A Online Appendices[32]–NOT For PUBLICATION.

A.1 Instructions[33]

Instructions

Welcome and thank you for participating in this experiment. For showing up on time you receive €2.50. Please read the following instructions carefully. Instructions are identical for all participants. Communication with other participants must cease from now on. Please switch off your mobile phone.

If you have any questions, raise your hand – we will answer them individually at your seat.
During the experiment all amounts will be stated in ECU (Experimental Currency Units). The sum of your payoffs from all rounds will be disbursed to you in cash at the end of the experiment (exchange rate: 1 ECU=0.03 €). Your initial endowment is 20 ECU.

Information regarding the experiment

Participants take on different roles **A** and **B**. You do not know your role in the beginning and will at first make decisions for role A as well as for role B. You will then be randomly assigned one role and will be informed accordingly. From then on, roles remain the same throughout the experiment.

You will be randomly matched with other anonymous participants. Your decisions affect your own payoff and the payoffs of those participants with whom you interact.

In the experiment, you encounter two situations. These situations are characterized as follows:

Situation 1. There are **200 ECU**. Participant **A** chooses between two alternatives **X** and **Y** to allocate these 200 ECU between herself and participant **B**.

X: She allocates **100 ECU** to herself and **100 ECU** to participant **B**.
Y: She allocates **20 ECU** to herself and **180 ECU** to participant **B**.

Participant B does not learn A's choice. B chooses between **U** and **V**:

U: **B agrees** with the allocation **unknown to her**. If so, the allocation corresponds to participants' payoffs in ECU.

V: **B does not agree** with the allocation **unknown to her**. If so, both participants obtain a payoff of **0 ECU**.

[33] available from http://www.chlass.de/research.html.

[33] Instructions of the experiment were written in German. The following chapter reproduces a translation into English for experimental sessions which introduced the Ultimatum and the Yes-no game. Emphases in bold or italic font are taken from the original text, **TEXT IN CAPITAL LETTERS WAS NOT PART OF THE ORIGINAL INSTRUCTIONS**. Instructions for other treatments are available from the authors.

Situation 2. There are **200 ECU**. Participant **A** chooses between options **X** and **Y** to allocate these 200 ECU between herself and participant **B**.

X: She allocates **100 ECU** to herself and **100 ECU** to participant **B**.
Y: She allocates **20 ECU** to herself and **180 ECU** to participant **B**.

Participant B learns A's choice and chooses between **U** and **V**.

U: **B agrees** with the allocation **known to her**. If so, the allocation corresponds to participants' payoffs in ECU.

V: **B does not agree** with the allocation **known to her**. If so, both participants obtain a payoff of **0 ECU**.

All participants now make their decisions for both roles and for both situations. You state for role A which option (**X** or **Y**) you would choose in situation 1 and situation 2, respectively. For role B, you decide for every situation between **U** and **V**. Both situations are initialized to occur with equal probability 0.50 (50%). The decisions made for the situation which is drawn become payoff relevant. Payoffs are calculated as described above.

Please be patient until the experiment starts. If you have any questions, raise your hand. Before the experiment starts, please answer the following control questions.

A.2 Control Questions

Control Questions[34]

1. Assume that participants choose as follows:

   participant A:

situation 1	situation 2
X	X

   participant B:

situation 1	situation 2	
	if X	if Y
agrees	agrees	disagrees

   This means that in situation 1 and in situation 2, participant A chooses X. Participant B agrees in situation 1. In situation 2, she agrees if A chooses X, and she does not agree if A chooses Y. If situation 1 is chosen randomly, what is (in ECU)

   (a) participant A's payoff?

   (b) participant B's payoff?

   If situation 2 is chosen randomly, what is (in ECU)

[34]CONTROL QUESTIONS ABOUT THE ACTIONS AND SITUATIONS IN PHASE 1.

   (a) participant A's payoff?
   (b) participant B's payoff?

2. Assume that A and B still choose as described in 1., with the exception that in situation 2, A now chooses Y.
   (a) What is participant B's payoff in situation 2?

Please press 'OK'.

3. What is the difference between situation 1 and 2? Please choose 'right' or 'wrong'.
   (a) In situation 2, B has two courses of action whereas in situation 1, she has one.
   (b) Both in situation 1 and in situation 2, B knows which distribution of payoffs A has chosen.
   (c) In situation 2, B can actually react to A's choice whereas in situation 1, she can merely make a decision.

Please press 'OK'.

A.3 Instructions – Bidding Phase

INSTRUCTIONS – BIDDING PHASE

Now, one of either participant may influence which situation is drawn. This participant is determined by casting lots between participant A and participant B. Thereby, A and B have an equal chance to be drawn. If drawn by chance, a participant can pay the amount of 5 ECU to make the situation she prefers (if any) more likely to occur. If she does not pay, both situations occur as they have been initialized with 50 % probability. At the end of the experiment, one situation will be drawn. The decisions made for this situation become payoff-relevant.

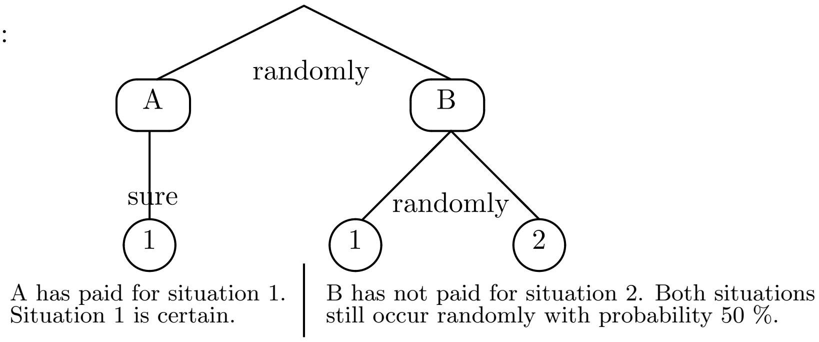
Payoffs for each situation are calculated as described in the instructions. If you may influence the draw of the situations and choose to do so, the cost of influencing the draw of the situations will be deducted from this payoff.

A.4 Control Questions – Bidding Phase

Control Questions[35]

Assume that A preferred situation 1 and paid 5 ECU for this situation. B preferred situation 2 but did not pay for this situation. Chance has not yet decided which participant's choice will actually be implemented. How likely is it that situation 1 occurs?

Some graphical help:



Please choose 'right' or 'wrong':

1. Situation 1 is certain. right/wrong.
2. Situation 1 is more likely than situation 2 (but not certain). right/wrong.
3. Situation 1 is as likely as situation 2. right/wrong.
4. Situation 1 is less likely than situation 2 (but not impossible). right/wrong.
5. Situation 1 is impossible. right/wrong.

Please press 'OK'. *(SUBJECTS ALSO HAD THE POSSIBILITY TO GO BACK TO THE PREVIOUS SCREEN WHICH SHOWED THE INSTRUCTIONS FOR THE BIDDING PHASE – SEE ABOVE.)*

[35] ABOUT THE INSTRUCTIONS FOR PHASE 2, I.E. THE BIDDING MECHANISM.

A.5 For Reviewing Purposes Only: The Moral Judgement Test by Georg Lind (1976, 2008). Do not Reprint or Use Without Written Consent from Georg Lind. Protected by International Copyright. For the analysis, see footnote 24.

Workers´ Dilemma

Recently a company fired some people for unknown reasons. Some workers think the managers are listening in on employees through an intercom system and using the information against them. The managers deny this charge. The union says it will only do something about it when there is proof. Two workers then break into the main office and take the tapes that prove the managers were listening in.

	I strongly *dis*agree						**I strongly agree**
15. Would you disagree or agree with the workers´ behavior?	-3	-2	-1	0	+1	+2	+3

How acceptable do you find the following arguments *in favor* of the two workers´ behavior? Suppose someone argued they were *right* . . .	**I strongly reject**								**I strongly accept**
16. because they didn't cause much damage to the company.	-4	-3	-2	-1	0	+1	+2	+3	+4
17. because due to the company's disregard for the law, the means used by the two workers were permissible to restore law and order.	-4	-3	-2	-1	0	+1	+2	+3	+4
18. because most of the workers would approve of their deed and many of them would be happy about it.	-4	-3	-2	-1	0	+1	+2	+3	+4
19. because trust between people and individual dignity count more than the firm's internal regulations	-4	-3	-2	-1	0	+1	+2	+3	+4
20. because the company had committed an injustice first, the two workers were justified in breaking into the offices	-4	-3	-2	-1	0	+1	+2	+3	+4
21. because the two workers saw no legal means of revealing the company's misuse of confidence, and therefore chose what they considered the lesser evil.	-4	-3	-2	-1	0	+1	+2	+3	+4

How acceptable do you find the following arguments *against* the two workers´ behavior? Suppose someone argued they were *wrong* . . .	**I strongly reject**								**I strongly accept**
22. because we would endanger law and order in society if everyone acted as the two workers did.	-4	-3	-2	-1	0	+1	+2	+3	+4
23. because one must not violate such a basic right as the right of property ownership and take the law into one's own hands, unless some universal moral principle justifies doing so.	-4	-3	-2	-1	0	+1	+2	+3	+4
24. because risking dismissal from the company on behalf of other people is unwise.	-4	-3	-2	-1	0	+1	+2	+3	+4
25. because the two should have run through the legal channels at their disposal and not committed a serious violation of the law.	-4	-3	-2	-1	0	+1	+2	+3	+4
26. because one doesn't steal and commit burglary if one wants to be considered a decent and honest person.	-4	-3	-2	-1	0	+1	+2	+3	+4
27. because the dismissals of the other employees did not affect them and thus they had no reason to steal the transcripts.	-4	-3	-2	-1	0	+1	+2	+3	+4

Doctor's Dilemma

A woman had cancer and she had no hope of being saved. She was in terrible pain and so weak that a large dose of a pain killer such as morphine would have caused her death. During a temporary period of improvement, she begged the doctor to give her enough morphine to kill her. She said she could no longer stand the pain and would be dead in a few weeks anyway. The doctor decided to give her a overdose of morphine.

