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## On the Nature of Fairness in Bargaining - Experimental Evidence from Germany and PR China

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**On the Nature of Fairness in Bargaining –  
Experimental Evidence from Germany and PR China**

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**Abstract**

This paper presents a new perspective on the nature of fairness in bargaining by using verbal data from spontaneous team discussions and written statements on decision motives. Systematic content analysis proves a valuable source for providing new insights. The nature of fairness can be viewed as consisting of different facets or components. The ones we study are allocation aspects, power asymmetry, cultural background, frequency of interactions and the procedure of assigning positions.

In one-shot UG experiments with randomly assigned positions less than half of the participants argue about fairness. Those who do, view the Equal Split as the predominant fairness norm in both the German and Chinese subject pool in symmetric and asymmetric settings. Equal Split related fairness discussions increase proposers' offers; fairness concerns per se do not have such an effect. We found cultural differences in that fairness is not irrelevant for the Chinese but seems more important for the German participants. The Equal Split predominance in fairness discussions vanishes in asymmetric bargaining situations where subjects interact repeatedly and work for their position. Here, the equitable but unequal allocations Split the Difference and Proportional Split are considered fair as well by more and less powerful players. It appears an important task for the future to incorporate such fairness norms into social preference models.

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*Keywords:* ultimatum game, video experiments, verbal data, content analysis, fairness, asymmetry, culture

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## 1. Introduction

Fairness<sup>1</sup> is at the heart of experimental research on ultimatum game (UG) bargaining since the first experiments by Güth, Schmidtberger and Schwarze in 1982<sup>2</sup>. The common interpretation of the empirical results of literally thousands of UG experiments since then is that fairness considerations play an important role in motivating receivers to reject low offers and in inducing senders to offer more than a negligible part of the pie at stake (Camerer 2003). Fairness has become central in an impressive body of theoretical models of social preferences (see e.g. Rabin 1993, Levine 1998, Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Charness and Rabin, 2002, Dufwenberg and Kirchsteiger 2004; for an overview see Camerer 2003).

Researchers typically study fairness perceptions of experimental subjects by inferring from their choices on the underlying motives assuming that subjects associate fairness with equality. Whether this actually applies – in particular when players face some kind of asymmetry – is an empirical question that only the experimental subjects can answer reliably. The nature of fairness most likely consists of more facets than the allocation of the pie and the choice set (for these distributive aspects see Falk, Fehr and Fischbacher 2003). Further components are for instance the norm character of fairness (Schlicht 1998) which might be of importance without any distributive association. Fairness perceptions might be affected by properties of the situation (List 2007) like symmetry/asymmetry of the game (Babcock, Loewenstein, Issacharoff and Camerer 1995). Participants' cultural and philosophical background and the frequency of interactions (Camerer 2003) as well as the procedure of assigning positions (Bolton, Brandts, Ockenfels 2005, Gächter and Riedl 2005) are other aspects likely to have an impact on how subjects perceive fairness and thus might influence behavior.

Arriving at the necessary information requires special tools. One method is to query subjects how fairness is conceived (e.g. Konow 1996, 2001, Yaari and Bar-Hillel 1984, Kahneman, Knetsch and Thaler 1986 for early studies). We use a different approach. We investigate verbal data of about 1,200 negotiators who made their choices in ultimatum game experiments and in addition had to “speak for themselves” in individual answers to open questions or in team discussions. By using these innovative data our study provides new insights about the nature of fairness in UG bargaining adding to the existing literature and justifying a further paper on UG experiments: The spontaneous verbalizations of the experimental subjects themselves not only allow us to investigate whether subjects do make fairness an issue, they also permit to analyze all its above mentioned facets. Finally, the impact of fairness and its components on choices can be studied.

We use content analysis to arrive at our verbal data set. This research method involves two coders independently assigning text segments to categories. The categories are designed to capture the above mentioned aspects of fairness potentially important to understand its nature.

Our research interests follow several directions. The first is an explorative one, namely which of the conjectured facets of fairness can be derived from our body of verbal material in UG experiments. Our second interest concerns whether the revealed fairness aspects influence subjects'

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

<sup>2</sup> In the standard ultimatum game, a proposer decides on how to split a given amount of money (the pie) between herself and a receiver who can accept or reject the proposal. In case of acceptance, both receive the amounts as allocated; in case of rejection both receive an outside option of zero.

choices. Finally, we extend our interest to other bargaining experiments to check for the robustness of our results derived from the UG experiments under study.

Our research agenda follows the aspects of fairness delineated above. Before providing a more detailed discussion and deriving our conjectures we describe our verbal data and explain why we consider it appropriate for our research interests.

### ***The verbal data***

The body of verbal material to be examined comprises individual participants' answers to a post-experimental open question on the choice motivations (individual UG) as well as team discussions (team UG). In the latter case we replaced single players by teams. We had them discuss within the teams and jointly decide, the discussions being videotaped and transcribed into text protocols later on. Our data set has some advantages that make them a valuable complement to mere choice data and questionnaires. It is based on spontaneous, direct information on participants' fairness perceptions as they reveal their motives themselves and we need not infer from subjects' behavioral data what intentions and conceptions of fairness they might have had. Spontaneity of statements permits to investigate whether fairness is mentioned at all without making a lack of fairness concern a salient option. We avoid drawing subjects' attention to our research question. We do not ask participants to make fairness statements which might provide an experimenter demand effect by inducing them to align fairness with choices. The verbal material allows a broader view on the nature of fairness. The content analysis reveals the fabric of fairness to consist of more ingredients than the distributive aspects usually studied in the experimental literature. Finally, our data allow investigating the impact of the revealed fairness components on participants' choices.

### ***Prevalence of fairness***

The experimental and theoretical literature on social preferences assumes that persons concerned with fairness – either by being inequity averse (e.g. Fehr and Schmidt 1999, Bolton and Ockenfels 2000) and/or by being intention driven (Rabin 1993, Dufwenberg and Kirchsteiger 2004, Falk and Fischbacher 2006) – behave differently from subjects not concerned with fairness. The distinction between fair-minded and 'selfish' people is usually based on choices or questionnaires. Our verbal data allow a clear distinction between those who actually argue about fairness and those refraining from it. We therefore can easily calculate the fraction of fair-minded participants in our experiment and we can also check whether behavior between these players differs with respect to proposers' offers and receivers' acceptance decisions.

### ***Fairness and asymmetry***

Asymmetry is an important aspect w.r.t. the nature of fairness as various conflicting fairness norms might be induced (Babcock and Loewenstein, 1997; see also Hennig-Schmidt 2002). Surprisingly, it has not attracted much attention yet in experimental economics research.<sup>3</sup> This paper in addition to symmetric UG settings reports on asymmetric ones where different outside options are assigned to the players. Equality (i.e., the Equal Split) is no longer the only and 'natural' reference point for

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<sup>3</sup> See, however, Knez and Camerer (1995), Kagel, Kim and Moser (1996), Buchan et al. (2004), Schmitt (2004), Kohnz and Hennig-Schmidt (2005), Hennig-Schmidt, Irlenbusch, Rilke and Walkowitz (2009)

fairness considerations like in symmetric situations. Unequal allocations (e.g. Split the Difference or Proportional Split<sup>4</sup>) might serve as focal points for fairness as well. Differences in fairness perceptions may affect players' choices if players view different allocations as fair and if their notions of fairness are self-servingly biased, i.e. tend towards settlements that favor themselves (Babcock and Loewenstein, 1997). We expect that in addition to the Equal Split, in the asymmetric situations allocations are perceived as fair despite their not being egalitarian ones.

### ***Fairness and distributive/non-distributive aspects***

Distributive aspects of fairness in addition to those evoked by asymmetry have been advanced in the literature. These capture the concept of inequity aversion (e.g. Fehr and Schmidt 1999, Bolton and Ockenfels 2000) but also may touch aversion against equality (see Hennig-Schmidt 1999, 2002). Further potential factors affecting fairness perceptions are the game situation and fairness as a general principle or a code of conduct beyond the game situation at hand (see Chiu and Hong 1997, Schlicht 1998). We expect all these factors to come up during the discussions and have at least some influence on choices.

### ***Fairness and culture***

Culture has been advanced as one important environmental factor to affect the nature of fairness (see Camerer 2003). With the word "culture" we have in mind the set of social norms and individual beliefs that are likely to affect individuals' behavior and are acquired from other members of their environment "through teaching, imitation and other forms of social transmissions" (Richerson and Boyd 2005, 5; see also Bornhorst et al. 2010). Different value systems and philosophical backgrounds may result in different social norms and individual beliefs and may thus be capable of influencing fairness perceptions in a different way. As a test bed for this conjecture we use Germany and P.R. China. Germany is influenced by the Greek/Christian culture and philosophy and China by Confucianism/Taoism (Jullien 2004). Justice and fairness in the sense of impartiality and lack of bias towards everybody (Webster 1995, 360) are of central concern in Western thinking rooted in the Greek philosophy. It does not go without saying that fairness is of comparable importance in Chinese societies. Here, a different notion of fairness prevails because 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)<sup>5</sup>. In modern Chinese societies, this fairness notion still applies.

We do not assume fairness to be irrelevant in China. Yet, given the differences in fairness conceptions in the East and the West, we expect fairness and related arguments to play an important role in Germany and a minor role in China. The latter may show up by fairness being less often mentioned and different fairness categories being found in both subject pools. Similarities across countries, however, would make a strong case for cross-cultural validity of the respective fairness aspects.

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<sup>4</sup> A Split the Difference allocation involves an Equal Split of the surplus above the outside options whereas a Proportional Split implies splitting the pie proportional to the outside options.

<sup>5</sup> These are for instance social interactions in Chinese families, *guanxi* – the status of the ties between two parties the relations of which prescribe mutual obligations –, or in-group/out-group relations.

### *Fairness and situational properties*

Fairness perceptions in asymmetric settings may also be affected by the situational properties (i) frequency of interactions and (ii) procedure of assigning positions, e.g. earning their position or being randomly assigned. As to (i), repeated bargaining is likely to provide a pronounced feeling of endorsed power in a high outside option player. His/her perception of what is a fair allocation might, therefore, move towards an equitable but unequal distribution like Split the Difference or Proportional Split. As to (ii), working for their position, i.e. creating entitlements, may evoke moral property rights (Gächter and Riedl 2005) that change a bargainer's fairness perception. To test this conjecture, we analyze alternating offer bargaining experiments where differences were made more salient by having teams interact repeatedly and, in addition, work for their position. Again, the verbal discussions are analyzed for fairness statements. Our expectation is that unequal equitable allocations like Split the Difference and Proportional Split increase in importance relative to the Equal Split.

