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Team, inequality aversion, preference aggregation, social image, experiment

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1. INTRODUCTION

Social comparisons, both among individuals and among groups, are widespread in human societies. While some individuals enjoy outperforming others, many people are inequality averse. In economic models such as Fehr and Schmidt (1999) and Bolton and Ockenfels (2000), inequality aversion captures the fact that people care about both their own material payoff and the distribution of payoffs between them and others. To date, the experimental literature has almost exclusively considered inequality aversion when an individual interacts with other individuals. It has largely neglected inequality aversion when individuals decide as members of a group interacting with another group. Yet, in this environment individuals can compare themselves both to their group members and to the members of the other group. Social dynamics and the influence of peers may also generate systematic differences in preferences compared to an environment in which people decide in isolation. It is unclear, however, whether inequality aversion is stronger or weaker in a social environment than when individuals interact with a single other individual. Indeed, if the reference group is one's in-group members, individuals may weigh less the difference with the other group; on the opposite, if the reference group consists of the out-group members, people may behave more competitively than when interacting with a single person, expressing more disadvantageous inequality aversion and less advantageous inequality aversion.

In this paper, we designed a laboratory experiment to compare inequality aversion in individuals when these individuals interact with another person and when they interact as a member of a team facing with another team, using various allocation tasks. We address three questions. First, we investigate whether the degree of inequality aversion when team members make initial proposals (that will be aggregated in team decisions) differs from when individual choices are made in isolation (i.e. when interacting with a single individual). That is, we examine the impact of a collective decision-making context. Second, we explore who in the team, either the more inequality averse or the less inequality averse member, has the strongest influence on the team final decision. Finally, we study whether individual preferences in team decision-making depend on whether the anonymity of team members is preserved or not during the aggregation process, revealing the possible role of social image concerns.

We contribute to the literature comparing group and individual decision-making. Many studies have found that teams behave in general more rationally and selfishly than individuals (Charness and Sutter, 2012), although some have shown that the difference depends crucially on the nature of the task and on the decision-making procedure (*e.g.*, Kocher and Sutter, 2007). However, these studies did not explore inequality aversion. A recent exception is Balafoutas *et al.* (2014) who show that if teams express the same advantageous inequality aversion as individuals, they are more benevolent than individuals in the domain of disadvantageous inequality and much more efficiency-oriented. This analysis builds on the theoretical approach of Kerschbamer (2013) and considers teams as a single unit. A major difference is that in our paper we elicit inequality aversion parameters at the individual level under the Fehr and Schmidt's (1999) theoretical framework in both the individual and the team decision-making environments. Moreover, we isolate the influence of image concerns in the aggregation of preferences in teams.

We also contribute to the literature on how individual preferences are aggregated in groups (*e.g*. Gillet *et al*., 2009; Zhang and Casari, 2012; Ambrus *et al*., 2014). Indeed, to address our first two questions we start by comparing the individual choices in various allocation tasks made in isolation and those made in a team environment under a unanimity rule. Then, we explore whether some individuals have a stronger influence in the team decision-making process, testing the hypothesis that players with median preferences make less concessions than other team members although all players have a veto power under the unanimity rule.

Another contribution is related to the study of whether and how the anonymity of decisions affects individual initial proposals in teams and their adjustment during the aggregation process. In real settings, choices by juries, boards, and families usually result from non-anonymous interactions. When it is common information that a proposal emanates from a physically identified team member, allocation choices may express a different degree of inequality aversion than when choices are made anonymously, due notably to social image concerns (see, *e.g.*, Benabou and Tirole, 2006).

In our experiment we elicit advantageous and disadvantageous inequality aversion at the individual level by means of the multiple price lists introduced by Blanco *et al*. (2011), based on the Ultimatum Bargaining Game (Güth *et al.*, 1982) and a Modified Dictator Game (originally developed by Forsythe *et al*., 1994; Hoffman *et al*., 1994). Blanco *et al*. (2011) used these tasks to test Fehr and Schmidt's (1999) model. Our contribution is to adapt this design to a team environment when all members of a team receive the same payoff. Pairs of three-player teams perform the same allocation tasks. The team decisions result from votes made under a unanimity rule. Using a within-subject design allows us to compare individuals' decisions made in isolation and their initial and final proposals within a team. To identify the role of anonymity, we use a between-subject design and add a treatment in which subjects can physically identify their team members and their proposals. Finally, we test the predictive capacity of our estimated parameters in a different setting, by using the production game designed by Yang *et al*. (2012) both in its original individual version and in our team environment.

We have four main findings. First, individuals express more disadvantageous and advantageous inequality aversion as team members than when they decide in isolation. This goes beyond a mechanical effect in the calculation of the parameters due to the comparison with more people. Second, the increase in inequality aversion when individuals make their initial proposals to the team compared to the decisions made in isolation is not primarily driven by social image concerns, as the lift of anonymity has little effect. It cannot be explained by efficiency concerns, as the difference is observed also in the UG where efficiency is kept constant across the decision problems and because switching earlier to equal sharing in the MDG reduces efficiency. Data are not consistent with a strategic inflation of inequality aversion by less selfish people in the anticipation of a match with more selfish people. Our interpretation is that the increase in inequality aversion stems from a change in the reference group that impacts preferences, as individuals know that their decision will influence the well-being of more people. Third, team members with the median level of inequality aversion drive the aggregation process, while the above median players make the largest concessions towards the position of the median members. This explains that the inequality aversion expressed by the final team decisions is lower than that based on initial proposals. Finally, the inequality aversion parameters based on Fehr and Schmidt's (1999) model have little predictive power of the effort provision behavior in Yang *et al*. (2012)'s model in both the individual and the team environments.

The remainder of this paper is organized as follows. Section 2 briefly reviews the related literature. Section 3 presents the experimental design and procedures. Section 4 analyzes the results, and Section 5 discusses these results and concludes the paper.

2. RELATED LITERATURE

Our main contribution is to connect the literatures on inequality aversion and on team decision-making. Tests of individual inequality aversion models have first been developed at the aggregate level (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). Then, several experimental studies attempted to elicit these preferences at the individual level (Engelmann and Strobel, 2004; Bolton and Ockenfels, 2006; Dannenberg *et al*., 2007; Güth *et al*., 2009; Bartling *et al*., 2009; Blanco *et al*., 2011; Yang *et al*., 2012; Beranek *et al*., 2015). Within-subject tests of the predictive power of inequality aversion preference estimates have produced mixed evidence. Engelmann and Strobel (2004) find no support for either Fehr and Schmidt's or Bolton and Ockenfels' models in a simple distribution game. Blanco *et al*. (2011) conclude that the predictive power Fehr and Schmidt's model is limited at the individual level. In contrast, Dannenberg *et al*. (2007) show that in social dilemmas the disadvantageous inequality aversion parameter has some explanatory power. These tests have used sequential prisoner's dilemma games (Blanco *et al.*, 2011) or public goods games (Blanco *et al*., 2011; Dannenberg *et al*., 2007). The production game introduced by Yang *et al*. (2012) provides precise normative standards in a richer environment offering more than binary choices. It shows the robustness of the inequality aversion model to efficiency concerns and variations in payoff scales. Our contribution is to adjust the games used in Blanco *et al*. (2011) and in Yang *et al*. (2012) to a team environment.

In the literature on group decision-making, many have found that teams behave more rationally in non-strategic interactions[1] and more selfishly than individuals in many games

[1] Teams make fewer mistakes (Fahr and Irlenbusch, 2011), suffer less from hindsight bias (Stahlberg *et al*., 1995), myopic loss aversion (Sutter, 2007), and overconfidence (Sniezek, 1992), are more risk averse (Baker *et al*., 2008; Shupp and Williams, 2008), closer to risk neutrality (He *et al.*, 2012) or take better risks (Rockenbach *et al*., 2007).

(Kugler *et al*., 2012),[2] although not all.[3] This behavior may be due to several factors, namely different preferences in groups than in individual interactions, the skewness of the distribution of individual members' preferences, the nature of the aggregation process. While Gillet *et al*. (2009) have shown that under the majority rule the median voter departs from his individual preferences after observing more selfish proposals than her own preferences, Ambrus *et al*. (2014) have found that median members are more influential than others because extremes neutralize each other (thus if the median member's pro-social preference is below the mean, it drives the group toward greater selfishness). However, the comparison of inequality aversion in individual and in team interactions has remained almost unexplored.[4]

As mentioned earlier, one exception is Balafoutas *et al*. (2014) who study distributional preferences under both individual and team regimes. They find that teams eliminate choices consistent with inequality aversion and spitefulness and they favor efficiency, in particular because communication allows efficiency-lovers to be more assertive than others in teams. While our objective is also to better understand how social preferences are aggregated in teams, we differ from this study in several respects. Balafoutas *et al*. (2014) elicit distributional preferences

[2] This result holds for dictator games (Luhan *et al*., 2009), sequential games such as ultimatum (Robert and Carnevale, 1997; Bornstein and Yaniv, 1998), trust (Cox, 2002; Kugler *et al*., 2007; Song, 2009), centipede (Bornstein *et al*., 2004a), power-to-take games (Bosman *et al.*, 2006) and signaling games (Cooper and Kagel, 2005), as well as simultaneous games such as public goods (Van Vugt *et al*., 2007; Gillet *et al*., 2009), beauty contests (Kocher and Sutter, 2005; Kocher *et al.*, 2006; Sutter, 2005), and auctions (Cox and Hayne, 2006; Sutter *et al*., 2009; Sheremeta and Zhang, 2010; Casari *et al*., 2011; Cheung and Palan, 2011).
[3] Cason and Mui (1997) find in a dictator game that teams who are initially more self-regarding tend to act less selfishly. This polarization is due more to social comparisons (which give more weight to pro-social individuals) than to persuasion. In a similar game, Franzen and Pointner (2014) find no difference. Müller and Tan (2013) find less selfish team choices in sequential market games. Kocher and Sutter (2007) find mixed evidence in gift-exchange.
[4] Note that one can find studies on how inequality aversion in teams affects contractual design (Rey-Biel, 2008; Bartling and von Siemens, 2010), sharing rules (Gill and Stone, 2015), peer pressure (Mohnen *et al*., 2008), or sanction and cooperation (Masclet and Villeval, 2008).

based on the theoretical approach of Kerschbamer (2013);[5] in contrast, we elicit inequality aversion parameters under the Fehr and Schmidt's (1999) theoretical framework. Moreover, they treat teams as a decision unit; instead, we consider team members as individuals and characterize how a team environment affects each individual parameter. In addition, our design allows us to isolate the role of anonymity in groups. Finally, we measure the predictive power of our measures of inequality aversion in a different environment of production game.[6]

The combination of the decision-making procedure and the distribution of players' types may determine the individual-team differences (see Bosman *et al.*, 2006). Previous literature has shown that groups do not reach the same decisions as individuals when the majority agrees or when unanimity is required (*e.g*. Bornstein *et al*., 2004b; Blinder and Morgan, 2005; Gillet *et al*., 2009).[7] Most studies use face-to-face with unrestricted communication (Kocher and Sutter, 2005; Kocher *et al*., 2006; Kugler *et al*., 2007; Sutter *et al*., 2009; Ambrus *et al*., 2014; Balafoutas *et al*., 2014). Kocher and Sutter (2007) show that groups behave more selfishly than individuals in an anonymous computerized procedure but not in a face-to-face protocol. Furthermore, anonymity may affect the process of deindividuation within teams.[8] In our paper, we impose