	I strongly *dis*agree … **I strongly agree**
28. Do you disagree or agree with the doctor's behavior?	-3 -2 -1 0 +1 +2 +3

How acceptable do you find the following arguments *in favor* of the doctor? Suppose someone said he acted *rightly* . . .

	I strongly reject … **I strongly accept**
29. because the doctor had to act according to his conscience. The woman's condition justified an exception to the moral obligation to preserve life.	-4 -3 -2 -1 0 +1 +2 +3 +4
30. because the doctor was the only one who could fulfill the woman's wish; respect for her wish made him act as he did.	-4 -3 -2 -1 0 +1 +2 +3 +4
31. because the doctor only did what the woman talked him into doing. He need not worry about unpleasant consequences.	-4 -3 -2 -1 0 +1 +2 +3 +4
32. because the woman would have died anyway and it didn't take much effort for him to give her an overdose of a painkiller.	-4 -3 -2 -1 0 +1 +2 +3 +4
33. because the doctor didn't really break a law. Nobody could have saved the woman and he only wanted to shorten her suffering.	-4 -3 -2 -1 0 +1 +2 +3 +4
34. because most of his fellow doctors would presumably have done the same in a similar situation.	-4 -3 -2 -1 0 +1 +2 +3 +4

How acceptable do you find the following arguments *against* the doctor? Suppose someone said that he acted *wrongly* . . .

	I strongly reject … **I strongly accept**
35. because he acted contrary to his colleagues´ convictions. If they are against mercy-killing the doctor shouldn't do it.	-4 -3 -2 -1 0 +1 +2 +3 +4
36. because one should be able to have complete faith in a doctor's devotion to preserving life even if someone with great pain would rather die.	-4 -3 -2 -1 0 +1 +2 +3 +4
37. because the protection of life is everyone's highest moral obligation. We have no clear moral criteria for distinguishing between mercy-killing and murder.	-4 -3 -2 -1 0 +1 +2 +3 +4
38. because the doctor could get himself into much trouble. They have already punished others for doing the same thing.	-4 -3 -2 -1 0 +1 +2 +3 +4
39. because he could have had it much easier if he had waited and not interfered with the woman's dying.	-4 -3 -2 -1 0 +1 +2 +3 +4
40. because the doctor broke the law. If one thinks that mercy-killing is illegal, then one should refuse such requests.	-4 -3 -2 -1 0 +1 +2 +3 +4

Thank you!

B Overall behavior and beliefs across protocols

B.1 Ultimatum vs. Yes-No Game

Fig. A–I) Proposer beliefs (n=93)

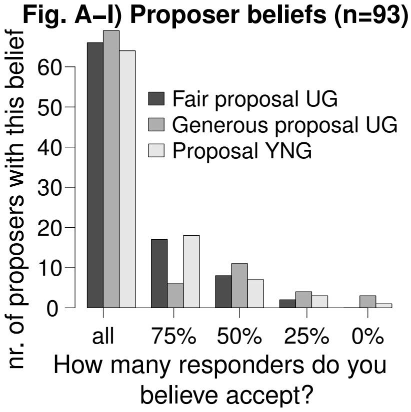


Fig. A–II) Responder beliefs (n=93)

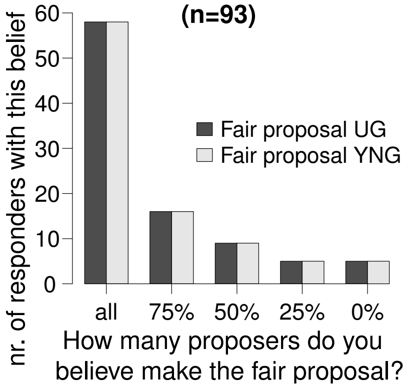


Fig. A–III) Proposer actions (n=93)

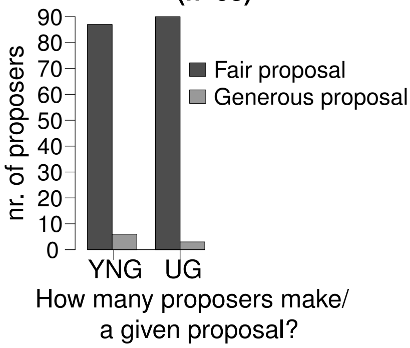
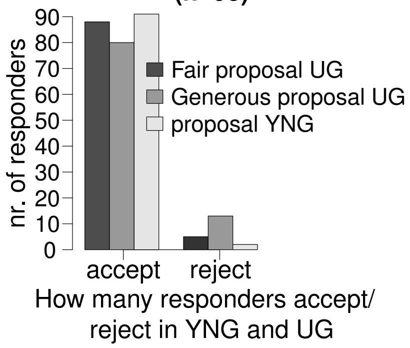


Fig. A–IV) Responder actions (n=93)



B.2 Dictator vs. Ultimatum Game

Fig. A–V) Proposer beliefs (n=83)

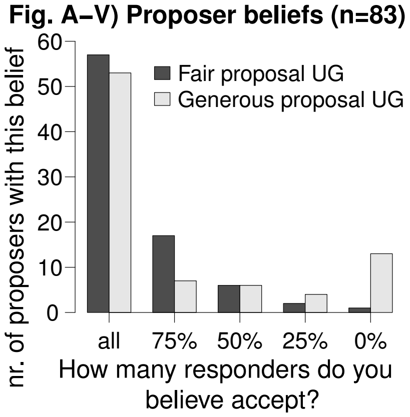
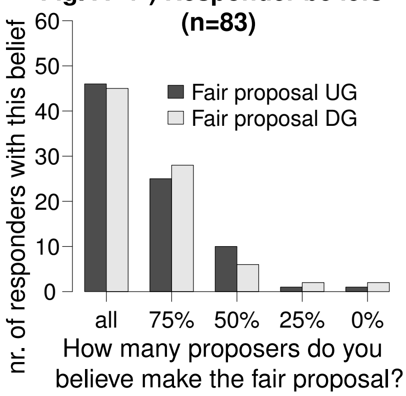


Fig. A–VI) Responder beliefs (n=83)



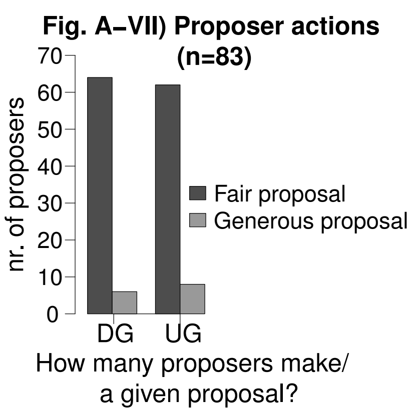


Fig. A–VII) Proposer actions (n=83)

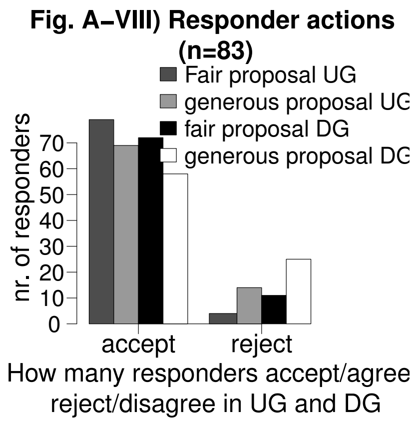


Fig. A–VIII) Responder actions (n=83)

C Lawrence Kohlberg's six 'classes' or 'ways' of argumentation.