Our results corroborate existing knowledge but also allow new insights in several respects. First of all, a considerable percentage of German and Chinese participants do *not* discuss about fairness. For those who do, the Equal Split seems to be the predominant fairness norm in both subject pools in the symmetric and – most unexpectedly to us – also in the asymmetric settings. This finding is supported by the pronounced effect Equal Split related fairness discussions have on increasing proposers' offers. In contrast, we find no evidence that fairness concerns as such do have such an effect. Fairness as a general principle is of some importance, in particular with regard to raising receivers' lowest acceptance levels. As to cultural differences, fairness appears to be more important for our German than for Chinese participants in that they discuss fairness more frequently, it becomes an issue much earlier and they discuss the Equal Split fairness norm more often. On the other hand, more Chinese argue on the notion of fairness as a general principle resulting in increased minimal acceptance levels of receivers. Our findings in the team UG and in the individual UG are very similar suggesting that the revealed aspects of fairness and their behavioral impact are of broad relevance.

Assessing the robustness of the fairness-related Equal Split predominance we analyzed alternating offer team experiments. We found that the equitable but unequal allocations Split the Difference and Proportional Split were considered fair as well by more as well as by less powerful teams. Not only did the Equal Split fairness norm lose relative importance for both player types but also showed more powerful teams aversion against equality by terming the Equal Split an unfair allocation. Finally, we survey the importance of fairness from the above and some additional studies the authors did that comprise more than 1.700 participants.. We found fairness in spontaneous arguments to be of minor influence as only one third of the players discuss about fairness. The survey data also show highly significantly more German than Chinese participants to be concerned with fairness.

The remainder of the paper is organized as follows. In Section 2, we discuss the experimental methods used and we give a detailed report of the design and the procedure of our UG experiment. Section 3 presents the results. In Section 4, we discuss our findings and analyze further bargaining experiments. In the final Section 5 we conclude.

## 2. Experimental methods, design and procedure

### *Experimental methods*

Our research agenda in the UG experiments requires information on all potential offers. We therefore modified the standard sequential protocol by using a variant of the strategy method (Selten, 1967) where receivers have to state acceptance or rejection for the full strategy space.<sup>6</sup> Our main approach for eliciting subjects' fairness perceptions is content analyzing verbal material.<sup>7</sup> In the individual UG (UGInd), we investigate individuals' spontaneous answers to the question "Please explain the reasons why you took your decision. What did influence your decision?"

In the team UG (UGTeam), our analysis is based on the video method. Three subjects play together as a team and have to take a consensus decision. As in the standard UG, proposers have to decide on dividing the pie, and receivers have to decide on acceptance or rejection of the offer. Intra-team discussions are videotaped; inter-team contacts are anonymous with the experimenter transmitting decisions. The video-taped discussions are transcribed word for word into text protocols by graduate students having been particularly trained and instructed for this task. All Chinese texts were translated into German allowing German and Chinese researchers to simultaneously work on the verbal material.<sup>8</sup> The video method changes the standard experimental procedure in two respects. For one thing, individuals are substituted by teams. Secondly, teams are video taped. Both modifications may have an impact on behavior as compared to anonymously taken individual decisions.<sup>9</sup> Yet, our focus is on understanding the nature of fairness; and eliciting motives and perceptions involves a tradeoff. On the one hand, directing subjects' attention to the research interest by for instance questionnaires or scales may influence their behavior. On the other hand, decisions might be affected if we avoid the attention impact and build a natural environment for spontaneous discussions in a team setting. We chose the latter approach because we avoid a possible experimenter demand effect by not drawing subjects' attention to our research intentions. Moreover, subjects' own verbalizations provide a rich data set that allows for extracting notions of fairness in a reliable way. 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?"

### *Experimental design and procedures*

We analyze a one-shot UG with individual players in UGInd, and teams of three participants as players in UGTeam. A proposer P has to decide about the division of a given pie of 20 tokens which she can allocate between herself and the receiver R. P decides on the amount  $x \in \{0, 1, \dots, 20\}$  to be offered to R. Simultaneously and independently, R states acceptance or rejection for any possible offer. In

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<sup>6</sup> In that respect our design differs from Knez and Camerer (1995), Buchan et al. (2004) and Kohnz and Hennig-Schmidt (2005) who elicit minimal acceptable offers only. The literature on whether the strategy method affects behavior is inconclusive. No differences in behavior are found by Cason and Mui (1998) in a dictator game, by Brandts and Charness (2000) in a prisoner's dilemma and a chicken game, and by Oxoby and McLeish (2004) in an ultimatum game. Brosig et al. (2005) find no behavioural divergence when investigating groups as decision makers in a gift exchange game. Güth et al. (2001) and Brosig et al. (2003) in a bargaining game do find differences.

<sup>7</sup> Employing verbal data to explain quantitative results is increasingly used; see e.g. Bewley (1999) Brosig (2002), Brosig et al. (2003), Cooper and Kagel (2005), Charness and Dufwenberg (2006).

<sup>8</sup> All texts in German and Chinese as well as translations into German are available upon request.

<sup>9</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 two issues.

case of acceptance of  $x$ , P receives the payoff  $20 - x$ , and R gets  $x$ . In case of rejection, both receive an outside option of 0 (treatment T1). In two additional treatments, P is guaranteed a positive outside option of 8 in case of rejection whereas R's outside option is 0 or 2 respectively (T2 or T3). Table 1 summarizes the parameters of the three treatments.

The sub-game perfect equilibrium in T1 is  $x=0$  if money is infinitely divisible. P will keep the whole endowment which R will accept. With a smallest money unit of 1 token a second sub-game perfect equilibrium exists, namely  $x=1$ . P will send an amount equal to the smallest money unit which R will accept since he is better off than when rejecting. With a similar argument, the second sub-game perfect equilibrium in T2 (T3) is  $x=1$  ( $x=3$ ).

UGInd and UGTeam were run as paper-and-pencil experiments at Bonn University, Germany, and at Sichuan University, Chengdu, PR China. UGInd was conducted in Bonn in August 2006 and in Chengdu in September 2004, with 359 students participating in six experimental sessions, three each in Bonn and Chengdu. Each session comprised either the symmetric or one of the asymmetric treatments. 30 proposers and 30 (29) receivers took part in each session. UGTeam was run in Bonn in February and June 2002 and in Chengdu in July 2001 and August 2002. In Bonn, we run 35 sessions comprising 200 students; in Chengdu, the number of sessions was 36 involving 208 students<sup>10</sup>. Almost all participants were undergraduates majoring in economics, law, natural sciences, and humanities. Each individual proposer (receiver) in UGInd and each proposer (receiver) team in UGTeam provides one independent observation (Table 1).

**Table 1. Experimental treatments**

	Independent observations									
	Outside option		Team UG (UGTeam)				Individual UG (UGInd)			
	Proposer	Receiver	# proposers		# receivers		# proposers		# receivers	
			Ger-many	China	Ger-many	China	Ger-many	China	Ger-many	China
Symmetric T1	0	0	12	12	12	12	30	30	30	30
Asymmetric T2	8	0	12	12	12	12	30	30	30	29
Asymmetric T3	8	2	11	12	11	12	30	30	30	30
Total			35	36	35	36	90	90	90	89

UGInd and UGTeam mainly followed the same experimental protocol. Subjects were recruited by campus advertisements promising a monetary reward for participation in a decision making (video) task. Registration assigned individual proposers (UGInd) / participants playing together in a proposer team (UGTeam) to a room separated from that of receivers guaranteeing full anonymity between both types of players. Being a proposer or receiver was randomly assigned to individuals or teams, respectively. All experimental sessions began with an introductory talk. The instructions were read aloud by native experimenters. Subjects then were encouraged to ask questions which were an-

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



swered. All participants were fully informed on all features of the experimental design and the procedure. See Appendix C for an English translation of the German/Chinese instructions.<sup>11</sup> All decisions were made by paper and pencil.

In UGInd, participants made their choices individually and anonymously seated far apart from each other such that no one could observe what another participant was deciding. According to the requirements of the video experiment, the procedure slightly differed in UGTeam. In each session, only one proposer and one receiver team interacted. Proposer teams had 15 minutes to decide on their proposal  $x$  and each receiver team had 15 minutes to decide on acceptance or rejection of any possible offer. All discussions were video taped. The decisions had to be taken jointly by the respective team members and then had to be filled in on the corresponding forms.<sup>12</sup> All team members had to agree by signing the forms. At the end of the experiment, the experimenters matched proposal and acceptance or rejection and informed individuals/teams about the result. Finally, participants were paid out and dismissed.

The monetary reward was calculated to equal the hourly wage in a typical students' job of about 10 Euro in Germany and 35 – 45 RMB (Chinese Yuan,  $\approx 4.70 - 6.00$  Euro). Individual participants were paid 0.60 Euro (2 RMB) for each token retained or received. The same amount was paid to each team member for each token retained/received by his/her team. In addition, each participant was paid a show-up fee of 4 Euro (10 RMB) independent of the subject's earning in the experiment. In UGInd, German participants on average earned 9.23 Euro including the show-up fee; Chinese participants were paid out 28.58 RMB (3.82 Euro). In UGTeam, subjects received 9.76 Euro in Germany and 28.67 RMB (3.83 Euro) in China.

### 3. Results

#### 3.1 Fairness and its aspects

The aim of this paper is to achieve greater clarity regarding the nature of fairness. To this end, we study ingredients of the fabric of fairness that proved important in the literature and in the discussions of our verbal data set. The aspects we look at are the prevalence of fairness (section 3.1.1), its components as derived by our category system (section 3.1.2) and asymmetry (section 3.1.3). The influence of culture is studied when investigating the above facets of fairness.

We analyze the text protocols of UGTeam and the spontaneous answers to the post-experimental open question: "Please explain the reasons why you took your decision. What did influence your decision?" in UGInd. The verbal data provide a valuable basis for revealing insights into the nature of fairness in addition to what has been found to date. The two data sets are valuable from different perspectives. The verbalizations of UGTeam are a rich data set based on three team members exchanging their opinions, having time to elaborate on reasons and motives and being able to pick up and enlarge previously mentioned ideas. These within-team discussions are not independent, however, and we, therefore, aggregate them to one single data point. The verbal data of UGInd, we got after the experiment was finished. Even though participants could take their time when answering the question – and the audible effort when typing suggests that they were happy being asked to comment

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<sup>11</sup> Instructions were translated into Chinese by a former co-researcher, Chaoliang Yang, who is a Chinese native speaker and both linguistically and culturally fluent in German. In addition, the back translation method was used (Brislin 1970).

