capture of fairness perceptions. In later steps, fairness discussions are categorized, e.g., regarding ES, ES<sub>fair</sub>, or perspective-taking.

*Representativeness of our results* Another important concern relates to the representativeness of our results. On the one hand, the number of groups studied is limited, although we analyzed data from a total of 142 groups from Bonn and Chengdu including 408 participants. Larger numbers of independent observations would have been easier to obtain when focusing on individual decisions. In our case, however, we were limited by our financial budget and our research method. We also acknowledge that our local data are most likely not representative for Germany or China and can only be considered as an initial step within the context of these countries and against the background of their cultural heritage. This is the more the case as evidence about the scope of heterogeneity in preferences within a country and between countries is mixed (see, e.g., Falk et al. 2018; Gächter and Herrmann 2009).

*Data* Another potential limitation regarding our findings is that we collected our data already in 2001 and 2002 and that since then, social values might have changed. Still, we decided to base our study on these data. We think our results are valuable and meaningful as there is evidence that cultural traditions are persistent over time despite economic changes. Inglehart and Baker (2000) show on the basis of 65 societies and 75 percent of the world's population that although economic development is associated with pervasive cultural changes, these are path-dependent. The cultural heritage of a country leaves an imprint on values that endures despite modernization; and belief systems exhibit remarkable durability and resilience. Furthermore, the empirical evidence is not robust that economically growing societies are becoming more individualistic as described, for example, by modernization theory (e.g., Inkeles 1975). Hamamura (2012), for instance, shows that also other societal patterns exist, which are best understood within the frameworks of a shifting focus of social relationships and a persisting cultural heritage. In the same vein, Faure and Fang (2008) and Fang (2011) stress that although China's modernization process in the last decades has brought about changes in Chinese values, the Chinese culture possesses the capacity to integrate divergent value orientations, thereby being able to embrace opposite traits of cultural dimensions and norms.

Beyond these considerations, our data are specific because they allow us valuable insights into the decision-making behavior of the participants and conclusions about their underlying motives. Comparably demanding studies making a similar effort to provide transcripts for fruitful analyses are still rare. In many recent studies, group members are allowed to chat and exchange messages via the computer before deciding. We are convinced that such methods are useful and can reduce the workload of data analysis, but they also provide an artificial environment in which spontaneous complex thinking processes such as perspective-taking on higher levels can be conveyed and perceived only to a limited extent. Finally, the present data set is special. Comparable data is no longer easily accessible because the research climate has changed in China. A video experiment as

in our study is likely to face difficulties, if it could be conducted at all. For all the above reasons, we decided to base our study on these data.

*Future research* The limitations of our setting could be starting points for future research. An obvious continuation of our study would be to investigate how robust our results are. Taking effect sizes into account, our findings on the relationship between fairness considerations and group behavior turn out to be rather conservative. It would be interesting to investigate how fairness considerations per se, equal-split discussions, and both in combination influence proposer and responder behavior in other participant samples. A further important research area is how our setting translates into intercultural bargaining situations, in particular, when Germans and Chinese interact with each other. Do other fairness considerations come into play, similar to what Hennig-Schmidt and Walkowitz (2015) found in a negotiation scenario? Another avenue for future studies would be to rigorously examine the extent to which spontaneously expressed fairness arguments are consistent with results obtained by surveys that explicitly ask about fairness considerations. New technologies can also give important impulses for further research. They likely facilitate eliciting and analyzing text data and thus enable investigating more complex and thus more realistic sequential and repeated bargaining and negotiation scenarios.

## 6 Conclusion

Our study makes an epistemological and related methodological contribution to better understand decision-making processes in bargaining or negotiation situations. We adopt a trans-cultural perspective and compare the spontaneously expressed perceptions of fairness in combination with the allocation decisions of German and Chinese bargainers in a situation of separate and interactive group decisions. At first glance, when focusing on the behavioral results only, we find no significant differences between the German and the Chinese groups. When going beyond this narrow perspective, however, the significance of our complementary research approach by using text analysis and studying decision-making processes becomes salient in order to avoid a biased interpretation of observed allocation decisions.

