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DISCUSSION PAPER SERIES

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ABSTRACT

Too Lucky to Be True: Fairness Views under the Shadow of Cheating*

The steady increase in inequality over the past decades has revived a lively debate about what can be considered a fair distribution of income. Public support for the extent of redistribution typically depends on the perceived causes of income inequality, such as differences in effort, luck, or opportunities. We study how fairness views and the extent of redistribution are affected by a hitherto over-looked, but relevant factor: immoral self-serving behavior that can lead to increased inequality. We focus on situations in which the rich have potentially acquired their fortunes by means of cheating. In an experiment, we let third parties redistribute resources between two stakeholders who could earn money either by choosing a safe amount or by engaging in a risky, but potentially more profitable, in-vestment. In one treatment, the outcome of the risky investment is determined by a random move, while in another treatment stakeholders can cheat to obtain the more profitable outcome. Although third parties cannot verify cheating, we find that the mere suspicion of cheating changes fairness views of third parties considerably and leads to a strong polarization. When cheating opportunities are pre-sent, the share of subjects redistributing money from rich to poor stakeholders triples and becomes as large as the fraction of libertarians – i.e., participants who never redistribute. Without cheating opportunities, libertarian fairness views dominate, while egalitarian views are much less prevalent. These results indicate that fairness views and attitudes towards redistribution change significantly when people believe that income inequality is the result of cheating by the rich.

JEL Classification: C91, D63, D81, H26

Keywords: fairness views, redistribution, unethical behavior, inequality, experiment

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1 Introduction

The unequal distribution of income within countries has become a major issue in the academic as well as the public debate in recent years (Corak, 2013; Chetty et al., 2014; Greenwood et al., 2014; Piketty, 2014; Saez and Zucman, 2016). While one side of the debate focuses on the reasons for the widening gap between haves and have-nots, another side addresses the important question of what would constitute a fair distribution of income between the rich and the poor. The answer to the latter question hinges to a large degree on the factors that generated the inequality in the first place, meaning that both sides of the debate are necessarily intertwined. It has been shown that fairness views with respect to redistribution of income depend on whether or not income inequalities have been caused by differences in effort and hard work (Alesina and Angeletos, 2005), or whether someone can be held accountable for one's (mis)fortune (Konow, 2000; Cappelen et al., 2013; Möllerström et al., 2015; Akbaş et al., 2016; Lefgren et al., 2016; Tinghög et al., 2017). Judgments about the fairness of an income distribution are also highly sensitive to the available information about, and the subjective perception of, the income distribution (Kuziemko et al., 2015). Moreover, fairness views about the preferred extent of redistribution within a society have been found to be affected by concerns about procedural fairness or efficiency (Bolton et al., 2005; Balafoutas et al., 2013; Almås et al., 2016), relative earnings or the level of impoverishment (Faravelli, 2007; Erkal et al., 2011; Cappelen et al., 2017b; Dohmen et al., 2017), cultural background or political orientation (Rey-Biel et al., 2011; Almås et al., 2016; Cappelen et al., 2016; Konow et al., 2016), or previous experience of fair or unfair treatment (Roth and Wohlfart, 2017; Cassar and Klein, 2016).

It is noteworthy that none of the studies mentioned above has looked at how fairness views are affected if suspicion about the integrity of one's fortunes arises. This is surprising given the evidence from leaks about offshore financial activities such as the "Panama papers", showing that tax evasion rises with wealth (Alstadsæter et al., 2017), thus increasing the income inequality within societies in favor of the rich. Another prominent example where immoral and illegal behavior was the source of undeserved wealth was the common practice at banks such as Wells Fargo to open up fake bank accounts to meet the monthly targets of sales personnel (`http://fortune.com/2017/04/13/wells-fargo-report-earnings/`). Seen from a broader, macro-level perspective, there seems to be even a positive correlation between inequality in a given country – measured by the Gini coefficient – and the perceived level of cheating and corruption (see country-level evidence supporting this relationship in Figure A-1 in the Appendix). Yet, at the macro-level, this correlation could be influenced by several country-specific factors, e.g., the quality of formal institutions, the level of trust, or cultural differences. These factors make it difficult to assess properly how the perception of cheating affects fairness views and the desire to redistribute between rich and poor. For this reason, we are going to present a carefully controlled experimental study in which we have rich and poor subjects, where in one treatment the rich may have acquired their income by cheating. We study how unbiased third parties redistribute income from rich to poor subjects in our experiment. We are particularly interested in situations in which it is untraceable for third parties whether the source of a person's high income may have originated from cheating or from honest behavior. We hence talk about redistribution *under the shadow of cheating* and not in the obvious presence of cheating. To our knowledge, we are the first to test the effect the shadow of cheating casts on fairness views, a topic of great relevance for the design of the welfare state and incentive schemes.

In our experiment, we let stakeholders choose between a safe option and a potentially more profitable, but risky investment. This choice is intended to capture many real-world situations, ranging from job choices to health and farming decisions, where subjects have to trade off risk and expected return. For instance, one could think of people having to select either into a low-pay, but secure job, or a potentially lucrative, but highly risky sector.

We exogenously manipulate the availability of cheating opportunities and hence the causes that can create income disparities among stakeholders. In one treatment – the *Nature* treatment, which follows Cappelen et al. (2013) – the outcome of the risky investment is determined by a random computer draw that yields either a high or a low income for the stakeholder with 50% probability, respectively. The safe option, in contrast, yields an intermediate income for sure. In the other treatment – the *Self-Report* treatment – stakeholders face the same choice between a safe option and a risky investment. Here, the investment's outcome is resolved by the stakeholders themselves. They have to flip a coin and self-report the outcome which can yield either the high or the low income with 50% probability each. Stakeholders are explicitly asked to report the outcome truthfully. Our request is, nonetheless, non-verifiable – mimicking many real-world situations in which monitoring is too costly. Hence, we focus on a specific form of cheating, that is, lying.[1]

[1]This aspect of our design – i.e., the possibility for stakeholders to lie – links our project to

After the stakeholders' decisions, we let third parties – henceforth called *spectators* – redistribute the total sum of earnings within a pair of stakeholders. Spectators are fully informed about the rules for stakeholders in both treatments and they are also made aware of our request to stakeholders to report truthfully the coin toss in the *Self-Report* treatment. Spectators in the *Self-Report* treatment, however, cannot identify whether a high income of a stakeholder was the consequence of either a lucky coin toss or of misreporting the true (i.e., low) outcome of the coin toss. Although spectators can form expectations about the likelihood of cheating, there is no certainty. This ambiguity creates a difficult challenge for those spectators who want to eliminate income inequality whenever the high income resulted from dishonest behavior, but simultaneously want to refrain from redistributing if a stakeholder's high income was righteously acquired.

A recent paper by Cappelen et al. (2017a) is closely related to this latter feature of our design and studies fairness views when redistribution in favor of a group cannot differentiate between honest and dishonest group members.[2] The authors report that spectators (i.e., third parties who decide upon redistribution) care more about rewarding the honest group members – thus accepting that dishonest group members also benefit from more redistribution – rather than being concerned with punishing dishonest group members at the expense of honest ones. Our experiment departs from Cappelen et al. (2017a) in three main aspects. First, we consider situations in which cheating is on the side of the rich, while Cappelen et al. (2017a) investigates the case in which cheating is on the side of the poor. We concentrate on cheating by the rich because the sentiment against the so-called elites in many countries is fueled by the poorer people's concerns that the rich have achieved their fortunes also through dishonest means. Second, we implement ambiguity about

the flourishing literature on deception and cheating (Gneezy, 2005; Fischbacher and Föllmi-Heusi, 2013; Abeler et al., 2016; Gächter and Schulz, 2016). Virtually all papers on this topic test how cheating depends on different contextual cues and conditions, including the structure of incentives (Conrads et al., 2013), loss avoidance (Grolleau et al., 2016), the nature of the task (Kajackaite, 2016), the costs associated with cheating (Gneezy et al., 2016), or the role of collaboration (Weisel and Shalvi, 2015). We take a completely different stand on the problem by not focusing on the *causes* of cheating, but rather on the *consequences of dishonesty on fairness views and distributional preferences of unaffected bystanders*. One paper by Ploner and Regner (2013) is remotely related to this aspect of our paper as they show that subjects who cheated in the first place are more likely to give more in a subsequent Dictator Game. We depart from their study as we are not interested in moral cleansing of cheaters, but rather on fairness views of spectators who had no possibility to cheat themselves and who have no material interest in the ultimate distribution of the available resources.

[2] Their paper and ours were developed at the same time and independently of each other.

cheating in the *Self-Report* treatment, while in Cappelen et al. (2017a) there was full disclosure of cheating behavior at the group level, leaving no room for ambiguity as to whether cheating was involved or not. Finally, we enlarge the choice set by having a safe option, while in Cappelen et al. (2017a) all group members were asked to work on a real effort task and were then paid according to a lottery system. This implies that a common ground of both papers is to consider a situation where two (groups of) stakeholders choose a risky option and one earns the high income and the other the low income; however, our set-up allows us to extend such a paradigm to include cases in which the stakeholders make different choices in the first place (i.e., one chooses a safe and the other a risky option), which is intended to mimic different types of behavior in the field, such as in educational or professional choices.

We report three main findings in ascending order of importance. First, in line with previous evidence about the incidence of dishonesty, we find cheating among stakeholders in the *Self-Report* treatment, but not to the full extent (Gneezy, 2005; Fischbacher and Föllmi-Heusi, 2013; Abeler et al., 2016; Gneezy et al., 2016). In line with stakeholders' behavior, we also provide evidence that spectators correctly expect cheating in this set-up.

Second, spectators are more likely to reduce inequality in the *Self-Report* treatment than in the *Nature* treatment when a stakeholder with high income – who might have cheated – is paired with a stakeholder who chose the safe option with the intermediate income. Interestingly, we do not observe any kind of *reward* for genuinely honest stakeholders who truthfully indicate a low income (through reporting an unlucky coin toss) in the *Self-Report* treatment.

Third, and most importantly, we document a strong and significant shift in fairness views across treatments. We use a discrete choice random utility model to estimate three types of spectators (Cappelen et al., 2007, 2013): *Libertarians* are spectators who never redistribute, independent of the degree of income inequality between stakeholders. *Egalitarians* always redistribute resources equally, while *Choice Egalitarians* redistribute only among stakeholders who chose the risky investment, but do not redistribute if one stakeholder chose the risky option and the other the safe option. While the share of *Libertarians* is similar across treatments, the share of *Egalitarians* is three times larger in *Self-Report* than in *Nature*. Hence, the shadow of cheating increases the fraction of Egalitarian fairness views substantially. This shift leads to a polarized situation in *Self-Report* where the share of *Libertarians*

– who never redistribute – and of *Egalitarians* – who always redistribute equally – becomes equally large, meaning that there are two large groups of spectators with completely opposing fairness views. As a consequence, the shadow of cheating might increase social tension concerning the question of how to deal with income inequalities.

The remainder of the paper is organized as follows. Section 2 describes the experimental design and data collection. Section 3 presents the results for both stakeholders and spectators. Section 4 reports the results of a discrete choice random utility model estimating fairness views. Section 5 concludes.

2 Experimental design

Our design builds on Cappelen et al. (2013). We have two types of players – stakeholders and spectators – and two stages. We start by presenting the details of the first stage, in which stakeholders made their decisions. After that, we introduce our two experimental treatments. We then explain the second stage where spectators made a series of redistributive decisions. Finally, we describe the experimental procedures.

2.1 Stage 1: Stakeholders' risk-taking decisions

Each stakeholder independently had to make five ordered decisions between a safe and a risky option, as shown in Table 1. The risky option paid either a high income of 800 tokens or a low income of 0 tokens, each with 50% probability. While the risky option remained fixed in all five decisions, the intermediate income paid by the safe option varied across decisions. This amount increased linearly from 100 tokens in the first decision to 500 tokens in the fifth decision, making the safe option more attractive as the stakeholders proceed through the five decisions. After all five decisions had been made, the risky option – if chosen – was resolved for each decision separately. The resolution of the risky option depended upon the experimental treatment.

Table 1: Stakeholders' choices

Decision	Safe option	Risky option	p
# 1	100	800 or 0	$p = .50$
# 2	200	800 or 0	$p = .50$
# 3	300	800 or 0	$p = .50$
# 4	400	800 or 0	$p = .50$
# 5	500	800 or 0	$p = .50$

Notes: p is the probability of earning the high income in the risky option. All amounts are expressed in tokens. Tokens are converted at the rate of 1 Euro = 300 tokens. In the *Nature* treatment, the outcome of the risky option is determined by a random draw of the computer. In the *Self-Report* treatment, the outcome is determined by a self-reported coin toss where Heads should yield the high income of 800 tokens, and Tails the low income of 0 tokens.

2.2 Experimental treatments: *Nature* and *Self-Report*

We ran two between-subjects treatments. The only difference between the two treatments is the way in which the outcome of the risky option was determined.