<sup>12</sup> Decision forms are available on Hennig-Schmidt's webpage at [http://www.bonneconlab.uni-bonn.de/team/publikationen/hennig\\_schmidt\\_et-al\\_non\\_monotone\\_quotations.pdf](http://www.bonneconlab.uni-bonn.de/team/publikationen/hennig_schmidt_et-al_non_monotone_quotations.pdf).

– the richness in arguments is less than in the text protocols. Yet, in UGInd, each individual is one data point and has more weight in the data analysis than team members have in the results of the aggregated decisions in UGTeam. Note that throughout the paper, all statistical tests are two-sided.

### 3.1.1 Fairness discussions

First, we investigate the prevalence of fairness discussions, i.e. whether fairness was made an issue during the argumentation or not. The verbal data were analyzed with regard to subjects mentioning the words *fair*, *just* (in German “gerecht, fair”) in all word combinations like *fairness*, *justice* but also *unfairness*, *injustice*.<sup>13</sup> In Chinese, the corresponding words are 公平 (gong ping), 平等 (ping deng), and 合理 (heli).<sup>14</sup> We investigated video protocols of 141 teams in UGTeam (69 in Germany<sup>15</sup>, and 72 in China) and 359 individual answers in UGInd (180 in Germany and 179 China<sup>16</sup>); see Table 2.

As the measure of importance for fairness and its components we take the frequency of being articulated *at least once* by a team in UGTeam or an individual in UGInd.

Our verbal data provides an excellent opportunity to learn from participants’ own verbalizations about the importance they attach to fairness. Moreover, given the attention fairness receives in the Western literature, one would expect nearly all teams/individuals to spontaneously emphasize this topic, at least in Germany. Result 1 presents a different picture, though.

RESULT 1: *Many teams/individuals in China and Germany do not discuss fairness.*

SUPPORT: Support comes from Table 2. In UGTeam, 47 teams did not discuss about fairness, 28 (38.89%) in China and 19 (27.54%) in Germany. In UGInd, fairness was an issue for only a small proportion of the participants as well. 116 German and 140 Chinese subjects did not mention fairness; i.e. 64.44% in Germany and 78.21% in China.

Result 1 shows that fairness as a spontaneous argument seems to be of no importance for a considerable percentage of participants. Recall that UGTeam discussions lasted for at least 15 minutes and individuals in UGInd had ample time to answer the open question. If fairness was not mentioned, we regard this as a strong signal for fairness not being an important issue. We consider Result 1 a remarkable finding given the emphasis put on fairness in the literature.

**Table 2: Fairness discussions in Germany and China**

Fairness discussion	Team UG ( <i>UGTeam</i> )			Individual UG ( <i>UGInd</i> )		
	Germany	China	Total	Germany	China	Total
Yes	50 (72.46%)	44 (61.11%)	94 (66.67%)	64 (35.56%)	39 (21.79%)	103 (28.69%)
No	19 (27.54%)	28 (38.89%)	47 (33.33%)	116 (64.44%)	140 (78.21%)	256 (71.31%)
Total	69 (100.00%)	72 (100.00%)	141 (100.00%)	180 (100.00%)	179 (100.00%)	359 (100.00%)

<sup>13</sup> We used the text analysis software ATLAS.ti. for both the German and Chinese transcripts.

<sup>14</sup> For unfair etc. the terms are 不公平, (bu gong ping), 不平等 (bu ping deng), 不合理 (bu heli).

<sup>15</sup> Due to a technical defect, one German receiver group was not video taped.

<sup>16</sup> Due to a now-show up we had to run T2 with 29 receivers only (see Table 1).

Result 1 also complies with findings from other experiments where fairness spontaneously could be made an issue (see e.g. Hennig-Schmidt 1999, Bosman et al. 2006, 2009, Kohnz and Hennig-Schmidt 2005, Hennig-Schmidt and Yan 2009, Hennig-Schmidt, Kohnz and Schlüter 2009, Hennig-Schmidt, Irlenbusch, Rilke and Walkowitz 2009). We will come back to this topic in the discussion section.

Fairness is mentioned highly significantly less often in UGInd than in UGTeam both in Germany and in China ( $p = 0.000$ , Fisher exact). This finding underlines our comments in the previous subsection on the dependence of team members' fairness discussions. If we were able to treat each individual in UGTeam as an independent observation we most probably would have found the same tendency like in UGInd for the following reason. Assume the distribution of fair-minded participants to be roughly the same in UGTeam as in UGInd. Aggregating individuals to teams of three will, on the team level, result in a much higher percentage of players arguing about fairness at least once than on the individual level and thus may explain the significant difference. See Bosman et al. (2006) for similar lines of reasoning.

We conjectured in the introduction that fairness has lesser importance in China than in Germany. Result 2 corroborates our expectation.

**RESULT 2:** *Fairness appears to be more important in Germany than in China.*

**SUPPORT:** Support is provided by Table 2 and Fisher exact tests. In UGTeam, there is a tendency of fairness being more important for Germans than for Chinese in that relatively more German than Chinese teams discuss fairness at least once. Yet, the difference is not significant ( $p = 0.211$ ). In UGInd, however, highly significantly more Germans mention fairness when commenting on the motives for their decision ( $p = 0.005$ ).

Another aspect regarding the importance of fairness is the timing of the fairness discussion. If fairness is an important concern in Western compared to Eastern countries we should observe German participants to start the fairness discussion much earlier than Chinese participants. We test this conjecture in UGTeam where we use discussion units<sup>17</sup> as the measure for the timing of the fairness discussion. We compare the discussion units when fairness was mentioned first.

**RESULT 3:** *Fairness is discussed much earlier in German than in Chinese teams.*

**SUPPORT:** Mann Whitney-U tests show fairness to come up highly significantly earlier in the German than in the Chinese teams ( $p = 0.005$ ). When accounting for the length of the discussions in a team by testing the first fairness discussion unit divided by the total number of discussion units, the result holds as well ( $p = 0.018$ ).

### **3.1.2 Content analysis of fairness discussions**

The next step in learning about the nature of fairness is content analyzing the fairness arguments. We concentrate on those 94 teams that made fairness an issue in their team discussions (UGTeam) and on the 103 individuals that mention fairness in their written statements (UGInd), see Table 2. Con-

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<sup>17</sup> A discussion unit comprises the articulation of a team member until another person starts to talk.

tent analysis is a technique to extract the information a researcher needs to answer his/her research questions from a body of – in our case verbal – material by systematically and objectively identifying specified characteristics of the data (Smith 2000). The information we are looking for are aspects of and reference points for fairness revealed by the fairness discussions and the spontaneous answers. We extract this information by coding the verbal material. Coding denotes the process of assigning text segments to categories. We carefully designed the categories of our coding system to capture the aspects of fairness found to be central or considered potentially important in the literature. Two coders independently assigned the fairness statements of the video-taped discussions and the spontaneous answers to these categories. Appendix B gives a detailed description of our coding procedure and coding scheme.

### Categories

Our classification system (Table 3<sup>18</sup>) consists of subcategories to FAIRNESS<sup>19</sup>, called main categories (MC) which are (i) the game situation (MC1 GAME); (ii) fairness as a principle (MC2 PRINCIPLE); (iii) allocations of the pie (MC3 ALLOCATION); (iv) a residual comprising fairness statements not assignable to the other main categories (MC4 OTHER).

**Table 3. Classification system**

FAIRNESS	
MC1	GAME (fair and unfair)
MC2	PRINCIPLE (fair and unfair)
MC3	ALLOCATION (fair and unfair)
	C1 EQUAL SPLIT (fair and unfair)
	C2 SPLIT THE DIFFERENCE (fair and unfair)
	C3 PROPORTIONAL SPLIT (fair and unfair)
	C4 MIDDLE RANGE (fair and unfair)
	C5 DIFFERENCE (fair and unfair)
	C6 NON-EQUAL SPLIT (fair and unfair)
	C7 LIMIT (fair and unfair)
	C8 LONGTERM ORIENTATION (fair and unfair)
	C9 ALLOCATION-OTHER (fair and unfair)
	C10 NO REASONING (fair and unfair)
MC4	OTHER

MC3 ALLOCATION is further differentiated by categories (C). The most important ones comprise the equity principle in symmetric and asymmetric settings, inequity aversion and cultural values.<sup>20</sup>

- Specific allocations serving as fairness norms in symmetric and asymmetric settings can be characterized by the *equity principle* (Selten 1978, 1987, see also Hennig-Schmidt 1999, 2002).