Our results emphasize the specific role the equal split in combination with fairness plays in distributive bargaining, but in a differentiated way: The overwhelming prominence of equal sharing revealed in the discussions is only partially reflected in the behavior of the groups under consideration. Rather, it fulfills a coordination and structuring function within the decision-making processes. Moreover, ES induces reflexive thought processes in both bargaining partners as they have a safe point of orientation. The relatively low rejection rates in our experiment may be attributed to these perspective-taking strategies. In contrast, alternative equitable sharing norms such as SD or PS, which are also associated with fairness in the literature, are offered but are hardly ever directly associated with fairness in the discussions. Our findings underline the importance of complementarily applying alternative research approaches to study bargaining processes and to understand the particular role fairness plays in these

processes. In transcultural exchanges, it seems particularly important to remain sensitive to the fact that similar behaviors can be induced by different motivations and goals. On the other hand, seemingly different decisions can be actually based on very similar patterns of behavior and intentions (e.g., Goerg et al. 2016).

Our findings are also informative for tacit bargaining situations in which communication between negotiating partners is severely restricted or not possible. Our insights on perspective-taking can be applied in situations when preparing negotiations in which communication with the negotiating partner has not yet taken place. In combination with reflexive thinking, bargainers could anticipate the negotiation process as well as potentially applicable distribution norms, and identify potential conflicts. The following example demonstrates the importance of anticipative perspective-taking and highlights fatal consequences resulting from incorrect anticipation of the counterpart's behavior (Goerg et al. 2016). The 1973 Yom Kippur War between Egypt and Israel might have been prevented if the US administration had seen the situation from Egyptian President Sadat's perspective and taken his announcements seriously that he would go to war in case the United States did not actively engage in reconciliation negotiations between the two countries (Cohen 1990).

## Appendix A: Alternative Fairness Norms

Alternative fairness norms can be derived from Selten's (1978, 1987) general definition of the equity principle. The amount in question is distributed in such a way that each party is treated equally according to a particular standard (Table 6). The application of the general equity principle gives rise to the equal split only in special cases. In asymmetric situations, there are good reasons for an uneven split. The rationale is that different amounts can be thought of as being at stake for allocation: the "standard of distribution" in Selten's (1978) terminology. To arrive at the final outcome, a different quota—the "standard of comparison"—can be applied to the standard of distribution.

**Table 6** Equitable allocations, standards of distribution and comparison

Equitable allocation	Standard of distribution	Standard of comparison	Payoff	
			Proposer	Responder
Equal split	Pie $a$	Egalitarian	$a/2$	$a/2$
Split the difference	Pie $a$ minus (OOP + OOR)	Egalitarian	$\text{OOP} + (a - (\text{OOP} + \text{OOR}))/2$	$\text{OOR} + (a - (\text{OOP} + \text{OOR}))/2$
Proportional split	Pie $a$	Proportional to outside options	$a * \text{OOP} / (\text{OOP} + \text{OOR})$	$a * \text{OOR} / (\text{OOP} + \text{OOR})$

OOP: proposer outside option; OOR: responder outside option

## Appendix B: Instructions and Decisions Sheets

### Instructions (translated from German/Chinese)

You take part in an interactive **decision experiment** between **two groups of students** in which you can **earn money** according to the decisions you take. The amount of money you earned will be **paid** to you **in cash** at the end of the experiment.

In this experiment **2 types of players** are involved: **Proposers and Responders**. You have been randomly chosen to be a **Proposer/Responder**. The role of either player group will be explained in a minute.

**Each proposing group** is endowed with an amount of **20 Tokens**. The proposing group has to **decide how to split these 20 Tokens** between their own group and the receiving group. The decision must be an **integer between 0 and 20**. The proposing group's decision has to be written down and **marked in the corresponding box on the decision sheet** for the **proposer** (see sheet attached). The decision has to be taken **unanimously**. **All group members** have to confirm the entry by his/her signature.

The **receiving group** can **accept or reject** the decision. At the same time the receiving group has to **indicate for any number of Tokens** that the sending group may allocate to them whether they accept or reject the decision. This has to be done by **marking the corresponding boxes on the decision sheet** for the **receiving group** (see sheet attached).

#### In case of rejection

- both players receive nothing. (Treatment 1)
- {*The proposing group receives 8 (8) Tokens.* (Treatments 2 and 3)}
- {*The receiving group receives 0 (2) Tokens.* (Treatments 2 and 3)}

#### In case of acceptance

- both players receive the amounts as they have been allocated by the proposer.

For every Token your group earned, **each group member** will be paid **0.60 Euro (2 RMB)**. Independently of the amount of money you earned during the experiment you will be given a **show up fee of 4 Euro (10 RMB)**.