- In the *Nature* treatment, the outcome of the risky option was determined by a random draw performed by the computer. The probability of the high or low income was 50% for each level. The outcome of each random draw was shown to the stakeholder after all decisions between the safe and risky option had been made.

- In the *Self-Report* treatment, the outcome of the risky option was determined by a self-reported coin toss. The coin tosses had to be performed only after all five decisions had been made. Stakeholders were asked to get a coin or to use an online website (`justflipacoin.com`) to flip a coin for each decision in which they had chosen the risky option. We explicitly requested stakeholders to report the results of the coin tosses truthfully (see Instructions in the Appendix). Misreporting was hence a clear violation of the rules. Under the assumption of honest reporting, our procedure guarantees the same likelihood (of 50%) of earning the high income across treatments, conditional on choosing the risky option. However, our request for honest reporting could not be enforced as there was no possibility to detect lies at the individual level (for further details, see the experimental procedure below). This set-up mimics situations in which rules are not enforceable or the cost of monitoring is too large.

Note that in both treatments the rules used to resolve the outcome of the risky option were common knowledge from the beginning of the experiment – i.e., before stakeholders made any decision. In line with Cappelen et al. (2013), we also informed stakeholders at the beginning of the experiment that the study comprised two stages. For comparability, we use the same wording as in the reference paper (Cappelen et al., 2013): “Stage 2 of the experiment concerns the distribution of earnings from Stage 1. Details of the second stage will be provided after the first stage is complete.” Only at the end of a session were stakeholders informed about the rules of stage 2.

2.3 Stage 2: Spectators' redistribution decisions

In stage 2, spectators decided how to redistribute the sum of earnings within a pair of stakeholders. For each pair, the spectator was informed about the stakeholders' choices. For each income level from the safe option (i.e., the same decision number in Table 1), the spectator learned each stakeholder's decision between the safe and the risky option, and also of the outcome if the risky option had been chosen. Spectators could redistribute the sum of the earnings of the two stakeholders from stage 1 in steps of 25 tokens. The payment for spectators themselves was a fixed amount and they were not affected by the stakeholders' decisions, and hence had no material self-interest at stake. This avoids any kind of personal self-serving bias on the part of spectators and allow us to elicit impartial and unbiased fairness views (Konow, 2000, 2009).

In the *Nature* treatment, spectators were informed that the mechanism used to determine the outcome of the risky option was a random draw performed by the computer, yielding the high or low income with equal probability. In the *Self-Report* treatment, instead, they were informed that stakeholders had to self-report the outcome of a coin toss to resolve the risky option.

Each spectator was exposed to only one treatment and had to make 20 redistribution decisions (see Table A-1 in the Appendix for further details). One of these redistribution choices was payoff-relevant for a pair of stakeholders, but spectators were not informed which one was relevant for stakeholders.

2.4 Experimental procedures

Stakeholders. Stakeholders were recruited via Amazon Mechanical Turk (MTurk, henceforth) using the behavioral research platform TurkPrime (Litman et al., 2016).[3] For our study, we recruited a total of 360 online participants - 120 in *Nature* and 240 in *Self-Report.*[4] Participation was restricted to subjects from the U.S. with a high completion rate to minimize attrition.[5] The stakeholders' average payment was $2, including a $0.60 participation fee. The task lasted on average 8 minutes (implying an average hourly rate of about $15, which is comparable to many laboratory experiments). Stakeholders were randomly assigned to one of the two treatments and the decisions were collected via SoSci (Leiner, 2014). Only participants who were able to answer all control questions correctly were allowed to participate. After two incorrect trials, stakeholders were automatically excluded from the study and were prevented from re-taking it.

We believe the task in Stage 1 is particularly well suited for MTurk for two main reasons. First, the task is extremely simple and short, hence reducing potential concerns about understanding and concentration. Second, conducting the experiment on MTurk grants a degree of privacy to participants that would be difficult to achieve in the lab. Stakeholders were identified by a code and they completed their assignment over the internet from home or a place of their choice. Hence, there was no possibility for the experimenter to observe the result of the coin toss used in the *Self-Report* treatment to determine the outcome of the risky option. Given the complete separation between participants and experimenter, stakeholders could easily infer that the experimenter had no way to detect cheating in the *Self-Report* treatment.

[3] MTurk has gained momentum among social scientists and it is increasingly regarded as a valid alternative to other data collection techniques, with over 1,000 peer-reviewed papers relying on the platform (Litman et al., 2016). MTurk participants – often referred to as "workers" – represent a massive dataset of potential participants from a wide range of countries, with a diverse background. Monetary incentives for MTurk workers are often lower (at least in absolute terms, much less so in relative terms) than in the laboratory; however, there is evidence that reduced incentives have little or no effect on behavior (Buhrmester et al., 2011; Horton et al., 2011; Litman et al., 2015).

[4] Initially, we had 120 online participants in *Nature* and 120 in *Self-Report.* After feedback from seminar participants, we added 120 more participants in *Self-Report* because we wanted to collect beliefs among spectators. That also required additional data collection of stakeholders on MTurk.

[5] We recruited only experienced online workers; all of them had taken part in at least 50 previous assignments and had successfully completed at least 95% of these assignments. The average completion rate was 97.5%.

Spectators. We recruited 177 students from the University of Cologne to play as spectators. Two sessions, with a total of 57 subjects, were assigned to the *Nature* treatment.[6] The other four sessions, with a total of 120 subjects, were assigned to the *Self-Report* treatment. All sessions were conducted at the Cologne Laboratory for Economic Research (CLER) two days after collecting data on MTurk. Subjects were recruited using ORSEE (Greiner, 2015) and the experiment was programmed using z-Tree (Fischbacher, 2007). Upon arrival, subjects were randomly assigned to a cubicle and no form of communication was allowed. A paper copy of the instructions was distributed to spectators and instructions were read aloud to assure common knowledge (see Appendix). Spectators could proceed to the proper experiment only after having answered all control questions correctly. Socio-demographic characteristics and personality traits (HEXACO Personality Inventory-Revised, Ashton and Lee 2009) were collected at the end of the experiment. Spectators were paid a fixed amount of €10 for the redistribution part, including a show-up fee of €4. The average session lasted about 45 minutes.

In two of the four *Self-Report* sessions, for a total of 60 spectators, we additionally elicited beliefs and risk aversion. After making their redistribution choices, spectators were asked to answer the two following questions about the stakeholders:

- What is the percentage of participants in the online assignment that chose the risky option?
- Consider now only the online participants who have chosen the risky option: what is the percentage of participants who reported Heads? Please recall that Heads yielded an income of 800 tokens and Tails 0 tokens.

For the sake of simplicity, we elicited beliefs only for a safe level of 300 tokens. Beliefs were incentivized with a stepwise quadratic scoring rule (see Instructions in Appendix) and six randomly selected spectators per session – of 30 subjects each – were paid based on one of the two questions.

To elicit a spectator's risk aversion (as a control variable for the redistribution choices), we followed the task proposed by Eckel and Grossman (2008). Spectators were presented with five options, of which they had to pick one. In each option, there was a 50% chance of a low payoff and a 50% chance of a high payoff. The low

[6] Due to a low show-up rate in one *Nature* session, we have only 57 spectators in this treatment. The number of pairs of stakeholders from MTurk was instead 60. The three extra-pairs were paid exactly the amount they had earned in Stage 1, as if there was no redistribution.

and high payoffs changed for each option. Higher expected payoffs were associated with higher risk (see Figure C-3 in the Appendix). One randomly selected spectator per session was paid for this task. On average, spectators in these two sessions earned additionally €4 from the belief-elicitation and risk task.

3 Results

In this section, we first present the results for the stakeholders' behavior. Then we continue with the discussion of redistribution patterns among spectators. In Section 4, we will use a discrete choice random utility model to estimate how the possibility of cheating changes fairness views of spectators.

3.1 Stakeholders' risk-taking and cheating behavior

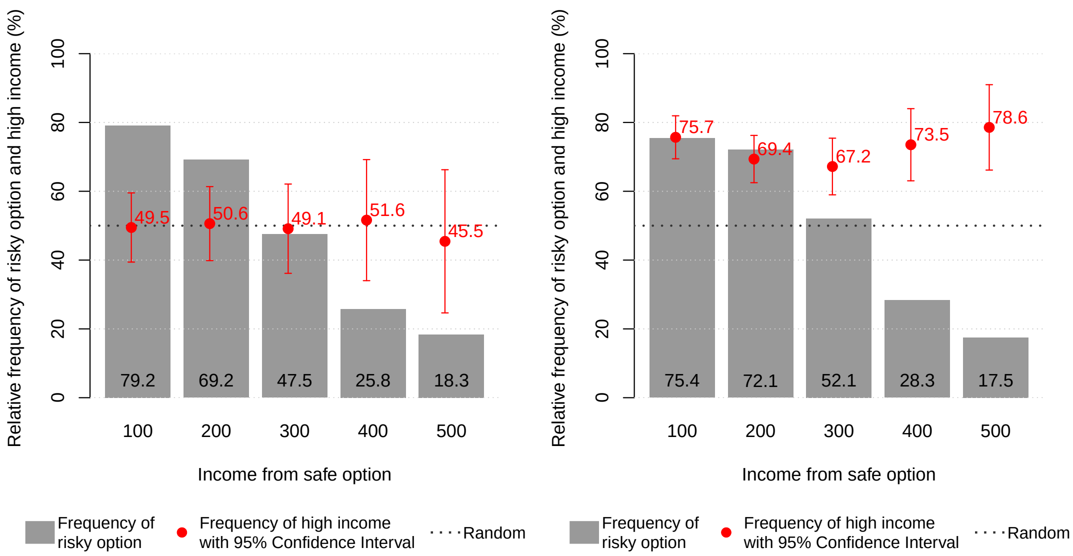
The bars in Figure 1 show the relative frequency with which stakeholders choose the risky option, conditional on the income from the safe option (ranging from 100 to 500 tokens) and on the treatment (left for *Nature*, right for *Self-Report*). We observe a clear downward trend in the relative frequency of choosing the risky option in both treatments, dropping from 79% (75%) for a safe income of 100 tokens to 18% (17%) for a safe income of 500 tokens in the *Nature* (*Self-Report*) treatment. A Chi-square test fails to reveal any significant difference in risk-taking between the two treatments for any safe income level (the p-value ranges from $p = .428$ to $p = .845$).[7] The fraction of stakeholders who always choose the safe option is also similar across treatments with 17% in *Nature* and 20% in *Self-Report*. Overall, stakeholders display a high degree of consistency in their choices, as less than 7% switch more than once between the risky option and the safe option.

Result 1 *The relative frequency of choosing the risky option is not significantly*

[7] It is interesting to note that the possibility to report a favorable outcome at one's discretion does not induce a change in risk-taking behavior as one could expect in the presence of cheating opportunities. When moving from the *Nature* to the *Self-Report* treatment, one would think that stakeholders only switch from the safe option to the risky one, but not vice versa. However, if subjects have a preference for being seen as honest, even risk-lovers could prefer to choose the safe option to avoid looking dishonest when reporting a lucky draw. In line with the evidence by Abeler et al. (2016) and Gneezy et al. (2016), our results suggest that direct costs of lying and reputation concerns are not negligible for a sufficiently large fraction of stakeholders, which could explain that the relative frequency of choosing the risky option does not differ between both treatments.

Figure 1: Relative frequency of risky choices and high income

(a) *Nature* (b) *Self-Report*



different across treatments. In both treatments, risk-taking drops as the income from the safe option increases.

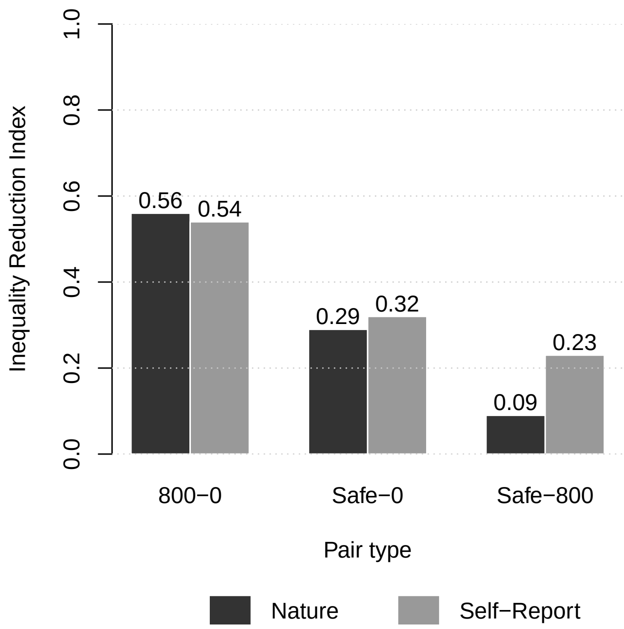
Figure 1 also shows the relative frequency of getting the high income from the risky option. On the left-hand side, we see that in the *Nature* treatment this relative frequency is not significantly different from 50%, due to the fact that the outcome of the risky option was determined by a random computer draw. On the right-hand side of Figure 1, we note instead that in the *Self-Report* treatment stakeholders report having been lucky in their coin toss significantly more often than chance would predict. In fact, conditional on choosing the risky option, they claim the high income in 72% of cases. Among all stakeholders, 32% report having been lucky in all instances where they chose the risky option, and 7% chose the risky option and reported a lucky outcome for all five decisions.