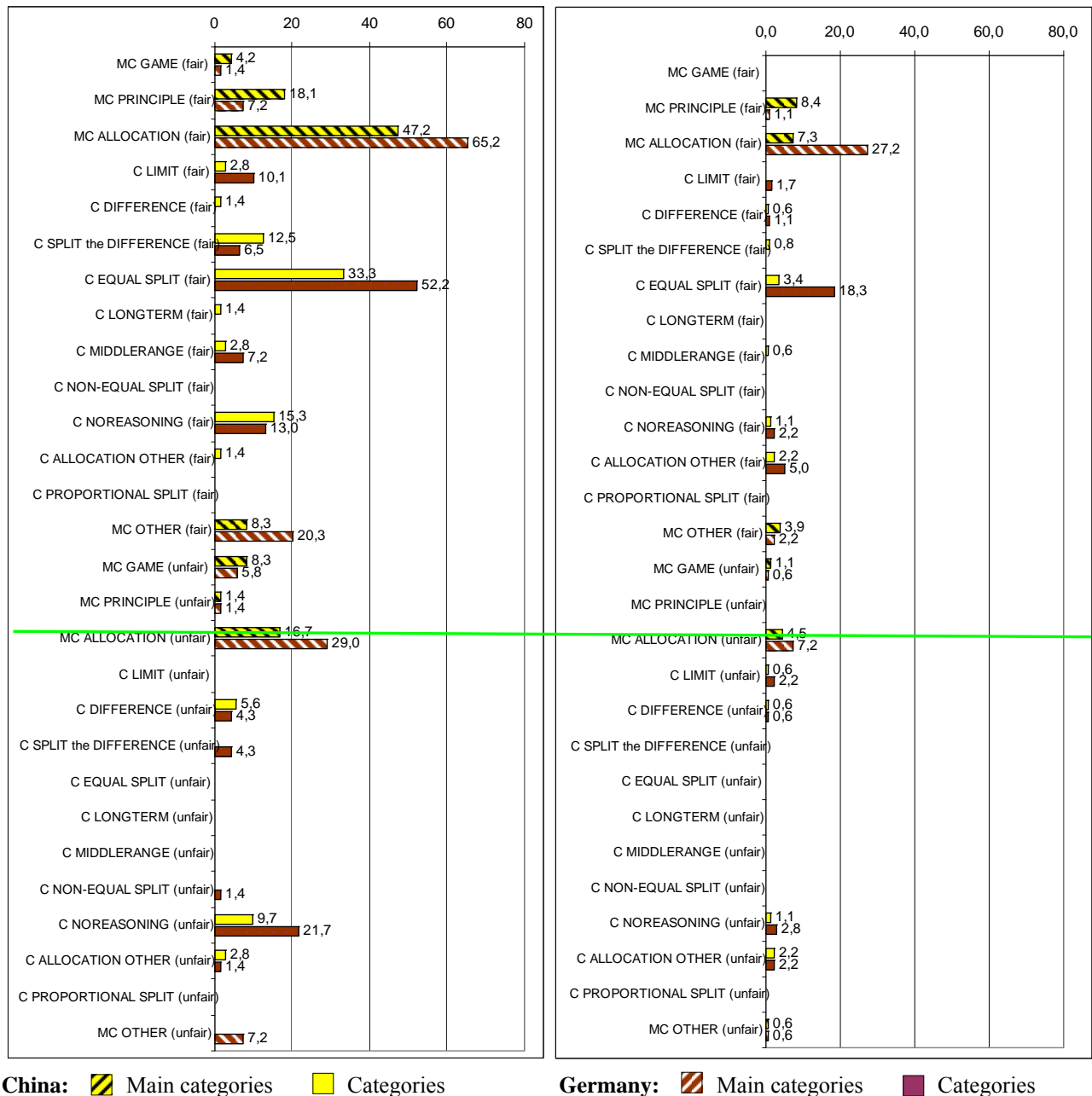
<sup>18</sup> See also Appendix B.

<sup>19</sup> If we explicitly refer to (main) categories of our coding system their names are written in CAPITAL letters.

<sup>20</sup> Category C9 ALLOCATION OTHER (fair and unfair) is a residual class comprising fairness statements not be assignable to one of the other categories. C10 NO REASONING (fair and unfair) comprises statements where arguments were not given although the allocation was termed (un)fair. MC4 OTHER is a residual main category containing fairness statements that could not be assigned to one of the other main categories.

These allocations, for instance, are the Equal Split, Split the Difference, Proportional Split (C1 – C3). The latter two can be observed in asymmetric settings only.

- Fairness as the core of *inequity aversion* (C1, C4 – C7) (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). In case the Equal Split were termed unfair this would touch aversion against equality (see Hennig-Schmidt 2002).
- Fairness and value orientation (C8) (Chinese Culture Connection 1987, Hu 1988, Hofstede 1991).



Panel 1a: UGTeam

Panel 1b: UGInd

Figure 1: Percentage of German and Chinese teams/individuals articulating a (main) category at least once

MC2 PRINCIPLE captures the notion of fairness as a general principle, a social norm, an idea, a rule, a code of conduct, something general that goes beyond the game situation at hand (see e.g. Chiu and Hong 1997, Schlicht 1998).

Figure 1 shows the number of teams (individuals) that articulate a (main) category at least once. Note that teams (individuals) verbalize up to 7 (4) different categories and/or main categories. Fairness-related arguments are found more frequently than arguments concerned with unfairness. Fairness apparently is associated with the distributive task in both UGTeam and UGInd as MC ALLOCATION (fair) and MC ALLOCATION (unfair) are brought up by most teams/individuals in both countries. C EQUAL SPLIT (fair) and MC PRINCIPLE (fair) are the most important (main) categories. The other classes are of nearly no significance in our experiments (see also Fn. 20). We focus on C EQUAL SPLIT (fair) and MC PRINCIPLE (fair) and neglect the unfairness part of our coding system in the following analyses.

### 3.1.3 Fairness and asymmetry

Our classification approach reveals an important finding: The Equal Split seems to capture what participants associate with fairness also in the asymmetric settings.

*RESULT 4: The Equal Split is the predominant fairness norm in both the symmetric and the asymmetric settings in Germany and China.*

SUPPORT: Figure 1 and Fisher exact tests support Result 4. In UGTeam, 60 teams (64.89% of all teams and 42.55% of those that discuss fairness) are coded for C EQUAL SPLIT (fair), 36 teams in Germany (52.17%, 72.00%, respectively) and 24 teams in China (33.33%, 54.55%, respectively). The two additional fairness norms suggesting themselves in the asymmetric treatments, C SPLIT THE DIFFERENCE (fair) and C PROPORTIONAL SPLIT (fair), have (nearly) no importance. C PROPORTIONAL SPLIT (fair) is not mentioned at all and C SPLIT THE DIFFERENCE (fair) comes up in only 9 of the 94 teams playing the asymmetric settings (9.57% of all teams in T2 and T3, and 14.75% of those that discuss fairness in these treatments).

Result 4 holds for UGInd as well. In total, 39 participants are coded for C EQUAL SPLIT (fair) (37.86% of all teams, and 10.86% of those that discuss fairness), 33 participants in Germany (18.33%, 51.56%, respectively) and 6 participants in China (3.35%, 15.38%, respectively). C SPLIT THE DIFFERENCE (fair) comes up only three times and C PROPORTIONAL SPLIT (fair) is not mentioned at all.

We do not find significant differences between the symmetric and the two asymmetric treatments in the frequency of teams/individuals discussing C EQUAL SPLIT (fair). This applies for UGTeam and UGInd and for both countries ( $p \geq 0.252$ , Fisher exact).

We next assess the validity of the Equal Split as a fairness norm across countries.

*RESULT 5: More German than Chinese teams/individuals discuss the Equal Split fairness norm.*

SUPPORT: Support is given by Figure 1 and Fisher exact tests. In both UGTeam and UGInd, relatively more German than Chinese teams discuss C EQUAL SPLIT (fair) at least once. This difference is weakly significant for UGTeam ( $p = 0.090$ ) and highly significant for UGInd ( $p = 0.000$ ).

The content analysis of the fairness discussions provides important insights. Most importantly, Result 4 corroborates the major assumption of the experimental and theoretical literature on fairness perceptions in symmetric games, namely that the notion of fairness is closely associated with the Equal Split. Unexpectedly, Result 4 holds for our asymmetric settings as well. We think this an astonishing finding as it has been maintained in the literature on self-serving biases in fairness perceptions that in asymmetric situations subjects tend to those fairness notions that give them a higher payoff (see e.g. Komorita and Kravitz, 1979; McClintock et al., 1984; Babcock et al., 1995; Babcock and Loewenstein, 1997). Note also, that Result 4 applies for both countries. Although the Equal Split is the pertinent fairness norm in both subject pools fairness-related Equal Split discussions seem less important for the Chinese participants (Result 5).

The prevalence of the Equal Split fairness norm may be due to the situational properties of our experiments that in turn may influence subjects' fairness perceptions. Recall two features of our experiments: the interaction is one-shot, and the advantaged (disadvantaged) position is randomly assigned, i.e. subjects do not earn their position as player types. Making power differences in the asymmetric treatments more salient, however, by repeated interactions or earning the position may induce a change in fairness perceptions. Because proposers and receivers get a more pronounced feeling of the prevailing power relation they may also perceive unequal but equitable allocations like Split the Difference or Proportional Split as fair. We will come back to this issue in the discussion of Section 4.

The main category MC PRINCIPLE (fair) was defined to capture the notion of fairness as a general principle, a social norm, an idea, a rule, a code of conduct.

*RESULT 6: More Chinese than German teams/individuals argue on the notion of fairness as a general principle.*

SUPPORT: Figure 1 and Fisher exact tests support Result 6. In Germany, only 5 teams (2 individuals) are coded for MC PRINCIPLE (fair) (7.25% of all teams, and 10.00% of those that discuss fairness; UGInd: 1.11 and 3.13%, respectively). MC PRINCIPLE (fair) is discussed by 13 teams (15 individuals) in UGTeam (UGInd) in China (UGTeam: 18.06% and 29.55%, respectively; UGInd: 8.38% and 38.46%, respectively). Significantly more Chinese than Germans make MC PRINCIPLE (fair) an issue both in UGTeam ( $p = 0.020$ ) and UGInd ( $p = 0.000$ ).

The notion of fairness as a general principle seems to be of higher relevance for Chinese participants. This may be due to the fact that justice perceptions in Chinese societies are strongly correlated with moral principles of role requirements (Chiu and Hong 1997). As these principles are based on Confucian thought and regulate social actions since more than 2.000 years they are very likely to be internalized in Chinese thinking also today.

### **3.2 The impact of fairness and fairness components on choices**

In the previous subsections, we analyzed the prevalence of fairness and the importance of various aspects of fairness. In the following, we investigate their impact on choices (offers and lowest

acceptance levels<sup>21</sup> – LAL) as it might be argued that these aspects are of importance only if they have a significant behavioral influence. In the next subsection 3.2.1, we investigate the choice data by non-parametric tests. The interplay between the different components of fairness and their effect on offers and LAL is studied in a series of regression analyses in subsection 3.2.2.

### 3.2.1 Descriptive statistics and nonparametric tests

Choices in the symmetric treatment T1 are in line with what is known from the literature. In UG-Team (UGInd), proposers' mean offer is 43.8 (42.5) percent in Germany and 41.3 (49.7) percent of the pie in China. Receivers on average reject offers lower than 20 percent in both countries (Table 6). These numbers are far above the standard game theoretic predictions stated in section 2. In the asymmetric treatments T2 and T3, average offers and average LAL are much higher than predicted, too. Offers and LAL in Germany and China are shown in Figures A1 to A4 in Appendix A.