[5] Subjects make binary allocation choices, one choice involving always the same symmetric payoffs and the other choice asymmetric payoffs. In half of the decisions, the decision-maker is ahead the passive agent and in the other half he is behind. In contrast, we use a game where the fixed option maximizes the level of inequality.
[6] There are other differences with our design. Contrary to Balafoutas *et al*., our games are played in a single session, we alternate the order between team and individual decisions, and we do not allow free communication. In their design, unanimity must be reached in five rounds maximum, while in our case we apply a time constraint. They pay subjects both as an active player and as a passive person while we pay subjects randomly in one of the two roles. In case of inability to reach an agreement, their subjects' payoffs are null, which may create a stronger pressure to reach unanimous team decisions than in our case where team decisions are randomly assigned from the possible decisions.
[7] Many papers on group decisions impose unanimity (*e.g*., Sutter, 2005; Kocher and Sutter, 2005, 2007; Shupp and Williams, 2008; Luhan *et al*., 2009; Sutter *et al*., 2009). Some use the majority (Baker *et al*., 2008; Harrison *et al*., 2012) or the median (Bischoff and Krauskopf, 2013). Others allow for unrestricted deliberation (Cason and Mui, 1997; Bornstein *et al*., 2004a; Bosman *et al*., 2006; Schupp and Williams, 2008; Ambrus *et al*., 2014).
[8] Anonymity is a key factor of deindividuation. In social psychology the deindividuation theory of Festinger *et al*. (1952) predicts that the anonymity of individuals in a group may lower their sense of personal identity and reduce compliance with the group norm. In contrast, the social identity model of deindividuation (Reicher *et al*., 1995) suggests that anonymity facilitates the alignment of the individual with the group's preferences.

unanimity and restricted communication instead of face-to-face in order to be able to identify the role of anonymity while keeping the environment constant, as explained below.

3. EXPERIMENTAL DESIGN AND PROCEDURES

3.1. The games

Inequality aversion in an individual decision-making environment

To estimate the individuals' disadvantageous and advantageous inequality aversion parameters as defined in Fehr and Schmidt's model, we replicate two of the games used in Blanco *et al*. (2011). Each game consists of 21 decision problems, as shown in Table 1. The games are played under the veil of ignorance using the strategy method.[9]

The Ultimatum Game (UG) involves a proposer and a responder. The proposer must share a pie of 400 points between himself and the responder. He makes an offer *S* to the responder, keeping (400 - *S*) to himself. If the responder rejects the offer (option A), both players earn zero. If the responder accepts the offer (option B), the share is implemented. The proposers' offers are restricted to multiples of 20, leading to 21 distributions from (400, 0), (380, 20), … to (0, 400). Subjects make their 21 decisions in each of the two roles sequentially on two separate screens to minimize interactions between the two decisions.

In the Modified Dictator Game (MDG), the dictator decides how many of 400 points she is willing to sacrifice to equalize payoffs between herself and the receiver. There are 21 decision problems with two options. The left option always pays 400 points to the dictator and nothing to

[9] Brandts and Charness (2011) survey the literature to compare the strategy method and the direct-response method. A total of 16 out of the 29 comparisons show no difference, four find differences and nine find mixed evidence.

the receiver. The right option gives equal payoffs to both players and varies from (0, 0), (20, 20), … to (400, 400). Each subject makes a choice in the role of a dictator.

In both games we impose the restriction of single switching between the two options in the 21 problems.[10] Specifically, in the UG responders choose the number of the decision problem from which they accept all of the proposer's offers; in the MDG dictators select the number of the decision problem from which they always choose equal sharing. It was made clear that the subjects could switch from the first problem and that they were allowed not to switch at all. This gives each responder in the UG a single minimum acceptable offer that determines the disadvantageous inequality aversion parameter, α. In the MDG the maximum amount that the dictator is willing to sacrifice to implement equal sharing determines the advantageous inequality aversion parameter, β. Random draws at the end of the session determined the actual role in each game and which one of the 21 decisions in each game was paid.

Table 1. The Ultimatum Game and the Modified Dictator Game

Decision problem	Ultimatum Game			Modified Dictator Game	
	Proposer's decision	Responder's decision		Dictator's decision	
		Option A	Option B	Option A	Option B
1	(400，0)	Reject	Accept	(400，0)	(0，0)
2	(380，20)	Reject	Accept	(400，0)	(20，20)
3	(360，40)	Reject	Accept	(400，0)	(40，40)
4	(340，60)	Reject	Accept	(400，0)	(60，60)
5	(320，80)	Reject	Accept	(400，0)	(80，80)
6	(300，100)	Reject	Accept	(400，0)	(100，100)
7	(280，120)	Reject	Accept	(400，0)	(120，120)
8	(260，140)	Reject	Accept	(400，0)	(140，140)
9	(240，160)	Reject	Accept	(400，0)	(160，160)
10	(220，180)	Reject	Accept	(400，0)	(180，180)
11	(200，200)	Reject	Accept	(400，0)	(200，200)
12	(180，220)	Reject	Accept	(400，0)	(220，220)

[10] Imposing single switching is in contrast with Blanco *et al*. Rational players with monotone preferences should switch only once from option A to option B because their payoff becomes larger in the UG for all problems beyond the switching point; similarly in the MDG, the egalitarian outcome is always cheaper beyond this point. Imposing single switching facilitates team decision-making by simplifying the aggregation process and rules out inconsistent choices. The same procedure has been applied by Tanaka *et al*. (2010) to elicit risk preferences and time consistency. We acknowledge that enforcing exactly one switching point may bias the choices of individuals who in the UG would like to reject both splits giving them less than the equal share (which depends on the value of α) and splits giving them more than the equal share (which depends on the value of β).

13	(160，240)	Reject	Accept	(400，0)	(240，240)
14	(140，260)	Reject	Accept	(400，0)	(260，260)
15	(120，280)	Reject	Accept	(400，0)	(280，280)
16	(100，300)	Reject	Accept	(400，0)	(300，300)
17	(80，320)	Reject	Accept	(400，0)	(320，320)
18	(60，340)	Reject	Accept	(400，0)	(340，340)
19	(40，360)	Reject	Accept	(400，0)	(360，360)
20	(20，380)	Reject	Accept	(400，0)	(380，380)
21	(0，400)	Reject	Accept	(400，0)	(400，400)

Note: The first numbers in parentheses display the proposer's payoffs, the second numbers the receivers' payoffs.

In addition, we used the production game (PG, hereafter) of Yang *et al*. (2012) to test the predictive power of our inequality aversion estimates. This PG involves two workers, A and B, who are in charge of departments 1 and 2, respectively. Each worker chooses an effort level (an integer between 0 and 100, multiple of 10) that determines the production of his department, p_i:

$$p_i\left(e_i\right) = 4e_i - e_i^2 / 100, i = A,B$$

The effort of each worker in his department conditions both his payoff and his co-worker's payoff. Indeed, total income is determined by four elements. (1) Fixed salary, s_i, is 200 points for A and 0 for B. (2) Bonus 1 depends on A's production in department 1 that is equally divided between A and B. (3) Bonus 2 depends on B's production in department 2 that is also equally shared between A and B. (4) Effort is costly: each unit of effort in one's department costs 2 points to A and 1 point to B. The total income is therefore equal to the sum of the basic salary and half of Bonuses 1 and 2 minus the cost of effort, that is,

$$\pi_i\left(e_A, e_B\right) = s_i + \frac{1}{2}\sum_{j=A,B} p_j\left(e_j\right) - e_i c_i, i = A,B$$

Because A always earns more than B regardless of the combination of efforts, the prediction is that A's effort should depend positively on his advantageous inequality aversion, while B's effort should depend negatively on his aversion to disadvantageous inequality. In line with Yang *et al.* (2012), subjects must make two simultaneous effort decisions in the role of A and B, as shown in Figure A1 in Appendix 3. A calculator on the screen can be used to explore the consequences of any possible combination of efforts.[11] The actual roles in the pairs are randomly assigned at the end of the session.

Inequality aversion in a team decision-making environment

In a team environment, we paired teams of three individuals who play a collective version of the previously described UG, MDG and PG. We use the same tables as for decisions made in isolation. To hold the monetary incentives comparable across individual and team conditions, the payoffs achieved in the team games are paid to each team member. For example, if the selected decision in the DG pays 400 points to the dictator team and leaves nothing for the receiver team, each of the three dictator team members earns 400 points and each of the three receiver team members receives 0. The actual roles of a team are randomly assigned at the end of the session and one decision problem in each of the UG and the MDG is randomly selected for payment.

Unanimity is required to form a team decision. Choosing unanimity instead of the majority rule allows us to study the convergence process to the team decision and gives each player a veto power. In each game the team members must simultaneously submit their individual proposal for the team decision. Then the three proposals are displayed on the members' screens. If they are not identical, a new round starts and each member must submit a new proposal (possibly the same as in the previous round). This procedure is repeated until all teammates submit identical proposals. The number of rounds is unrestricted within the limit of 10 minutes for each team's decision. In case unanimity has not been reached after the 10 minutes have elapsed, the computer selects one decision at random. We have preferred a formal process of decision-making with restricted communication instead of a face-to-face procedure to have a better control of the

[11] A subject's screen displays his effort level, the bonus from his department, his effort cost and his total income. The bonus from the other department cannot be displayed because it depends on the other worker's effort. The consequences of this other effort could be explored in the right panel of the screen.

interactions between team members and to be able to isolate in a separate treatment the role of anonymity while keeping the rest of the environment constant. This also allows us to observe the evolution of proposals when all members make exactly the same number of proposals.

One advantage of our design is that for each subject, we are able to observe his individual decision made in isolation, his initial proposal in the team before learning others' preferences, and his final decision as aggregated in the team decision.

3.2. Treatments and matching protocol

The experiment consists of three main treatments using a between-subjects design. Each treatment includes five parts that allow us to make within-subject comparisons across parts. Parts 1 and 2 correspond to the one-shot UG and MDG played individually, whereas Parts 3, 4 and 5 differ across treatments. The I-I (I for *Individual*) treatment involves only individual decision-making: Parts 3 and 4 replicate Parts 1 and 2 (UG and MDG) and Part 5 consists of the individual PG. The I-AT (AT for *Anonymous Team)* treatment introduces collective decision-making in Parts 3 and 4 (UG and MDG) and in Part 5 (PG). Players do not know whom they are interacting with. The I-NAT (NAT for *Non-Anonymous Team*) treatment is identical to the I-AT treatment with two exceptions. First, we lift anonymity within the team: at the beginning of Part 3, players are told that the three subjects seated in the same row belong to the same team, with identification numbers I, II, and III assigned to the players seated at the left, middle and right of the row, respectively. Second, the identification number of the player appears next to his proposals so that teammates can trace the evolution of a player's proposals across rounds. Lifting anonymity may expose subjects to a higher social pressure, which may influence both their degree of inequality aversion and their bargaining behavior. In contrast, players receive no information on the composition of the team they are paired with and on the proposals made within the other team.