The other group receives the **same information** as you do and knows that you also get this information. I will now handle the decision sheet over to you. For your information, I show you **a sample** of the **decision sheet** for the **proposing/receiving group**. You have up to 15 min to make your decision.

Do you have **any questions**?

Decision sheets (translated from German/Chinese)

Session:

Date:

Decision Sheet for PROPOSERS

Endowment of PROPOSER	PROPOSER allocates to RESPONDER	PROPOSER receives	Mark Decision
20	0	20	
20	1	19	
20	2	18	
20	3	17	
20	4	16	
20	5	15	
20	6	14	
20	7	13	
20	8	12	
20	9	11	
20	10	10	
20	11	9	
20	12	8	
20	13	7	
20	14	6	
20	15	5	
20	16	4	
20	17	3	
20	18	2	
20	19	1	
20	20	0	

We allocate to the receiving group ..... Token.

We as the proposing group receive ..... Token.

.....  
Signature      Signature      Signature

*Session:**Date:***Decision Sheet for RESPONDERS**

Endowment of PROPOSER	PROPOSER allocates to RESPONDER	PROPOSER receives	Mark here to ACCEPT	Mark here to REJECT
20	0	20		
20	1	19		
20	2	18		
20	3	17		
20	4	16		
20	5	15		
20	6	14		
20	7	13		
20	8	12		
20	9	11		
20	10	10		
20	11	9		
20	12	8		
20	13	7		
20	14	6		
20	15	5		
20	16	4		
20	17	3		
20	18	2		
20	19	1		
20	20	0		

.....      .....      .....

Signature      Signature      Signature

## Appendix C: Coding Procedures and Coding System for Fairness

### Appendix C1: Data and Coding Procedures

We analyze spontaneous, authentic and direct information on participants' fairness perceptions. We use content analysis as the method of analyzing the transcripts. Content analysis is a technique to extract the information a researcher is interested in from a body of—in our case verbal—material by systematically and objectively identifying specified characteristics of the material (Smith 2000). The information we are interested in are components of and reference points for fairness revealed by the fairness discussions of our Chinese and German participants. We extract this information by coding the verbal protocols. Coding denotes the process of assigning text segments to categories.

We use a hierarchical coding process (Bakeman 2000; Smith 2000). ATLAS.ti, a software for qualitative data analysis, was used for auto-coding both the Chinese and the German transcripts whenever participants mention fair(ness)/just(ice). Then, independent raters assigned the fairness discussions to categories according to our coding scheme.

Native raters of both countries were extensively trained to do the coding. They independently classified the discussions according to our classification system. The coders were provided with a detailed coding manual. Coding was made very restrictive in order to rule out raters' own interpretations as far as possible. Only when the category characteristic was explicitly mentioned during a discussion, this text segment was assigned to a category.

Data are reliable only if inter-coder agreement on category assignments is high. A generally accepted measure for inter-coder reliability is Cohen's Kappa K, which accounts for the agreement that would result if coders merely make random assignments (Siegel and Castellan 1988).<sup>5</sup>  $K \geq 0.70$  indicates satisfactory inter-rater reliability (Merten 1995; Smith 2000; Krippendorff 1980). For the vast majority of our categories,  $K \geq 0.70$ . We conclude that on average our classification system yields satisfactory data.

Finally, coder disagreement was resolved to base the analysis on as much data as possible. We followed a procedure suggested by Bartholomew et al. (2000). If two coders disagree on a categorical assignment, a third and fourth rater is added, and the classification agreed upon by two of the four raters becomes the final rating. With this procedure, all but one disagreement in the German and Chinese verbal data were resolved.

Videotaping groups changes the standard experimental procedure in two respects. For one thing, we substitute individuals by groups. Secondly, groups are videotaped. Both modifications may have an impact on behavior as compared to anonymously taken individual decisions.<sup>6</sup> Yet, as our focus is on evaluating fairness and equity discussions, eliciting motives and perceptions involves a tradeoff. On the one hand, directing participants' attention to the research interest by for instance questionnaires or scales may influence their behavior. On the other hand, decisions might be affected when we avoid the attention impact and build a natural environment for spontaneous discussions in a group setting. We choose the latter approach because we avoid a possible experimenter demand effect that would draw participants' attention to our research intentions. Moreover, participants' own verbalizations provide a rich data set that allows us to extract notions of fairness in an important and new

<sup>5</sup> K is the ratio of the proportion of times the coders agree,  $P(A)$ , (corrected for chance agreement  $P(E)$ ) to the maximum proportion of times they could have agreed (corrected for chance agreement), i.e.,  $K = [P(A) - P(E)] / [(1 - P(E))]$ .  $K = 1.00$  means complete agreement above chance.  $K = 0$  means no agreement above chance.