Result 2 *Many stakeholders cheat in the Self-Report treatment. The observed fraction of stakeholders reporting the high income from the risky option is significantly larger than 50%. Yet, stakeholders do not cheat to the full extent, as in more than one quarter of the cases they report the low income (of zero tokens) when they could have easily claimed the high income.*

3.2 Spectators' redistribution decisions

Our 177 spectators made a total of 3,540 redistribution decisions. In 314 cases, there was nothing to redistribute because both stakeholders had earned the low income of zero tokens from the risky option. In addition, there are 805 cases where both stakeholders had the same positive income (either by having chosen the safe option or by having earned the high income from the risky option). In virtually all of these instances (96.5%), spectators did not redistribute any income from one stakeholder to the other, as they had the same income to begin with. Therefore, we have a total of 2,421 (out of 3,540) cases with income inequality between the two stakeholders. In the majority of these cases (54%), spectators modified the initial distribution of earnings and their intervention was almost always aimed at reducing disparities. Only in less than 5% of cases (116 in total) did they increase inequality.

Figure 2: Inequality Reduction by pair composition and treatment



Notes: The Inequality Reduction index compares the extent of inequality within each pair of stakeholders before and after redistribution. An index of zero indicates no redistribution, while an index of 1 indicates that spectators have equally split the pair's total earnings.

For the cases with strictly positive inequality, we can distinguish between three types of pairs in order to provide a more detailed analysis of redistributive behavior. In the first pair, henceforth called *800-0*, both stakeholders chose the risky option, but only one stakeholder earned the high income of 800 tokens, while the other earned the low income of zero tokens. The second pair is labeled *Safe-0*. One stakeholder in such a pair chose the safe option and received an intermediate income in the range from 100 tokens to 500 tokens. The other stakeholder earned zero tokens after having chosen the risky option. The third pair is denoted as *Safe-800*. In this pair, one stakeholder earned the high income of 800 tokens from the risky option, and the other one chose the safe option with an intermediate income from 100 tokens to 500 tokens.

In Figure 2, we present the extent of redistribution by spectators, depending upon the type of stakeholders' pair. The vertical axis presents a measure of redistribution that we call Inequality Reduction index (IR) which is defined as follows:

$$IR = 1 - \frac{|\pi^1_{post} - \pi^2_{post}|}{|\pi^1_{pre} - \pi^2_{pre}|}$$

where π^i_t are the earnings for stakeholder $i = \{1, 2\}$ before ($t = pre$) or after ($t = post$) the redistribution stage. An index $IR = 0$ indicates no redistribution at all, while $IR > 0$ indicates that spectators have reduced the initial inequality through redistribution and in case of $IR = 1$ that they have implemented an equal split of the pair's total earnings.[8]

In Figure 2, we observe the highest degree of inequality reduction in the pairs of the type *800-0*. The initial degree of income inequality is reduced by more than 50% on average. In the *Safe-0* pairs, inequality is reduced by roughly 30%. Both in pairs *800-0* and *Safe-0* there is no difference in the extent of inequality reduction across treatments. This is noteworthy because stakeholders reporting the low income of zero tokens in the *Self-Report* treatment are almost certainly honest subjects who resisted the temptation of cheating about their income. Spectators would have had the chance to *reward* such honest stakeholders by redistributing more money in their favor in the *Self-Report* treatment than in the *Nature* treatment, since spectators can infer honesty in the *Self-Report* treatment, but not in the *Nature* treatment.

Although spectators do not reward honesty in the *Self-Report* treatment, they strongly react to potential dishonesty. We see this in the right-most bars in Figure

[8] Negative values of IR are possible only for *Safe-800* pairs. Overall, we observed a negative IR index in 4.18% of the cases in the *Nature* treatment and in 5.06% of the cases in the *Self-Report* treatment.

2, where the redistribution in pairs of the type *Safe-800* is shown. Here we note that the average inequality reduction is only 9% in *Nature*, but 23% in *Self-Report*. Hence, when a high income of 800 tokens is potentially caused by cheating and the respective stakeholder is paired with someone who chose the safe option, spectators are much more willing to take away money from such a stakeholder than when they can be sure that the stakeholder had no means of earning such a high income through dishonest behavior.

Result 3 *The reduction of income inequality through redistribution is, in general, similar in Nature and Self-Report, with one notable exception: there is more redistribution from the rich stakeholder to the poorer one who chose the safe intermediate amount when the former may have earned the high income by cheating (Self-Report treatment) than when cheating was not an option (Nature treatment).*

Table 2 reports a series of OLS estimations providing statistical support for the evidence in Figure 2. In Table 2, the dependent variable is the Inequality Reduction index and the main explanatory variables of interest are dummies for the *Self-Report treatment*, for *Safe-0* pairs, and for *Safe-800* pairs, thus taking *800-0* pairs as benchmark. In addition, we are interested in the interaction between *Self-Report* and the dummies for pair composition. Model 1 in Table 2 suggests that at the aggregate level the Inequality Reduction index is not different across treatments. In Model 2, we add dummies for *Safe-0* and *Safe-800* pairs and both coefficients are negative and highly significant, thus suggesting less inequality reduction as compared to *800-0* pairs. In Model 3, the positive and highly significant coefficient for the interaction between *Self-Report* and *Safe-800* confirms the observation from Figure 2 that there is more redistribution in these pairs in the *Self-Report* treatment than in the *Nature* treatment. These results are robust after controlling for socio-demographic characteristics and personality traits (Model 4) and after introducing fixed effects for the safe income level (Model 5). The role of socio-demographic characteristics and personality traits (as included in Models 4 and 5) will be discussed at the end of Section 4.

4 Estimation of fairness views

Our experimental design allows estimates of spectators' fairness views based on their 20 redistribution choices. We are going to introduce a discrete choice random utility

Table 2: Determinants of the Inequality Reduction index

Dep. var.: Inequality Reduction (IR)	Model 1	Model 2	Model 3	Model 4	Model 5
Self-Report treatment *(d)*	0.036	0.065	-0.022	-0.015	0.003
	(0.059)	(0.059)	(0.065)	(0.064)	(0.066)
Safe-0 pair *(d)*		-0.229***	-0.274***	-0.274***	-0.231***
		(0.024)	(0.038)	(0.038)	(0.039)
Safe-800 pair *(d)*		-0.357***	-0.474***	-0.474***	-0.447***
		(0.019)	(0.036)	(0.036)	(0.038)
Self-Report x *Safe-0*			0.061	0.061	0.013
			(0.049)	(0.049)	(0.050)
Self-Report x *Safe-800*			0.163***	0.163***	0.148***
			(0.042)	(0.042)	(0.047)
Male *(d)*				-0.028	-0.029
				(0.059)	(0.059)
Age (years)				-0.015	-0.015
				(0.009)	(0.009)
Honesty-Humility score				0.021*	0.021*
				(0.012)	(0.012)
Center *(d)*				-0.125**	-0.128**
				(0.063)	(0.063)
Right *(d)*				-0.164*	-0.164*
				(0.094)	(0.095)
Inequality (questionnaire)				0.004	0.004
				(0.014)	(0.014)
Constant	0.294***	0.501***	0.561***	0.694**	0.721**
	(0.048)	(0.050)	(0.053)	(0.280)	(0.281)
Safe level fixed effect	No	No	No	No	Yes
N.obs	2421	2421	2421	2421	2421
R^2 (overall)	0.001	0.078	0.081	0.113	0.120

Notes: OLS regression with individual random effects. Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively. The regressions only include pairs with strictly positive pre-redistribution inequality. Dummy variables are indicated by *(d)*. *Male* takes value 1 for males and 0 for females. Political orientation was measured on a scale from 1 (left) to 10 (right) in the final questionnaire. *Center* takes value 1 for participants that indicated a value between 4 and 7, and 0 otherwise. *Right* takes value 1 for participants that indicated a value between 8 and 10, and 0 otherwise. The Honesty-Humility score is based on the HEXACO-PI. "Persons with very high scores on the Honesty-Humility scale avoid manipulating others for personal gain, feel little temptation to break rules, are uninterested in lavish wealth and luxuries, and feel no special entitlement to elevated social status." (`http://hexaco.org/scaledescriptions`) *Inequality (questionnaire)* is a self-reported variable ranging from 1 (a society should aim to equalize incomes) to 10 (a society should **not** aim to equalize income). Post estimation tests for *Safe-0* pair = *Safe-800* pair: Model 2, $p = .000$; Model 3, $p = .000$; Model 4, $p = .000$; Model 5, $p = .000$. Post estimation tests for *Self-Report* x *Safe-0* = *Self-Report* x *Safe-800*: Model 3, $p = .0275$; Model 4, $p = .0275$; Model 5, $p = .0111$.

model (which follows Cappelen et al. 2007, 2013) and then present the distribution of fairness views, showing how the shadow of cheating leads to a strong shift in this distribution. At the end of this section, we will examine how the estimated fairness views depend on spectators' beliefs, their personality traits, and their political orientation.

For the estimation of different types, we assume spectators are only motivated by fairness views, because self-interest does not play a role in our set-up, given the flat payment of spectators. Specifically, if X is the total income in the pair of stakeholders to which a spectator is assigned, we assume that the spectator's utility from giving y to the first and $X - y$ to the second stakeholder is given by:

$$V(y; \cdot) = -\beta(y - F^k)^2/2X$$

where F^k is the fair amount allocated to the first stakeholder according to the spectator's fairness view k and where β is the weight attached to fairness. A spectator's utility is decreasing in the distance between the amount (y) allocated to the first stakeholder and the fair amount F^k prescribed by the fairness view k.

Spectators can differ along two dimensions: (i) how much they care about fairness (β); and (ii) their fairness views (F^k). In line with previous papers, we consider three possible types of fairness views:

- ***Libertarians*** never support redistribution, and no matter what the severity of, and the reasons for, the inequality are, they leave the earnings within a pair of stakeholders unaltered. If x is the income of the first stakeholder before redistribution, we have $F^{Libertarians} = x$, which yields the optimal choice $y = x$.
- ***Egalitarians*** always eliminate inequality within a pair and split the earnings equally: $F^{Egalitarians} = X/2$, which yields the optimal choice $y = X/2$.
- ***Choice Egalitarians*** eliminate inequality only when the disparities are generated by luck in case two stakeholders have chosen the same option (i.e., the risky option), but do not redistribute if inequality reflects differences in choices (safe option vs risky option):

$$F^{ChoiceEgalitarians} = \begin{cases} X/2 & \text{if } C_1 = C_2 \\ x & \text{if } C_1 \neq C_2 \end{cases}$$

  where C_i takes value 1 if stakeholder i chooses the risky option and 0 if he/she chooses the safe option with the safe income level.

Looking at the descriptive data, we observe that 73.7% of all possible decisions correspond exactly to one of the three types (68.8% in *Nature* and 75.4% in *Self-Report*).[9] Since we let all spectators make 20 redistribution decisions, we can estimate the likelihood with which a spectator belongs to any of the three different types of fairness views. Given a spectator's fairness view k, we consider a discrete choice random utility model of the form

$$U(y;\cdot) = V(y;\cdot) + \varepsilon_{iy} \qquad \text{for } y = 0, 25, \ldots, X \tag{1}$$

where ε_{iy} is assumed to be i.i.d extreme value distributed and, to control for individual heterogeneity in noisy behavior, β is assumed to be log normally distributed with $\log(\beta) \sim \mathcal{N}(\zeta, \sigma^2)$. Denoting by $L_{i,k}$ the individual likelihood conditional on being of type k, we can obtain the total likelihood of an individual by considering the finite mixture of types $L_i = \sum_k \lambda^k L_{i,k}$, where λ^k is the probability of being of type k.[10]

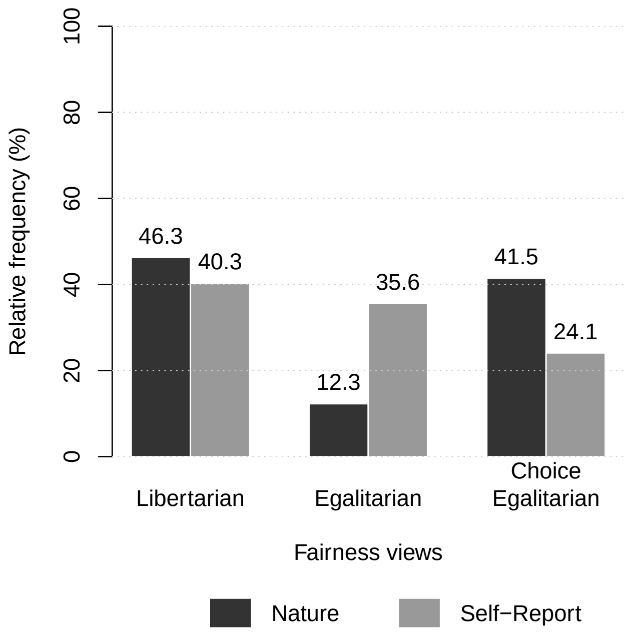
Figure 3 and Table A-2 in the Appendix report the estimated proportion of types, λ^k. *Libertarians* are the modal type in both treatments, 46% in *Nature* and 40% in *Self-Report*. Yet, apart from this similarity, the distribution of fairness types differs substantially across treatments (likelihood ratio test, $\chi^2(4) = 13.696$; $p = .008$). In *Nature*, only 12% of spectators are *Egalitarians*, while a large share of spectators (41%) are *Choice Egalitarians*. This pattern is almost reversed in *Self-Report*, where 36% of the participants are classified as *Egalitarians* and only 24% are *Choice Egalitarians*. In other words, under the shadow of cheating spectators are much less likely to condition their redistribution decision on whether the two stakeholders chose the same action – i.e., the risky option – or not. Rather, unconditional egalitarianism becomes much more prominent.

