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(Not) Everyone Can Be a Winner – The Role of Payoff Interdependence for Redistribution*

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Abstract

Frequently, one person's success comes at the expense of others. We contrast such zero-sum environments in which individuals' payoffs are interdependent to those where payoffs are independent. In a laboratory experiment, we study whether the resulting inequality is perceived differently and how this affects redistribution. Across treatments, we compare a spectator's redistribution of two workers' earnings. If workers do not compete in a zero-sum setting, average redistribution decreases. In a representative survey, we replicate this finding and document that individuals who believe in a zero-sum world support higher levels of redistribution and are more likely to be Democrats.

Keywords: Redistribution, Fairness, Zero-sum, Social preferences, Lab experiment
JEL-Classification: C91, D31, D63, H23

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1 Introduction

Inequality and its political responses have frequently been described as one of the defining challenges of the 21st century (e.g., World Economic Forum, 2017). Facing rising levels of wealth and income inequality (Atkinson, Piketty, and Saez, 2011; Keeley, 2015), political actors and institutions have to determine commonly accepted levels of redistribution. Implementing respective policy measures that are widely accepted requires a sound understanding of which allocations people consider fair. Therefore, finding the underlying determinants of preferences for redistribution is crucial for designing corresponding institutions and mechanisms, and advancing our general knowledge of social preferences. While luck (e.g., Croson and Konow, 2009; Cappelen, Konow, et al., 2013), performance (e.g., Abeler et al., 2010), as well as individual decision making (e.g., Gantner, Güth, and Königstein, 2001; Cappelen, Hole, et al., 2007) are known channels, we propose a new determinant: payoff interdependence.

If an environment has a zero-sum nature, success always comes at the expense of others and payoffs are negatively correlated, that is, interdependent. As greater payoffs harm others, any inequality in such an environment might be viewed as less acceptable. If, on the other hand, success is generally attainable for everyone simultaneously, inequality might still arise but need not realize. As other (equal) outcomes are in principle possible, realized inequality might more readily be accepted.

Respondents in the World Values Survey (Inglehart et al., 2014) indeed seem to consider inequality less fair in zero-sum environments: those who believe that wealth can only be accumulated at the costs of others are also more strongly in favor of a redistribution of incomes.[1] Notably, respondents in the US hold a significantly stronger belief in the independence of payoffs than those in all other developed countries.[2] That might relate to the American Dream, the concept of everybody succeeding solely on their own effort.[3] This potentially translates to the welfare system: the social spendings in the US are among the lowest (Alesina and Angeletos, 2005; Schuknecht and Zemanek, 2021).

This paper investigates how different degrees of payoff interdependence shape the demand for redistribution. In particular, we contrast zero-sum environments where individuals' payoffs are negatively correlated with those where such a correlation is absent. Negatively correlated results arise in every direct competition, for example when two workers compete for a single bonus payment in a tournament. Here, the outcome will always be unequal. If, however, the bonus payment depends on the individual worker reaching a certain threshold or goal, the results are no

[1] Both measures have a correlation of $\rho = 0.13$, $p < 0.0001$.

[2] Figure A.1 in the Appendix presents the mean beliefs in the interdependence of payoffs in the western countries.

[3] James Truslow Adams originally coined the term in his book *The Epic of America* as a "dream of a land in which life should be better and richer and fuller for every man, with opportunity for each according to his ability or achievement" (Adams, 1931).

longer correlated. In the end the outcome might still contain inequality, but not necessarily so. In this paper, we focus solely on those situations where the same level of inequality (in the examples one worker receives the bonus, the other does not) was created by the two different environments.

We illuminate this channel in three separate steps: First, we conduct a laboratory experiment that isolates the causal effect of payoff interdependence on preferences for redistribution. Second, we replicate this link in a survey featuring a representative sample of US citizens. Third, in the same survey, we relate the belief in a zero-sum world to personal characteristics and political attitudes to get a better understanding of its prevalence in different parts of the population.

In the laboratory experiment, pairs of workers work on a real-effort task and can gain a prize. Afterwards, a spectator can redistribute the prize earnings between them. The first set of treatments features randomness in the allocation process of prizes to workers. Treatment RANDOMNESS – ZERO-SUM resembles a zero-sum world where payoffs are perfectly interdependent and workers compete for a single prize in a Tullock contest. Here, their relative performances determine their chances of receiving the prize. We remove the interdependence stepwise in two treatments. In treatment RANDOMNESS – CHANCE COMPETITION, we take away the zero-sum environment – one worker wins, the other loses – but keep the mutual impact of performances on others' chances of receiving a prize identical. Prizes are now determined via two independent draws, one for each worker, whereby the two of them can both win a prize at the same time, only one might win, or neither of them. As in the Tullock contest, relative performances determine a worker's chances of receiving a prize and hence payoffs are nonetheless negatively correlated. Therefore, in a second step, we implement treatment RANDOMNESS – NO COMPETITION where payoffs are entirely independent of each other: each worker still competes in a Tullock contest, but now individually against a randomly-drawn performance level, which is identical for both workers.