To control for possible order effects, we also conducted the NAT-I treatment. Compared to the I-NAT treatment, the appearance order of Parts 3 and 4 and Parts 1 and 2 is reversed. This allows us to study whether decisions made in isolation after team decisions differ from those made before the team bargaining.

In all treatments the appearance order of the UG and the MDG was randomized across sessions, but the order of the two games was held constant in Parts 1 and 2 and in Parts 3 and 4 in the same session. A perfect stranger matching protocol rules out reciprocity and reputation building across parts. Each team (individual) is paired with a different team (individual) across parts, whereas the composition of each team is kept constant across parts. This is common knowledge.

Table 2 summarizes the key features of our experimental design.

Table 2. Summary of the experimental design

Treatment	Part 1	Part 2	Part 3	Part 4	Part 5
I-I	Individual UG/MDG	Individual MDG/UG	Individual UG/MDG	Individual MDG/UG	Individual PG
I-AT	Individual UG/MDG	Individual MDG/UG	Team UG/MDG Anonymity	Team MDG/UG Anonymity	Team PG Anonymity
I-NAT	Individual UG/MDG	Individual MDG/UG	Team UG/MDG No anonymity	Team MDG/UG No anonymity	Team PG No anonymity
NAT-I	Team UG/MDG No anonymity	Team MDG/UG No anonymity	Individual UG/MDG	Individual MDG/UG	Team PG No anonymity

Note: UG for Ultimatum Game, MDG for Modified Dictator Game, and PG for Production Game.

3.3. Procedures

The experiment was conducted at the laboratory of Beijing Normal University. 336 volunteers were recruited via announcements on the bulletin board system and in accommodation and teaching buildings of local universities. Each of the 14 sessions involved 24 subjects (2 sessions with I-I and 4 with each other treatment). In total, we have 48 individual observations for the I-I treatment and 32 team observations for each other treatment. Due to inability to reach unanimity, we lost a few observations of the final team decisions in the role of the dictator in the MDG (1 in both I-AT and NAT-I) or in the role of the proposer in the UG (4 in I-AT and 2 in NAT-I).

The experiment was computerized using z-Tree (Fischbacher, 2007). Upon arrival, the subjects were assigned randomly to a computer terminal. Each part was introduced sequentially after completion of the previous one. Instructions were distributed and questions were answered in private (see Appendix 1). Subjects were given no information about the number of parts and they received no feedback on the outcome of any part until the end of the experiment. Sessions lasted approximately 90 minutes. Subjects received in cash the sum of their earnings for all parts from an assistant who was unaware of the content of the experiment. This was made common information in the instructions. In the experiment we used a conversion rate of 100 points = 3 Chinese Yuan ≅ US$ 0.5. Participants earned on average 82.70 Yuan (about US $13.65), including a 10-Yuan show-up fee, which is above the average salary for a student's part-time job.

4. RESULTS

First, we report descriptive statistics on the subjects' aversion to disadvantageous inequality (α) and to advantageous inequality (β) in individual and team environments. Second, we compare the α and β parameters between treatments. Third, we explore the process that leads to team decisions. Last, we test whether the α and β parameters predict behavior in the production game.

4.1. Inequality aversion in individual and team environments

The two inequality aversion parameters are calculated as in Blanco et al. (2011), using non-linear monotonic conversion both for the individual and the team decision-making environments (see details in Appendix 2). In the individual decision-making environment, the calculation is based on the income comparison between the player and his co-participant. In the team decision-making environment, the calculation accounts for the fact that the player compares his payoff to that of five co-players (his two team members whose payoffs are identical to his and the three members of the other team). Assuming that each of the five co-players has the same weight as in Fehr and Schmidt (1999), the value of the parameters in the team environment is 5/3 of their value in the individual environment.

Using point estimates, Mann-Whitney rank-sum tests (M-W, hereafter)[12] indicate no significant difference between the values of α and β calculated in the individual environment in our experiment and those reported in Blanco *et al*. (2011) (p=0.594 for α and p=0.878 for β). Table A1 in Appendix 3 displays the distribution of the two parameters using the same intervals as Fehr and Schmidt (1999) and Blanco *et al*. (2011) based on the individual decisions, the individual initial proposals and the final decision in the team environment. Surprisingly, considering the differences in the cultural and political backgrounds between China and the U.K., the distributions of each parameter based on decisions in the individual environment are similar in our experiment and in Blanco *et al*. (Kolmogorov-Smirnov tests, p=0.234 for α and p=0.562 for β). [13,14]

[12] All the non-parametric tests are two-tailed. Each individual gives one independent observation in the individual decisions and initial proposals and each team gives one independent observation in the team decisions. Considering $s_i = s_i' - 10$ and $\tilde{x}_i = x_i' - 10$ in the calculation of the parameters is an approximation that does not impact the results of the non-parametric statistics because they are based on ordinal rankings (see Blanco *et al.,* 2011).

[13] In the absence of individual data to compare with Fehr and Schmidt (1999), we conducted Chi-squared tests like Blanco *et al*. with the aggregate data for the distribution percentages in the various categories. There is no significant difference either between our distributions and those reported in Fehr and Schmidt (p=0.785 for α and p=0.140 for β).

[14] Spearman correlation coefficients indicate that α and β are not correlated in either decisions in isolation, initial proposals or final decisions in the team environment in any treatment (p>0.10 in all cases). This is consistent with Blanco *et al*. but contrasts with Fehr and Schmidt's assumption. When pooling treatments, we find that 40% of the subjects violate Fehr and Schmidt's assumption that $\alpha \geq \beta$ when making individual decisions (this percentage was 38% in Blanco et al. and 55% in the British sample of Beranek *et al*., 2015). This violation occurs for 33% of subjects in the final team decision in I-AT, 34% in I-NAT and 28% in NAT-I. W tests show that subjects are not significantly more or less likely to have $\alpha \geq \beta$ in the team than in the individual environment (p>0.10).

To analyze the differences between the individual and the team decision-making environments, Table 3 reports the mean values of the inequality aversion point estimates of α and β based on the same three types of decisions, by treatment.

Table 3. Mean values of the α and β parameters in the individual and the team environments

	Individual environment		Team environment				Number of subjects
			Individual initial proposals		Final team decisions		
Treatments	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Disadvantageous inequality aversion parameter (α)							
I-I	1.07	1.43	-	-	-	-	48
I-AT	1.29	1.53	2.79***	2.78	2.23***	2.38	84
I-NAT	1.04	1.29	2.48***	2.44	2.14***	2.10	96
NAT-I	1.10	1.40	2.44***	2.65	1.86**	2.11	90
Advantageous inequality aversion parameter (β)							
I-I	0.45	0.28	-	-	-	-	48
I-AT	0.51	0.29	0.90***	0.46	0.85***	0.33	93
I-NAT	0.45	0.27	0.89***	0.44	0.83***	0.35	96
NAT-I	0.36	0.29	0.65***	0.41	0.58***	0.37	93

Notes: The parameter values in the individual environment are calculated based on the 2-person Fehr and Schmidt's model; the parameter values in the team environment refer to the 6-person Fehr and Schmidt's model. The values reported for I-I are for the first set of decisions; the values for the second set of decisions in I-I are 1.02 (S.D.=1.42) for α and 0.45 (S.D.=0.29) for β; there is no significant difference between the first and the second sets of decisions. The number of team observations is different for α and β because the number of teams reaching unanimity differs in the UG and the MDG. *** and ** indicate significance at the 1% and the 5% levels, respectively, in two-tailed W tests in which the reference is the parameters determined by the individual decisions.

Table 3 reveals that the mean values of both α and β are significantly higher when moving from the individual to the team environment; this applies to both the initial proposals and the final decisions in all treatments, regardless of the order of decisions. The inequality aversion revealed by the final decisions in teams is, however, lower than that revealed by the initial proposals.[15] We now explore in details these findings.

[15] As a complement, Table A2 in Appendix 3 displays the mean switching points given by the decision numbers in the UG (for the acceptance threshold) and in the MDG by treatment, in the individual environment and in the initial

4.2. Between- and within-subject comparisons

Between-subject comparisons across treatments

We can first rule out that the differences between treatments are due to sample specificities. Indeed, pairwise comparisons show no significant difference in the inequality aversion parameters derived from individual decisions.[16] In contrast, M-W tests indicate significant differences between the values of the parameters deriving from the second set of decisions in I-I and from the individual initial proposals in I-AT and I-NAT (p<0.001 for both α and β in both treatments), and indicate no difference for α (p=0.602) and a marginally significant difference for β (p=0.094) between the values of the parameters from second set of decisions in I-I and from the individual decisions in NAT-I. We also find significant differences when comparing the second set of individual decisions in I-I and the team decisions in I-AT (p=0.003 for α, <0.001 for β) and in I-NAT (p=0.003 for α, <0.001 for β). The fact that we find no difference between I-AT and I-NAT as regards both the initial proposals (p=0.719 for α, 0.834 for β) and the final team decisions (p=0.940 for α, 0.754 for β) indicates that social image is unlikely to motivate the higher inequality aversion in the team environment.

Comparing the I-NAT and the NAT-I treatments we find no order effect in the determination of the disadvantageous inequality aversion, regardless of whether it is based on individual decisions, initial proposals or team decisions (M-W tests, p=0.990, 0.613, and 0.455, resp.). In contrast, starting a session with team decision-making reduces the advantageous inequality aversion expressed in initial proposals and in team decisions (p<0.001). The advantageous

proposals and final team decisions in the team environment. It shows that subjects switch later in the UG and sooner in the MDG when making their first proposal in the team compared to the individual environment. In contrast, except in I-NAT, the switching points in final decisions in teams do not differ from those in the individual environment.

[16] Considering the first individual decisions in I-I, M-W tests give the following p-values for α: 0.673 for I-I *vs*. I-AT, 0.841 for I-I *vs*. I-NAT, and 0.650 for I-AT *vs*. I-NAT. The respective values for β are 0.277, 0.942, and 0.221. Using instead Fisher's exact tests for categorical outcomes gives the same qualitative conclusions. Kruskal-Wallis tests for I-I *vs*. I-AT *vs*. I-NAT indicate p=0.867 for α and 0.386 for β.

inequality aversion revealed by the individual decisions is also lower when these decisions follow decisions in teams (p=0.031) than when they precede them and than that in the second set of decisions in I-I (p=0.094). However, this result does not probably stem from social information during the aggregation process since the initial proposals in NAT-I already reveal less inequality aversion than individual decisions in I-NAT.

Within-subject comparisons in each treatment

At the individual level, the I-I treatment shows no significant difference in the values of α (Wilcoxon signed-rank tests, W hereafter, p=0.453) and β (p=0.929) between the two sets of individual decisions. In all the other treatments, the values of the parameters based on final team decisions are significantly higher than in the individual environment (p=0.043 for α in NAT-I and p<0.001 for all the other cases, see Table 3). To explore this increase in inequality aversion in the team environment, we start by comparing the individual decisions made in isolation and the initial proposals in teams. Wilcoxon tests reveal significant differences for both parameters (p<0.001 in all treatments, see Table 3). This is also supported by the post-regression tests shown in Table A4 in Appendix 3, which are based on the random-effects interval regressions and Tobit regressions reported in Table A3 in which we study the sensitivity of α and β to the type of decision by treatment.