Result 4 *The shadow of cheating produces a large and statistically significant shift in fairness views. While the fraction of Libertarians is similar across treatments, the share of Egalitarians is threefold in Self-Report compared to Nature (36% vs. 12%). The fraction of Choice Egalitarians is smaller in Self-Report than in Nature.*

[9] This fraction corresponds to the number of decisions consistent with the action prescribed by at least one fairness view, and it does not indicate the fraction of spectators being classified as *pure types*. Note that our data are remarkably similar to the 71.1% reported in Cappelen et al. (2013) for their experiment in Norway.

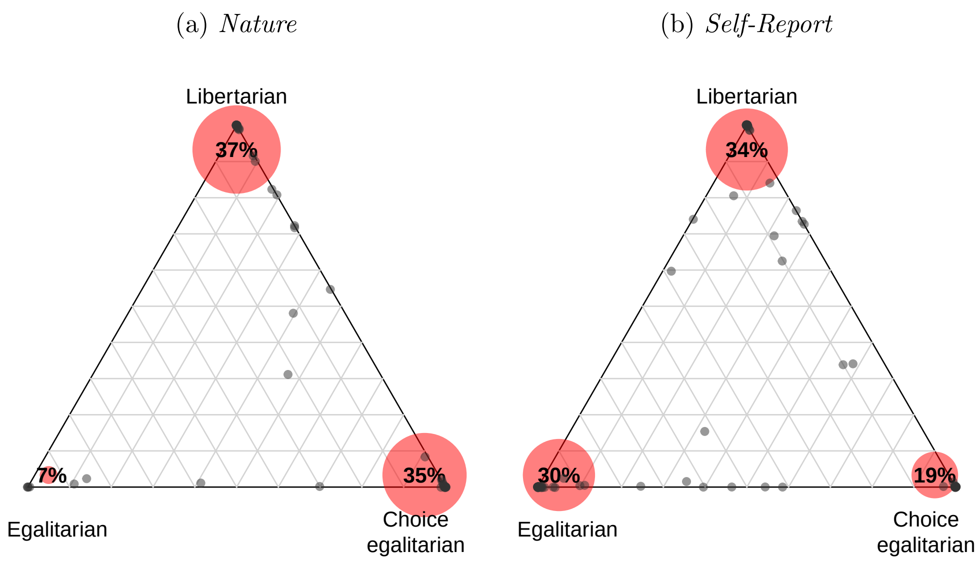
[10] For further details on the estimation strategy, please refer to section 5 in the Appendix or see Cappelen et al. (2013).

Figure 3: Estimation of fairness views



Notes: The bars report the share of λ^k (in %). The results are based on a discrete choice random utility model.

Figure 4: Fairness types and posterior probabilities



Notes: Each vertex of the triangle represents a fairness type and the bubbles in the corners report the relative frequency of spectators for whom we estimate a posterior probability higher than 90% of being of that particular type.

To test the accuracy of our type classification, we compute the ex-post probability of any specific spectator to belong to a particular fairness type. Figure 4 reports the simplex with the posterior probability for each spectator (see Conte and Hey (2013) for a similar exercise). Each vertex of the triangle represents one fairness type and each dot represents one spectator. The bubbles in the corners report the percentage of spectators who have a posterior probability higher than 90% of being that type. We can observe that the vast majority of the spectators – 79% in *Nature* and 83% in *Self-Report* – are located in one of the three corners, hence suggesting that types are identified with great precision. The shift in fairness types from *Nature* to *Self-Report* is illustrated on the horizontal axis at the bottom of both triangles in Figure 4 where we see the shift from *Choice Egalitarians* (in *Nature*) to *Egalitarians* (in *Self-Report*).[11]

The role of beliefs. Next, we present some further analysis to investigate what might determine a spectator's fairness views. A first candidate to drive one's fairness views is beliefs. It might be that spectators with different fairness views hold significantly different beliefs about the likelihood with which a stakeholder's high income might have been caused by cheating. For instance, one could imagine that *Libertarians* want to abstain from any kind of redistribution because they expect stakeholders to be (mostly) honest and therefore see no reason to take money away from them. Similarly, one could argue that *Egalitarians* favor extensive redistribution because they expect high income to be undeserved and (mostly) the result of cheating.

Figure 5 suggests that there is no correlation between beliefs and types.[12] This figure is based on data from two *Self-Report* sessions in which we asked a total of 60 spectators at the end of the sessions to guess (in an incentive compatible way) the fraction of stakeholders who choose the risky option and how many of the latter report the high income. To avoid any priming or demand effect, we elicited beliefs only at the end of the session, after spectators had made all their distributive choices. For the sake of brevity, we elicited beliefs only for the income level of 300 tokens in the safe option. For this safe level, spectators expect 58% of stakeholders to choose

[11] Actual and predicted redistribution choices are reported in the Appendix (Figures A-2 and A-3).

[12] See also Table A-3 in the Appendix for regressions. Both in Figure 5 and Table A-3 we define types based on posterior probabilities. Each spectator is assigned to a particular type if the posterior probability of being of that type is at least .5. The results are robust to more demanding cut-offs of .7 and .9, for instance.

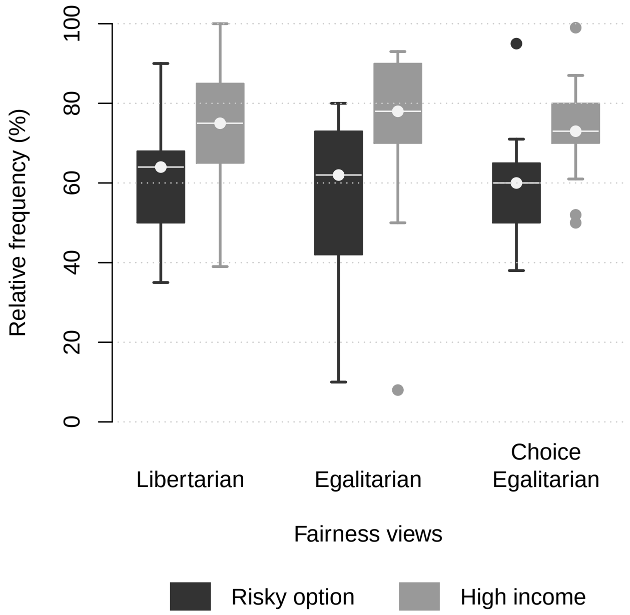
the risky option. The expected fraction is quite close to the actual frequency (of 52%) with which stakeholders choose the risky option when the safe option pays 300 tokens (see right-hand side of Figure 1). Spectators expect on average that 74% of stakeholders who choose the risky option report the high income, even though truthful reporting would yield a 50% chance for the high income. The expected fraction of reporting the high income (74%) is again very close to the actual share of stakeholders reporting the high income (67% in case the safe option pays 300 tokens). Interestingly, Figure 5 reveals that there are no differences in the beliefs of spectators with different fairness views. We consider this a noteworthy finding. For instance, both *Libertarians* and *Egalitarians* expect three quarters of stakeholders who choose the risky option to report the high income. Evidently, both *Libertarians* and *Egalitarians* infer from this large fraction of high income that cheating is going on, but they nevertheless make opposite redistribution choices. Hence, fairness views are obviously not significantly driven by the beliefs about the risk-taking behavior and the expected honesty of stakeholders.

In order to address potential concerns about spectators' beliefs being elicited only after 20 redistribution choices, we also elicited beliefs among students not involved in the redistribution task. We invited 289 additional students from an Introductory Microeconomics course at the University of Cologne to predict the stakeholders' behavior, conditional on the different levels of income from the safe option. For the safe amount of 300 tokens, they expected 66% of stakeholders to choose the risky option (where the actual relative frequency is 52%). Students estimated that on average 69% of stakeholders who choose the risky option would report the high income while, in fact, the actual number is 67%. Hence, these new students who had not taken part in any of our treatments before were very capable of predicting the relative frequency of cheating among stakeholders, even when they were not asked to make redistribution choices. This evidence suggests that our design did not induce any bias in spectators' beliefs.[13]

The role of personality traits and political orientation. Based on self-reported data collected at the end of the experiment, we can relate spectators' behavior to their personality traits and political orientation. Models 4 and 5 in Table 2 show that both personality and political orientations are correlated with the

[13] These 289 additional students were paid according to a stepwise quadratic scoring rule for the accuracy of their guesses and they did not make any redistribution decisions. More details about the data of these students are available upon request.

Figure 5: Spectators' beliefs about stakeholders' behavior



Notes: The figure shows the distribution of spectators' beliefs about the percentage of stakeholders choosing the risky option (light gray) and about the percentage of stakeholders reporting the high income (black), by fairness views. The white line inside the boxes indicates the median of the distribution, the box represents the interquartile range, and the whiskers extend to the most extreme data point which is no more than 1.5 times the interquartile range. Dots indicate outliers, i.e., data points lying outside the whiskers.

level of redistribution, measured in these models as the inequality reduction index. As control variables, we include age and gender, dummies for political orientation (*Center* and *Right*, taking *Left* as omitted category), and two further variables. *Inequality (questionnaire)* is a variable that ranges from 1 ("A society should aim to equalize incomes") to 10 ("A society should not aim to equalize incomes"), thus measuring a spectator's attitude towards redistribution. The "Honesty-Humility score" is based on the HEXACO-personality inventory and it has been shown to be correlated with fairness and cheating in previous studies (Hilbig et al., 2014; Hilbig and Zettler, 2015). This score indicates the following personality traits: "Persons with very high scores on the Honesty-Humility scale avoid manipulating others for personal gain, feel little temptation to break rules, are uninterested in lavish wealth and luxuries, and feel no special entitlement to elevated social status" (`https://hexaco.org/scaledescriptions`).

While gender and age do not have any influence on the level of inequality reduction, we see from Models 4 and 5 in Table 2 that spectators with a high Honesty-Humility score tend to have a larger Inequality Reduction index. They are more prone to reduce inequality, compared to spectators who are less honest and more interested in lavish wealth and luxuries. Moreover, the Honesty-Humility score is positively correlated with the posterior probability of being Egalitarian or Choice Egalitarian, but negatively correlated with the probability of being Libertarian (the last pairwise comparison is statistically significant). Political orientation also plays a role. Spectators who consider themselves in the center or towards the right of the political spectrum tend to reduce inequality to a lesser extent than their left-oriented counterparts (the omitted category). A similar picture emerges when correlating the political views and fairness types, even though only the pairwise comparison between political orientation and *Libertarians* is marginally significant.

Result 5 *Libertarians, Egalitarians, and Choice Egalitarians hold very similar beliefs about risk-taking and cheating among stakeholders (in the Self-Report treatment). They differ to some extent with respect to personality traits and political attitudes.*

5 Conclusion

The growing gap between the haves and have-nots has revived a debate about what constitutes a fair level of redistribution to alleviate income inequalities within societies. This debate does not reject the possibility that income inequalities per se may actually work as an incentive for increasing efforts on the side of the less well-off. Accordingly, it is understood that there is a trade-off between efficiency and equality (Balafoutas et al., 2013). Whether a given society leans more towards incentives for efficiency – by largely refraining from redistribution from the rich to the poor in the hope of increasing effort levels – or favors more equality – by supporting more redistribution – depends largely on the perceived sources of income inequality (Konow, 2000; Alesina and Angeletos, 2005; Cappelen et al., 2013; Möllerström et al., 2015; Almås et al., 2016; Konow et al., 2016).