In another set of treatments, we alter the allocation process to exclude the impact of randomness or luck on the workers' earnings. For the zero-sum setting in treatment DETERMINISTIC – ZERO-SUM, this implies that the tournament becomes deterministic and the better-performing worker wins with certainty. Under complete independence in treatment DETERMINISTIC – NO COMPETITION, workers do not compete against each other but rather individually against a randomly-drawn threshold, which is the same for both workers.

In all treatments, the spectator knows the details of the procedure that generates the payoffs. After observing the outcome as well as the individual performances, she can redistribute payoffs between the two workers. These redistribution decisions are our main variable of interest as we interpret them as a proxy for the underlying distributional preferences. Throughout the analysis of this paper, we focus on situations with actual inequality in payoffs, namely where only one worker receives a prize while the other worker ends up empty-handed. This means that any potential treatment differences in redistribution decisions cannot be explained by different levels of inequality.

We find that redistribution decisions are affected by a zero-sum environment: (1) The redistributed share is even larger if – right from the start – only one worker can potentially win a prize. (2) The nature of the environment also affects how spectators respond to performance differences. In general, spectators allocate greater shares of earnings to higher-performing workers, the greater the difference. However, if both workers can win simultaneously, differences matter less for redistribution decisions. (3) For both effects, it is not relevant whether chances of winning are still influenced by the other worker's performance or completely independent from one another. Thus, redistribution decisions are only affected by whether there is a zero-sum environment, namely if in principle everyone can win simultaneously, or not. Whether workers additionally influence each others' chances of winning has no further impact on redistribution.

The above patterns prevail in settings in which a mix of luck and performance allocates prizes (first set of treatments), as well as in those that are deterministic (second set of treatments). However, the overall level of redistribution differs between these settings: when luck is part of the allocation process, spectators redistribute a higher share of the prize. This is independent of the interdependence of payoffs.

Building on the results of the lab experiment, we examine the importance of payoff interdependence for redistributional preferences in a representative survey in the US. The first part of the survey investigates whether the main results translate to the general population. We present respondents with hypothetical scenarios which reflect either interdependence of payoffs of two employees in a zero-sum environment, or independent payoffs. We corroborate the results of the experiment and find more redistribution between the employees' payoffs in the zero-sum environment.

In the second part, we correlate respondents' beliefs in a zero-sum world with personal characteristics and attitudes. Once again, a stronger belief in a zero-sum world is related to a higher demand for redistribution, as well as the belief that success is due to luck. Furthermore, those who believe in a zero-sum world are slightly less in favor of competition, are more morally universal (Enke, Rodríguez-Padilla, and Zimmermann, forthcoming), and have a higher likelihood to be Democrats.

Our findings contribute to the literature on fairness and redistribution in two distinct ways: First, to the best of our knowledge, our study is the first to establish that inequality is tolerated more if it does not come at the expense of others. Second, we show that the mere presence of randomness or luck in the allocation process leads to higher demand for redistribution. Our findings therefore highlight an important channel – the outcome-generating mechanism itself – that shapes redistributive preferences.

While this paper focuses on the interdependence of payoffs and hence the degree of how people's decisions and fortunes affect others, the overwhelming majority of the literature on redistribution concentrates on the individual accountability for own payoffs (e.g., Konow, 1996, 2000). Major differences in demand for redistribution emerge if inequalities arise due to luck compared with differences in individual decisions (Cappelen, Konow, et al., 2013), investment (Cappelen, Hole, et al., 2007), and effort (Fischbacher, Kairies-Schwarz, and Stefani, 2017). Inequality is accepted when it originates from differences in performance and investment (e.g., Frohlich, Oppenheimer, and Kurki, 2004; Almås, Cappelen, and Tungodden, 2020) and equality is even seen as unfair (Abeler et al., 2010). By contrast, third parties tend to eliminate inequalities between others once luck is involved in the payoff mechanism (e.g., Mollerstrom, Reme, and Sørensen, 2015; Breza, Kaur, and Shamdasani, 2017; Gee, Migueis, and Parsa, 2017; Rey-Biel, Sheremeta, and Uler, 2018).[4]

In the studies investigating the role of luck in tournaments, it is unclear to the spectator whether the winner is the high-performing worker and whether her win was due to merit or luck.[5] We eliminate any doubts about possible discrepancies by providing additional information about individual performances and hence only vary the presence of luck. Therefore, we causally demonstrate that a high demand for redistribution under luck is not solely a result of uncertainty about whether a high payoff was indeed merited or not. Unequal outcomes tend to be viewed as more unfair as soon as luck is involved in their creation.