Table A1: Six ways of moral argumentation (summary by Ishida 2006, examples from the authors).

argumentation	Classes of motivation for moral behavior	I prefer...
preconventional way	***Kohlberg 1.*** Orientation to punishment and obedience, physical and material power. Rules are obeyed to avoid punishment. ***Kohlberg 2.*** Naïve hedonistic orientation. The individual conforms to obtain rewards.	...the yes-no game because therein, I will not be punished for not being generous./ ...the ultimatum game: because the responder can and will reward me for being generous by accepting the proposal.
conventional way	***Kohlberg 3.*** "Good boy/girl" orientation to win approval and maintain expectations of one's immediate group. The individual conforms to avoid disapproval. One earns approval by being "nice".	...the ultimatum game because therein, I can signal my generous intentions to the responder who will reciprocate by accepting/
	Kohlberg 4. Orientation to authority, law, and duty, to maintain a fixed order. Right behavior consists of doing one's duty and abiding by the social order.	...because the responder expects me to be generous, and in the ultimatum game, I can show the responder I do not want to disappoint her expectations and let her down...
postconventional way	***Kohlberg 5.*** Social contract orientation. Duties are defined in terms of the social contract and the respect of others' rights. Emphasis is upon equality and mutual obligation within a democratic order.	...the yes-no game: it is more democratic since it grants both parties equality in decision and information rights/...the ultimatum game: it proceeds more transparently and the social contract can only be backed by transparent institutions/
	Kohlberg 6. The morality of individual principles of conscience, such as the respect for the individual will, freedom of choice etc. Rightness of acts is determined by conscience in accord with comprehensive, universal and consistent ethical principles.	...the ultimatum game: as proposer, I respect the responder's will and she has more opportunity to express this will in the ultimatum game

D Purely procedural concerns

D.1 Inequality in information: Formalization

As before, we use the terminology of Osbourne and Rubinstein (1994) if not otherwise stated. Let Γ be a two-player extensive form game where each player moves at most once. Let $s_i \in S_i$ be a strategy of player i in her strategy set in that game. A terminal history of the game in the set of terminal histories is denoted by $z \in Z$.

If we wish to model players who care about the interpersonal dimension in the distribution (or put differently, the precision) of information, we first need a means to express the amount of information each player has. There are two sources of information for a player: first, information about events exogenous to the game (e.g. information about nature's move) that each player has. Second, the information which each player learns about her opponent's actions. We assume here that each player can perfectly control and learn her own actions, and also assume perfect recall. Information from both sources determines how well a player can predict which terminal node or history of a game will be reached. If both players can transparently observe all actions and gain all relevant information about exogenous events and all actions at each stage of a procedure, then each player knows the terminal history for sure and coincidentally, there is also equity of information (there is also equity of information if players ignore the terminal history of the game to the same extent). If one of the players knows all relevant aspects and controls all decisions determining the allocation of material benefits in the game and this takes place without any transparency or possibilities for the opponent to monitor those actions, then there is severe asymmetry of information about the terminal histories of the game. Hence, we express the amount of information for each player by the fragmentation of her information partition about the terminal histories of the game. These information partitions have, to date, not directly entered the utility function, and thus not been modelled as directly relevant for indvidual preferences.

Let us denote player $j's$ partition of information over the terminal nodes with $\mathcal{I}_j^z$. This is what j knows about terminal nodes given j's own information, what j learns about $i's$ actions, and the control j has over her own actions when she is active. These partitions for players 1 and 2, respectively, will in a natural way be perfectly determined by the player nodes, information partitions, and action sets for each player.

As examples, consider the ultimatum game and the yes-no game. In both games, both players fully control their own actions: the proposer fully controls her proposal, the responder fully controls her acceptance/rejection decision. Yet, the two games differ regarding how much the responder knows about the proposal. In the ultimatum game, the responder learns the proposal made by the proposer. Since in addition, the responder also controls her own decision, she knows which terminal node will be reached. Therefore, the four terminal nodes of the ultimatum game are partitioned into singleton sets for the responder. The proposer in turn fully controls her own action – the proposal she makes/made. She does, however, not know how the responder reacts to each of her two potential proposals. Thus, the proposer's information partition over the terminal nodes consists of two non-singleton sets each containing two terminal nodes: the first set contains the responder's acceptance and rejection of the fair proposal; the second set containing the acceptance and rejection of the generous proposal. In summary, the cardinality of the information partitions over the terminal nodes of the ultimatum game are 2 for the proposer, and 4 for the reponder, respectively. In the yes-no game, the responder does not learn the proposal. She fully controls her acceptance/rejection. Thus, her partition over the terminal histories of the game contains two sets, i.e. has *cardinality two*: one set with the two possible terminal histories where the responder has accepted, another set with the two terminal histories where she has rejected. The proposer's information partition is identical in the yes-no and the ultimatum games, since she controls the proposal, but does not know how the responder will react. The information partition has therefore *cardinality two* as well.

Using these measures for how much information each player has, we can now express a player's aversion to information asymmetries. If player i cares about purely procedural fairness and the equality of access to information in particular, her preferences could be characterized by the utility function

$$u_i(s_i, s_j; b_i, b_j) - \beta_i max\{\#\mathcal{I}_i^z - \#\mathcal{I}_j^z, 0\} - \alpha_i max\{\#\mathcal{I}_j^z - \#\mathcal{I}_i^z, 0\}$$

where $u_i(s_i, s_j; b_i, b_j)$ captures the social welfare function dependent on the outcome s_i, s_j (as in inequity aversion models; Fehr-Schmidt, 1999; Bolton and Ockenfels, 2000, for instance) and possibly on players' belief systems b_i, b_j (as in psychological games; Battigalli and Dufwenberg, 2009). The procedural fairness notion of inequity aversion in access to information is modelled as $-\beta_i max\{\#\mathcal{I}_i^z - \#\mathcal{I}_j^z, 0\} - \alpha_i max\{\#\mathcal{I}_j^z - \#\mathcal{I}_i^z, 0\}$ where the first term captures the aversion for advantageous inequality in access to information and the latter term the aversion for disadvantageous inequality in access to information. Notice that the cardinality of a set B, $\#B$, denotes the number of elements in that set. This is the simplest specification with piecewise linear utility in information asymmetries. As an analogy with Fehr-Schmidt (1999), it is natural to assume that $\alpha_i \geq \beta_i$ so that players are assumed to be more aversive to disadvantageous inequality than to advantageous inequality. Thus a proposer and a responder with identical procedural preferences facing a choice between the same two procedures may each prefer a different procedure just, because of their role, the inequality in access to information in a given procedure is advantageous for one of the players and disadvantageous for the other (see tables 3 and 4 in section 6). Such a proposer would have a payoff $u_1^{UG}(s_1, s_2; b_1, b_2) - \alpha_1 max\{\#\mathcal{I}_2^{z,UG} - \#\mathcal{I}_1^{z,UG}, 0\} = u_1^{UG}(s_1, s_2; b_1, b_2) - \alpha_1 max\{4 - 2, 0\}$ in the ultimatum game, and a payoff $u_1^{YNG}(s_1, s_2; b_1, b_2) - \alpha_1 max\{\#\mathcal{I}_2^{z,YNG} - \#\mathcal{I}_1^{z,YNG}, 0\} = u_1^{YNG}(s_1, s_2; b_1, b_2) - \alpha_1 max\{2 - 2, 0\}$ in the yes-no game. Thus the proposer with purely procedural concerns of equality of information would strongly prefer the yes-no game if the terms $u_1^{UG}(s_1, s_2; b_1, b_2)$ and $u_1^{YNG}(s_1, s_2; b_1, b_2)$ are equal (which requires analogous actions and beliefs in the two procedures, see table 2, section 3). The responder with purely procedural concerns of equality of information would also prefer the yes-no game but her preference would be weaker since $\alpha \geq \beta$ This is in line with the observed revealed preference patterns over the two procedures (see table 4, section 6).

D.2 Procedural transparency

Hegel (1821, §215) argues that people should have an equal claim to jurisprudence which can only be the case if the law is transparent, and in particular, if all decisions pertaining to judicial processes are common knowledge to all parties at all points in time. Rawls (1958) argues that transparency – along with simplicity, and equal freedom of choice – define fairness which in turn promotes justice. Transparency of institutions, does, therefore, also have ethical content. Moreover, as a necessary feature of those institutions backing the social contract, it could be motivated by the same ethical ideal from which preferences about the equality of rights should spring, that is, Kohlberg class 5, see table 5. There are two games which proceed transparently in our setting: the dictator, and the ultimatum game. Whenever a party is called upon to choose, she knows all decisions which have previously been made. Note that subjects who choose between the yes-no and the ultimatum game can only opt for transparency (i.e. the ultimatum game) at the cost of introducing unequal information and decision rights.