In this paper, we have introduced the possibility of cheating as a potentially important source of income inequality into the framework. We have studied how the shadow of cheating affects fairness views and the desired level of redistribution from the rich to the poor. A major motivation for our study was the observation that citizens in countries with larger income inequalities are also more likely to perceive their fellow citizens as corrupt and dishonest. Hence, cheating behavior can be suspected to be a source of income inequality. While it seems undisputed that income inequalities clearly caused by cheating should be eliminated, the situation becomes much less clear when it cannot be proven whether income inequalities have been caused by by wealthy subjects cheating, or whether the wealthy acquired their income by honest means. Such ambiguous situations are hard to study in the field, because too many other factors (such as, institutional and legal frameworks, the effectiveness of the legal system to detect cheating) come into play to isolate the effect the shadow of cheating casts on fairness views. For this reason, we have presented the first controlled laboratory experiment on how potential cheating as the source of income inequalities affects fairness views of impartial spectators who can redistribute money between pairs of rich and poor stakeholders. Our experimental treatment variation has allowed us to implement two otherwise identical conditions: one in which income inequalities cannot be caused by cheating, and another one in which cheating may well be the reason for income inequalities, but where spectators have no means to detect it. This implies they must take the shadow of cheating into consideration while making their redistribution decisions.

We have found a substantial shift in the distribution of fairness views when spectators know that cheating is possible. More precisely, under the shadow of cheating, we have observed a split of the spectators into two diametrically different subpopulations. On one side of the spectrum are *Libertarians* who abstain from any redistribution, no matter what might be the source of income inequalities. On the other side of the spectrum are *Egalitarians* who implement perfect equality.

The polarization of fairness views under the shadow of cheating is mainly driven by a strong shift from *Choice Egalitarians* – who do not redistribute between stakeholders when they have generated their income by means of different actions – to *Egalitarians* when moving from *Nature* to *Self-Report*. Under the shadow of cheating, spectators face the conundrum of whether to take money away from a rich person who has either rightfully earned it or who may have purposefully acted dishonestly to profit from an unobservable situation. The strong increase in Egalitarian fairness views in such an environment may reflect the spectators' wish to reward stakeholders who refrained from the temptation of falsely reporting their earnings by choosing the safe option.

While the shadow of cheating has led to a large increase in the number of *Egalitarians*, we find it remarkable that the proportion of spectators with a *Libertarian* point of view has remained practically the same across both treatments. The fairness views of these spectators have not been significantly altered by suspected unethical behavior. This suggests that either dishonesty itself is not a good reason for these spectators to reduce inequality or they are concerned to wrongfully take money away from truly lucky stakeholders who have truthfully reported their income. We can rule out that *Libertarians* have different beliefs about the honesty of stakeholders than *Egalitarians* or *Choice Egalitarians* have. Rather, the different fairness views are somewhat related to political attitudes and personality traits. We consider the lack of differences in beliefs an important finding. Indeed, *Libertarians* deliberately refrain from redistributing despite knowing that some of the income disparities are caused by cheating on the part of the rich. Likewise, *Egalitarians* support an equal distribution of income although they acknowledge that some inequalities were not caused by dishonesty on the part of the rich.

These results relate to a recent paper by Cappelen et al. (2017a) on false negative aversion. They find that spectators are more concerned with giving less than the deserved share to honest stakeholders than with giving more than the deserved share to dishonest stakeholders. Cappelen et al. (2017a) find evidence of false negative aversion in a setting where all stakeholders participate in a risky setting. Quite interestingly, we find a similar result for the *800-0* pairs where both stakeholders chose the risky option. This seems to suggest that the shadow of cheating does not significantly alter redistribution choices when all stakeholders have taken the same path – i.e., they are all involved in a risky investment for generating their income. However, the picture radically changes when stakeholders chose different patterns (safe vs. risky option) in the first place. Whenever a stakeholder who chose the safe option is involved, spectators become less lenient toward the rich, and potentially dishonest, stakeholder. Our results uncover an interesting and non-trivial effect of the shadow of cheating that seems to affect fairness views in different ways depending on the choices made by the stakeholders in the initial phase.

Overall, the shadow of cheating has created a polarization of fairness views at opposite ends of the spectrum, having *Egalitarians* on the one end and *Libertarians* on the other end. This could lead to increased social tensions and more disruptive changes in redistribution policies when political majorities swing back and forth between one camp (of *Egalitarians*) and the other camp (of *Libertarians*). Politicians might want to take this factor into account when setting the legal and institutional framework that is intended to prevent illicit behavior of citizens. In fact, failing to fight dishonesty will not only cause more illicit activities, but – according to our findings – it will also contribute to a polarization of fairness views and a demand for redistribution. The latter effect is likely an overlooked side-effect of failed attempts to fight corruption and illegal activities, which are often at the root of large income inequalities (Glaeser et al., 2003).

References

Abeler, J., D. Nosenzo, and C. Raymond (2016). Preferences for Truth-Telling. Discussion Paper 2016-13, The Centre for Decision Research and Experimental Economics, School of Economics, University of Nottingham.

Akbaş, M., D. Ariely, and S. Yuksel (2016). When Is Inequality Fair? An Experiment on the Effect of Procedural Justice and Agency. Discussion papers, Available at SSRN: https://ssrn.com/abstract=2474368.

Alesina, A. and G.-M. Angeletos (2005). Fairness and Redistribution. *American Economic Review 95*(4), 960–980.

Almås, I., A. W. Cappelen, and B. Tungodden (2016). Cutthroat Capitalism Versus Cuddly Socialism: Are Americans More Meritocratic and Efficiency-Seeking than Scandinavians? Discussion Paper No. 18/2016, NHH Dept. of Economics.

Alstadsæter, A., N. Johannesen, and G. Zucman (2017). Tax Evasion and Inequality. Technical report.

Ashton, M. C. and K. Lee (2009). The HEXACO60: A Short Measure of the Major Dimensions of Personality. *Journal of Personality Assessment 91*(4), 340–345.

Balafoutas, L., M. G. Kocher, L. Putterman, and M. Sutter (2013). Equality, Equity and Incentives: An Experiment . *European Economic Review 60*, 32–51.

Bolton, G. E., J. Brandts, and A. Ockenfels (2005). Fair Procedures: Evidence from Games Involving Lotteries. *Economic Journal 115*(506), 1054–1076.

Buhrmester, M., T. Kwang, and S. D. Gosling (2011). Amazon's Mechanical Turk. *Perspectives on Psychological Science 6*(1), 3–5.

Cappelen, A., S. Fest, E. O. Sørensen, and B. Tungodden (2016). Choice and Personal Responsibility: What is a Morally Relevant Choice? Discussion Paper 27/2014, NHH Dept. of Economics.

Cappelen, A. W., C. Cappelen, and B. Tungodden (2017a). False Positives and False Negatives in Distributive Choices. Discussion paper, Mimeo.

Cappelen, A. W., T. Halvorsen, E. O. Sørensen, and B. Tungodden (2017b). Face-Saving or Fair-Minded: What Motivates Moral Behavior? *Journal of the European Economic Association 15*(3), 540–557.

Cappelen, A. W., A. D. Hole, E. O. Sørensen, and B. Tungodden (2007). The Pluralism of Fairness Ideals: An Experimental Approach. *American Economic Review 97*(3), 818–827.

Cappelen, A. W., J. Konow, E. O. Sørensen, and B. Tungodden (2013). Just Luck: An Experimental Study of Risk-Taking and Fairness. *American Economic Review 103*(4), 1398–1413.

Cassar, L. and A. H. Klein (2016). A Matter of Perspective: How Experience Shapes Preferences for Redistribution. Discussion paper, Mimeo.

Chetty, R., N. Hendren, P. Kline, E. Saez, and N. Turner (2014). Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility. *American Economic Review 104*(5), 141–47.

Conrads, J., B. Irlenbusch, R. Rilke, and G. Walkowitz (2013). Lying and Team Incentives. *Journal of Economic Psychology 34*(C), 1–7.

Conte, A. and J. D. Hey (2013). Assessing Multiple Prior Models of Behaviour under Ambiguity. *Journal of Risk and Uncertainty 46*(2), 113–132.

Corak, M. (2013). Income Inequality, Equality of Opportunity, and Intergenerational Mobility. *Journal of Economic Perspectives 27*(3), 79–102.

Dohmen, T., F. Meyer, and G. Walkowitz (2017). Satisfaction of Basic Needs as a Distributive Principle: Experimental Evidence on Prevalence and Relative Importance. Discussion paper, Mimeo.

Eckel, C. C. and P. J. Grossman (2008). Forecasting Risk Attitudes: An Experimental Study using Actual and Forcasted Gamble Choices. *Journal of Economic Behavior & Organization 68*(1), 1–17.

Erkal, N., L. Gangadharan, and N. Nikiforakis (2011). Relative Earnings and Giving in a Real-Effort Experiment. *American Economic Review 101*(7), 3330–48.

Faravelli, M. (2007). How Context Matters: A Survey Based Experiment on Distributive Justice. *Journal of Public Economics 91*(78), 1399–1422.

Fischbacher, U. (2007). z-Tree: Zurich Toolbox for Ready-made Economic Experiments. *Experimental Economics 10*(2), 171–178.

Fischbacher, U. and F. Föllmi-Heusi (2013). Lies in Disguise: An Experimental Study on Cheating. *Journal of the European Economic Association 11*(3), 525–547.

Gächter, S. and J. F. Schulz (2016). Intrinsic Honesty and the Prevalence of Rule Violations across Societies. *Nature 531*(7595), 496–499.

Glaeser, E., J. Scheinkman, and A. Shleifer (2003). The Injustice of Inequality. *Journal of Monetary Economics 50*(1), 199–222.

Gneezy, U. (2005). Deception: The Role of Consequences. *American Economic Review 95*(1), 384–394.

Gneezy, U., A. Kajackaite, and J. Sobel (2016). Lying Aversion and the Size of the Lie. Discussion paper, Available at SSRN: https://ssrn.com/abstract=2852055.

Greenwood, J., N. Guner, G. Kocharkov, and C. Santos (2014, May). Marry Your Like: Assortative Mating and Income Inequality. *American Economic Review 104*(5), 348–53.

Greiner, B. (2015). Subject Pool Recruitment Procedures: Organizing Experiments with ORSEE. *Journal of the Economic Science Association 1*(1), 114–125.

Grolleau, G., M. G. Kocher, and A. Sutan (2016). Cheating and Loss Aversion: Do People Cheat More to Avoid a Loss? *Management Science 62*(12), 3428–3438.

Hilbig, B. E., A. Glöckner, and I. Zettler (2014). Personality and Prosocial behavior: Linking Basic Traits and Social Value Orientations. *Journal of Personality and Social Psychology 107*(3), 529–539.

Hilbig, B. E. and I. Zettler (2015). When the Cats Away, Some Mice will Play: A Basic Trait Account of Dishonest Behavior. *Journal of Research in Personality 57*, 72–88.

Horton, J. J., D. G. Rand, and R. J. Zeckhauser (2011). The Online Laboratory: Conducting Experiments in a Real Labor Market. *Experimental Economics 14*(3), 399–425.

Kajackaite, A. (2016). Lying About Luck versus Lying About Performance. Discussion paper, Available at SSRN: https://ssrn.com/abstract=2851149.

Konow, J. (2000). Fair Shares: Accountability and Cognitive Dissonance in Allocation Decisions. *American Economic Review 90*(4), 1072–1091.

Konow, J. (2009). Is Fairness in the Eye of the Beholder? An Impartial Spectator Analysis of Justice. *Social Choice and Welfare 33*(1), 101–127.

Konow, J., T. Saijo, and K. Akai (2016). Equity versus Equality. Discussion paper.

Kuziemko, I., M. I. Norton, E. Saez, and S. Stantcheva (2015). How Elastic Are Preferences for Redistribution? Evidence from Randomized Survey Experiments. *American Economic Review 105*(4), 1478–1508.

Lefgren, L. J., D. P. Sims, and O. B. Stoddard (2016). Effort, Luck, and Voting for Redistribution. *Journal of Public Economics 143*, 89–97.

Leiner, D. J. (2014). SoSci Survey (Version 2.5.00-i) [Computer software].

Litman, L., J. Robinson, and T. Abberbock (2016). TurkPrime.com: A Versatile Crowdsourcing data Acquisition Platform for the Behavioral Sciences. *Behavior Research Methods*, 1–10.

Litman, L., J. Robinson, and C. Rosenzweig (2015). The Relationship between Motivation, Monetary Compensation, and Data Quality among US- and India-based Workers on Mechanical Turk. *Behavior Research Methods 47*(2), 519–528.

Möllerström, J., B.-A. Reme, and E. O. Sørensen (2015). Luck, Choice and Responsibility An Experimental Study of Fairness Views. *Journal of Public Economics 131*, 33–40.

Piketty, T. (2014). *Capital in the Twenty-First Century.* Harvard University Press.