The higher advantageous and disadvantageous inequality aversion revealed by initial proposals in teams compared to the individual decisions can be attributed to several reasons. First, individuals can compare themselves to more players in the team environment: this may affect their preferences but this may also have a mechanical effect in the calculation of the parameters. Second, since they receive no information about the preferences of their team members, individuals may strategically submit more inequality averse proposals in order to balance others' expectedly more selfish proposals. Third, the higher efficiency concerns that have been observed in previous literature in teams may affect behavior. Fourth, behavior may be driven by social image concerns because proposals are shown to team members.

We can reject the fourth explanation since Chi-squared tests show that the difference in α and β between individual decisions and initial proposals is the same in I-NAT and in I-AT (see second panel in Table A4). We also reject the third explanation in terms of efficiency concerns for two reasons: a change is observed in the UG where efficiency is kept constant across decisions; and switching earlier from the selfish to the equal sharing in the MDG (which generates higher advantageous inequality aversion) decreases efficiency, as measured by the sum of payoffs. Since we did not elicit the players' beliefs about others' preferences, we cannot test directly the second explanation. However, it is not supported by the fact that those who inflate more their inequality aversion when submitting their initial proposal are the less inequality averse players in the individual environment: Spearman coefficients indicate a negative correlation between the parameters from individual decisions and the degree of inflation (p=0.005 for α and p<0.001 for β). Considering the first explanation, we can isolate the pure mechanical effect of the change in the size of the reference group by calculating an artificial index of inequality aversion based on the choices in the individual environment as if the choices applied to six co-players instead of two. Wilcoxon tests comparing the inequality aversion parameters based on the individual initial proposals in teams with this artificial index still indicate a significant positive difference in almost all treatments except for β in NAT-I.[17] This rejects a pure mechanical

[17] The artificial values of α are 2.14 in I-AT, 1.73 in I-NAT and 1.84 in NAT-I. The corresponding artificial values of β are 0.84, 0.76 and 0.60. The W tests are significant at the 1% level for α in I-AT, for α and β in I-NAT, and at the 5% level for α in NAT-I and for β in I-AT, respectively.

explanation. Therefore, we speculate that our findings are more in line with a change in preferences due to a change in the reference group.

Finally, comparing the final team decisions to the individual initial proposals reveals significant negative differences for α in I-AT and NAT-I (W tests, p=0.076 and 0.084), but not in I-NAT. For β the only significant negative difference is observed in I-NAT (W test, p=0.091). We explore further the aggregation process in sub-section 4.3.

Econometric analysis

Table 4 reports the marginal effects of Tobit regressions.[18] The dependent variable is either the disadvantageous inequality aversion parameter α (models (1) to (4)) or the advantageous inequality aversion parameter β (models (5) to (8)) as calculated from the individual decisions from all treatments in the individual environment (excluding the second set of decisions in I-I in Models (1) and (5)), and the individual initial proposals and the final team decisions in the team environment in I-AT, I-NAT and NAT-I.[19] Models (4) and (8) are random-effects Tobit models in which we pool the data from individual decisions and initial proposals from all treatments. In all regressions standard errors are clustered at the team level because it is more conservative.

The independent variables include three dummy variables indicating whether the MDG was played before the UG, whether the session started with the team environment and capturing the influence of a lift of anonymity when appropriate. In the regressions on initial proposals, we include the respective point estimates of α (model (2)) and β (model (6)) from individual decisions. In the regressions based on team decisions, we include the respective median value of α (model (3)) and β (model (7)), as determined by the three teammates' initial proposals. We also

[18] Interval regressions (available upon request) provide qualitatively similar results.
[19] Note that in models (3) and (7), we consider only one observation per team that achieved unanimity. This is more conservative than taking one observation per team member. To be consistent, in all the other models we only include data from individuals belonging to teams that achieved unanimity.

include the positive distance in initial proposals between the estimates of α (respectively, β) for the player who is above the median in his team and for the player with the median preference. Similarly, we include the absolute negative distance for the player who is below the median and for the median player. This gives an indication of the impact of the different teammates on the team decision. We also include in models (2) and (3) the switching point corresponding to the team's offer in the UG because the agreement found in the team when determining its offer informs players about others' preferences, which may affect the acceptance threshold and thus the α parameter. In models (4) and (8) using pooled data, three dummy variables control for individual decisions made first (first set of decisions in I-I and individual decisions in I-AT and I-NAT), for the second set of decisions in I-I, and for individual decisions made after team decisions in NAT-I, with the initial proposals taken as the reference category. Finally, we control for individual characteristics such as gender, age, monthly income and number of acquaintances in the same session. In the models relative to the team decision, we instead control for the gender composition of the team and interact this variable with the non-anonymity of the proposals.

Table 4 confirms that individuals express higher disadvantageous and advantageous inequality aversion in their initial proposals in the team environment than when they decide in isolation (see models (4) and (8)). If a team made a more generous offer in the UG, the player is more likely to propose initially a lower acceptance threshold compared to the individual environment (model (2)) but this has no effect on the final team decision (model (3)). Models (3) and (7) show that the median parameters based on the initial proposals influence positively the degree of inequality aversion of the final decisions. A larger positive distance to the median has a surprising negative impact on advantageous inequality aversion, suggesting that the aggregation process does not treat preferences symmetrically. Model (3) confirms that lifting anonymity has no significant impact except increasing disadvantageous inequality aversion in team decisions; this effect is largely driven by females, as the interaction between the number of males in the team and the non-anonymous framing is significant and negative. We also find that males express more disadvantageous inequality aversion in their initial proposals than females. Finally, having more acquaintances in the session increases advantageous inequality aversion in initial proposals. This analysis can be summarized as follows.

Table 4. Determinants of the disadvantageous and advantageous inequality aversion parameters (Tobit models)

Variables	*Disadvantageous inequality aversion parameter (α)*				*Advantageous inequality aversion parameter (β)*			
	Indiv. decision (1)	Initial proposal (2)	Team decision (3)	Indiv. dec and initial proposal (4)	Indiv. decision (5)	Initial proposal (6)	Team decision (7)	Indiv. dec and initial proposal (8)
MDG played before UG				-0.196				
				(0.120)				
Team offer in UG				-				
						-0.030	0.046	
No anonymity		0.251		-	0.019	(0.032)	(0.035)	
		(0.220)	-0.199		(0.029)	-	-	
Individual decision	-0.266*	0.202**	(0.250)	-	-			0.014
made first	(0.143)	*	0.033	1.246**		0.043	-0.019	(0.033)
Individual decision made	-	(0.054)	(0.064)	*	-	(0.036)	(0.075)	-
after individual decision (I-		-0.011	0.986**	(0.151)		-	-	
I=1)	-	(0.249)	(0.464)	-	-			-
Individual decision made		-	-	1.255**		-	-	
after team decision (NAT-	-			*	-			-0.363***
I=1)		-	-	(0.163)		-	-0.027	(0.021)
Number of males in the team	-			-	-	0.129**	(0.063)	-0.348***
		0.119	-0.234	1.086**	0.120**	*	-0.013	(0.036)
Number of males in the team	0.032	(0.298)	(0.290)	*	*	(0.045)	(0.030)	-0.321***
* Non-anonymity	(0.178)	-	0.428	(0.217)	(0.039)	-	-0.017	(0.036)
α in individual decision	-		(0.280)	-	-		(0.050)	-
		-	-0.689**			-	-	
β in individual decision	-		(0.350)	-	-			-
		1.041**	-			-	-	
Team median α in initial	-	*		-	-			-
proposals		(0.085)	-			1.118**	-	
Dist between above median	-	-		-	-	*		-
and median α in initial			0.712**			(0.069)	-	
proposals	-	-	*	-	-	-		-
|Dist| between below median			(0.092)				-	
and median α in initial	-	-	-0.151	-	-	-		-
proposals			(0.150)				1.039**	
Team median β in initial	-	-	0.045	-	-	-	*	-
proposals			(0.081)				(0.060)	
Dist between above median	-	-	-	-	-	-	-	-
and median β in initial							0.175**	
proposals	-	-	-	-	-	-	*	-
|Dist| between below median							(0.056)	
and median β in initial	-	-	-	-	-	-	-0.045	-
proposals							(0.070)	
Male	-0.015	0.488**	-	0.174*	-0.043	-0.039	-	-0.042
	(0.126)	(0.239)		(0.090)	(0.031)	(0.040)		(0.033)
Age	-0.007	0.003	-	-0.002	0.011	0.012	-	0.014***
	(0.034)	(0.062)		(0.038)	(0.007)	(0.008)		(0.005)
Monthly income	-0.003	-0.145	-	-0.053	0.021	0.006	-	0.023
	(0.071)	(0.098)		(0.067)	(0.019)	(0.019)		(0.017)
Having acquaintances	-0.086	-0.220	-	-0.206	-0.027	0.082**	-	0.028
in the session	(0.133)	(0.260)		(0.162)	(0.033)	(0.039)		(0.022)
				636				
Nb of observations	318	264	88	72	330	282	94	660
Left-censored observations	38	29	5	41	31	21	5	55
Right-censored observations	31	41	6	<0.001	12	11	0	0
Chi-squared test	0.681	<0.001	<0.001	-	0.021	<0.001	<0.001	<0.001
Log-likelihood	-565.928	-517.48	-154.304	1252.79	-130.351	-102.414	15.965	-255.448
				2				

Notes: Marginal effects are reported and standard errors clustered at the team level are in parentheses. In models (4) and (8), standard errors have been clustered using bootstrapping. MDG played before UG, No anonymity, Individual decisions made first, Individual decisions made after individual decisions and Individual decisions made after team decisions are dummy variables. ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively. Including the variable "Team offer in UG" in columns (2) and (3) excludes 2 teams (6 subjects) that did not reach unanimity for proposer decisions in the UG.

Result 1: Both disadvantageous and advantageous inequality aversion is larger in the team decision-making environment than in the individual decision-making environment.

Result 2: Individual initial proposals in teams reveal more inequality aversion than individual decisions made in isolation. Efficiency concerns, social image or strategic reasoning in the absence of information about others' preferences cannot rationalize this result. We suggest that a change in preferences due to a change in the reference group might drive this result.

4.3. Aggregation of individual choices in teams

We now explore the aggregation of preferences in teams by means of two measures. The first one is the number of proposal rounds needed to reach unanimity, which captures the tension in the team. The second measure is a concession index between an individual's initial proposal to the team decision, given by the mean absolute distance (described by the number of decision problem) between an individual's initial proposal and the team decision divided by the number of rounds. A higher index means larger concessions per round. We exclude four teams for which the initial proposals were already unanimous and eight teams that did not reach unanimity.

When we pool the three team treatments, it takes on average 4.44 rounds (S.D.=3.77) to converge to a team decision on the acceptance threshold in the UG and 4.14 rounds (S.D.=2.11) to converge to the dictator's decision in the MDG.[20] The number of rounds does not differ significantly across UG and MDG (W test, p=0.327). The mean concession index is 0.89 switching point per round in the UG (S.D.=1.49) and 1.37 (S.D.=2.07) in the MDG. Comparing I-AT and I-NAT reveals no significant difference based on either the number of rounds or the concession index on the acceptance threshold in the UG (W tests, p=0.849 and 0.909, respectively) or the dictators' decision (p=0.288 and 0.503, respectively). Finally, comparing I-NAT and NAT-I reveals no order effect based on the number of rounds or the concession index in the UG (p=0.408 and 0.727, respectively) as well as on the concession index in the MDG (p=0.589), although the number of rounds differs in the latter (p=0.003).