D.3 Procedural simplicity

We express the simplicity of a procedure by the number of eventualities a player needs to reason about, see already (de Tocqueville 1868) for some aspects, and the desirability of this property[36]. This number of eventualities depends on two elements: the number of the opponent's choices, and the number of the player's own choices. For each opponent choice, the player must determine what her own preferred reaction to this choice is, and whether given this reaction, the opponent choice was in the opponent's interest given some preference the opponent might hold. The higher this number of eventualities, the more cognitive effort is required, and the more cognitive resources are bound. Players could prefer procedures where the number of strategic eventualities she needs to consider, is small(er). In the yes-no game, each player has to think about the two moves of her own, and the two moves of the other player. Therefore, each player in a yes-no game has to think about altogether only four possible combinations of moves (which coincides with the cardinality of a player's set of 'pure strategies')[37]. In the ultimatum game, each player has to think about the proposer's two moves, and the responder's two moves given each proposal. Altogether, each player needs to think about six possible combinations of moves. In terms of procedural simplicity, the yes-no game is therefore *simpler* than the ultimatum game. Since the yes-no game also distributed rights equally while the ultimatum game did not, a natural way to disentangle these motivations is to look whether a player's preference for the yes-no game correlates with her moral judgement (motive: distribution of rights), or not (motive: simplicity). Looking at this paper's specific dictator game, proposer and responder also have to think about six eventualities each: the proposer needs to understand that whatever she proposes, whether the responder agrees or disagrees with each proposal, does not change the final

[36] The complexity of strategies has also been described game-theoretically by e.g. Rubinstein (1986) or Kalai and Stanford (1988)

[37] We do not explicitly consider mixed strategies. But note that the pure strategies are the limiting case for each mixing strategy, and therefore, two different sets of distinct pure strategies – whatever they are – always spawn the exact same number of mixed strategies on a continuous scale.

allocation. The responder needs to understand the same.

D.4 Procedural efficiency

In our setting, the proposer can only make a fair, and a generous proposal. Hence, she cannot bias distributive fairness in a self-serving way. The veto right in our mini-ultimatum game thus does not protect the responder from a proposer's self-serving distributive unfairness: the veto is merely an inefficiency-inducing option. Responders and proposers could intrinsically value procedures which preclude conflict, even if they know for sure they agree, and that conflict is a purely hypothetical scenario. In our setting, the only game which meets the criterion of purely procedural efficiency, is the dictator game.

Table A2: Yes-No Game vs Ultimatum Game: Distribution Of Rights across proposer and responder, Simplicity, Transparency, and Efficiency of each game.

	role	yes-no game	ultimatum game
decision rights (nr. of effective pure strategies)	proposer	2	2
	responder	2	4
	distribution of rights	$\{2,2\}$	$\{2,4\}$
information rights (cardinality of information partition over terminal nodes)	proposer	2	2
	responder	2	4
	distribution of rights	$\{2,2\}$	$\{2,4\}$
simplicity (sum of own and opponent's moves a party has to reason about)	proposer responder	4	6
transparency: game has perfect information	proposer responder	no	yes
efficient regulation of conflicts?		no	no

Table A3: Dictator Game vs Ultimatum Game: Distribution Of Rights across proposer and responder, Simplicity, Transparency, and Efficiency of each game.

	role	dictator game	ultimatum game
decision rights (nr. of effective pure strategies)	proposer	2	2
	responder	1	2
	distribution of rights	$\{2,1\}$	$\{2,4\}$
information rights (cardinality of information partition over terminal nodes)	proposer	4	2
	responder	4	4
	distribution of rights	$\{4,4\}$	$\{2,4\}$
simplicity (sum of own and opponent's move a party has to reason about)	proposer responder	6	6
transparency: game has perfect information	proposer responder	yes	yes
efficient regulation of conflicts?		yes	no

E Predictions of the existing theories

Let us now illustrate that existing and ultimately outcome-based preference models have a hard time explaining procedural preferences in this paper's setting.

E.1 Distributive theories

Self-interested opportunism. If R is opportunistic, she only cares about her share of the 200 units of pie and never rejects any proposal. Anticipating R's opportunism, P selects the allocation (100,100) in all three games and R accepts whenever she has the opportunity.[38] The expected payoff in each procedure is 100 for each player. Self-interested players are therefore indifferent between all three allocation procedures. *Self-interested parties who violate these predictions are still procedurally indifferent if their actual behaviour, and actual beliefs are the same in all procedures.*

Inequity aversion. Models of allocative fairness (Bolton 1991; Bolton and Ockenfels 2000; Fehr and Schmidt 1999) assume that a player's utility does not only increase in a player's private payoff, but also in the equality of payoffs. Fehr and Schmidt (1999) assume that each player's own payoff and her payoff from (in)equality are additively separable. That is, if a player earns x units and her opponent earns y units, then the player's utility is $x - a \times max\{(y-x), 0\} - b \times max\{(x-y), 0\}$ where a and b denote non-negative individual parameters. Further, the model assumes that players suffer more from disadvantageous than from advantageous inequality, that is, $a \geq b$. A player strictly prefers the allocation $(0,0)$ to (x,y) with favourable inequality $x > y$ iff $b > \frac{x}{(x-y)}$. A player strictly prefers $(0,0)$ to the allocation (x,y) with unfavourable inequality $x < y$ iff $a > \frac{x}{(y-x)}$. For our two allocations ($x = 100$, $y = 100$) and ($x = 180$, $y = 20$), inequity averse responder with $b < 1$ would accept all proposals. If so, inequity-averse proposers maximize their utility by proposing (100,100). The expected payoff is 100 for each player in each procedure. Thus, neither player should prefer one procedure over another. *Inequity-averse parties who for some reason, violate these predictions are still procedurally indifferent if their actual behaviour, and their actual beliefs are the same in all procedures.* An inequity averse individual invokes a social reference point about the distribution of material payoffs (Fehr and Schmidt, pp. 820-821, Bolton and Ockenfels, p. 172), or put differently, a social norm about the equality of outcomes (Bolton et al. 2005, p. 1068) to derive the right course of action.

E.2 Psychological game theory

Reciprocity. If responders care for the kindness of the intention behind a proposal, they compare the actual proposal with other proposals that could have been made. The kindness of a proposal therefore depends on the set of possible proposals. The unrestricted set of proposals is a set where the pie can be split into any numerically possible way. On this set, the equal division is fair. If only two options are available, the equal split may be considered even fairer. Indeed, Falk et al (2003) hardly ever find responders who reject meager offers in mini-ultimatum games when only two proposals are possible –

[38] These strategies are sequentially rational (Selten 1967).

suggesting that even meager offers are more acceptable for the smaller set. Apart from restricting the set of proposals, our experimental design also has no proposal where the proposer earns more than the responder. Hence, both allocations: $(100, 100)$, and $(20, 180)$ should appear kind and be accepted. We next discuss reciprocal concerns in the frameworks of Falk and Fischbacher (2006), and Dufwenberg and Kirchsteiger (2004).[39] Throughout, reciprocal preference models assume that individuals invoke others' intentions to derive the right course of action.

Reciprocity – Falk and Fischbacher (2006). The kindness of player j towards i at node n is defined as $\varphi_j(n, s_i'', s_i') := \vartheta_j(n, s_i'', s_i')\Delta_j(n, s_i'', s_i')$ where s_i' represents i's first-order belief about the strategy of j and s_i'' is i's second-order belief (the belief about the first-order belief of j). In equilibrium, this second-order belief coincides with a player's actual behaviour. The term $\Delta_j(n, s_i'', s_i') = x_i(n, s_i'', s_i') - y_j(n, s_i'', s_i')$ expresses the perceived payoff difference, $\vartheta_j(n, s_i'', s_i') \in [0, 1]$ measures the degree of intentionality in j 's choices. For negative Δ_j, player j is unkind to i whereas for positive Δ_j, player j is kind. For binary choices, a player is intentionally unkind if she gives her opponent a smaller share of the pie than she keeps herself when she might have offered the opponent the larger share. A player is unintentionally unkind to her opponent if she gives her opponent a smaller share of the pie than she keeps for herself but had no opportunity to give the same or the larger share. For all our procedures and all their outcomes, the difference between what the proposer gave and what she kept, i.e. Δ_j, remains non-negative. Therefore, the *proposer* cannot be unkind.

The *responder* ensures equal payoffs both if she accepts the fair offer, and if she rejects it. The fair proposal $(100, 100)$ is not unkind and is therefore always accepted. The generous proposal $(20, 180)$ is even kinder. If a responder accepts this generous offer, she is unkind – because this gives her opponent less than herself. However, this unkindness is not deemed intentional, since rejecting the generous offer would give the proposer even less than the generous proposal does. Thus, the generous offer is accepted provided that purely distributional motives do not matter. If, however, an individual holds a high concern for equal outcomes *and* sufficiently strong reciprocal motives, Falk and Fischbacher (2006) can predict rejections of the generous offer in equilibrium. This reaction to the generous offer does, however, not matter, since the proposer in equilibrium prefers to propose the fair offer anyway. The fair proposal is accepted with certainty in every perfect equilibrium of both the mini ultimatum and the mini yes-no game. In the dictator game, the responder cannot be intentionally kind or unkind since she has no influence on any payoff. The proposer thus chooses the fair proposal. In summary, Falk and Fischbacher (2006) predict that the fair offer is always proposed and accepted with certainty in all procedures, and that each player earns 100. Since there are no payoff differences, the psychological payoffs are zero and the equilibrium payoffs identical in all procedures. No player should prefer one procedure over another.