Ploner, M. and T. Regner (2013). Self-image and Moral Balancing: An Experimental Analysis. *Journal of Economic Behavior & Organization 93*, 374–383.

Rey-Biel, P., R. M. Sheremeta, and N. Uler (2011). (Bad) Luck or (Lack of) Effort?: Comparing Social Sharing Norms between US and Europe. Discussion paper, Availalable at http://pareto.uab.es/prey/Neslihansub.pdf.

Roth, C. and J. Wohlfart (2017). Experienced Inequality and Preferences for Redistribution. Working paper, ssrn: https://ssrn.com/abstract=2809655.

Saez, E. and G. Zucman (2016). Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data. *Quarterly Journal of Economics 131*(2), 519–578.

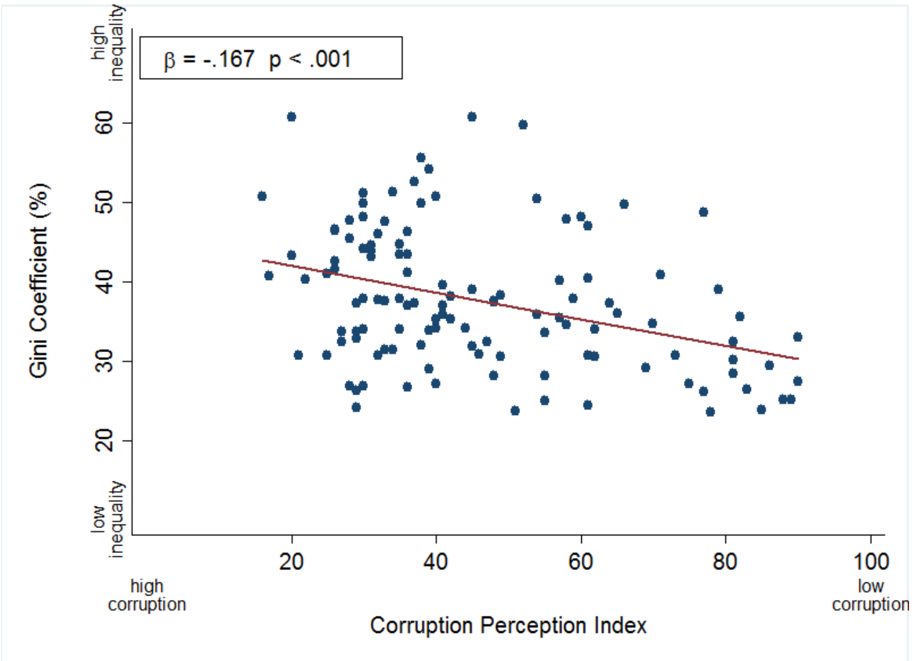
Tinghög, G., D. Andersson, and D. Västfjäll (2017). Are Individuals Luck Egalitarians? An Experiment on the Influence of Brute and Option Luck on Social Preferences. *Frontiers in Psychology 8*(460).

Train, K. (2009). *Discrete Choice Methods with Simulation.* Cambridge University Press.

Weisel, O. and S. Shalvi (2015). The Collaborative Roots of Corruption. *Proceedings of the National Academy of Sciences 112*(34), 10651–10656.

Appendix A: Tables and Figures

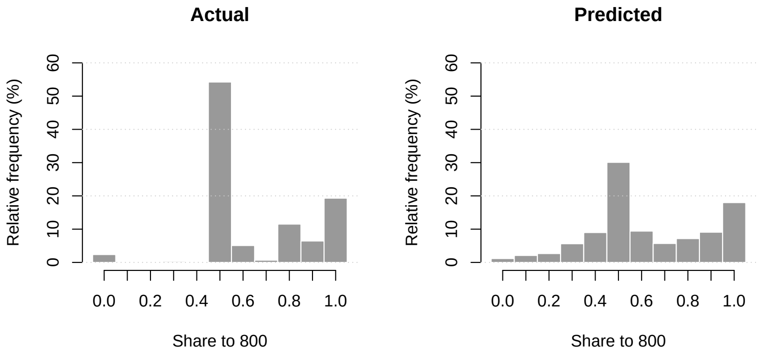
Figure A-1: Gini Index and Corruption Perception Index



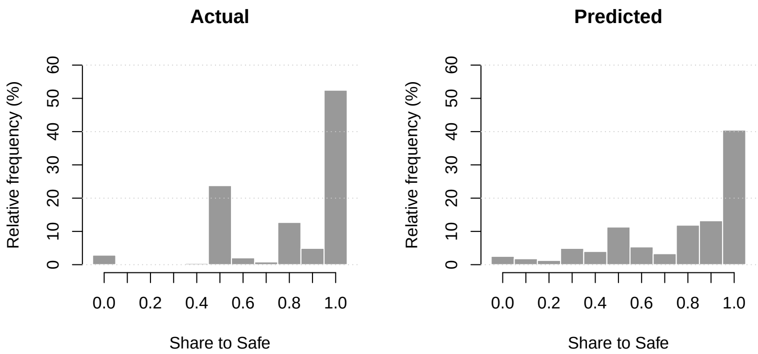
Notes: The graph reports data for 120 countries. The coefficient and significance level are obtained from an OLS regression. Data for the Gini coefficient are from the World Income Inequality Database (WIID release 3.4 `https://www.wider.unu.edu/data`). For each country, we considered the most recent year available. For the sake of homogeneity, we excluded countries with data only prior to year 2010 from the analysis. In case of multiple sources for the selected year, we computed the Gini coefficient as the average of all available sources. A coefficient of 0% indicates complete equality, a coefficient of 100% indicates complete inequality. The Corruption Perception Index is based on data from Transparency International (`https://www.transparency.org/`) and refers to year 2016 for all countries. An index of 0 indicates that a country is perceived as highly corrupt, while an index of 100 indicates that a country is perceived as very clean.

Figure A-2: Actual and predicted income redistribution - *Nature* treatment

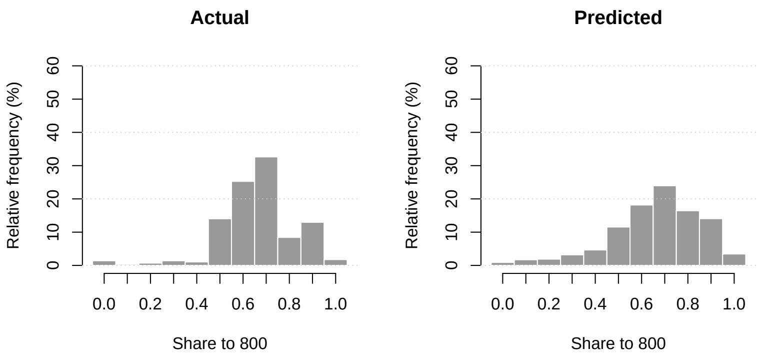
(a) *800-0*



(b) *Safe-0*



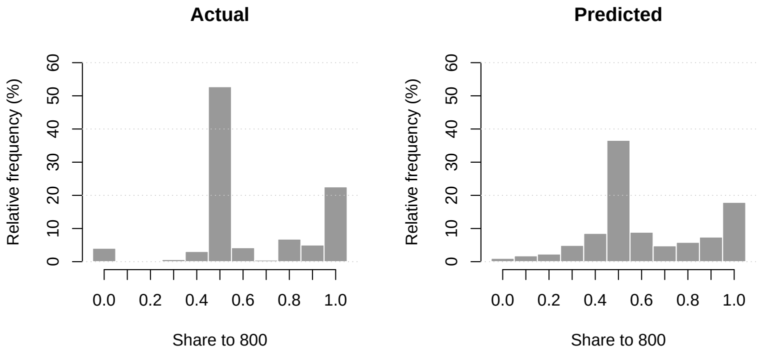
(c) *Safe-800*



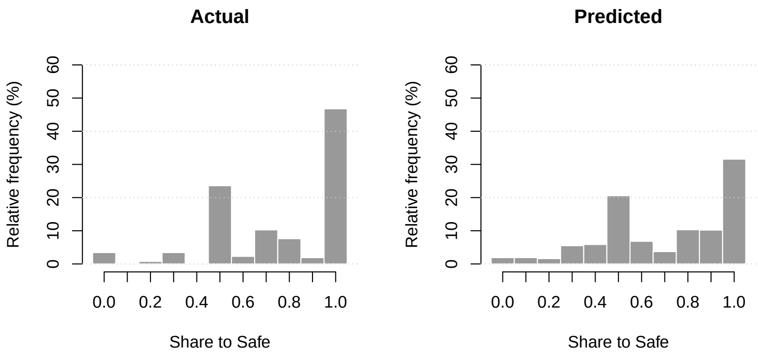
Notes: "Actual" refers to the choice made by the spectators. "Predicted" refers to simulated choices obtained using the discrete choice random utility model and the estimated parameters in Table A-2. For each spectator, we run 1000 simulations of the 20 choices he/she faced. In each simulation, we randomly draw a fairness view F^k and a β in accordance with the estimated parameters. Panel (a) shows actual and predicted choices in pairs of the type *800-0*; Panel (b) shows actual and predicted choices in pairs of the type *Safe-0*; and Panel (c) shows actual and predicted choices in pairs of the type *Safe-800*.

Figure A-3: Actual and predicted income redistribution - *Self-Report* treatment

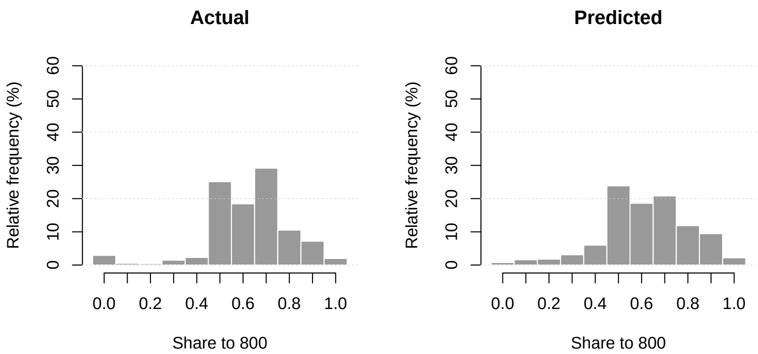
(a) *800-0*



(b) *Safe-0*



(c) *Safe-800*



Notes: "Actual" refers to the choice made by the spectators. "Predicted" refers to simulated choices obtained using the discrete choice random utility model and the estimated parameters in Table A-2. For each spectator, we run 1000 simulations of the 20 choices he/she faced. In each simulation, we randomly draw a fairness view F^k and a β in accordance with the estimated parameters. Panel (a) shows actual and predicted choices in pairs of the type *800-0*; Panel (b) shows actual and predicted choices in pairs of the type *Safe-0*; and Panel (c) shows actual and predicted choices in pairs of the type *Safe-800*.

Table A-1: Procedures and generation of decision sequence

	Nature			Coin		
Scenario	Stakeholder 1	Stakeholder 2	Safe level	Stakeholder 1	Stakeholder 2	Safe level
Based on pilot experiments						
1	Safe	800	300	Safe	800	400
2	800	0	200	Safe	0	300
3	0	0	200	Safe	800	200
4	0	0	100	800	0	300
5	800	0	100	800	0	200
6	0	0	100	Safe	Safe	400
7	Safe	800	300	0	800	200
8	Safe	800	100	800	800	100
9	0	Safe	100	800	800	200
10	Safe	Safe	400	800	Safe	100
11	800	Safe	500	Safe	800	400
12	0	0	100	800	Safe	400
13	0	Safe	500	Safe	Safe	500
14	0	0	300	Safe	800	500
15	800	0	100	Safe	800	400
16	Safe	0	400	800	800	200
Pre-defined by the experimenter						
17	Safe	0	S_i	Safe	0	S_i
18	800	Safe	S_i	800	Safe	S_i
19	0	800	S_i	0	800	S_i
Relevant for stakeholders' earnings						
20	*stakeholder 1*	*stakeholder 2*	S	*stakeholder 1*	*stakeholder 2*	S

Notes: Each stakeholder faced 20 scenarios. Scenarios 1 to 16 were based on a pilot experiment with 30 stakeholders per treatment and ran a few weeks prior to the proper experiment. Even though the sequences were pre-determined, all pairs were a possible outcome. Each scenario was generated by randomly drawing a pair (with reposition) and by randomly selecting a safe level for each chosen pair. The relevant outcomes for the selected pairs and safe level are reported in the table. The first 16 scenarios were treatment specific. Data from the pilot experiment on MTurk and the code to generate the sequence are available upon request from the authors. The outcomes (Safe, 800, 0) for the scenarios 17 to 19 were defined by experimenters and represent pairs with initial inequality. The safe level for these scenarios, S_i, was randomly drawn. An independent random draw was performed for each spectator. The randomly selected safe level was kept constant across scenarios 17 to 19. Finally, the last scenario was the payoff-relevant one. Each spectator was assigned to one pair of stakeholders.