**Table 6. Mean offers and lowest acceptance levels (LAL) in UGTeam and UGInd**

Treatment		Germany		China	
		Offer	LAL	Offer	LAL
<b>UGTeam</b>					
T1	Token	8.75 (1.92)	4.00 (1.91)	8.25 (1.82)	4.08 (2.43)
	% of pie	43.8 (9.6)	20.0 (9.3)	41.3 (9.1)	20.4 (12.1)
T2	Token	7.17 (1.34)	2.67 (1.72)	6.75 (1.71)	2.50 (2.68)
	% of pie	35.8 (6.7)	13.3 (8.6)	33.8 (8.6)	12.5 (13.4)
T3	Token	5.82 (1.66)	4.18 (2.04)	6.42 (1.31)	4.33 (2.53)
	% of pie	29.1 (8.3)	20.9 (10.2)	32.1 (6.6)	21.7 (12.7)
All treatments	Token	7.29 (2.01)	3.60 (1.96)	7.14 (1.77)	3.64 (2.61)
	% of pie	36.4 (10.0)	18.0 (9.8)	35.7 (8.9)	18.2 (13.0)
<b>UGInd</b>					
T1	Token	8.50 (1.76)	3.93 (2.56)	9.93 (2.78)	4.10 (2.26)
	% of pie	42.5 (8.8)	19.7 (12.8)	49.7 (13.9)	20.5 (11.3)
T2	Token	7.73 (2.23)	5.40 (5.40)	7.40 (3.47)	3.69 (2.83)
	% of pie	38.7 (11.1)	27.0 (17.1)	37.0 (17.4)	18.4 (14.1)
T3	Token	6.73 (2.55)	4.57 (2.39)	6.83 (2.25)	5.07 (3.13)
	% of pie	33.7 (12.7)	22.8 (11.9)	34.2 (11.2)	25.3 (15.6)
All treatments	Token	7.66 (2.29)	4.63 (2.86)	8.06 (3.15)	4.29 (2.79)
	% of pie	38.3 (11.5)	23.2 (14.3)	40.3 (15.7)	21.5 (13.9)

Numbers in brackets are standard deviations.

We find significant variations between treatments in both countries. As to offers, in UGTeam they are higher in the symmetric treatment than in the asymmetric ones in both countries ( $p \leq .0633$ , Fisher-Pitman permutation test for two independent samples, FP-test in the following). In UGInd the same holds for China and for a comparison between T1 and T3 in Germany ( $p \leq 0.003$ ). There is no evidence in the data, that offers in T1 and T2 differ significantly ( $p = .163$ ).

<sup>21</sup> In China, participants not only rejected low but also high offers (c.f. Hennig-Schmidt et al. 2008). In the following, we neglect the high-offer rejection thresholds and analyze lowest acceptance levels only.



As to LAL, the picture looks different. In UGTeam we find no significant differences between the symmetric treatment and the asymmetric ones in both countries ( $p \geq 0.109$  FP-test). For UGInd we find a weakly significant difference between T1 and T3 in the German subject pool only ( $p = 0.070$ ).

Comparing behavior in Germany and China, we got the following results. There is no evidence in the data for significant differences in UGTeam neither in offers ( $p \geq 0.416$  FP-test) nor in LAL ( $p \geq 0.925$ ) for the symmetric and the asymmetric settings. In UGInd, these results hold for offers in the asymmetric treatments T2 and T3 ( $p \geq 0.699$ ) and for LAL in T1 and T2 ( $p \geq 0.522$ ). Offers in T1 are significantly higher ( $p = 0.0181$ ) and LAL in T2 are significantly lower ( $0.045$ ) in China than in Germany.

Given that fairness is a focal point in the literature on inequity aversion, one should expect an impact on choices. For one thing, offers of proposers who discuss fairness should be higher than offers of those who do not. We find this tendency in both UGTeam and in UGInd in both countries. Yet, the differences are not significant, also when asymmetry is accounted for ( $p \geq 0.109$  FP-test). The only exception is T2 in UGInd in Germany where fairness-concerned proposers send highly significantly higher offers ( $p = 0.007$ ).

As with offers, it could be argued that LAL of receivers who are concerned with fairness are higher than LAL of those who are not because they do not want to get a much lower share of the pie than the proposers. We do find this tendency in both UGTeam and UGInd in both countries except for T1 and T3 in China UGTeam. Yet, the differences are not significant, also when asymmetry is accounted for ( $p \geq 0.318$ , FP-test). The only exception is T3 in UGInd in Germany where fairness-concerned receivers show significantly higher LAL ( $p = 0.042$ ).

### 3.2.2 Regression analysis

We run several OLS regressions<sup>22</sup> checking for effects of fairness and its aspects. In the final regression analysis we include *Outside option proposer*, *Outside option receiver*, *Country* as well as FAIRNESS. We also add C EQUAL SPLIT (fair) and MC PRINCIPLE (fair) because in line with our results on the importance of (main) categories in subsection 3.1 these two had an impact on offers and LAL, respectively. All other (main) categories as well as interaction terms did not show any effect on proposers' or receivers' choices. We always enter the *Outside option proposer* in the first step and then successively add the other independent variables.

#### *Offers*

Simple regression analyses corroborate the results from our previous non-parametric tests. In UGTeam, *country* and FAIRNESS have no significant effect on offers (models 3 and 4), see Table 7. Coefficients for *Outside option proposer*, *Outside option receiver* as well as for C EQUAL SPLIT are (highly) significantly different from zero (models 1, 2 and 5). Both outside options have a negative effect whereas offers rise for more than one point if the Equal Split is discussed in a group. In the latter case, Adjusted  $R^2$  is rather low, however, and model 5 is only weakly significant.

When we successively add the independent variables mentioned above and replace FAIRNESS by C EQUAL SPLIT (fair), model 9 shows the best fit to the data. Results qualitatively remain the same

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<sup>22</sup> Tobit regressions provide qualitatively similar results.

except for *Outside option receiver* and C EQUAL SPLIT (fair) becoming significant at the 5% level. Adjusted R<sup>2</sup> rises to .359 and model 9 is highly significant.

**Table 7: UGTeam: Impact of fairness and fairness aspects on offers**

		Dependent variable: Offer							
Independent variables/model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outside option proposer	-.243 <sup>#</sup>					-.193 <sup>#</sup>	-.193 <sup>#</sup>	-.206 <sup>#</sup>	-.209 <sup>#</sup>
	(.052)					(.059)	(.059)	(.059)	(.067)
Outside option receiver		-.799 <sup>#</sup>				-.414 <sup>+</sup>	-.413 <sup>+</sup>	-.356	-.581 <sup>*</sup>
		(.220)				(.237)	(.239)	(.239)	(.275)
Country (1 = China)			-.147				-.116	-.039	.157
			(.449)				(.388)	(.399)	(.486)
FAIRNESS				.569				.639	
				(.476)				(.433)	
C EQUAL SPLIT (fair)					1.158 <sup>+</sup>				1.145 <sup>*</sup>
					(.587)				(.517)
Constant	8.500 <sup>#</sup>	7.729 <sup>#</sup>	7.286 <sup>#</sup>	6.826 <sup>#</sup>	6.600 <sup>#</sup>	8.500 <sup>#</sup>	8.558 <sup>#</sup>	8.081 <sup>#</sup>	8.031 <sup>#</sup>
	(.337)	(.251)	(.449)	(.391)	(.487)	(.332)	(.386)	(.501)	(.626)
Observations	71	71	71	71	71	71	71	71	71
Adjusted R <sup>2</sup>	.232 <sup>#</sup>	.148 <sup>#</sup>	-.013	.006	.058 <sup>+</sup>	.254 <sup>#</sup>	.244 <sup>#</sup>	.257 <sup>#</sup>	.359 <sup>#</sup>

OLS-regression; Standard errors in parentheses; <sup>+</sup> significant at 10%; <sup>\*</sup> significant at 5%; <sup>#</sup> significant at 1%.

**Table 8: UGInd: Impact of fairness and fairness aspects on offers**

		Dependent variable: Offer							
Independent variables/model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outside option proposer	-.255 <sup>#</sup>					-.206 <sup>#</sup>	-.206 <sup>#</sup>	-.201 <sup>#</sup>	-.198 <sup>#</sup>
	(.051)					(.059)	(.059)	(.058)	(.057)
Outside option receiver		-.804 <sup>#</sup>				-.392 <sup>+</sup>	-.392 <sup>+</sup>	-.358	-.344
		(.209)				(.235)	(.235)	(.234)	(.229)
Country (1 = China)			.400				.400	.524	.804 <sup>*</sup>
			(.411)				(.384)	(.388)	(.394)
FAIRNESS				.953 <sup>*</sup>				.797 <sup>+</sup>	
				(.467)				(.448)	
C EQUAL SPLIT (fair)					1.811 <sup>#</sup>				1.916 <sup>#</sup>
					(.602)				(.594)
Constant	9.217 <sup>#</sup>	8.391 <sup>#</sup>	7.656 <sup>#</sup>	7.612 <sup>#</sup>	7.624 <sup>#</sup>	9.217 <sup>#</sup>	9.017 <sup>#</sup>	8.702 <sup>#</sup>	8.495 <sup>#</sup>
	(.334)	(.242)	(.290)	(.236)	(.215)	(.332)	(.384)	(.420)	(.407)
Observations	180	180	180	180	180	180	180	180	180
Adjusted R <sup>2</sup>	.118 <sup>#</sup>	.071 <sup>#</sup>	.000	.017 <sup>*</sup>	.043 <sup>#</sup>	.127 <sup>#</sup>	.127 <sup>#</sup>	.138 <sup>#</sup>	.171 <sup>#</sup>

OLS-regression; Standard errors in parentheses; <sup>+</sup> significant at 10%; <sup>\*</sup> significant at 5%; <sup>#</sup> significant at 1%.

In UGInd, results of the simple regression analyses are similar to those in UGTeam, except for coefficients of FAIRNESS and C EQUAL SPLIT (fair) being (highly) significantly different from zero (models 4 and 5 in Table 8). Including all independent variables into the model (model 9) removes the significant effect of *Outside option receiver* and in addition makes the effect of *Country* significant. Adjusted R<sup>2</sup> rises to .171, and model 9 is highly significant.

We found fairness-related Equal-Split discussions to be a powerful predictor for increasing offers. Moreover, our analysis revealed two interesting findings. First, the proposer's outside option matters for offers in both UGTeam and UGInd. Proposers on average offer .20 tokens less in the asymmetric

treatments when all other independent variables are held constant. Second, when the receiver's outside option increases to two tokens, proposers, *ceteris paribus*, reduce their offers by .381 (.344) tokens in T3 of UGTeam (UGInd).