Reciprocity – Dufwenberg and Kirchsteiger (2004). This model of reciprocity first identifies efficient strategies. The difference between the payoff a player gives her opponent with a specific strategy and

[39] Cox et al. (2007, 2008) formulate an alternative to the psychological game theory models of reciprocity discussed in the main text of this appendix. In their model, a player's lost or gained payoff opportunities at earlier nodes of an extensive form game influence the subsequent marginal rate of substitution (MRS) between the player's own earnings and those of her opponent. The MRS remains constant across two games where the fair proposal is always proposed and each proposal is always accepted. Thus, also according to Cox et al. (2007, 2008) players are indifferent between this paper's protocols.

the average payoff a player gives her opponent over all efficient strategies which are still available at a given node measures the kindness of a specific strategy (see Dufwenberg and Kirchsteiger, pp. 276). In every protocol of our setting, there is a single efficient responder strategy: the pure strategy which accepts every proposal. Thus, all responder strategies that put a positive probability on rejection are unkind, and the responder can only be neutral or unkind towards the proposer. This implies that the proposer always prefers the fair offer if the probabilities of acceptance of each offer are equal: there is no kindness she would need to reciprocate. Knowing that the fair offer will be proposed for sure, the kindness of the responder who rejects with probability q equals $q \cdot 100$ for the yes-no game, and the ultimatum game. If the proposer believes that each offer is accepted with probability q, her kindness in proposing the fair offer is[40] $(q \cdot 100 - q \cdot (100 + 180)/2)$ in both games. Each player's equilibrium payoff is thus identical in the mini-ultimatum and the mini- yes-no game given her sensitivity to reciprocity. In equilibrium therefore, players are indifferent between these two procedures.

In the dictator game, each proposal is accepted with certainty. The responder has no influence on payoffs and for this reason, is always neutral towards the proposer. Therefore, psychological payoffs are zero, preferences coincide with rational self-interest, and the proposer chooses the fair proposal. As we saw above for the ultimatum and yes-no game, accepting both offers with certainty is efficient and expresses zero kindness towards the proposer. The psychological payoffs are zero as in the dictator game. Players who believe that every proposal is accepted with certainty in all games and who expect the fair proposal to be always proposed are indifferent between the dictator, ultimatum, and yes-no game. At the bottom of this appendix, we characterize all equilibria of the games at hand under the constraint of equal acceptance probabilities across nodes and games (which is a necessary condition for procedural indifference and a feature imposed by the empirical analysis).

General remark on psychological games. In psychological games, payoffs depend explicitly on beliefs and thus, expected payoffs do not have to be linear in probabilities (contrary to standard expected utility theory). Specifically, the psychological payoffs of the two theories of reciprocity are quadratic in beliefs. For instance, the responder's evaluation of the proposer's kindness depends explicitly and quadratically on how likely she deems the generous offer. We denote this probability by $1-p$. Since in the ultimatum game, the responder reacts to updated information about this probability, the expected payoff of the responder differs from his expected payoff in the yes-no game (where the responder does not receive an information update) whenever the ex-ante belief about the probability of the fair offer is $0 < p < 1$, even if ex ante beliefs are identical in the two games (by Jensen's inequality). The expected payoffs are yet equal in the two games if ex ante, the fair offer is either certain, i.e. $p = 1$, (as predicted by sequential reciprocity equilibrium if acceptance rates are equal, see appendix E) or impossible, i.e. $p = 0$.

Guilt aversion (Battigalli and Dufwenberg 2007; Charness and Dufwenberg 2006) is yet another other-regarding concern which can also be modelled via psychological game theory. In these theories, guilt matters only if a player harms the other and lets the other down (Bicchieri, 2006, pp. 52; Battigalli and Dufwenberg, 2007, pp. 171; Miettinen, 2013, pp. 71). If the responder expects the

[40] The difference between the expected responder payoff in the fair offer, i.e. $q \cdot 100$, and the expected average responder payoff over all efficient available strategies, i.e. $q \cdot (100 + 180)/2$.

proposer to expect rejection, the responder does not harm the proposer by accepting instead and the responder's guilt payoff is zero. Thus, the responder's preferences coincide with rational self-interest and she always accepts. If the responder expected the proposer to put some weight on acceptance in her beliefs, rejecting would harm the proposer. The responder's guilt payoff will then only increase her incentive to accept. Therefore, the responder always accepts, and her guilt payoff is zero. A very guilt averse proposer who very much expects the responder to expect a generous offer might indeed offer $(20, 180)$. However, as long as actual actions and actual beliefs are the same for two procedures, guilt averse parties are indifferent between them. This differs from reciprocity, because in guilt aversion, psychological payoffs are linear in beliefs (Battigalli and Dufwenberg 2007), and not quadratic. In terms of ethical ideals, a guilt averse individual invokes others' expectations (Battigalli and Dufwenberg 2007, p. 170) or social norms (Bicchieri 2006, López-Pérez 2008) to derive the right course of action.

E.3 Economic models of procedural fairness

Recently, *economic approaches to procedural fairness* have been developed, some building upon inequity aversion (Bolton et al. 2005; Krawczyk 2011; Trautmann 2009), others upon reciprocity (Sebald 2010)[41]. Even these approaches predict indifference between the two pie-sharing games in each of the two pairs of games. Bolton and Ockenfels (2005) formulate that individuals are inequity-averse over expected payoffs and prefer lotteries with similar expected payoffs for both players to lotteries with dissimilar expected payoffs. Applying this – or the other two inequity based models of procedural preferences (Trautmann 2009; Krawczyk 2011) – to our setting, we find that participants who hold the same beliefs in two procedures will also expect the same payoffs in each procedure and therefore, be indifferent between the procedures.

Sebald (2010) allows the preference to be influenced by the kindness of a procedure, that is, the kindness the opponent would have shown had she chosen that procedure. In Sebald's model – contrary to Dufwenberg and Kirchsteiger (2004) – the responder does not update her beliefs about the proposer's choice probabilities in the ultimatum game when she learns the proposal that has been made (if both proposals have a positive probability ex ante). Thus, if a player has procedurally invariant actions and beliefs, she is predicted to be indifferent between the mini yes-no game and the mini ultimatum game. Similarly, if each proposal is accepted for sure in the ultimatum game, the responder is neither kind nor unkind towards the proposer (recall that accepting is the only efficient strategy) and the psychological payoffs are always zero in the dictator, and the ultimatum game. Thus, if each proposal is proposed with equal probability in these games, players are indifferent. Table 2 in the main text reviews the conditions under which participants are procedurally indifferent.

[41] Sebald's model is based upon the reciprocity model of Dufwenberg and Kirchsteiger (2004).

E.4 Predictions of the sequential reciprocity equilibrium, Dufwenberg and Kirchsteiger (2004)

Proposition (YNG). *There is a unique equilibrium. The proposer (all types) proposes F. A responder with sensitivity to reciprocity $Y_R \leq 1/40$ accepts with probability one, a responder with $Y_P > 1/40$ accepts with probability $q = \frac{1}{40Y_R}$.*

Proof. The responder has a single efficient strategy (see Dufwenberg and Kirchsteiger, 2004, pp. 276): to accept with probability one. Therefore, the responder R is commonly known to be unkind towards the proposer P. The responder's kindness towards the proposer is captured by variable κ_{RP} where kindness is associated with a positive value and unkindness associated with negative value. By the above argument, $\kappa_{RP} \leq 0$.

Given acceptance rate q, the proposer's pecuniary payoff for proposing F is $100q$ and that for proposing G is $20q$. The responder's respective payoffs are $100q$ and $180q$. The proposer proposes F if the payoff for doing so (on the left-hand side of the following inequality) is greater than the payoff of proposing G (on the right-hand side)

$$100q + Y_P \kappa_{RP}(100q - \frac{100q + 180q}{2}) > 20q + Y_P \kappa_{RP}(180q - \frac{100q + 180q}{2})$$

where the parameter Y_P is the proposer's sensitivity to reciprocity, $(100q - \frac{100q+180q}{2})$ and $(180q - \frac{100q+180q}{2})$ measure the proposer's kindness κ_{PR} of proposing F and G, respectively. Since κ_{RP} is non-positive, the responder maximizes her payoff by proposing F.