Table A-2: Estimation of types

	Nature Model 1	Coin Model 2	Pooled Model 3
$\lambda^{Libertarians}$	0.463	0.403	0.418
	(0.071)	(0.047)	(0.039)
$\lambda^{Egalitarians}$	0.123	0.356	0.282
	(0.048)	(0.046)	(0.036)
$\lambda^{ChoiceEgalitarians}$	0.415	0.241	0.300
	(0.072)	(0.043)	(0.038)
ζ	4.635	5.297	5.110
	(0.117)	(0.059)	(0.051)
σ	3.161	3.351	3.103
	(0.127)	(0.070)	(0.058)
logLik	-1871.573	-5413.893	-7292.313
Degrees of freedom	4	4	4

Notes: The likelihood is maximized in R using the BFGS method with mle2 function (bbmle package). One population share and its standard error are calculated residually. Numerical integration is perfomed using 100 halton draws for each observation (Train, 2009). Models 1 and 2 are estimated separately with *Nature* and *Self-Report* data respectively; Model 3 is estimated using pooled data;

Table A-3: Beliefs and fairness views

Dep. var.:	Risky choices		High income	
Ex-post beliefs	Model 1	Model 2	Model 3	Model 4
Egalitarians *(d)*	-1.506	-0.394	-1.979*	-0.298
	(1.115)	(1.183)	(1.119)	(1.178)
Choice egalitarians *(d)*	-0.245	-0.077	-1.527	0.980
	(1.146)	(1.207)	(1.150)	(1.202)
Male *(d)*		-2.969***		3.590***
		(1.021)		(1.016)
Age (years)		-0.007		0.207
		(0.180)		(0.179)
Honesty-Humility score		-1.104***		-0.199
		(0.188)		(0.187)
Center *(d)*		1.301		3.014***
		(1.114)		(1.110)
Right *(d)*		1.574		4.202***
		(1.540)		(1.534)
Risk aversion		-1.796***		-2.496***
		(0.335)		(0.334)
Constant	58.941***	79.496***	75.122***	77.323***
	(0.728)	(5.141)	(0.731)	(5.119)
N.obs.	1200	1200	1200	1200
R^2	0.002	0.052	0.003	0.068

Notes: OLS regression. In Models 1 and 2, the dependent variable is the estimated frequency of risky choices; in Models 3 and 4, the dependent variable is the estimated fraction of subjects who report the high income from the risky investment. Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5%, and 10% level, respectively. Dummy variables are indicated by *(d)*. *Risk aversion* takes values from 1 to 6, where 1 indicates risk aversion and 6 risk loving. See Table 2 for the explanation of the other regressors. Post estimation tests for Egalitarian = Choice Egalitarian: Model 1: p = .3060; Model 2: p = .8040; Model 3: p = .7143; Model 4: p = .3161.

Appendix B: Estimation procedure

In this Appendix, we provide further details about the estimation of fairness views (based on Cappelen et al. 2007, 2013).

Given the random utility model in equation (1) and under the assumption that ε_{iy} is i.i.d. extreme value distributed and that $\log(\beta)$ is $\mathcal{N}(\zeta, \sigma^2)$, we can write the likelihood contribution of a spectator i conditional on fairness view k as follows:

$$L_{i,k}(\zeta,\sigma) = \int_0^\infty \left(\prod_{j=1}^{j_i} \frac{e^{V(y_{ij};F^k,\beta,\cdot)}}{\sum_{s\in\mathcal{Y}_{ij}} e^{V(s;F^k,\beta,\cdot)}} \right) f(\beta;\zeta,\sigma) d\beta \tag{2}$$

where $f(\cdot)$ is the density function of the log normal distribution and y_{ij} is the allocation chosen by spectator i from the choice set $\mathcal{Y}_{ij} = \{0, 25, \ldots, X_{ij}\}$ that spectator i faces in the redistribution decision j.

To calculate the total likelihood contribution of spectator i, we take the weighted sum of the conditional likelihood $L_{i,k}$

$$L_i(\lambda^L, \lambda^E, \lambda^{CE}, \zeta, \sigma) = \sum_{k\in\{L,E,CE\}} \lambda^k L_{i,k} \tag{3}$$

where λ^k is the population share of spectators with fairness view $k \in \{L, E, CE\}$. k^L corresponds to *Libertarians* view, k^E corresponds to *Egalitarians* view, and k^{CE} corresponds to *Choice Egalitarian* view. Finally, the total log-likelihood is obtained by taking the sum of the log of the total likelihood contributions of each spectator.

Parameters are estimated by simulated maximum likelihood with 100 Halton draws for each observation (Train, 2009). One population share and its standard error are calculated residually. The estimation is performed in R using the BFGS method with mle2 function (bbmle package).

Appendix C: Instructions

Instructions for stakeholders (MTurk)

The study comprises two stages. Please find below the instructions for stage 1. Stage 2 of the study concerns the distribution of earnings from stage 1. Details of the second stage will be provided after the first stage is completed.

Stage 1

If you complete the study, you will earn a **fixed amount of $0.60 plus a bonus** that depends on your choices. All earnings are expressed in tokens that will be converted into real money at the end of the study ($1=300 tokens).

The study will take about 10 minutes to complete (including the time for reading the instructions). You will receive a code to collect your payment via MTurk upon completion.

Your task

You will face **five decisions**. In each decision, you have to choose between two options: option A and option B (see Table C-1).

Table C-1

Decision	Option A	Option B
1	100 for sure	800 with prob. 50% or 0 with prob. 50%
2	200 for sure	800 with prob. 50% or 0 with prob. 50%
3	300 for sure	800 with prob. 50% or 0 with prob. 50%
4	400 for sure	800 with prob. 50% or 0 with prob. 50%
5	500 for sure	800 with prob. 50% or 0 with prob. 50%

Option A is safe. The safe amount changes in each decision: it ranges from 100 tokens in decision 1 to 500 tokens in decision 5.

Option B is risky Option B is the same for all five decisions. If you select option B, you have a 50% probability of earning 0 tokens and a 50% probability of earning 800 tokens. [**Nature only:** If you choose option B for a given decision, the computer will resolve the lottery. The outcome will be reported in the end.] *[**Self-Report only:** If you choose option B for a given decision, after the last decision you have* *to flip a coin. If the coin lands face-up on Tails you get 0 tokens, if it lands face-up on Heads you get 800 tokens. Please notice that you have to report the outcome of the coin flip truthfully. You may also use justflipacoin.com to virtually flip a coin.]*

At the end, the computer will randomly select **one** decision that will be relevant for stage 2. Further details about stage 2 will be provided later.

If the instructions are clear, please enter your MTurk worker ID and proceed to the control questions.

$\Longrightarrow$ ——— *new screen* ——— $\Longleftarrow$

Suppose you chose Option A (safe) in decision 2. What is the outcome of this decision?

☑ The outcome is 200 for sure.

☐ The outcome is 800 for sure.

☐ The outcome can be either 0 or 800.

☐ There is no bonus for sure.

$\Longrightarrow$ ——— *new screen* ——— $\Longleftarrow$

Suppose you chose Option B (risky) in decision 4. What is the outcome of this decision?

☐ The outcome is 400 for sure.

☐ The outcome is 800 for sure.

☑ *[**Self-Report only:** You will toss a coin to determine]* [**Nature only:** A random draw of the computer will determine] the outcome that can be either 0 or 800.

☐ There is no bonus for sure.

$\Longrightarrow$ ——— *text in case of wrong answer* ——— $\Longleftarrow$

$\Longrightarrow$ ——— *new screen: sample screen for decision 1* ——— $\Longleftarrow$

Your answer was incorrect. If you fail next time, your HIT cannot be accepted.

Decision 1 Please decide between option A and B.

○ Option A (safe): 100 tokens

○ Option B (risky): 0 or 800 tokens

Please remember that in option B the two outcomes (0 and 800 tokens) are equally likely.
If you choose option B, the computer will resolve the lottery. The outcome will be reported in the end.

⟹ ——— *new screen: sample screen for result 1* ——— ⟸

Decision 1 – Random draw In decision 1, you chose Option B (risky). The computer has now performed the random draw.

The result for decision 1 is: 0 tokens

⟹ ——— *new screen: stage 2 and beliefs* ——— ⟸

Stage 2

Thank you for completing stage 1 of the study. We will now explain stage 2. In stage 2 you will be randomly matched with another worker (partner, henceforth), who has completed the exact same study as you have. One of the 5 decisions will be randomly selected.

A third person will be informed about the assignment and about your choice and your partner's choice in the selected decision. In case you or your partner chose option B, the third person is also informed about the *[**Self-Report only:** self-reported]* outcome of the [**Nature only:** random draw.] *[**Self- Report only:** coin toss.]*

The third person will be given the opportunity to redistribute the total amount of tokens generated between you and your partner. The total amount redistributed to you and to your partner must be equal to the sum of tokens you and your partner got in the selected decision. The redistribution done by the third person will determine your bonus for the present assignment. You will receive your bonus within one week from the completion of the assignment.

Please answer the following questions for stage 2:

In decision 3, you selected **Option [A safe/B risky - and your *[Self-Report only: self-reported]* outcome was [XX] tokens**]. Suppose your partner chose **Option A (safe)** for decision 3. A third person will now redistribute the sum of tokens, which equals [SUM], between you and your partner. How do you think the tokens will be redistributed?
(NOTE: The distributed tokens must sum up to [SUM] tokens.)
Amount of tokens you will receive: [blank]
Amount of tokens your partner will receive: [blank]

In decision 3, you selected **Option [A safe/B risky -and your *[Self-Report only: self-reported]* outcome was [XX] tokens**]. Suppose your partner chose **Option B (risky) with the *[Self-Report only: self-reported]* outcome of 0 tokens** for decision 3. A third person will now redistribute the sum of tokens, which equals [SUM], between you and your partner. How do you think the tokens will be redistributed?
(NOTE: The distributed tokens must sum up to [SUM] tokens.)
Amount of tokens you will receive: [blank]
Amount of tokens your partner will receive: [blank]

In decision 3, you selected **Option [A safe/B risky - and your *[Self-Report only: self-reported]* outcome was [XX] tokens**]. Suppose your partner chose **Option B (risky) with the *[Self-Report only: self-reported]* outcome of 800 tokens** for decision 3. A third person will now redistribute the sum of tokens, which equals [SUM], between you and your partner. How do you think the tokens will be redistributed?
(NOTE: The distributed tokens must sum up to [SUM] tokens.)
Amount of tokens you will receive: [blank]
Amount of tokens your partner will receive: [blank]

$\Longrightarrow$ ——— *new screen: validation code* ——— $\Longleftarrow$

Validation code. Please enter this code <*code here*> in the MTurk HIT to complete the study.

IMPORTANT: you need to enter this code to collect your payments.

$\Longrightarrow$ ——— *new screen: last screen* ——— $\Longleftarrow$

Thank you for completing this study. Your answers have been transmitted. You may close the browser, window, or tab now.

Instructions for Spectators[14]

Welcome. The purpose of this study is to investigate how people make decisions. From now until the end of the study, any communication with other participants is not allowed. If you have a question, please raise your hand and one of us will come to your desk to answer it. Upon completion of the study, you will receive a payment of €10, including €4 show-up fee.

Overview. You will be presented with 20 decisions, one after the other. In each decision, your task is to decide how to redistribute the money between an ORANGE and a BLUE player. One of these decisions will have real monetary consequences for two individuals that we recruited via an international online marketplace to conduct an assignment. We will first explain in detail the task we gave to the individuals who participated in the online assignment. After that, we will provide you with further information about your task.

Online Assignment. A few days ago we recruited participants via an international online marketplace to conduct an assignment. They were offered a fixed participation compensation of $0.60.

The assignment consisted of 5 decisions. In each decision, they had to choose between two options: option A and option B (see Table 1). All values in the assignment were expressed in tokens. Tokens are exchanged at the rate of $1=300 tokens. Please notice that the amount of money at stake is above the average amount for similar tasks in the same online marketplace.

Table C-2: Online decisions

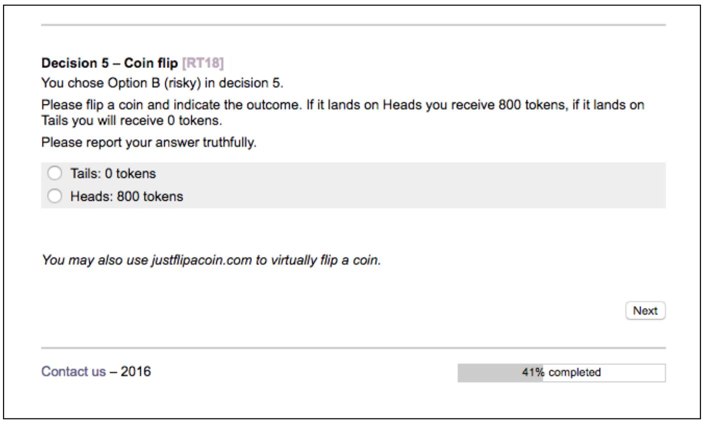
Decision	Option A	Option B
1	100 for sure	800 with prob. 50% or 0 with prob. 50%
2	200 for sure	800 with prob. 50% or 0 with prob. 50%
3	300 for sure	800 with prob. 50% or 0 with prob. 50%
4	400 for sure	800 with prob. 50% or 0 with prob. 50%
5	500 for sure	800 with prob. 50% or 0 with prob. 50%

Option A is safe. The safe amount changed in each decision: it ranged from 100 tokens in decision 1 to 500 tokens in decision 5.