[20] For the team acceptance decision in UG, the number of rounds is 4.74 in I-AT, 4.19 in I-NAT and 4.44 in NAT-I, and the convergence speed is respectively 1.03, 0.81 and 0.85. For the team dictator decisions, the number of rounds is 3.68 in I-AT, 4.13 in I-NAT and 4.61 in NAT-I, and the convergence speed is respectively 1.51, 1.41 and 1.18.

Next, we study who in the team is converging more rapidly to the team decision. In each team, we rank the subjects based on the median initial proposal and we calculate for each rank the number of rounds until the subject proposes the team final decision. On average, for α and β respectively, the median member needs 1.48 and 0.87 fewer rounds to reach the team decision than the below-median player, and 1.02 and 0.62 fewer rounds than the above-median player (M-W tests, $p<0.001$ in all cases). Considering the mean absolute distance between the initial proposal and the team decision for each rank in the team, we find that it is significantly smaller for the median player (0.40 for α and 0.05 for β) than for the below-median player (0.94 for α and 0.23 for β) and for the above-median player (1.83 for α and 0.27 for β) (M-W tests, $p<0.001$ in all comparison tests). The concessions are larger for the above-median individuals than for the below-median team members; this difference is significant for α ($p<0.001$), not for β ($p=0.200$). Recalling that the inflation from individual decisions to initial proposals in teams was higher for the less inequality averse subjects in the individual environment, these players may be more prone to revise downward during the aggregation process. Overall, these observations suggest that although each member has a veto power, the aggregation process is driven mainly by the median player. This is consistent with the results of Ambrus *et al*. (2014).

We next turn to a more formal analysis of the aggregation process. Table 5 reports the marginal effects from four regressions in which the dependent variable is either the number of rounds until convergence (Tobit models (1) and (3))[21] or the concession index at the team level (OLS models (2) and (4)). The first two columns are for the team's acceptance threshold in the UG and the last two columns for the dictator team's decisions. The independent variables include the median value of α (respectively, β), as determined by the three teammates' initial proposals, the positive distance between the estimates of α (β) for the player who is above the median in the team and for the player who is the median, and the corresponding absolute negative distance for

[21] Using negative binomial count data models instead of the Tobit models delivers the same qualitative results.

the player who is below the median. They also include three dummy variables indicating whether the MDG was played before the UG, whether the session started with the team environment (equal to 1 for NAT-I and 0 otherwise) and capturing the influence of a lift of anonymity. Standard errors are clustered at the team level.

Table 5. Determinants of the number of proposal rounds and concession index in teams

Variables	*Team acceptance threshold in UG*		*Team decision in MDG*	
	Number of proposal rounds (1)	Concession index (2)	Number of proposal rounds (3)	Concession index (4)
MDG played before UG	-0.206	0.041	0.042	-0.113
	(0.671)	(0.139)	(0.388)	(0.179)
Team decision first (NAT-I=1)	0.322	0.077	0.279	-0.070
	(0.630)	(0.147)	(0.492)	(0.229)
Non-anonymity	-0.431	-0.257	0.442	0.021
	(0.881)	(0.180)	(0.484)	(0.227)
Median α in initial proposals	-0.806**	-0.200***	-	-
	(0.333)	(0.045)		
Median β in initial proposals	-	-	-1.282*	0.682**
			(0.692)	(0.326)
Dist between above median and median α in initial proposals	1.101*** (0.396)	0.329*** (0.084)	-	-
Dist between above median and median β in initial proposals	-	-	2.113*** (0.666)	1.267*** (0.385)
|Dist| between below median and median α in initial proposals	0.203 (0.130)	0.076** (0.034)	-	-
|Dist| between below median and median β in initial proposals	-	-	0.534 (0.741)	1.763*** (0.324)
Observations (Left censored)	86 (29)	86 (-)	94 (16)	94 (-)
Chi-squared test	0.095	-	0.009	-
F-test	-	<0.001	-	<0.001
Pseudo /Adjusted R^2	0.028	0.213	0.044	0.328
Log-Likelihood	-190.946	-	-187.352	-

Notes: The regressions include only teams that reached unanimity with at least two rounds of proposals. Models (1) and (3) are Tobit regressions and models (2) and (4) are OLS regressions. Marginal effects are reported and standard errors clustered at the team level are in parentheses. ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 5 shows that a higher median inequality aversion in the initial proposals reduces the number of rounds needed to reach unanimity and decreases the concession index in the UG (but increases it marginally in the MDG). This may be an effect of more pro-social groups in general, as if people are more pro-social they may also agree more rapidly and also have less concessions to make. Controlling for the median, a greater distance above the median increases both the number of rounds for convergence and the size of concessions per round, for both parameters. A greater absolute negative distance below the median has no significant impact on the number of rounds but it increases the size of concessions per round. In UG, the coefficient of the concession per round for the below-median players (0.076) is about four times lower than the coefficient associated with the above-median players (0.329) (p<0.001). Table 6 also indicates that the order of games and treatments and the lift of anonymity do not affect the aggregation process.

This analysis supports the following result.

Result 3: Even under the unanimity rule, the aggregation process within teams is driven mainly by the team member with median preferences. More inequality aversion above the median in the team leads to more concessions than less inequality aversion.

4.4. Predictive power of the inequality aversion parameters in the Production Games

Next, we test whether the inequality aversion estimated based on the Fehr and Schmidt's (1999) model correlates with behavior in the Production Game of Yang *et al*. (2012). A prediction is that worker A's effort should depend exclusively and positively on the degree of advantageous inequality aversion because worker A always earns more than worker B (with $e_A = 200\beta_A$). We find that worker A's mean effort levels (57.71, S.D.=31.09), initial proposals (59.27, S.D.=30.53) and team effort levels (58.95, S.D.=29.75) are all significantly higher than 0 (W tests, p<0.001), showing evidence of advantageous inequality aversion. Another prediction is that the effort of worker B should depend negatively on the degree of disadvantageous inequality aversion (with $e_B = 100 - 100\alpha_B$). Worker B's mean effort levels (88.33, S.D.=19.93), initial proposals (86.81, S.D.=20.87) and team effort levels (93.54, S.D.=12.65) are all significantly lower than 100 (W tests, p<0.001), expressing disadvantageous inequality aversion. Workers B (but not A) agree on higher effort in teams compared to the initial proposals (W tests, p<0.001).

Table A5 in Appendix 3 reports various Tobit regressions. In models (1) and (2), the dependent variable is either the effort level of worker A, e_A, or worker B, e_B, in the individual PG. Following Yang *et al*.'s model, the independent variables include either the individual α or β parameters (note that including both does not change any level of significance). Models (3) and (4) for the team PG include the team α and β parameters and dummy variables for each treatment

(I-NAT is the reference category). Models (5) and (6) augment models (3) and (4), respectively, with interaction terms between α and β and each treatment to examine their impact across treatments. This Table reveals that advantageous inequality aversion β correlates with the effort provision of team A but not of individual worker A; its magnitude is only a quarter of the theoretical prediction and the effect is driven by the NAT-I treatment. Disadvantageous inequality aversion captured by α is correlated with the effort of neither team B nor worker B. Moreover, the coefficients of α and β differ significantly from the predicted values of -100 and 200, respectively, in all regressions (Chi-square tests, p<0.001). Note that Blanco *et al*. (2011) also found no correlation between the inequality aversion parameters at the individual level and behavior in a public goods game and a prisoners' dilemma game. This leads to our last result:

Result 4: Overall, the inequality aversion parameters based on Fehr and Schmidt's (1999) model have little predictive power of behavior in Yang *et al*. (2012)'s model in both the individual and the team decision-making environments.

5. DISCUSSION AND CONCLUSION

Charness and Sutter (2012) write that teams are "less behavioral than individuals" because they are more likely than individuals to make decisions following standard game-theoretic predictions. Comparing distributional preferences in teams and in individuals, Balafoutas *et al*. (2014) have found that while 15% of individuals can be classified as inequality averse, team decision-making eliminates choices consistent with inequality aversion. Our results are somewhat different. First, we do not find that the degree of revealed advantageous or disadvantageous inequality aversion is lower in the team decision-making environment than in the individual environment. Second, the initial proposals in teams express more inequality aversion than the decisions made in isolation even after controlling for the pure effect of the size of the comparison group in the calculation of parameters. We suggest that this difference is more likely due to the change in the reference group than to efficiency, strategic reasoning vis-à-vis team members or social image concerns. A third result is that the team decision is mainly influenced by the degree of inequality aversion of the team member who holds the median preferences. Relative position matters also in the sense that the more-selfish-than-median player makes smaller concessions than the more-inequality-averse-than-median player. Our last result is that anonymity in team decision-making has little overall impact.

The differences with the results of Balafoutas *et al*. (2014) could result from three different sources. First, the two methodologies are based on different theoretical backgrounds. In their price lists, one option always pays symmetric payoffs whereas in our MDG the fixed option always corresponds to the highest possible inequality. It makes a direct comparison difficult. Second, in our study individuals cannot communicate freely with their teammates while verbal deliberations may allow subjects with certain types of preferences to be more assertive than others. An extension of our paper could test whether verbal communication affects group thinking and reduces the difference in inequality aversion between the two environments. Finally, we have conducted our study in China. In the individual environment subjects expressed levels of inequality aversion similar to those observed in similar experiments conducted in Europe, despite their exposure to different political and economic institutions. It would be interesting to further compare the sign and the size of the difference between inequality aversion in individual and team environments in collectivist societies vs. in individualistic societies.

Other extensions could explore the sensitiveness of inequality aversion in teams to the environmental conditions. For example, informing the members of newly formed teams about the choices of their teammates in the individual environment may influence the formation of initial proposals. Replacing simultaneous decision-making with a sequential procedure could possibly affect the aggregation process. Finally, allowing people to self-select to be part of a team or manipulating the saliency of group identity could also affect the difference in inequality aversion between the individual and the team decision-making environments. This is left for further research.

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Appendix 1. Instructions for the I-NAT treatment (translated from Chinese: instructions for the other treatments available upon request)

Welcome to this experiment. You have already earned 10 Yuan for showing up on time. During today's experiment, you and the other participants will be asked to make decisions. If you read the following instructions carefully, you can earn a considerable amount of money depending on the decisions you and other participants make. It is therefore important that you take your time to understand the instructions. Please do not communicate with the other participants during the experiment. Should you have any questions, please raise your hand. The experimenters will come to you and answer your question in private.

The experiment consists of several parts. In each part you will be asked to make one or more decisions. You will receive specific instructions before each part begins. The instructions for different parts are different; please read them carefully. Your decisions and answers will remain anonymous unless explicitly specified.

Note that your final earnings from the experiment will be the sum of payoffs from all parts. All payments in the experiment are denoted in points. At the end of the experiment, points will be exchanged to Yuan at a rate of *1 point = 0.03 Yuan* .

Your experimental payoff plus the show-up fee will be paid to you in cash in private in another room at the end of the experiment, by an assistant who is not aware of the content of this experiment.