<sup>6</sup> It is not clear that both modifications indeed induce an effect. There is inconclusive evidence whether groups behave differently from individuals. Moreover, the available evidence in the literature suggests that observation does not systematically affect behavior. See Bosman et al. (2006) for a detailed discussion of these issues.

manner. In our view, our method is a valuable complement to, e.g., Likert scales or direct questions like “What do you think is a fair distribution?”.

We analyze the group discussions videorecorded throughout the decision time. The verbalizations are based on (in general) three group members exchanging their opinions during 15 min discussions to elaborate on reasons and motives and being able to pick up and enlarge previously mentioned ideas. These within-group discussions are not independent, however, and we, therefore, aggregate them to one single data point.

## Appendix C2: Coding Fairness and Content Analysis of Fairness Discussions

### (a) Coding fairness

We analyzed the verbal data using the text analysis software ATLAS.ti., which searched for participants mentioning the words *fair*, *just* (in German: “gerecht, fair”) in all word combinations such as, for instance, *fairness*, *justice*. In Chinese, the corresponding words are 公平 (gong ping), 平等 (ping deng), and 合理 (he li).<sup>7</sup>

### (b) Content analysis of fairness discussions

After the pool of fairness discussions has been defined, two native coders each for the German and Chinese protocols independently assigned segments of the videotaped in-group discussions to fairness categories.

## Equity Norms

In this paper, we analyze categories that relate to distributive fairness by investigating the connection between fairness reasoning and equity concerns in an ultimatum game experiment (Güth et al. 1982). In the standard symmetric ultimatum game, an individual proposer decides how to split a given amount of money (the pie) between herself and an individual responder who can accept or reject the proposal. In the case of acceptance, both players in the dyad receive the amounts as allocated. In the case of rejection, both receive an outside option of zero. In asymmetric treatments, both players’ outside options differ from each other. Specific allocations serving as fairness norms in symmetric and asymmetric settings can be characterized by the equity principle (e.g., Selten 1978; Hennig-Schmidt et al. 2018). The ones we look at are the Equal split (ES), Split the difference (SD), Proportional split (PS). ES entails splitting the pie equally. SD involves that each bargaining partner receives his/her outside option and in addition the amount that results from dividing the remainder of the pie equally. PS divides the pie in proportion to the bargaining partners’ outside options.

<sup>7</sup> We also analyzed unfair (unfairness)/unjust (injustice). The respective Chinese terms are 不公平 (bu gong ping), 不平等 (bu ping deng), and 不合理 (bu he li). We could not assign the vast majority of statements on unfairness to one of our categories because subjects did not state a characterization of why the allocation is perceived unfair. Including unfairness in our analysis would thus rely on not well-interpretable data. We, therefore, focus on the fairness data.

We content-analyzed the transcripts with regard to whether group members discussed these fairness norms. We coded a discussion of an equity norm as fairness related if group members talk about ES (SD, PS), and argue in the same discussion unit or in up to 15 discussion units above or below about fairness. We use this range to establish a contextual relation between equity norm and fairness. We found in the transcripts that sometimes the respective discussion unit is a continuation of a player's statement being interrupted, or it is a follow-up of a related discussion. We also checked when ES was mentioned, independently of being related to fairness.

## Perspective-Taking

Previous research has shown that participants not only spontaneously form beliefs about their counterparts, they also apply different types of perspective-taking in that participants reflect on the counterparts' actions, motives, and intentions and they explicitly put themselves into the counterparts' shoes viewing the situation as if they were the counterpart (see, Hennig-Schmidt and Geng 2006; Geng and Hennig-Schmidt 2007). The former type of perspective-taking has been termed "imagine-other-perspective" (IOP), while the latter is known as "imagine-self-perspective" (ISP); see Batson et al. (1997).

We define perspective-taking as follows.

– *Imagine-other-perspective (IOP)*: In *IOP*-mode, subjects reflect upon the counterparts' actions, motives, and intentions.

– *Imagine-self-perspective (ISP)*: In *ISP*-mode, subjects explicitly put themselves into the counterparts' shoes viewing the situation as if they were the counterpart. *ISP* comprises a more complicated cognitive scheme than *IOP* as it proceeds a step further than mere imagination.