[14] Translated from German. Original instructions are available upon request from the authors.

Option B is risky. Option B was the same for all five decisions. If option B was selected, the participant had a 50% probability of earning 0 tokens and a 50% probability of earning 800 tokens. [**Nature only:** If a participant chose option B for a given decision, the computer resolved the lottery at the end of the assignment.] *[**Self-Report only:** If a participant chose option B, for a given decision, he/she was asked to flip a coin. If the coin landed face-up, on Tails, the outcome was 0 tokens; if it landed face-up on Heads, the outcome was 800 tokens. Participants were asked to report the outcome of the coin flip truthfully and were given a link to flip a coin virtually in case they did not have a coin with them (see sample screen shot in Figure C-1).]*

Figure C-1: Sample screen shot from the online assignment **(Self-Report only)**



Participants were allowed to take part in the assignment only if had they correctly answered all control questions. After collecting all the data, we randomly formed pairs and selected at random one of the 5 decisions. After completing the assignment, participants were told that a third person would be informed about the rules and the outcome of the assignment, and would be given the opportunity to redistribute the earnings and thus determine how much they were paid for the assignment.

Your Task. You are the third person and we now want you to choose whether to redistribute the tokens for the assignment between two people. Your decision is completely anonymous. The people who participated in the online assignment will receive the payment that you choose for them within a few days, but will not receive any further information.

Figure C-2 shows a sample decision screen. In the upper part of the screen, you can see the initial situation for ORANGE and BLUE player. For each player, you

Figure C-2: Sample screen shot (*Self-Report* treatment)

Notes: In the *Nature* treatment, the sentence "ORANGE reported HEADS" was not displayed.

can see whether they chose option A (safe) or option B (risky). In each decision, you will be able to see the amount of tokens yielded by the safe option A. In this example, the safe level is 500 tokens.

In the example in Figure C-2, ORANGE chose option B and BLUE chose option A. Recall that the outcome of option B is determined [**Nature only:** by a random draw of the computer and both outcomes –0 and 800 tokens– have the same probability of being randomly selected.] *[**Self-Report only:** by the toss of a coin. Participants in the online assignment, were asked to toss a coin and self-report the outcome truthfully. If a participant reported TAILS the outcome of option B was 0 tokens, if the participant reported HEADS the outcome of option B was 800 tokens.]* In this example, the outcome for ORANGE was 800 tokens *[**Self-Report only:** – as he reported HEADS]*.

In the central part of the screen you can see the sum of the tokens by ORANGE and BLUE players. In the example, the sum of tokens is 1300. **Your task is to decide whether and how to redistribute the total amount of tokens between ORANGE and BLUE.** You can choose any positive amount in steps of 25 tokens, as long as you redistribute all tokens. In our example, the sum of what you give to ORANGE and BLUE must be exactly 1300 tokens.

You have to make 20 decisions and one decision will be relevant – that is, it will have actual monetary consequences – for two individuals who have completed the online assignment. You will not know in advance which decision is relevant for the earnings of other individuals. This means that you have to pay attention to every decision.

Before starting, please answer a few control questions.

⟹ ——— *new section* ——— ⟸

Control Questions

1. Suppose a participant in the online assignment chose Option A (safe) in decision 2 (see Table C-1). What is the outcome of this decision?

   - ☑ The outcome is 200 for sure.
   - ☐ The outcome is 800 for sure.
   - ☐ The outcome can be either 0 or 800.
   - ☐ The outcome is 0 for sure.

2. Suppose a participant in the online assignment chose Option B (risky) in decision 4. What is the outcome of this decision?

   - ☐ The outcome is 400 for sure.
   - ☐ The outcome is 800 for sure.
   - ☑ *[**Self-Report only:** The participant had to toss a coin to determine]* [**Nature only:** A random draw of the computer determined] the outcome that can be either 0 or 800.
   - ☐ The outcome is 0 for sure.

3. You are the third person who has to choose how to redistribute the tokens from the assignment

   - ☐ Your identity will be revealed to the participant in the online assignment.

- ☑ One of your decisions will have real monetary consequences for two participants in the online assignment.
- ☐ You have to make only one decision.

4. Suppose ORANGE chose option A in decision 3. BLUE, instead, chose option B and [**Nature only:** the computer selected at random the low amount.] *[**Self-Report only:** self-reported TAILS.]* What is the total number of tokens earned in this situation? (e.g., the sum of the tokens by ORANGE and BLUE)
   - ☐ The total number of tokens is 200.
   - ☐ The total number of tokens is 800.
   - ☐ The total number of tokens is 1100.
   - ☑ The total number of tokens is 300.

5. Suppose the total number of tokens earned in a situation is 1600.
   - ☐ You can give 0 tokens to both ORANGE and BLUE.
   - ☑ The sum of the tokens you give to ORANGE and BLUE has to be exactly 1600.
   - ☐ The sum of the tokens you give to ORANGE and BLUE can be larger than 1600.
   - ☐ The sum of the tokens you give to ORANGE and BLUE can be smaller than 1600.

⟹ ——— *new section* ——— ⟸

Final Questionnaire

1. Gender
   - ☐ Male
   - ☐ Female

2. Age: ____

3. Field of study

- ☐ Medicine
- ☐ Physics, Biology, Mathematics
- ☐ Computer science
- ☐ Social sciences
- ☐ Psychology
- ☐ Other

4. Please indicate where you were born

- ☐ Schleswig-Holstein
- ☐ Mecklenburg-Vorpommern
- ☐ Hamburg
- ☐ Bremen
- ☐ Niedersachsen
- ☐ Hessen
- ☐ Nordrhein-Westfalen
- ☐ Rheinland-Pfalz
- ☐ Saarland
- ☐ Baden-Württemberg
- ☐ Bayern
- ☐ Brandenburg
- ☐ Berlin
- ☐ Sachsen
- ☐ Sachsen-Anhalt
- ☐ Thüringen
- ☐ Outside Germany

5. In political matters, people talk of *the left* and *the right.* How would you place your views on this scale, generally speaking?

	○	○	○	○	○	○	○	○	○	○	
Left	1	2	3	4	5	6	7	8	9	10	*Right*

6. We now want you to indicate to what extent you agree with the following statement. 1 means that you agree completely with the statement on the left, 10 means that you agree completely with the statement on the right, and the numbers in between indicate the extent to which you agree or disagree with the statements.

A society should aim to equalize incomes.	*A society should **not** aim to equalize incomes*

○	○	○	○	○	○	○	○	○	○
1	2	3	4	5	6	7	8	9	10

7. Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?

   - ☐ Most people can be trusted.
   - ☐ Need to be very careful.

In addition, subjects answered the 60-item version of the HEXACO Personality Inventory-Revised Test (http://hexaco.org/hexaco-inventory).

Instructions for beliefs and risk aversion in the lab[15]

Instructions for Part 2

In this part, we ask you to guess what people chose in the online assignment explained before.

Your Task. Please consider the decision between Option A that yields 300 tokens for sure and Option B that yields 800 with a probability of 50% and 0 with a probability of 50%. You will have to answer the following two questions:

- **Question 1:** What is the percentage of participants in the online assignment who chose Option B (risky)?
- **Question 2:** Consider now the online participants who have chosen Option B: what is the percentage of participants who reported *Heads*? Please recall that *Heads* yielded 800 tokens and *Tails* 0 tokens.

Your Payment. You can earn a substantial amount of money based on the accuracy of your guess, as reported in Table C-3. If your guess is correct, you can earn €22. If your guess deviates from the true value by 5 percentage points (plus or minus), you can earn €20.90. If your guess deviates by more than 21 percentage points, you can receive €2 for this part.

Table C-3: Your payment

deviation in percentage points	**payment**
exact number	€22.00
between 1 and 5	€20.90
between 6 and 10	€17.60
between 11 and 15	€12.10
between 16 and 20	€4.40
over 21	€2.00

After everyone has answered both questions, six participants will be chosen at random for payment for this part. The selected participants will be paid for one of the two questions, selected at random. Since you do not know in advance who and which question will be chosen, it is important that you pay attention to both answers.

[15]Translated from German. Original instructions are available upon request from the authors. This set of instructions was used only in two Self-Report sessions, for a total of 60 participants.

Instructions for Part 3

Your task. Now, please select one option out of six different options. The six different options are displayed in Figure C-3. You must select one and only one of these gambles.

Figure C-3: Options and payments

OPTION	Wenn GRÜN gewählt wird	Wenn ROT gewählt wird
I	28 Euro	28 Euro
II	36 Euro	24 Euro
III	44 Euro	20 Euro
IV	52 Euro	16 Euro
V	60 Euro	12 Euro
VI	70 Euro	2 Euro

Options and earnings. Each option has two possible colors (green and red), each with a 50% probabilitie of occurring. Your earnings for this part of the study will be determined by:

- Which of the six options you select; and
- Which of the two possible colors (green or red) occurs

For example, if you select Option 4 and green occurs, you earn €52. If red occurs, you earn €16.

At the end of this task, the computer will randomly select one participant for payment. The computer will then randomly draw one of the two colors (green or red) and the earnings for the selected participant will be determined. Please remember that for every option, each color has a 50% chance of occurring.

Instructions for beliefs in the classroom[16]

Instructions

Welcome. The purpose of this study is to investigate how people make decisions. *[**Experimenter only** If you have a question please raise your hand, after the instructions have been read and one of us will come to your desk to answer it. Your answers will be treated anonymously.]* More specifically, you will be asked to guess the results of a previous study. *[**Experimenter only** We will now explain both the previous task – an online assignment – and your task in detail.]* From now until the end of the study, any communication with other participants is not allowed.

Online Assignment. We recruited over 100 participants via an international online marketplace and asked them to make a series of decisions. Participants had to choose between:

- **Option A (safe)** yields a safe payment, with the amount specified on your decision sheet;
- **Option B (risky)** yields 800 tokens with a 50% probability and 0 tokens with a 50% probability. If a participant chose option B he/she was asked to flip a coin and self-report the result:
  - if the coin landed face-up on **Heads** the outcome was 800 tokens;
  - if the coin landed face-up on **Tails** the outcome was 0 tokens.

Participants were asked to report the outcome of the coin flip truthfully. Participants were aware that a self-reported coin toss would resolve the outcome for Option B before choosing between the two options. All earnings were expressed in tokens and exchanged at the rate of $1=300 tokens.

Your Task. We ask you to guess what people did in the online assignment. You will have to answer the following two questions:

- **Question 1:** What is the percentage of participants who chose Option B (risky)?

[16]Translated from German. Original instructions are available upon request from the authors. A total of 289 students participated in the classroom experiment.

- **Question 2:** Consider now the participants who have chosen Option B: what is the percentage of participants who reported *Heads*? Please recall that *Heads* yielded 800 tokens and *Tails* 0 tokens.

Your Payment. You can earn a substantial amount of money based on the accuracy of your guess, as reported in Table C-4. If your guess is correct you can earn €22.00. If your guess deviates from the true value by 5 percentage points (plus or minus), you can earn €20.90. If your guess deviates by more than 21 percentage points, you get €2.00.

Table C-4: Your payment

deviation in percentage points	**payment**
exact number	€22.00
between 1 and 5	€20.90
between 6 and 10	€17.60
between 11 and 15	€12.10
between 16 and 20	€4.40
over 21	€2.00

After everyone has answered both questions, one out of every 20 students will be chosen at random for payment. The selected students will be paid for one of the two questions, selected at random. Since you do not know in advance who and which question will be chosen, it is important that you pay attention to both answers. You can now make your decisions. Please read the information on the decision sheet carefully.

Decision sheet

Safe level for Option A = 100 tokens for sure

Participants in the online assignment had to make a decision between Option A and Option B.

Option A (safe)	Option B (risky)
100 tokens for sure	**800** tokens if Heads **0** tokens if Tails

Please answer the following questions

Question 1: What is the percentage of participants who chose Option B (risky)?

_____ %

Please write an integer number between 0 and 100

Question 2: Consider now the participants who have chosen Option B: what is the percentage of participants who reported *Heads*? Please recall that *Heads* yielded 800 tokens and *Tails* 0 tokens.

_____ %

Please write an integer number between 0 and 100

Gender:

- ☐ Male
- ☐ Female

Field of study:

- ☐ Economics
- ☐ Economics majoring in sociology
- ☐ Sociology
- ☐ Math
- ☐ Other