Please do not touch the computer before you are told so, and please do not fold the screen during the entire experiment.

If you have finished reading these instructions and do not have any question, please wait quietly. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Part 1

In this part, there are two roles: Player A and Player B.

Player A is asked to choose between two possible distributions of money between himself/herself and Player B in each of the 21 different decision problems.

Player B knows that A has been asked to make those decisions, and there is nothing s/he can do but accept them.

The role of each participant will be randomly determined as Player A or Player B by the program at the end of the experiment. Which role a participant plays will remain anonymous.

<u>*Decisions*</u>

The 21 decision problems will be presented in a chart. Each decision problem will look similar to the following example:

Option X		Option Y		Player A's decision	
Player A's Payoff	Player B's Payoff	Player A's Payoff	Player B's Payoff	(Choose X or Y)	
400	0	100	100	X	Y

You will have to make a decision in the role of Player A.

Hence, if in this particular decision problem you choose Option X, you decide to keep the 400 points for you, so your paired Player B's payoff will be 0 points. Similarly, if you choose Option Y, you and your paired Player B will receive 100 points each.

The 21 rows will be displayed on the computer screens as illustrated in the below chart. The payoffs in Option X are always 400 points for Player A and 0 point for Player B in all decision problems, while the payoffs in Option Y are the same for both Player A and Player B and the payoffs vary from 0 to 400 points in increments of 20 points, in decision problems #1 to #21.

The 21 decision problems for Player A (Payoffs in point)

Decision problem #	Option X		Option Y		Player A's decision (Choose A or B)	
	Player A's Payoff	Player B's Payoff	Player A's Payoff	Player B's Payoff		
1	400	0	0	0	X	Y
2	400	0	20	20	X	Y
3	400	0	40	40	X	Y
4	400	0	60	60	X	Y
5	400	0	80	80	X	Y
6	400	0	100	100	X	Y
7	400	0	120	120	X	Y
8	400	0	140	140	X	Y
9	400	0	160	160	X	Y
10	400	0	180	180	X	Y
11	400	0	200	200	X	Y
12	400	0	220	220	X	Y
13	400	0	240	240	X	Y
14	400	0	260	260	X	Y
15	400	0	280	280	X	Y
16	400	0	300	300	X	Y
17	400	0	320	320	X	Y
18	400	0	340	340	X	Y
19	400	0	360	360	X	Y
20	400	0	380	380	X	Y
21	400	0	400	400	X	Y

At the end of the experiment, the computer program will randomly assign you as the role of Player A or Player B. If you are assigned the role of Player A, your payoff will be determined as the amount you have chosen for Player A. If you are assigned the role of Player B, your payoff will be determined as the amount your paired participant has chosen for Player B.

You will have to decide the number of the decision problem until which you choose Option X and after which you choose Option Y. You will have to enter an integer between 1 and 21 into one of the two boxes on your computer screen as indicated below, to specify your decision.

I choose Option X from decision problem # 1 to decision problem # [ ].

I choose Option Y from decision problem # [ ] to decision problem # 21 .

Once you enter a number in the range 1-20 in the box in the first line, you must fill in the box in the second line with the number equals to one plus the number in the box in the first line. This means that once you start to choose Option Y in a decision problem, you are not allowed to switch to choose Option X again in any decision problems occurring after this one.

You are also allowed to make the same choice for all 21 decision problems.

If you always choose Option X, you enter the number 21 in the box in the first line. You must keep the box in the second line blank.

If you always choose Option Y, you enter the number 1 in the box in the second line. You must keep the box in the first line blank.

Examples

If you enter 21 in the box in the first line, it indicates that you decide to choose Option X in all 21 decision problems.

If you enter 9 in the box in the first line and 10 in the box in the second line, it indicates that you decide to choose Option X from decision problem #1 to decision problem #9 and Option Y from decision problem #10 to decision problem #21.

If you enter 1 in the box in the second line, it indicates that you decide to choose Option Y in all 21 decision problems.

After you have made your choices, please validate your decision by clicking the "Validate" button on your screen.

Payoff determination

At the end of the experiment, the computer program will randomly pair you with another participant in the room and will randomly assign the two roles. The computer program will randomly choose one of the 21 decision problems, and the decision outcome in the chosen decision problem will then determine your earnings. The matching and role assignment will remain anonymous. You will make the decision as Player A, but the computer program might assign you the role of Player B when determining payoffs. The assignment of roles is random and does not depend on your decisions as Player A.

If you are assigned the role of Player A, you will receive the amount that you have chosen for Player A in the randomly selected decision problem, and the person paired with you will receive the amount that you have chosen for Player B.

If you are assigned the role of Player B, you will receive the amount that the Player A whom you are paired has chosen for Player B in the randomly selected decision problem.

Before this part begins, a few control questions will be asked to make sure that you have fully understood these instructions. If you have finished reading these instructions and do not have any questions, please wait quietly. The control questions will be displayed on your screen soon. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Part 2

In this part, there are two roles: Player A and Player B.

Player A is asked to choose one of 21 possible distributions of 400 points between her and Player B.

Player B knows that A has been asked to make those decisions, and may either accept the distribution chosen by A or reject it.

If Player B accepts A's proposed distribution, this distribution will be implemented. If B rejects the offer, both receive nothing.

The role of each participant will be randomly determined as Player A or Player B by the program at the end of the experiment. Which role a participant plays will remain anonymous.

<u>Decisions</u>

The 21 decision problems for Player A and Player B will be presented in a chart. Each decision problem will look similar to the following example:

Distribution chosen by Player A		Option X	Option Y	Player B's decision (Choose X or Y)	
Player A's Payoff	Player B's Payoff				
300	100	Reject	Accept	X	Y

You will have to make decisions in the roles of both Player A and Player B.

In the latter case, you will have to decide whether you reject or accept each of A's possible 21 proposed distributions. In this example, if you choose Option X, it rejects your paired Player A's proposed distribution and both of your payoffs will be 0 points. If you choose Option Y, A's proposed distribution is accepted; you will receive 100 points and your paired Player A will receive 300 points.

The following chart showing the 21 decision problems will be displayed on your computer screen. The 21 decision problems illustrate the 21 possible distributions of 400 points proposed by Player A, respectively. For decision problems #1 to #21, the payoff distributed to Player A reduces from 400 to 0 in increments of 20 points, while the payoff distributed to Player B increases from 0 to 400 in the same increments of 20 points.

The 21 decision problems for Player B (Payoffs in point)

Decision problem #	Distribution proposed by Player A		Option X	Option Y	Player B's decision (Choose X or Y)	
	Player A's Payoff	Player B's Payoff				
1	400	0	Reject	Accept	X	Y
2	380	20	Reject	Accept	X	Y
3	360	40	Reject	Accept	X	Y
4	340	60	Reject	Accept	X	Y
5	320	80	Reject	Accept	X	Y
6	300	100	Reject	Accept	X	Y
7	280	120	Reject	Accept	X	Y

8	260	140	Reject	Accept	X	Y
9	240	160	Reject	Accept	X	Y
10	220	180	Reject	Accept	X	Y
11	200	200	Reject	Accept	X	Y
12	180	220	Reject	Accept	X	Y
13	160	240	Reject	Accept	X	Y
14	140	260	Reject	Accept	X	Y
15	120	280	Reject	Accept	X	Y
16	100	300	Reject	Accept	X	Y
17	80	320	Reject	Accept	X	Y
18	60	340	Reject	Accept	X	Y
19	40	360	Reject	Accept	X	Y
20	20	380	Reject	Accept	X	Y
21	0	400	Reject	Accept	X	Y

In the role of Player A, you will have to decide how to distribute 400 points payoff between Player A and Player B as stated in one of the 21 decision problems. You will have to enter an integer between 1 and 21 in the box on your computer screen as indicated below, to specify your decision.

> **I decide to distribute the 400 points payoff between me and my paired Player B as the way stated in decision problem # ☐.**

In the role of Player B, you will have to decide whether you reject or accept each of A's possible 21 proposed distributions. You will have to decide the number of the Player A's proposal until which you reject Player A's proposals (i.e., choose Option X) and after which you accept Player A's proposals (choose Option Y). You will have to enter an integer between 1 and 21 into one of the two boxes on your computer screen as indicated below, to specify your decision.

> **I reject the distribution (choose Option X) as shown from decision problem # 1 to decision problem # ☐.**
>
> **I accept the distribution (choose Option Y) as shown from decision problem # ☐ to decision problem # 21.**

Once you enter a number in the range 1-20 in the box in the first line, you must fill in the box in the second line with the number equals to one plus the number in the box in the first line. This means that once you start to accept Player A's proposal in a decision problem, you are not allowed to switch to rejecting the proposals again in any decision problems occurring after this one.

You are also allowed to make the same choice for all 21 decision problems.

If you always reject the proposals of Player A, you enter the number 21 in the box in the first line. You must keep the box in the second line blank.

If you always accept the proposals of Player A, you enter the number 1 in the box in the second line. You must keep the box in the first line blank.

Examples

If you enter 21 in the box in the first line, it indicates that you decide to reject Player A's proposals (choose Option X) in all 21 decision problems.

If you enter 9 in the box in the first line and 10 in the box in the second line, it indicates that you decide to reject Player A's proposals (choose Option X) from decision problem #1 to decision problem #9 and accept the proposals (choose Option Y) from decision problem #10 to decision problem #21.

If you enter 1 in the box in the second line, it indicates that you decide to accept Player A's proposals (choose Option Y) in all 21 decision problems.

After you have made your choices, please validate your decisions by clicking the "Validate" button on your screen.

Payoff determination

At the end of the experiment, the computer program will randomly pair you with another participant in the room and randomly assign the two roles. The assigned roles and decision outcomes of the two matched participants will then determine your earnings. The matching and the role assignment will remain anonymous.

If you are assigned the role of Player A at the end of the experiment, you will receive the payoff you have chosen for yourself only if your paired person B accepts your offer. Otherwise, both will receive nothing.

If you are assigned the role of Player B at the end of the experiment, you will receive the payoff that your paired Player A has chosen for B, only if you accept that particular offer. Otherwise, both will receive nothing.

Before this part begins, a few control questions will be asked to make sure that you have fully understood these instructions. If you have finished reading these instructions and do not have any question, please wait quietly. The control questions will be displayed on your screen soon. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Part 3

This part is identical to *Part 1*, with one exception. The only difference from Part 1 is that you are now a member of a team, and your team must make team decisions jointly as one decision-maker. Your team consists of three participants in this room.

Please note that your team consists of members with the ID numbers I, II, and III. The other two members in your team are seated next to you in the same row. Members I, II and III are seated at the left, middle and right of the row, respectively. For example, if you are seated at the far right of your row, the two persons to your left from left to right are members I and II, respectively. If you are seated in the middle of your row, the persons to your left and right are members I and III, respectively. If you are seated at the far-left of your row, the two persons to your right from left to right are members II and III, respectively. Thus, each member's proposal will be identified by the two other members by his ID number.

In the role of Player A, your team has to make a collective team decision on the number of the decision problem until which you choose Option X and after which you choose Option Y.

Player B makes no decisions.

At the end of the experiment, the computer program will randomly assign your team the role of Player A or the role of Player B.