The responder accepts if the payoff of accepting (the left-hand side of the following inequality) is greater than that of rejecting (on the right hand side)

$$100 + Y_R \times 0 \times \kappa_{PR} > 0 + Y_R \times (-100) \times \kappa_{PR}$$

where $\kappa_{PR} = \frac{100q-180q}{2} < 0$. The inequality simplifies to$Y_R < \frac{1}{40q}$. If to the contrary $Y_R > \frac{1}{40q}$, then the responder rejects the fair proposal. Notice that in equilibrium, the proposer must have correct beliefs about the rejection rate. Thus, in equilibrium the responder never rejects with probability one. The responder with sensitivity to reciprocity $Y_R \leq 1/40$ accepts with certainty and a responder of specific sensitivity $Y_R = \frac{1}{40q}$ is indifferent and accepts with probability $q = \frac{1}{40Y_R}$. *QED.*

Proposition (UG). *Under the restriction $q_F = q_G$, there is a unique equilibrium where $q_F = q_G = 1$. The proposer (all types) proposes F. A responder with sensitivity to reciprocity $Y_R \leq 1/40$ and accepts with probability one. (The proposer must expect $Y_R \leq 1/40$ with probability one).*

Proof. As in the yes-no game, the responder can only be neutral or unkind, $\kappa_{RP} \leq 0$. Given the acceptance rates q_F and q_G of the fair and the generous proposal respectively, the proposer's pecuniary payoff for proposing F is $100q_F$ and that for proposing G $20q_G$. The responder respective payoffs are $100q_F$ and $180q_G$. The proposer proposes F if $100q_F + Y_P \kappa_{RP}(100q_F - \frac{100q_F+180q_G}{2}) >$

$20q_G + Y_P\kappa_{RP}(180q_G - \frac{100q_F+180q_G}{2})$, i.e. if

$$100q_F - 20q_G > Y_P\kappa_{RP}[180q_G - 100q_F].$$

Three cases: (1) $q_G < 5/9q_F$. In this case, the proposer prefers F if

$$Y_P < \frac{100q_F - 20q_G}{\kappa_{RP}(180q_G - 100q_F)}.$$

(2) $5q_F \geq q_G \geq 5/9q_F$. (this includes the case $q_F = q_G$). In this case, the proposers of all sensitivities Y_P prefer F. (3) $5q_F < q_G$.In this case the proposer prefers F if $Y_P > \frac{100q_F - 20q_G}{\kappa_{RP}(180q_G - 100q_F)}$.

We are interested in predictions under the restriction that the responder is expected to accept both proposals with equal probability, $q_F = q_G$ (this is something we control for by eliciting beliefs). In this case the proposer always proposes F. The responder who expects that the fair proposal is proposed accepts if $Y_R < \frac{1}{40q_F}$. By the same argument as above, the responder accepts with certainty if $Y_R < \frac{1}{40q_F}$, i.e. in equilibrium where beliefs are correct $Y_R < \frac{1}{40}$. There is no pure strategy equilibrium where the responder rejects with certainty. Yet, given a commonly known sensitivity type Y_R, there is a mixed strategy equilibrium where the type $Y_R = \frac{1}{40q_F}$ is indifferent and accepts with probability $q_F = \frac{1}{40Y_R}$).

Let us finally verify that it is optimal to accept G with probability $q_G = q_F$. Acceptance is preferred if

$$180 + Y_R \times 0 \times \kappa_{PR} > 0 + Y_R \times (-20) \times \kappa_{PR}$$

where $\kappa_{PR} = \frac{180q - 100q}{2} > 0$ and thus acceptance is always preferred. The unique equilibrium under our restriction $q_F = q_G = 1$ where responder is of type $Y_R \leq 1/40$. *QED.*

Proposition (Procedural indifference). *If $q_F = q_G = 1$, each player is indifferent between whether UG or YNG is used/played.*

Proof. If $q_F = q_G = 1$, the proposer proposes F and the responder accepts with certainty. Thus. the responder's equilibrium payoff equals $100 + Y_R \times \kappa_{RP} \times \kappa_{PR}$ where both in the YNG and in the UG, $\kappa_{RP} = 0$ (the responder is neither kind or unkind). Thus the expected payoffs are equal in both games. It is easy to verify that the same argument implies that also the proposer payoffs are equal in the two games.

In the dictator game, the responder cannot influence the payoffs, so he can only be neutral $\kappa_{RP} = 0$. Thus the proposer receives the same payoff in the UG and in the DG, so does the responder. Therefore, there is procedural indifference between the two procedures if $q_F = q_G = 1$. *QED.*

F Appendix section 7.1 – precision of beliefs.

How imprecise is the unbiased belief elicitation method we apply? Theoretically – see Schlag and Tremewan (2012) for details – a subject who submits a belief that 4 out of 4 opponents choose a specific action, has a probabilistic confidence of 80 % or higher that all opponents choose this action. A subject in turn who submits that 0 out of 4 opponents choose that action has a probabilistic confidence of 80 % or higher that no opponent chooses this action.

$\geq$ 80 % confidence is not equal to 100% confidence, and yet our identification method for *purely procedural preferences* requires that we identify subjects who are 100% confident that each procedure generates the same outcomes, and who still pay for a(ny) game. An argument against our claim that we find evidence for new, purely procedural preferences goes as follows: *"The majority of 'EQ' subjects prefers the yes-no game. An 'EQ' proposer who chooses between the mini-ultimatum game and the mini-yes-no-game could report a belief that 4 out of 4 responders accept the equal split in both games, and that four out of four responders also accept the generous split (20 ECUs for the proposer and 180 ECUs for the responder) in both games. Yet, this proposer might actually believe that the proposal in the yes-no-game will be accepted with probability 99 % and the fair fifty-fifty proposal in the ultimatum game with 81 % probability. If this proposer offers the equal split in both games, she would be* 0.18×100 *ECUs better off in the yes-no-game. Since the proposer can only influence the draw of the procedures with* 50% *probability in her pair and only if she pays* 5 *ECU, she would gain* $0.5 \times (18 - 5) = 6.5$ *ECU by paying for the yes-no game. Therefore, this proposer's so called purely procedural preference exhibits nothing but self-interest after all."*

Let us look at the relevant set of proposers who always offer the equal split. If the counter-argument above were true, then we must – firstly – observe that there are *more* such equal split proposers who report a *4/4* acceptance belief for the yes-no game than who report such a *4/4* belief for the ultimatum game.[42] This is, however, not true: there are *less* (64) proposers who always offer the equal split who report a *4/4* belief in the yes-no game than in the ultimatum game (66).[43] Summing up, we find that – if anything – proposers and responders would each expect to hold a small material *dis*advantage in the yes-no game. Self-interest can therefore, not explain the aggregate preference for the yes-no game which was also 'EQ' subjects' main preference in 6.1[44]. Outcome-based equity theories do not explain the preference for the yes-no game either given the belief patterns mentioned: players can

[42] If in the yes-no game, the acceptance likelihood were 99% and in the ultimatum game only 81%, then on a set of 84 proposers who always offer the equal split, we should observe $(0.99 - 0.81) \cdot 84 = 15$ *more* proposers with *4/4* beliefs in the yes-no game than we observe *4/4* beliefs in the ultimatum game.

[43] For 'EQ' responders, we can also reject the argument that they might in general expect an immeasurable material advantage in the yes-no game. Of 74 responders who accept all proposals in all games, 52 believe all four proposers offer the equal split in the yes-no game whereas only 47 think this is true in the ultimatum game. There are hence *more* responders who always accept and who expect all four proposers offer the generous split in the ultimatum game than there are such responders in the yes-no game. These belief results carry over to the complete set of participants: looking at *all* proposers, expected acceptance rates of *both* splits are *higher* in the ultimatum game than the expected acceptance rate in the yes-no game; looking at *all* responders, the generous split is expected more often in the ultimatum game than in the yes-no game. These results differ from the literature because we do not allow for a self-serving proposal.

[44] Coincidentally, the yes-no game is also the preferred according to a purely procedural preference for the equality of decision rights, see 4, the equality of information D.1, and purely procedural simplicity D.3.

achieve an invisibly higher degree of expected equity by opting for the ultimatum game. Reciprocity explanations work into the same direction: if anything, the overall belief patterns suggest that both responders and proposers (with identical actions) would expect a higher psychological payoff in the ultimatum game. Hence, if parties had reciprocal preferences, they should unanimously prefer the kinder, the ultimatum game. Nevertheless, most prefer the yes-no game.

If the counter-argument were true, we should – secondly – observe that proposer choices for the yes-no-game correlate with moral argumentation from Kohlberg classes one to four, see appendix C – where material benefits, costs, social comparisons and norms, expectations and status determine what a subject deems to be the *right* course of action. This is, however, not what we observe. The evidence for purely procedural preferences in 6.1 correlated with Kohlberg class five in 6.2, a new ethical ideal upon which none of the existing preferences in section 3 builds, and an ethical ideal which explicitly refers to the equality of rights. It is also noteworthy that given the actual distribution of 'EQ' beliefs, risk-aversion would – if anything – predict that 'EQ'-subjects hold an aggregate preference for the ultimatum game where they would expect a weakly higher payoff at a lower risk.

Summing up, our evidence is indeed in line with purely procedural fairness, and at odds with outcome-based explanations building upon immeasurable differences in beliefs across games, or risk preferences. In particular, we need not make an equilibrium assumption at any point to show this. Finally, if the counter-argument were true, we should certainly not observe proposers who – motivated by the same new ethical ideal about the equality of rights – avoid the yes-no game when they expect a measurable material advantage (and hence, a disadvantage for the responder) for this game, but opt into this game when it does not hurt the responder and hence, is to their own disadvantage. Yet, sections 7.1-7.3 assemble these pieces of evidence which allow us to brush off concerns for hidden differences in beliefs and explore the robustness of our findings.

dictator vs. ultimatum game. On the relevant set of proposers – those who state an efficiency concern and who always offer the equal split – 95% report a *4/4* acceptance belief for the equal split in the ultimatum game but only 63% also report such a belief for the generous proposal (which they do not offer). In the dictator game, the expected acceptance probability is by construction 100%. Given these belief patterns, the main difference between both games would therefore lie in the greater *unkindness* of the ultimatum game, if immeasurable belief differences mattered at all. Yet, we do not observe that dictator game choices link to moral argumentation underlying reciprocal preferences according to which intentions, social norms, punishment avoidance, or a material cost-benefit analysis (Kohlberg classes one to three) determine the right course of action. On the responder side, the 65 who always accept report altogether more *4/4* equal split beliefs for the dictator than for the ultimatum game which implies a payoff advantage in the ultimatum game. Hence, self-interest or risk aversion could not explain why 'EQ' responders prefer the dictator game. Fairness and equity norms might be at play but in this case, responder choices of the dictator game would need to correlate with Kohlberg class three. Since i) choices of the dictator game do not correlate with any Kohlberg class, since ii) they do correlate with an efficiency concern, and since iii) self-interest cannot be at play given these beliefs, our evidence is again more in line with a purely procedural concern for efficiency.