Apparently, proposers want to manifest their endorsed power in T2 and T3 which leads to lower offers than in the symmetric treatment T1. Similar results were found by Kohnz and Hennig-Schmidt (2005), see also Suleiman (1996). The reduction in offers when receivers become more powerful in T3 may be explained by an effect pointed out by Suleiman (1996): Proposers treat receivers with higher relative power less generously than those with very low power because in the latter case more psychological and moral motives might be activated whereas in the former more strategic considerations might apply.

#### *Lowest acceptance levels (LAL)*

The results of our OLS regressions on receivers' LAL are much less conclusive. For UGTeam, simple regression analyses show coefficients of *Outside option receiver* and MC PRINCIPLE (fair) to be (weakly) significantly different from zero (Table 9, models 2 and 5). Both regressors induce LAL to rise, in the case of MC PRINCIPLE (fair) even by 1.9 tokens. Including all independent variables into the model (model 9) increases the significant effect of *Outside option receiver* and reduces that of MC PRINCIPLE (fair). Yet, Adjusted R<sup>2</sup> is low, and model 9 is significant at the 5% level only.

**Table 9: UGTeam: Impact of fairness and fairness aspects on LAL**

Independent variables/model	Dependent variable: LAL								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outside option proposer	-.058 (.071)					-.161* (.079)	-.160* (.079)	-.143 <sup>+</sup> (.080)	-.118 (.082)
Outside option receiver		.524 <sup>+</sup> (.281)				.839* (.315)	.837* (.318)	.829* (.316)	.769* (.315)
Country			.168 (.541)				.139 (.521)	.127 (.518)	.017 (.517)
FAIRNESS				.784 (.563)				.689 (.556)	
MC PRINCIPLE (fair)					1.921* (.872)				1.587 <sup>+</sup> (.903)
Constant	3.869 <sup>#</sup> (.470)	3.213 <sup>#</sup> (.322)	3.471 <sup>#</sup> (.388)	3.042 <sup>#</sup> (.456)	3.365 <sup>#</sup> (.276)	3.869 <sup>#</sup> (.451)	3.797 <sup>#</sup> (.529)	3.264 <sup>#</sup> (.679)	3.516 <sup>#</sup> (.545)
Observations	70	70	70	70	70	70	70	70	70
Adjusted R <sup>2</sup>	-.005	.035 <sup>+</sup>	-.013	.014	.053*	.078*	.065 <sup>+</sup>	.072 <sup>+</sup>	.093*

OLS-regression; Standard errors in parentheses; <sup>+</sup> significant at 10%; \* significant at 5%; <sup>#</sup> significant at 1%.

In UGInd, simple regression analyses show only the coefficient for FAIRNESS to be (highly) significantly different from zero (model 4 in Table 10). When the independent variables are successively included, model (8) gives the best fit to the data and FAIRNESS stays highly significant. When receivers argue about fairness they, *ceteris paribus*, increase their LAL by 1.3 tokens. Yet, Adjusted R-squared stays very low and model (8) is significant at the 5%-level only.

**Table 10: UGInd: Impact of fairness and fairness aspects on LAL**

Independent variables/model	Dependent variable: LAL								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outside option proposer	.084 (.056)					.068 (.065)	.067 (.065)	.102 (.065)	.076 (.065)
Outside option receiver		.265 (.223)				.129 (.258)	.130 (.259)	.078 (.254)	.107 (.258)
Country			-.341 (.422)				-.340 (.422)	-.184 (.417)	-.485 (.429)
FAIRNESS				1.173 <sup>#</sup> (.446)				1.297 <sup>#</sup> (.456)	
MC PRINCIPLE (fair)					1.153 (.877)				1.437 (.898)
Constant	4.017 <sup>#</sup> (.363)	4.286 <sup>#</sup> (.258)	4.633 <sup>#</sup> (.298)	4.090 <sup>#</sup> (.251)	4.393 <sup>#</sup> (.217)	4.017 <sup>#</sup> (.364)	4.187 <sup>#</sup> (.421)	3.547 <sup>#</sup> (.470)	4.139 <sup>#</sup> (.420)
Observations	179	179	179	179	179	179	179	179	179
Adjusted R <sup>2</sup>	-.007	.002	-.002	.032 <sup>#</sup>	.004	.003	.001	.039*	.009

OLS-regression; Standard errors in parentheses; <sup>+</sup> significant at 10%; \* significant at 5%; <sup>#</sup> significant at 1%.

#### 4. Discussion: Fairness and situational properties

Our previous analyses showed the Equal Split to be the predominant fairness norm in both countries in the symmetric and in the asymmetric settings. The Equal Split coming up in the fairness discussion significantly increases proposers' offers. We already pointed out that fairness perceptions might be affected by the situational properties asymmetry, frequency of interactions and the procedure of assigning positions, like earning their position or being randomly assigned. Repeated bargaining is likely to provide a pronounced feeling of the endorsed power relation and fairness perceptions might, therefore, move towards an equitable but unequal distribution like Split the Difference or Proportional Split. Creating entitlements by working for their position may evoke moral property rights that also change a bargainer's fairness perception. Motivated by these arguments we made power differences more salient by having teams interact repeatedly in alternating offer games and, in addition, work for their position. We expect the Equal-Split predominance in fairness perceptions to decline and the unequal equitable allocations Split the Difference and Proportional Split to increase in importance.

To check for the robustness of our previous findings and to investigate our above conjecture, we in this section analyze three additional experiments; one UG-experiment where positions are assigned randomly with players deciding twice, and two alternating offer bargaining experiments. Again, verbal data are analyzed for fairness statements.

##### 4.1 Individual Ultimatum Game with different opponents

In Hennig-Schmidt, Irlenbusch, Rilke and Walkowitz (2009), individual proposers decide on the distribution of a pie. They do it twice with different opponents. The same holds for receivers who can accept or reject the proposals. Pies always amount to 240 tokens. Except for one decision in a symmetric outside option setting (30/30) that each participant faces, outside options for proposers and receivers differ (150/30, 90/30, 30/150, 30/90). Each participant decides once in the symmetric setting and once in one of the four asymmetric treatments. Positions are assigned randomly. The game

was played in Germany and China. We had 192 participants in Germany and 160 in China with 48 subjects participating in each treatment in Germany and 40 taking part in each treatment in China.

Content analyzing the answers to open questions like in UGInd, we again find rather small fractions of the subject pools arguing about fairness. Only 99 of the 192 German (52.56%) and 26 of the 160 Chinese subjects (16.25%) made fairness an issue. 72 German (16 Chinese) participants talked about fairness either in the symmetric or the asymmetric setting and 27 Germans (10 Chinese) in both settings. We again find the Equal Split to be the predominant fairness norm in both countries in the symmetric and in the asymmetric settings. This is in line with the results in the previous experiments with random assignment of player types. Split the Difference and Proportional Split are negligible.

#### **4.2 Alternating offer bargaining team experiment with anonymous interaction and random assignment of outside options**

Next we check our conjecture that making asymmetry salient by repeated interaction increases the fairness perception of equitable but unequal distributions. Hennig-Schmidt and Yan (2009) analyze bargaining goals (aspiration levels) in an experiment where teams make alternating offers on the distribution of a pie of 320 tokens and receive outside options of 128 and 32 tokens in case of no agreement. Outside options are assigned randomly. Teams bargain anonymously, with the experimenter transmitting offers and within-team discussions being videotaped and transcribed. The same content analyzing procedure like in UGTeam was used.

Fairness with regard to bargaining goals is not an issue in all teams. Only 58.33% of the 12 German and 27.78% of the 18 Chinese teams connect aspiration levels to fairness, the difference being weakly significant ( $p = 0.079$ , Fisher exact test). As conjectured Split the Difference and Proportional Split gain while the Equal Split loses importance as an anchor for fairness. Split the Difference is perceived a fair goal by 41.67% of the German and by 8.33% of the Chinese teams; the values for the Proportional Split are 0.00% in the German, and 11.11% in the Chinese subject pool. The Equal Split is termed a fair bargaining goal by 8.33% of the German and 5.56% of the Chinese teams. A player-type specific tendency seems to exist for perceiving fairness in a self-serving manner: High-outside-option players aim at allocations larger than half of the pie whereas low-outside-option players do strive for the Equal Split.

#### **4.2 Alternating offer bargaining team experiment with face-to-face interactions and earned positions**

To make the power asymmetry even more salient, we run an alternating offer bargaining game where two teams bargain on the distribution of a pie of 300 Euro (1.500 RMB) and receive outside options of 120 Euro (600 RMB) and 30 Euro (150 RMB) in case of no agreement (Hennig-Schmidt and Yi 2009, Hennig-Schmidt, Geng, Reintgen, Walkowitz and Yang 2009). Teams earn their position as a high or low outside option player in a quiz preceding the experiment. Between-team bargaining is face-to-face. Prior to each negotiation phase teams have the opportunity to elaborate on their strategies in within-team discussions. The experiment was conducted on the first day of the first and second Sino-German Summer School on Experimental Economics in Chengdu, China, and in Bonn,

Germany, in 2006 and 2007.<sup>23</sup> Sessions lasted for about three hours. All discussions were video-taped. We had two German-German, two Chinese-Chinese and two Chinese-German bargaining sessions. We analyzed the transcripts of 12 teams, half of them were high outside option players and half of them low outside option players.

Our conjecture that making asymmetry more salient increases the importance of equitable but unequal distributions was corroborated in two ways. First, four of the six bargaining pairs agreed on dividing the pie exactly at Split the Difference (195/105 Euro = 925/575 RMB) and two dyads settled on a prominent allocation near to it (200/100 Euro = 1,000/500 RMB; 210/90 Euro = 1,050/450 RMB). Second, five (three) weak teams termed Split the Difference (Proportional Split) fair in their internal discussions against all six (five) strong teams. Yet, during the between-team negotiation phases only one weak team characterized Split the Difference as fair while five strong teams did so with regard to the Proportional Split and only two strong teams concerning Split the Difference. We again find a player-type specific tendency to perceive fairness in a self-serving manner: Four (one) strong teams labeled the Equal Split (Split the Difference) unfair when negotiating with their counterpart, while weak teams only called unequal distributions unfair vis-à-vis their opponent.