The three members of the team must propose individual proposals and to enter them on their computer screens independently. **Unanimity is required for the three members to reach a collective team decision**. The following procedure determines the team decision:

- The three individual proposals will be simultaneously displayed on all members' screens.
- If the three proposals are not identical, a new proposal round starts. Each member must enter a new proposal. Each member may choose the same proposal as in previous rounds or make a different proposal.
- This team decision-making procedure must be repeated until all team members propose an identical number. This proposal will be automatically converted into the team's decision.
- Members have unlimited number of rounds to enter new proposals **in a 10 minute window**. Proposals made by each member during previous rounds can be observed in the proposal history box on the right-hand side of the screen.
- If team members have not reached an identical proposal after 10 minutes, the computer program will randomly select one of the possible decisions as the team decision.

Please note that members are not allowed to communicate orally during the entire experiment.

<u>Payoff determination</u>

The rules of payoffs determination are identical to that in *Part 1*.

Please note that each member of the team will receive the determined payoff rather than sharing this amount. That is, for the selected decision, each member in your team will receive this amount.

If you have finished reading these instructions and do not have any questions, please wait quietly. The decision-making screen will be displayed soon. Please enter your proposal as if you were Player A for this part. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Part 4

This part is identical to *Part 2,* with one exception. The only difference from Part 2 is that now you will be teamed up with the same two other members with the same ID numbers as in *Part 3*, and your team must make team decisions jointly as one decision-maker.

In the role of Player A, your team will make a collective team decision for the distribution of 400 points payoff between Player A and Player B as stated in one of the 21 decision problems.

In the role of Player B, your team will make a collective team decision on the number of the Player A's proposal until which you reject Player A's proposals (choose Option X) and after which you accept Player A's proposals (choose Option Y).

At the end of the experiment, the computer program will randomly assign your team the role of Player A or the role of Player B.

The three members of the team must propose individual proposals and to enter them on their computer screens independently. **Unanimity is required for the three members to reach a collective team decision**.

The procedure to determine team decisions is identical to that in *Part 3*. In the role of Player A, members have unlimited number of rounds to enter new proposals in a 10 minute window. If team members have not reached an identical proposal after 10 minutes, the computer program will randomly select one of the possible decisions as the team decision.

In the role of Player B, the same procedure applies. Team members have again 10 minutes maximum to reach an identical proposal, otherwise the computer program will randomly select one decision as the team decision.

Payoff determination

The rules of payoffs determination are identical to that in *Part 2*.

Please note that each member of the team will receive the determined payoff rather than sharing this amount. That is, for the selected decision, each member in your team will receive this amount.

If you have finished reading these instructions and do not have any questions, please wait quietly. The decision-making screen will be displayed soon. Please enter your proposals as if your team was Player A and Player B, respectively, for this part. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Part 5

You are a member of the same team with the two other members with the same ID numbers as in *Parts 3 and 4*. In this part, your team will participate in a production game.

The production game involves two working teams, Team A and Team B, who are in charge of Departments 1 and 2, respectively. Each team chooses an effort level (an integer between 0 and 100 that is a multiple of 10, i.e., 0, 10, 20, … , 100), which will determine the production of the department the team is in charge of. A team's total income from this game consists of four parts: (1) Basic salary; (2) A bonus dependent on the production of Department 1; (3) A bonus dependent on the production of Department 2; (4) Effort cost, which is dependent on team's own effort level. We introduce each part in turn.

1. **Basic salary**. The basic salary is 200 points for Team A and 0 point for Team B.
2. **Bonus 1**. The production of Department 1 will be equally divided between Team A and Team B as Bonus 1. Production is wholly determined by Team A's effort level. The higher the effort level Team A chooses, the more Department 1 produces, and, hence, the larger Bonus 1 received by both Team A and Team B .
3. **Bonus 2**. The production of Department 2 will be equally divided between Team A and Team B as Bonus 2. Production is wholly determined by Team B's effort level. The higher the effort level Team B chooses, the more Department 2 produces, and, hence, the larger Bonus 2 received by both Team A and Team B .
4. **Effort cost**. A team bears the cost of each unit of effort input into the department's production. Each unit of effort in Department 1 costs Team A 2 points. Each unit of effort in Department 2 costs Team B 1 point.

For each team, the total payoff from the production game is represented by the following equation:

Total income = Basic salary + Bonus 1+ Bonus 2 - Effort cost.

Please note that, because Team A's basic salary is 200 points while Team B's is 0, total income for Team A is always higher than Team B regardless of the effort levels chosen by Team A and Team B. Of course, the difference varies with different effort levels chosen by the two teams.

After you enter an effort level, you can immediately view the corresponding potential amount of bonus and effort costs displayed. You may test different effort levels to observe the corresponding variation in total income for Team A and Team B. When make your final decisions, ensure that the numbers in the boxes are correct, and press “Submit” at the bottom of the page.

In this part, you will be randomly paired and assigned the role of Team A or Team B. The results of the random pairing and role assignment will remain anonymous and will not be revealed until the end of the experiment. For this reason, every participant is asked to make a decision as Team A and Team B. At the end of the experiment, your decision for Team A’s effort level will only apply if you are assigned the role of the Team A, otherwise, if you are assigned the role of Team B, your decision for Team B’s effort level will adopted.

Team decisions

The three members of the team must propose individual proposals and to enter them into their computers independently. **Unanimity is required for the three members to reach a collective team decision**. Team members must propose individual proposals simultaneously in both the roles of Team A and Team B on the same computer screens. The procedure to determine team decisions is identical to that in *Parts 3 and 4*.

In the roles of Team A and Team B, members have unlimited number of rounds to enter new decisions **in a 20 minute window**.

If team members have not reached identical decisions in the roles of the two types of working teams after 20 minutes, the computer program will randomly select one of the possible decisions as the team decisions for Team A and for Team B, respectively.

Payoff determination

Each of the members will receive the determined payoff for a working team rather than sharing this amount. That is, for the selected decision, each of the members in your team will receive this amount.

If you have finished reading these instructions and do not have any questions, please wait quietly. The decision-making screen will be displayed soon. Please enter your proposals as if your team was Team A and Team B, respectively, for this part. Otherwise, please raise your hand and the experimenters will come to you and answer your questions in private.

Appendix 2. Calculations

Part 1: Calculation of point estimates

If a subject switches between two points in the UG, this does not mean that he is indifferent at both points; he may be indifferent at one of the endpoints of the interval or at one point in-between. As explained by Blanco et al. (2011), to determine a near point estimate of α_i for each individual, we can suppose that s_i' is the minimum offer responder i is willing to accept and s_i' *- 20* is the highest offer that i rejects.

A responder is indifferent between accepting an offer $s_i \in [s_i' - 20, s_i']$ and rejecting it. Thus,

$U_i(s_i, 400 - s_i) = s_i - \alpha_i(400 - s_i - s_i) = 0$, which gives $\alpha_i = \dfrac{s_i}{[2(200 - s_i)]}$

Determining a near point estimate of β_i for each individual requires identifying the decision (x_i, x_i) for which the dictator in the MDG is indifferent between sharing equally and keeping her 400 points. If she switches to equal sharing at (x_i', x_i'), she prefers (400, 0) over $(x_i' - 20, x_i' - 20)$ but (x_i', x_i') over (400, 0). Thus, she is indifferent between (400, 0) and $(\tilde{x}_i, \tilde{x}_i)$, where $\tilde{x}_i \in [x_i' - 20, x_i']$ and $x_i' \in \{0, ..., 400\}$. So, β_i is estimated from the equation $U_i(400, 0) = U_i(\tilde{x}_i, \tilde{x}_i)$ iff $400 - 400\beta_i = \tilde{x}_i$,

which gives $\beta_i = 1 - \dfrac{\tilde{x}_i}{400}$.

We assume $s_i = s_i' - 10$ and $\tilde{x}_i = x_i' - 10$. For the responders who accept only $s_i > 200$ in the UG, we only know that $\alpha_i \geqslant 4.5$, and therefore we consider arbitrarily that $\alpha_i = 4.5$, and if $s_i' = 0$, we set $\alpha_i = 0$.

Similarly, we set $\beta_i = 0$ for subjects who prefer (400,0) to (400,400) but who perhaps would have $\beta_i < 0$, and we set $\beta_i = 1$ for subjects who prefer (0,0) over (400,0) but who perhaps would have $\beta_i > 1$ because we cannot observe a switching point. ■

Part 2: Calculation of the individual inequality aversion parameters

Individual decision-making environment

In the individual environment, individuals compare themselves to a single other individual. Fehr and Schmidt (1999) define utility for n-players as follows:

$$U_i(x_i, x_k) = x_i - \alpha_i \frac{1}{n-1} \sum_{k \neq i} \max(x_k - x_i, 0) - \beta_i \frac{1}{n-1} \sum_{k \neq i} \max(x_i - x_k, 0)$$

assuming that $0 \leq \beta_i \leq \alpha_i$ and $\beta_i < 1$, with α representing the disadvantageous inequality aversion parameter and β the advantageous inequality aversion parameter, and with x_i and x_k representing the payoffs of players i and k, respectively.

In a two-player game, this gives:

$$U\left(x_i, x_j\right) = \begin{cases} x_i - \alpha_i\left(x_j - x_i\right), if\ x_i \le x_j \\ x_i - \beta_i\left(x_i - x_j\right), if\ x_i > x_j \end{cases}$$

Team decision-making environment

In a team environment individuals compare themselves with five other players, two from the same team (who earn the same) and three from the other team (who can earn a different amount). In this 6-person case, Fehr and Schmidt's (1999) model writes:

$$U_i\left(x\right) = x_i - \alpha_i \frac{1}{6-1} \sum_{j=1,2,3} max\left\{x_j - x_i, 0\right\} - \beta_i \frac{1}{6-1} \sum_{j=1,2,3} max\left\{x_i - x_j, 0\right\}$$

where $x_1 = x_2 = x_3$ is the payoff of the three players from the other team.

The simplified 6-person model under our game structure yields:

$$U\left(x_i, x_j\right) = \begin{cases} x_i - \frac{3}{5}\alpha_i\left(x_j - x_i\right), if\ x_i \le x_j \\ x_i - \frac{3}{5}\beta_i\left(x_i - x_j\right), if\ x_i > x_j \end{cases}$$

Applying the calculation method of Blanco *et al*. (2011), we obtain:

$$\alpha_i^{team} = \frac{5}{3}\left[\frac{s_i}{2(200 - s_i)}\right]$$

$$\beta_i^{team} = \frac{5}{3}\left[1 - \frac{\tilde{x}_i}{400}\right]$$

This indicates that the values of α and β based on the 6-player model is equal to 5/3 of the values based on the 2-player model. The variances of α and β based on the 6-player model is equal to 25/9 of the variance based on the 2-player model.■

Appendix 3. Tables and Figures

Table A1. Distribution of the α and β parameters in the individual and the team decision-making environments

		Disadvantageous inequality aversion parameter (α)				*Advantageous inequality aversion parameter (β)*		
		α< 0.4	0.4≤α <0.92	0.92≤α <4.5	4.5≤α	β< 0.235	0.235≤β <0.5	0.5≤β
Fehr and Schmidt (1999)		30%	30%	30%	10%	30%	30%	40%
Blanco et al. (2011)		31%	33%	23%	13%	29%	15%	56%
Our data								
Individ. environment	All treatments	35%	24%	31%	10%	23%	23%	54%
Team environment		α<(5/3)*0.4	(5/3)*0.4≤α <(5/3)*0.92	(5/3)*0.92≤α <(5/3)*4.5	(5/3)*4.5 ≤α	β<(5/3) *0.235	(5/3)*0.235 ≤β<(5/3) *0.5	(5/3)*0.5 ≤β
Initial proposals	I-AT	24%	13%	27%	36%	12%	11%	77%
	I-NAT	24%	14%	32%	30%	11%	7%	81%
	NAT-I	30%	10%	31%	29%	22%	15%	63%
Final decisions	I-AT	18%	18%	39%	25%	13%	52%	35%
	I-NAT	22%	16%	41%	22%	16%	50%	34%
	NAT-I	30%	20%	23%	27%	29%	61%	10%

Note: In the team environment, the intervals for the parameters are adjusted to account for comparison with five players.