## Levels of Reasoning

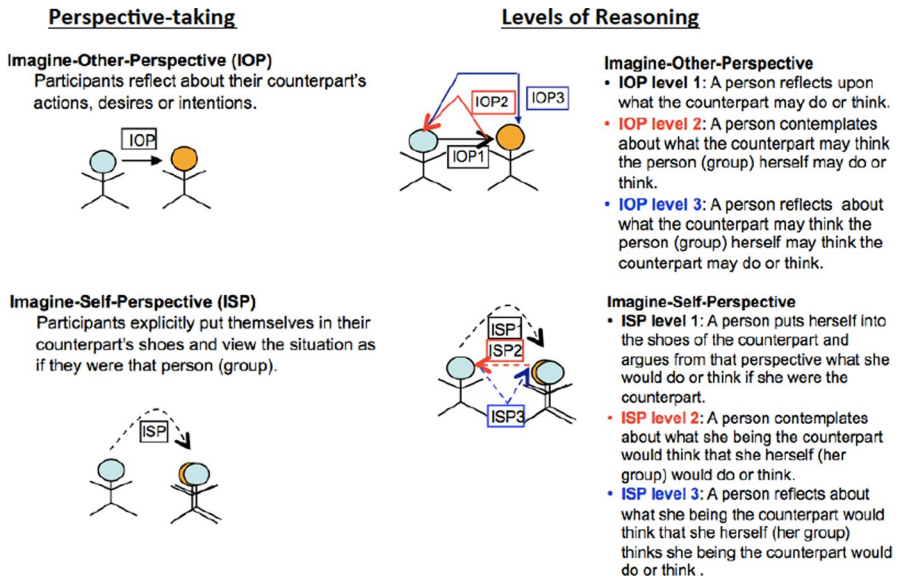
We also found different depths of reasoning in both modes. See Nagel (1995); Mauersberger and Nagel (2018) for levels of reasoning and Crawford et al. (2013) for level-*k* reasoning. We define levels of reasoning as follows (see also Fig. 2).

### Imagine-Other-Perspective Mode

– At *IOP*, a group member at reasoning level 1 (*IOP1*) reflects about the counterpart's actions, desires, beliefs or intentions.

– At *IOP* level 2 (*IOP2*), a group member contemplates about what the counterpart may think about the own group's actions, desires, beliefs or intentions.

– At *IOP* level 3 (*IOP3*), a group member contemplates about what the counterpart may think the person (group) herself believes the counterpart's actions, desires, beliefs or intentions are.



**Fig. 2** Perspective-taking and levels of reasoning. The figure shows the perspective-taking modes (imagine-other-perspective and imagine-self-perspective) and respective levels of reasoning up to 3

### Imagine-Self-Perspective Mode

- At *ISP level 1 (ISP1)*, a group member puts herself in the counterpart's shoes and argues from that perspective what she would do, think, desire, or believe if she were the counterpart.
- At *ISP Level 2 (ISP2)*, a group member contemplates what she being the counterpart would think that her own group would do, think, desire, or believe.
- *ISP Level 3 (ISP3)* was not found in the transcripts.

In the present study, we connect fairness with perspective-taking. This is a natural approach in distributive tasks, because fairness is concerned with at least two actors between whom a given resource has to be shared. In our setup, it is the proposer and the responder. We coded a discussion for fairness-related perspective-taking if group members think about the counterpart and argue about fairness either in the same discussion unit or in up to three discussion units later. We define this range based on the transcripts: sometimes the respective discussion unit is a continuation of the statement of a player who was interrupted or is a follow-up of an immediately preceding discussion.

## Appendix D: Prevalence of Fairness and Equal Split Discussions

**Table 7** Proposer and responder groups mentioning Fairness/ES/ES<sub>fair</sub>

	Groups at least once discuss...		
	Fairness	ES	ES <sub>fair</sub>
	(1)	(2)	(3)
<b>Bonn</b>			
Proposer	80.00	97.14	65.71
Responder	70.59	91.18	41.18
Total	75.36	94.20	53.62
<b>Chengdu</b>			
Proposer	55.56	88.89	27.78
Responder	66.67	72.22	38.89
Total	61.11	80.56	33.33

The table shows the percentages of groups mentioning Fairness (Column 1), ES (Column 2) and ES<sub>fair</sub> (Column 3) at least once differentiated by location and player type

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## Declarations

**Conflict of interest** All authors declare no competing interests.

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