G Appendix section 7.2 – other sets of beliefs.

G.1 Yes-No vs. Ultimatum Game

Within each cluster of beliefs and actions, we analyze whether individuals who choose a procedure *and* have a strategic incentive to do so, respond to this strategic incentive, or whether – just as their 'EQ'-counterparts – they are concerned about individual rights (or efficiency) and just coincidentally happen to believe that the procedures also generate different (subjective) outcomes. Similarly, we can test more generally whether individuals who prefer not to pursue their strategic gain (who for instance, state indifference when one game clearly yields them more payoff) do so out of a concern about the distribution of rights, or a concern about procedural efficiency, respectively.

A) Proposers with procedurally variant actions and beliefs, yes-no vs. ultimatum game. The WARD-clustering procedure on non-EQ proposers generated one cluster with #22, one with #9, and one with #20 proposers. The second cluster being too small to be analyzed, we manually merged it with cluster 1 thus keeping cluster 3 at maximal homogeneity[45]. In this merged cluster with #31 observations, proposers believe to have a material advantage in the ultimatum game, see table A4 for details on all clusters. Those who opt for the yes-no game and decide *against* their incentive make more use of *postclass 1* arguments than those who are indifferent (effect: 0.24, $z - stat$: 3.94, $p - value = 0.00$) with $n = 25$. Interestingly, also those proposers who act in line with their incentive and opt for the ultimatum game make more use of *postclass 1* arguments than those who are indifferent (effect: 0.29, $z - stat$: 3.33, $p - value < 0.01$) on $n = 16$. Altogether, 15/31 (48%) of all proposers in the merged cluster prefer the yes-no game, and 6/31 (19%) prefer the ultimatum game. In cluster 3 with $n = 20$, 10 proposers prefer the yes-no game, and 9 state to be indifferent. Most proposers who prefer the yes-no game expect a material advantage in this game. Instead, most proposers who state to be indifferent expect a material advantage in the ultimatum game but decide *not to pursue* this advantage. These proposers make more use of *postclass 1* arguments than those who prefer the yes-no game. If we exclude the only three proposers who state to be indifferent and have yet another incentive structure, the effect turns from weak (-0.25, $z - stat$: -1.98, $p - value < 0.047$) on $n = 20$ to intermediate significance (-0.29, $z - stat$: -2.38, $p - value < 0.017$) on $n = 17$. These proposers who state indifference and at the same time expect an advantage of an average 40 ECU in the ultimatum game might not wish to materially profit from amending the transparency of the procedure by choosing the ultimatum game – see appendix D.2 for a formulation of this property.

B) Responders with procedurally variant actions and beliefs, yes-no vs. ultimatum game. The initial clusters contained #22, #21, and #12 observations, respectively. In cluster 1, responders expect a payoff advantage in the ultimatum game. Those who nevertheless prefer the yes-no game make more use of *postclass 1* arguments than responders who prefer the ultimatum game (effect: 0.46, $z - stat$: 2.96, $p - value < 0.01$) with $n = 15$. Responders who opt for the yes-no game expect to forego an average strategic advantage of 98.33 ECU. Even responders who state to be

[45] Since the results on cluster 1 before and after merging it with cluster 2 are the same, the additional heterogeneity introduced into cluster 1 is not critical. Note that only manually merging both clusters at this stage allow us to keep cluster 3 at maximal homogeneity and therefore, at maximal similarity in the strategic confound. Generating two clusters from the outset would have introduced more heterogeneity into *all* clusters and should therefore be avoided.

indifferent and thus do not actively pursue their average advantage of 9.28 ECU in the ultimatum game care weakly more for *postclass 1* arguments than other responders who – in line with their material incentive – opt for the ultimatum game (effect: +0.27, $z-stat: +1.75$, $p-value = 0.08$) with $n = 16$. Moving to cluster 2 and 3, responders believe they have a payoff advantage in the yes-no game. Responders who state to be indifferent – and hence, prefer not to actively pursue an expected average strategic advantage of 32.08 ECU – make more use of *postclass 1* arguments than those who exploit their advantage and opt for the yes-no game. We merge both clusters to obtain a reliable sample size, and find a marginal effect of *postclass 1* arguments on the likelihood of being indifferent of 0.31 ($z-stat: 4.12$, $p-value < 0.01$) with $n = 21$. Responders who prefer stating indifference over opting for the ultimatum game, make more use of *postclass 1* arguments, too (effect: +0.22, $z-stat: +2.15$, $p-value = 0.04$) with $n = 24$.

Table A4: Yes-No vs Ultimatum game: Strategic incentives, and actual procedural choices for both roles and all clusters in section 7.2

role	cluster nr. (# nr of observations in brackets)	game preference (#nr of observations in brackets)	material advantage		payment[46]
			where?	*size*	
proposer	1 & 2 (#31)	indifference (#10)	ultimatum	11.50	cannot pay
		yes-no (#15)	ultimatum	1.00	9/15
		ultimatum (#6)	ultimatum	14.17	2/6
	3 (#17)	indifference (#6)	ultimatum	40	cannot pay
		yes-no (#10)	yes-no	9	5/10
		ultimatum (#1)	ultimatum	50	1/1
responder	1 (#22)	indifference (#7)	ultimatum	9.29	cannot pay
		yes-no (#6)	ultimatum	98.33	3/6
		ultimatum (#9)	ultimatum	26.67	1/9
	2&3 (#33)	indifference (#12)	yes-no	32.08	cannot pay
		yes-no (#9)	yes-no	22.78	6/9
		ultimatum (#12)	yes-no	33.75	4/12

G.2 Dictator vs. Ultimatum game

A) Proposers with procedurally variant beliefs, dictator vs. ultimatum game. Stated efficiency concerns perfectly predict proposers' choices of the dictator game in all clusters. #6 of #24 proposers choose the dictator game and state an efficiency concern in cluster 1, see also table A5 which summarizes all clusters. These efficiency-minded proposers expect a greater advantage (on average, 44.17 ECU) in the dictator game than their non-efficiency minded counterparts (24.67 ECU). Yet, only

[46] Reading example: Take the first line of table A4. The first cluster we analyzed in section 7.2 was a merger between cluster 1 with n=22 and cluster 2 with n=9. In the merged cluster, 10 subjects state they are indifferent. These 10 subjects believe they have a material advantage in the ultimatum game (see column 4.1) of an average 11.50 ECU (see column 4.2). Since only subjects who state a positive preference for one game can pay, these 10 subjects cannot pay (see column 5) to influence the draw of the procedures. Take the second line. 15 subjects state to prefer the yes-no game. On average, they believe to have a slight average advantage in the ultimatum game of 1 ECU. 9 out of them actually pay for the yes-no game. Hence, for this group, neither the stated preference, nor the payment decision are in line with their material incentive. Note also that for these subjects, those who pay and those who do not pay *reveal* whatever they state to prefer: both forego payoff but those who pay forego more than those who do not.

1 efficiency-minded proposer pays for this game while 8 (of 15) non-efficiency minded proposers do so. Again, proposers who value procedural efficiency might not wish to amend this property at the material expense of the recipient. In clusters 2 and 3, we observe an analogous effect. In cluster 2, #7 of #24 proposers who opt for the dictator game and state an efficiency reason expect a material advantage in the *ultimatum game* of an average 9.29 ECU. Amending the efficiency of the game does therefore not cause any material disadvantage to the recipient. Now, nearly all (#6 out of #7) efficiency-minded proposers pay for the dictator game. Non-efficiency minded proposers expect an advantage in the dictator game of an average 11.67 ECU but only #5 out of #12 of them pay for it. Altogether, 'efficiency' statements explain the dictator game choices for 27% of all non 'EQ'-proposers within a 99% confidence interval of $[12\%, 47\%]$.