Interestingly, fairness was an issue for all teams; yet it was discussed with different intensity. German participants argued on fairness much more frequently than Chinese did. In particular, Germans intensively discussed the relevance of fairness for justifying specific equitable allocations like Equal Split, Split the Difference and Proportional Split. Participants in strong teams argued that the process of assigning the position by working for it was fair creating a clear incentive for pursuing a bargaining goal much larger than the Equal Split. Some weak teams denied this argument by questioning the procedure and strove for the Equal Split. The two Chinese teams who bargained with German counterparts identified the importance of fairness arguments as a special characteristic of German negotiators.

### 4.3 Survey on fairness discussions

Finally, we review the importance of fairness in the above five experiments plus in four additional studies that one or more of the authors conducted in Germany and/or China<sup>24</sup>. This survey is based on video-taped team discussions and individuals' answers to open questions of more than 1,700 participants amounting to 1,366 independent observations.

Fairness appears to be of minor influence in spontaneous articulations as only 34.77% of the players discuss about fairness (39.30% in the German and 27.20% in the Chinese subject pools). Highly significantly more German than Chinese participants are concerned with fairness ( $p = 0.000$ , Fisher exact test).

Two features seem for fairness to matter: repetition and team discussions. In repeated bargaining, fairness was an issue for more than 75% of the teams. But also in the one-shot UGTeam the

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<sup>23</sup> The summer schools were supported by the Sino-German Center for Research Promotion, Beijing.

<sup>24</sup> *Video team experiments*: alternating offer bargaining games (Hennig-Schmidt 1999, Germany; Hennig-Schmidt, Yan 2009, Germany and China; Hennig-Schmidt and Yi 2009, Hennig-Schmidt, Geng, Reintgen, Walkowitz, Yang 2009, Germany and China); ultimatum games (UGTeam, this paper, Germany and China); power-to-take game (Bosman, Hennig-Schmidt and v. Winden 2006, Germany).

*Individual experiments*: ultimatum games (Kohnz, Hennig-Schmidt 2005, Germany; Hennig-Schmidt, Kohnz, Schlüter 2009, Germany; UGInd, this paper, Germany and China; Hennig-Schmidt, Irlenbusch, Rilke, Walkowitz 2009, Germany and China); Power-to-take game (Bosman, Hennig-Schmidt and v. Winden 2009, China).

percentage is rather high (72.46% in Germany and 61.11% in China). In one-shot individual interactions, however, fairness was no issue for a considerable proportion of participants (between 12.50% and 52.56% in Germany and between 9.21% and 21.97% in China). One would have expected that individuals talk more about fairness at least in our German subject pools given the attention fairness receives in the (Western) experimental literature. This is the more the case as most of this literature is based on experiments involving individuals and not teams.

## **5. Conclusion**

Our paper presents a new perspective on the nature of fairness by using verbal data from spontaneous team discussions and written statements on decision motives. Systematically content analyzing this verbal material proves a valuable source for providing new insights, corroborating existing knowledge and supplementing other data eliciting approaches. The nature of fairness can be viewed as consisting of different facets or components. The ones we studied are allocation aspects of fairness, its norm character, and how fairness perceptions are affected by power asymmetry and cultural background. We also investigate how the frequency of interactions and the procedure of assigning positions affect fairness perceptions. Not all of the above fairness aspects have an impact on choices in our study.

Our one-shot UG experiments with randomly assigned positions provide a clear tendency: Those subjects who make fairness an issue (two thirds in UGTeam and nearly 30% in UGInd) view the Equal Split as the predominant fairness norm in both the German and the Chinese subject pools in the symmetric and – most surprising to us – also in the asymmetric settings. Moreover, Equal Split related fairness discussions pronouncedly increase proposers' offers. Fairness concerns per se do not have such an effect. Our finding on the predominance of the Equal Split fairness norm corroborates the assumption in the experimental and theoretical literature that the notion of fairness is closely associated with the Equal Split.

Other important results of our study concern the differences in fairness perceptions in our subject pools. Fairness does not appear irrelevant for the Chinese but seems more important for the German participants: It is discussed more frequently, it becomes an issue much earlier, and the Equal Split fairness norm is discussed more often.

In asymmetric bargaining situations where subjects interact repeatedly and work for their position the predominance of the Equal Split fairness norm vanishes. Here, the equitable but unequal allocations Split the Difference and Proportional Split are considered fair as well by more as well as by less powerful players. The Equal Split fairness norm not only loses relative importance for both player types but high-power players also show aversion against equality by terming the Equal Split an unfair allocation. It appears an important task for the future to enlarge the theoretical models on social preferences by incorporating the equitable but unequal fairness norms.

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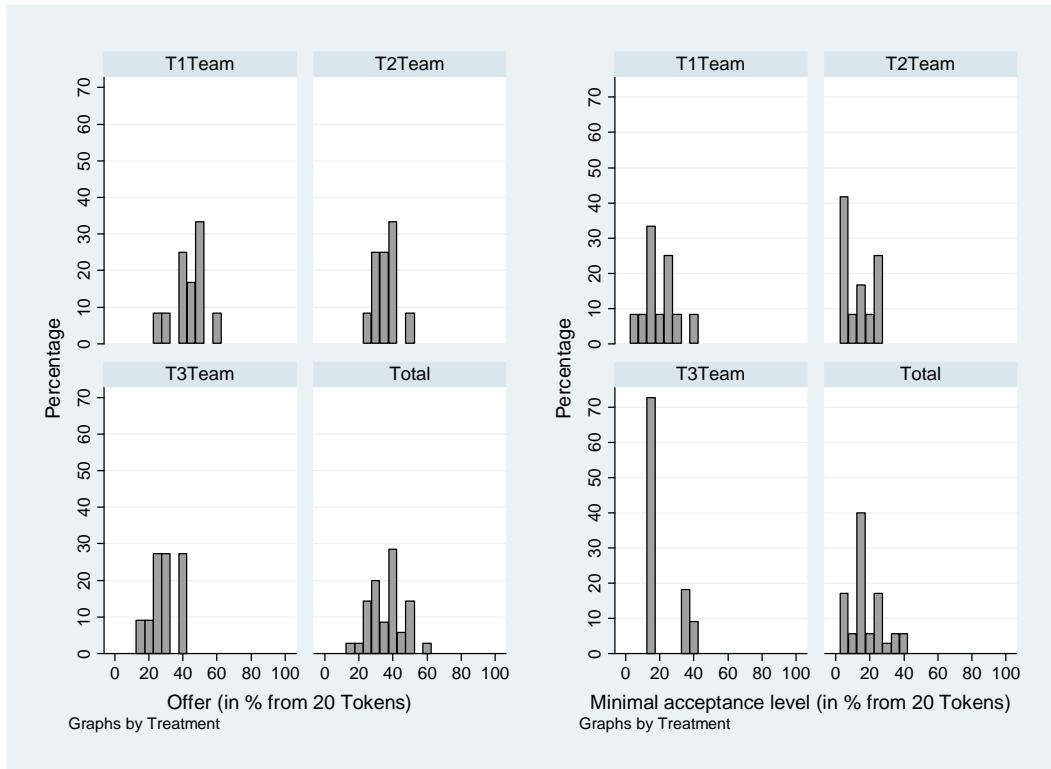


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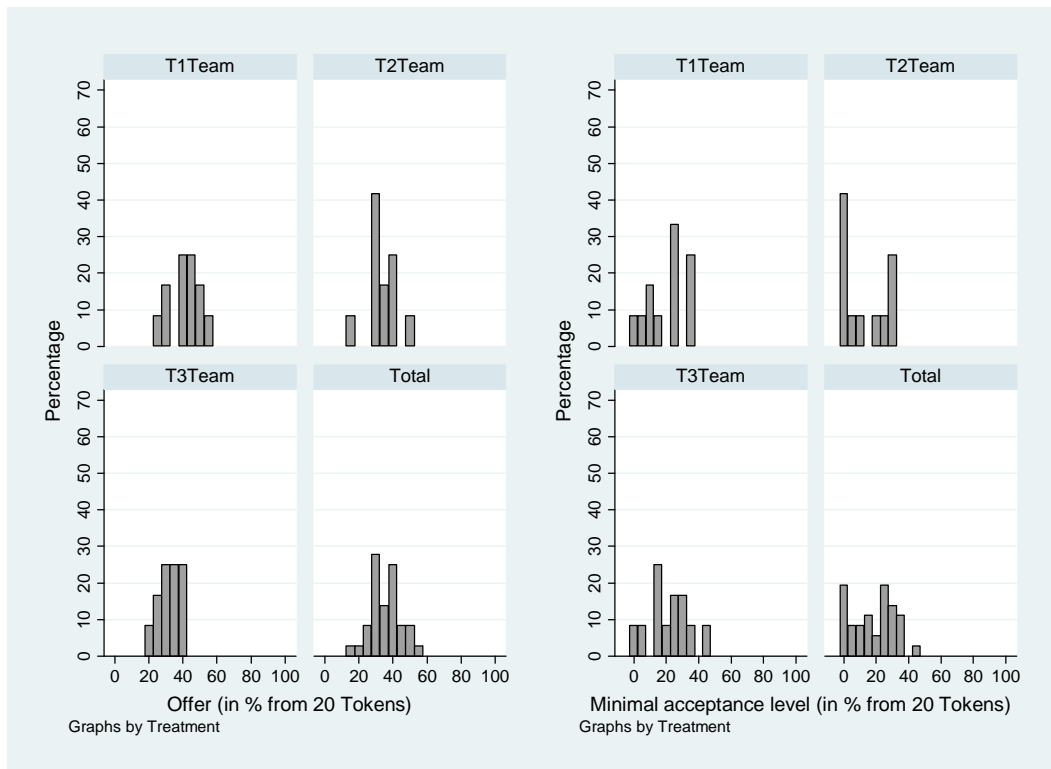
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## Appendices