Table A2. Mean switching points in the UG and the MDG
in the individual and the team environments

	Individual environment		Team environment				Number of subjects
			Individual initial proposals		Team decisions		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Switching point in the UG (acceptance threshold)							
I-I	6.00	3.50	-	-	-	-	48
I-AT	6.43	3.99	7.23***	3.73	7.04	3.04	84
I-NAT	6.14	3.30	7.09***	3.35	7.03***	3.06	96
NAT-I	6.02	3.46	6.76***	3.66	6.37	3.15	90
Switching point in the MDG							
I-I	12.60	5.73	-	-	-	-	48
I-AT	11.37	5.99	10.74**	5.64	11.29	3.88	93
I-NAT	12.44	5.60	10.83***	5.33	11.59	4.24	96
NAT-I	14.31	5.86	13.73	5.01	14.61	4.46	93

Notes: The table displays the mean switching points (given by the decision numbers) in the UG (for the acceptance threshold) and in the MDG by treatment, in the individual environment and in the initial proposals and final team decisions in the team environment. The switching point corresponds to the decision number. The switching point reported for I-I are for the first set of decisions; the switching point for the second set of decisions in I-I are 5.79 (S.D.=3.60) for α and 12.46 (S.D.=5.82) for β ; there is no significant difference between the first and the second sets of decisions. The number of team observations differs in UG and MDG because the number of teams reaching unanimity differs in the two games. *** and ** indicate significance at the 1% and the 5% levels, respectively, in two-tailed Wilcoxon signed rank tests in which the reference is the switching points in the individual decisions.

Table A3. Influence of the type of decision and of the treatment on the disadvantageous and advantageous inequality aversion parameters

Variables	*Disadvantageous inequality aversion parameter (α)*		*Advantageous inequality aversion parameter (β)*	
	(1)	(2)	(3)	(4)
Ref.: First individual decision in I-I	-	-	-	-
Second decision in I-I	-0.049	-0.034	0.008	0.007
	(0.341)	(0.242)	(0.051)	(0.046)
Individual decision in I-AT	0.158	0.054	0.063	0.053
	(0.490)	(0.322)	(0.071)	(0.063)
Initial proposal in I-AT	1.820***	1.407***	0.454***	0.420***
	(0.488)	(0.319)	(0.071)	(0.062)
Team decision in I-AT	1.697***	1.249***	0.377***	0.349***
	(0.576)	(0.385)	(0.083)	(0.073)
Individual decision in I-NAT	-0.158	-0.102	-0.005	-0.004
	(0.476)	(0.314)	(0.071)	(0.062)
Initial proposal in I-NAT	1.408***	1.132***	0.444***	0.412***
	(0.476)	(0.312)	(0.070)	(0.062)
Team decision in I-NAT	1.333**	1.056***	0.426***	0.394***
	(0.553)	(0.370)	(0.082)	(0.072)
Individual decision in NAT-I	0.079	0.052	-0.110	-0.092
	(0.480)	(0.316)	(0.071)	(0.063)
Initial proposal in NAT-I	1.395***	1.116***	0.188***	0.181***
	(0.481)	(0.316)	(0.071)	(0.063)
Team decision in NAT-I	0.919	0.751**	0.075	0.079
	(0.563)	(0.375)	(0.083)	(0.074)
Observations	726	726	754	754
Left-censored obs.	77	77	60	60
Right-censored obs.	83	47	25	11
Number of subjects	318	318	330	330
Chi-squared test	<0.001	<0.001	<0.001	<0.001
Log-likelihood	-1960.377	-1437.503	-2164.234	-315.586

Notes: Regressions (1) and (3) are random-effects interval regression models. Regressions (2) and (4) are random-effects tobit models based on point estimates. Reported values are marginal effects. Standard errors are in parentheses. *** and ** indicate significance at the 1% and 5% level, respectively.

Table A4. Comparisons between the individual and the team environments based on the estimates of Table A2 (*p*-values from Chi-squared tests)

	Disadvantageous inequality aversion parameter (α)		*Advantageous inequality aversion parameter (β)*	
	(1)	(2)	(3)	(4)
TD *vs*. ID in I-AT	<0.001***	<0.001***	<0.001***	<0.001***
TD *vs*. ID in I-NAT	<0.001***	<0.001***	<0.001***	<0.001***
TD *vs*. ID in NAT-I	0.029**	0.009***	0.001***	0.001***
IIP *vs*. ID in I-AT	<0.001***	<0.001***	<0.001***	<0.001***
IIP *vs*. ID in I-NAT	<0.001***	<0.001***	<0.001***	<0.001***
IIP *vs*. ID in NAT-I	<0.001***	<0.001***	<0.001***	<0.001***
TD *vs*. IIP in I-AT	0.762	0.577	0.172	0.158
TD *vs*. IIP in I-NAT	0.841	0.772	0.746	0.715
TD *vs*. IIP in NAT-I	0.218	0.177	0.046**	0.048**
(TD-ID) in I-AT *vs*. I-NAT	0.931	0.924	0.136	0.149
(TD-ID) in I-NAT *vs*. NAT-I	0.226	0.224	0.002***	0.002***
(IIP-ID) in I-AT *vs*. I-NAT	0.794	0.640	0.255	0.288
(IIP-ID) in I-NAT *vs*. NAT-I	0.477	0.494	0.004***	0.002***
(TD-IIP) in I-AT *vs*. I-NAT	0.931	0.831	0.456	0.454
(TD-IIP) in I-NAT *vs*. NAT-I	0.456	0.443	0.229	0.246
ID first time *vs*. second time in I-I	0.886	0.889	0.879	0.880
ID in I-I *vs*. I-AT	0.748	0.868	0.374	0.393
ID in I-I *vs*. I-NAT	0.739	0.745	0.938	0.948
ID in I-I *vs*. NAT-I	0.869	0.870	0.121	0.142
ID in I-AT *vs*. I-NAT	0.438	0.560	0.240	0.263
ID in I-AT *vs*. NAT-I	0.848	0.994	0.003***	0.005***
ID in I-NAT *vs*. NAT-I	0.548	0.555	0.073*	0.087*

Notes: Columns (1) and (3) are based on the interval regressions of Table A2 and columns (2) and (4) on the Tobit models based on point estimates of Table A2. ID for individual decisions, IIP for individual initial proposals, and TD for team decisions. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table A5. Determinants of effort levels in the individual and team Production Games

	Individual Production Game		*Team Production Game*			
	e_A (1)	e_B (2)	e_A (3)	e_B (4)	e_A (5)	e_B (6)
Disadvantageous inequality aversion (α)	-	-1.139	-	-0.767	-	-0.654
		(1.852)		(0.619)		(1.040)
Advantageous inequality aversion (β)	23.575	-	25.985***	-	11.303	-
	(15.305)		(7.784)		(12.833)	
I-AT treatment	-	-	-8.705	1.800	1.075	2.306
			(6.876)	(3.193)	(17.217)	(4.809)
NAT-I treatment	-	-	-7.923	1.229	-39.215***	1.536
			(7.194)	(3.101)	(13.973)	(4.547)
α*I-AT treatment	-	-	-	-	-	-0.346
						(2.436)
α*NAT-I treatment	-	-	-	-	-	-0.223
						(2.511)
β*I-AT treatment	-	-	-	-	-18.466	-
					(31.870)	
β*NAT-I treatment	-	-	-	-	81.006***	-
					(29.438)	
Observations	48	48	94	90	94	90
Right-censored obs.	9	28	18	64	18	26
Pseudo R^2	0.006	0.002	0.017	0.006	0.031	0.006
Log likelihood	-201.773	-118.300	-392.174	-158.208	-386.707	-158.197
Chi-square test	0.137	0.540	0.003	0.593	0.000	0.860

Notes: These regressions are Tobit models. Marginal effects are reported and standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively. Teams that did not reach unanimity are excluded.

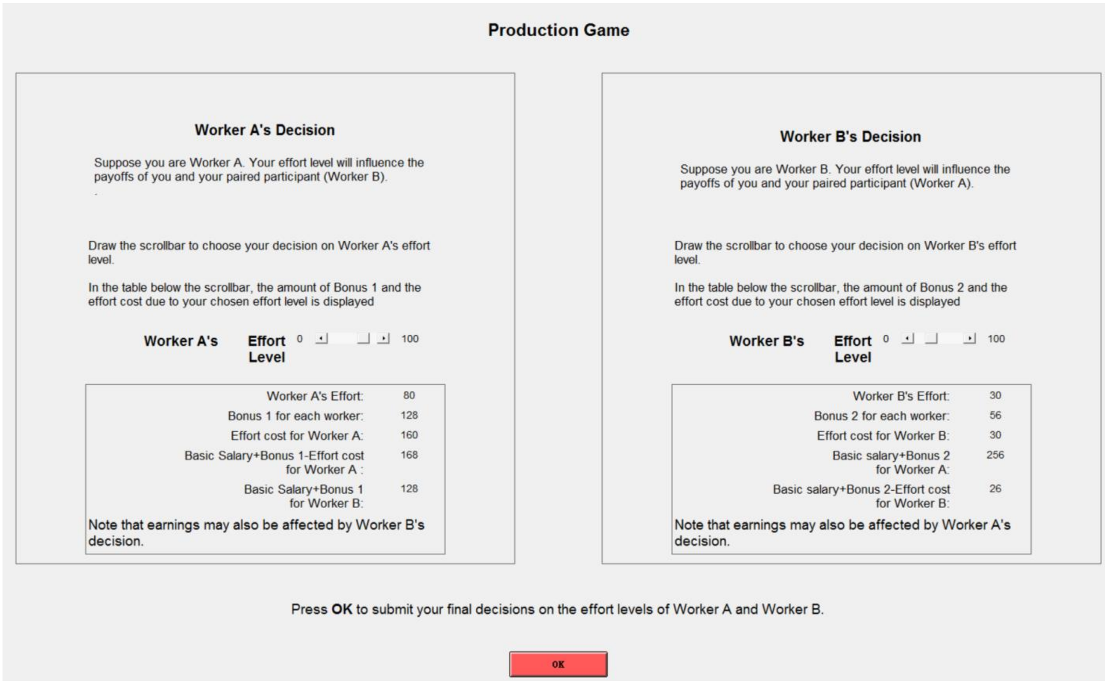

Figure A1. Screenshot of the individual Production Game