Table A5: Dictator vs Ultimatum game: Strategic incentives, and actual procedural choices for efficiency-minded, and non-efficiency minded individuals opting for the dictator game; for both roles and all clusters in section 7.2

role	cluster nr. (# nr of observations in brackets)	game preference (#nr of observations in brackets)	motive[47]	material advantage *where?*	*size*	payment
proposer	1, n = #24	indifference (#1)	(-)	dictator	80	cannot pay
		dictator (#21)	efficiency (#6)	dictator	44.17	1/6
			other (#15)	dictator	24.67	8/15
		ultimatum (#2)	(-)	dictator	55	1/2
	2, n = #24	indifference (#1)	(-)	dictator	80	cannot pay
		dictator (#19)	efficiency (#7)	ultimatum	9.29	6/7
			other (#12)	dictator	11.67	5/12
		ultimatum (#2)	(-)	dictator	95	2/2
responder	1, #33	indifference (#7)	(-)	dictator	21.43	cannot pay
		dictator (#22)	efficiency (#6)	dictator	10	5/6
			other (#16)	dictator	30.94	9/16
		ultimatum (#4)	(-)	dictator	40	3/4
	2, #13	indifference (#4)	(-)	dictator	10	cannot pay
		dictator (#7)	efficiency (#3)	ultimatum	20	2/3
			other (#4)	ultimatum	20	2/4
		ultimatum (#2)	(-)	dictator	17.50	0/2
	3, #12	indifference (#3)	(-)	dictator	20	cannot pay
		dictator (#4)	efficiency (#2)	ultimatum	5	1/2
			other (#2)	dictator	25	2/2
		ultimatum (#5)	(-)	ultimatum	18	3/5

B) Responders with procedurally variant beliefs, dictator vs. ultimatum game. Turning to responders, stated efficiency concerns perfectly predict responder choices of the dictator game in all clusters. In cluster 1, #6 out of #33 responders (18%) choose the dictator game and state an efficiency concern. #5 of #6 efficiency-minded responders pay while expecting, on average, a material advantage of only 10 ECU. Non-efficiency minded responders expect three times this advantage (30.94 ECU) in the dictator game but only #9 of #16 pay for it. In cluster 2, #3 of #13 responders (23%)

[47] We only classified whether a subject who had opted for the dictator game, had stated an efficiency reason in the open form section of the post-experimental questionnaire, or not. Subjects who chose the ultimatum game or stated indifference do therefore have no entries in the 'motive' table.

state an efficiency concern and choose the dictator game while expecting a material *dis*advantage of 20 ECU. #2 of #12 (17%)responders do so in cluster 3 expecting a material disadvantage of 5 ECU while non-efficiency minded counterparts expect an average advantage of 20 ECU. Altogether, responders who choose the dictator game for its 'efficiency' account for 19% of all non 'EQ'-responders with a 99% confidence interval of $[8\%, 36\%]$).

Table A6 shows postestimation results for each of the clusters in appendix G. We identify the critical threshold of *postclass 1* arguments for which the predicted outcome in a given Logit model changes and report the number of participants who score above this critical threshold. For choices between the dictator and ultimatum game, this amounts to counting who states an efficiency concern and opts for the dictator game since these correlate perfectly. Altogether, we obtain the estimated shares of non 'EQ' participants who act out of the same purely procedural motivation as 'EQ'-subjects did in section 6.2 which extends the analysis from sections 6.1 and 6.2 to the full set of participants.

Table A6: LOGIT MODELS PREDICT THAT 48% OF NON 'EQ' SUBJECTS CHANGE THEIR BEHAVIOUR FOR *postclass 1* ARGUMENTS (LEFT TABLE), 23% FOR EFFICIENCY ARGUMENTS (RIGHT TABLE).

role	cluster (#nr. of obs.)	UG vs. YNG	
proposer	cluster 1 (#31)	21 (68%)	$[43\%, 87\%]$
	cluster 2&3 (# 17+#3)	6 (30%)	$[8\%, 61\%]$
responder	cluster 1 (# 22)	6[48](27%)	$[7\%, 57\%]$
	cluster 2&3 (# 33)	18 (55%)	$[31\%, 76\%]$
all	106	51 (48%)	$[35\%, 61\%]$

role	nr. of obs.	DG $\succ$ UG, DG vs. UG	
proposer	cluster 1 (# 24)	6 (25%)	$[7\%, 53\%]$
	cluster 2 (# 24)	7 (29%)	$[9\%, 58\%]$
responder	cluster 1 (# 33)	6 (25%)	$[7\%, 53\%]$
	cluster 2 (# 13)	3 (23%)	$[3\%, 62\%]$
	cluster 3 (# 12)	2 (17%)	$]0\%, 58\%]$
all	106	24 (23%)	$[13\%, 35\%]$

G.3 Summary

To sum up appendix G, we find that the new ethical ideal is at play in all sets of procedurally varying beliefs and behaviour and hence, amongst all types of non-'EQ' subjects. On the one hand, there are subjects who still choose a given procedure due to *postclass 1* arguments or purely procedural efficiency concerns even in the presence of a small material confound. In these cases, the material confound which we measure is either too small to crowd out the purely procedural concern at hand, or the material incentive is too small to be perceived. On the other hand, the motives underneath this paper's purely procedural preferences – see 6.2 – also explain statistically why many subjects choose *against* their incentives. The *simlicity* concern does not carry over to non-'EQ' responders. Instead, non-'EQ'-responders' choice of the yes-no game also links to *postclass 1*. Interestingly, the interaction effect $con \cdot post$ which *reduced* the likelihood of a purely procedural concern on the set of 'EQ'-subjects is never significant for non 'EQ'-subjects. Purely procedural concerns might hence be *more* frequent among non 'EQ'- than among 'EQ'-subjects.

[48]We use only Logits where *postclass 1* arguments had a marginal effect with $p - value < 0.05$. If we also consider weaker significance levels, there are further estimated 5 responders in cluster 1 who change their behaviour out of a *postclass 1* motivation. These responders expect a payoff advantage in the ultimatum game but state to be indifferent.

H Appendix section 7.3: Is there a selection effect?

A selection effect would imply that 'EQ'-subjects differ from all other subjects in some characteristic which is *critical* for a purely procedural choice, and that therefore, the new type of preference which we report is either significantly more, or less prevalent in non 'EQ'- than in 'EQ'-subjects. To test for such an effect, we use the motivations behind 'EQ'-subjects' purely procedural choices – the characteristics which were *critical* for their purely procedural choices – and test whether these motivations are per se more relevant to 'EQ'-, than to non 'EQ'-subjects.[49]

Moral argumentation & simplicity. We could not confirm that 'EQ'-proposers or 'EQ'-responders differ from their non-'EQ' counterparts when making a moral judgement. Specifically, 'EQ'-proposers and 'EQ'-responders cannot be confirmed to make *more* use of those moral arguments – i.e. the first class of postconventional arguments *postclass1*, see section 6.2 – which were positively linked to the purely procedural choices we report (Wilcoxon Rank Sum tests, proposers: $p-value = 0.67$, responders: $p-value = 0.60$). Moreover, 'EQ'-proposers and 'EQ'-responders cannot be confirmed to score *lower* on variable $con \cdot post$ which was negatively linked to purely procedural choices and which therefore makes these choices *less* likely (Wilcoxon Rank Sum tests, proposers: $p-value = 0.62$, responders: $p-value = 0.40$). Comparing the simplicity rankings, 'EQ'-responders deem the yes-no game less often simpler than the ultimatum game than non-'EQ' responders (exact Wilcoxon Rank Sum test, $p-value < 0.05$). *A negative selection effect* might therefore have occurred in section 6.1 by underestimating the frequency of responders preferring the yes-no game.

For each motive, we also derive the critical 'strength' at which the binary logit models in section 6.2 start to predict a purely procedural choice, if all other explanatory variables take on their mean value and perform Fisher's exact test to see whether there are significantly more 'EQ'-, than non-'EQ'-subjects who score above this critical threshold. We did not find any significant difference for any explanatory variable in any type of procedural choice, or any role. 'EQ'- and non 'EQ'-responders do not even differ in their simplicity rankings of the procedures around the respective critical threshold. However, the 45% of proposers who care *most* for postconventional argumentation always have non-'EQ' beliefs and actions. Some proposers might choose procedurally variant actions or hold procedurally variant beliefs *because* they deem the procedures unjust.

Efficiency motive. Many 'EQ'-proposers and responders preferring the dictator over the ultimatum game stated in an open form post experimental questionnaire that they did so because the dictator game prevents zero payoffs for *either* party. The purely procedural nature of this efficiency concern was particularly credible for 'EQ' responders: knowing that they would always accept in both games, and expecting the equal split for sure, they opted for the procedure where they had no influence at all. While 45% of all 'EQ'-subjects ('EQ'-proposers: 39%, 'EQ'-responders: 58%) stated this reason for their choice, also 33% of all non 'EQ'-subjects (proposers: 33%, responders: 33%) did so. This is surprising since for these belief conditions, one would have expected either self-interest, or an outcome

[49] The selection effect could also operate such that a link between these motivations and a purely procedural preference exists exclusively in 'EQ'-subjects. However, we have shown in the previous section that this is not the case.

based other-regarding concern to matter. Again, the efficiency motive is not reported significantly more often by either 'EQ'-proposers or 'EQ'-responders than by their non 'EQ'-counterparts.