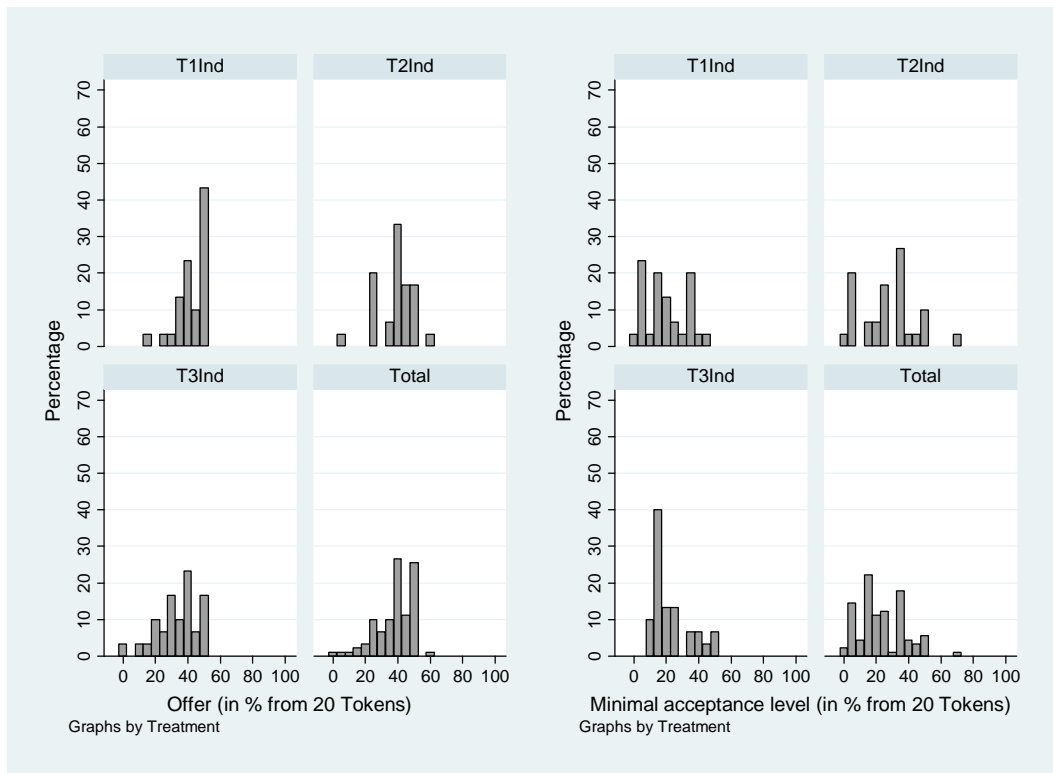
### Appendix A: Offers and Lowest Acceptance Levels



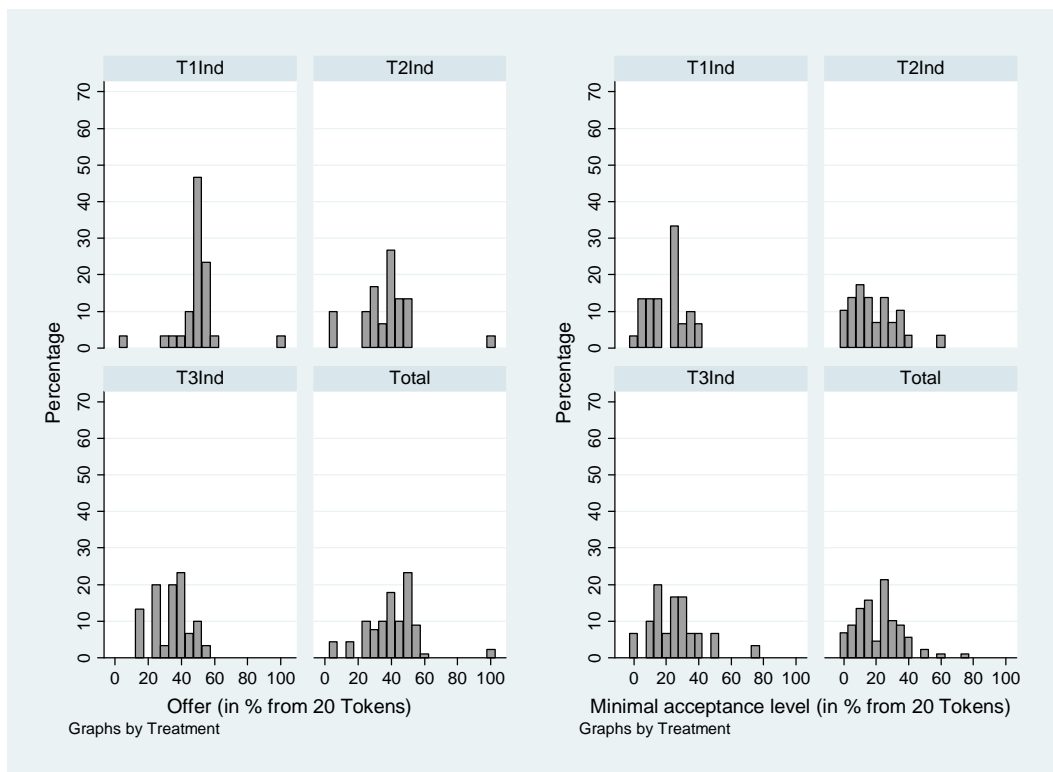
**Figure A1: Germany – Offers and Lowest Acceptance Levels in UGTeam**



**Figure A2: China – Offers and Lowest Acceptance Levels in UGTeam**



**Figure A3: Germany – Offers and Lowest Acceptance Levels in UGInd**



**Figure A4: China – Offers and Lowest Acceptance Levels in UGInd**

## **Appendix B: Coding procedures and coding system for FAIRNESS**

### **Appendix B1: Coding procedures**

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 in UG-Team or the fairness statements in UGInd by 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, 142; Smith 2000, 322). In UGTeam, ATLAS.ti, a software for qualitative data analysis, was used for auto-coding both the Chinese and the German transcripts whenever (un)fairness has been mentioned. In UGInd, individual coders did the screening for fairness statements in the written answers to the open question: “Please explain the reasons why you took your decision. What did influence your decision?” Then, independent raters assigned the fairness discussions found 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 detailed coding manuals. 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>25</sup>  $K \geq .70$  indicates satisfactory inter-rater reliability (Merten 1995, Smith 2000, Krippendorff 1980). For the vast majority of our categories,  $K \geq .70$ . We conclude that on average our classification system yields satisfactory data.

Finally, coder disagreement has to be 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.

### **Appendix B2: Coding System, characterization of subcategories to FAIRNESS**

- MC1 GAME (fair and unfair)  
The game, the experiment, the game situation, the setting for proposers and receivers is perceived as (un)fair.
- MC2 PRINCIPLE (fair and unfair)  
Participants talk about a general principle, a social norm, an idea, a rule, a code of conduct, something general that goes beyond the game situation at hand (see Chiu and Hong 1997, Schlicht 1998) and relate the discussion to (un)fairness.
- MC3 ALLOCATION (fair and unfair)  
The discussion on (un)fairness refers to an allocation of the pie. MC3 is further subdivided into categories.

The first three categories comprise variations of the equity principle (Selten 1978, 1987, see also Hennig-Schmidt 1999, 2002).

- C1 EQUAL SPLIT (fair and unfair) (ES)

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<sup>25</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.

The discussion on (un)fairness refers to the Equal Split and is perceived as (un)fair (see also Fehr and Schmidt 1999, Bolton and Ockenfels 2000).

- C2 SPLIT THE DIFFERENCE (fair and unfair) (SD)  
The discussion on (un)fairness refers to Split the Difference (SD). This allocation divides the surplus over the sum of the outside options equally. It refers to the equity principle. SD gives 6 to the receiver R and 14 to the proposer S in treatment 2. In Treatment 3, R and S get 7 and 13, respectively.
- C3 PROPORTIONAL SPLIT (fair and unfair) (PS)  
The discussion on (un)fairness refers to the Proportional Split (PS). This allocation divides the pie proportionally to the outside options and is therefore perceived as fair. It also refers to the equity principle. PS can be calculated in T3 only. As the relation of the outside options is 1:4, R's and S's pay-offs are 4 and 16, respectively.

The next three categories capture the concept of inequity aversion (e.g. Fehr and Schmidt 1999, Bolton and Ockenfels 2000) but may also touch aversion against equity (see Hennig-Schmidt 1999, 2002).

- C4 MIDDLE RANGE (fair and unfair)  
The allocation in the middle range of the pie near the Equal Split is perceived as (un)fair.
- C5 DIFFERENCE (fair and unfair)  
The allocation makes the difference between the two players' payoffs (too) large/small and is thus perceived as (un)fair and (not) acceptable (see also Fehr and Schmidt 1999).
- C6 NON-EQUAL SPLIT (fair and unfair)  
The allocation is *not* the Equal Split and therefore is termed (un)fair.
- C7 LIMIT (fair and unfair)  
The allocation is stated as a limit for (un)fair allocations that can(not) be accepted. In all but two cases, this limit is the Equal Split.

The next category captures a specific Chinese value, namely long-term cooperation (Chinese Culture Connection 1987, Hofstede 1991).

- C8 LONGTERM ORIENTATION (fair and unfair)  
The allocation favoring a virtual long-term cooperation is perceived as (un)fair. Even though the experiment involves a one-shot interaction only, the possibility of long-term cooperation is discussed.
- C9 ALLOCATION-OTHER (fair and unfair)  
This category comprises discussions of (un)fairness for an allocation that cannot be assigned to any of the other subcategories of MC3.
- C10 NO REASONING (fair and unfair)  
The allocation is termed (un)fair but arguments as to the underlying motives are not given.

- MC4 OTHER (fair and unfair)  
(Un)Fairness is discussed but cannot be assigned to one of the other three main categories.

## Appendix C: Instructions

### Instructions for UGTeam (*translated from German/Chinese*) [Changes for UGInd]

You take part in an interactive **decision experiment** between **two groups of students [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 Receivers**. You have been randomly chosen to be a **Proposer / Receiver**. The role of either player group will be explained in a minute.

**Each proposing group [proposer]** is endowed with an amount of **20 tokens**. The proposing group [proposer] has to **decide how to split these 20 tokens** between their group and the receiving group [himself and the receiver]. The decision must be an **integer between 0 and 20**. The proposing group's [proposer'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 last two sentences were left out in *UGInd* instructions.]

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

**In case of rejection**

- \* **both player groups [players] receive nothing. (Treatment 1)**
- { \* *The proposing group [proposer] receives 8 (8) Tokens. (Treatments 2 and 3) }*
- { \* *The receiving group [receiver] receives 0 (2) Tokens. (Treatments 2 and 3) }*

**In case of acceptance**

- \* **both player groups [players] receive the amounts as they have been allocated by the proposer.**

For every Token your group earned **each group member [you earned you]** 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 [player] 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 [proposer/receiver]**. You have up to **15 minutes** to make your decision. [The last sentence were left out in *UGInd* instructions.]

Do you have **any questions?**