At the same time, the source of inequality becomes less important as long as people can be made (partially) responsible for their earnings, resulting in a higher acceptance of unequal incomes. Cappelen, Fest, et al. (forthcoming) argue that even arbitrary decisions induce a sense of responsibility for resulting inequalities. In relation to our findings, their results indicate that spectators might hold high earners responsible for the low payoffs of others if payoffs are interdependent but not if the low earner could have won simultaneously. The importance of responsibility is further stressed by Bartling et al. (2018). Once people are given the opportunity to select into winner-take-all tournaments without randomness, the tournament's inequality is widely accepted. Our treatments without randomness support this finding. In addition, we document that the acceptance of inequality increases even further if the two parties were not competing against each other, but rather against an exogenous threshold.

The remainder of this paper is structured as follows. Section 2 describes the design of the laboratory experiment, before Section 3 shows the results. Section 4

[4] These papers treat the impact of performance and luck separately. We depart from this dichotomous view and allow both luck and performance to influence earnings at the same time. In a recent paper, Cappelen, Moene, et al. (2017) also investigate the interplay of merit and luck as determinants for redistribution. In contrast to our paper, a discernible part of individual payoffs is determined by luck and another part by performance. Spectators are unaware of the individual performances. The authors find that even if only a small part of the total inequality is based on merit, spectators redistribute similar amounts than in a case where all inequality is based on merit.

[5] One exception are Rey-Biel, Sheremeta, and Uler (2018) who inform their subjects in some treatments about the share of luck entering in final payoffs but keep the presence of luck constant. They also find that redistribution increases when luck accounts for a larger share of payoffs.

presents the survey. Finally, Section 5 discusses and lines out possible policy implications.

2 Design

In natural environments, the multitude of factors determining income and wealth as well as the ignorance about the specific relationship between performance, luck and outcomes makes it very difficult to identify the causal impact of the specific context on demand for redistribution. We therefore use the controlled environment of a lab experiment to investigate how preferences for redistribution are affected by the interdependence of payoffs.

Our design is based on a two-stage experiment which features two types of subjects: workers and spectators. In the first stage of the experiment, workers have the opportunity to gain a prize. They are grouped in pairs and can work on a real-effort task to increase their likelihood of winning a prize. Subsequently, the winner(s) of the prize are determined, whereby the payoff-generating mechanism is varied between treatments. In the second stage, each spectator observes performances and earning distributions of one pair and has the opportunity to redistribute earnings between the two workers. Roles and treatments are assigned at random. In some treatments it is possible that more than one worker receives a prize.

2.1 Workers

At the beginning of the experiment, workers are informed that they are matched with another worker and that they have the opportunity to gain a prize of €6. They are also told that another participant subsequently can redistribute any earnings between the two workers. Workers perform a real-effort task (repositioning sliders, based on Gill and Prowse, 2012). On every screen, subjects have to adjust five sliders ranging from 0 to 100 to the mid-position (50). Each screen with five sliders counts as a single task. Workers can spend up to twelve minutes completing as many tasks as they like. This part of the experiment is conducted online.

The number of completed tasks is used to determine whether a worker is awarded a prize or not. In principle, a higher performance increases the likelihood of earning such a prize. Across treatments, we vary how earnings are realized. While workers are informed about the outcome-generating process, that is, they know the number of potential prizes, they are not informed of the actual outcome at this point. They are only informed that a third subject – the spectator – observes performances and earnings and can redistribute any amount between the two workers. Only after spectators' decisions are implemented do the workers receive information about their performances and final payoffs.

2.2 Spectators

In the second stage, a third subject – acting as a spectator – can redistribute money within pairs of workers. For this purpose, spectators are introduced to the real-effort task and have to test it for themselves for one minute. Prior to making their decision, the spectators observe performances and current earnings of each worker. Whenever only one prize is allocated, we label worker A as the winner of that prize. Subsequently, they are asked to redistribute any amount of the prize(s) between the two workers in steps of €1. These options are presented as income distributions for workers A and B, respectively, and workers are paid according to the chosen distribution.

Each spectator can redistribute earnings between multiple pairs of workers. We use a variant of the strategy method (as used, e.g., in Kube and Traxler, 2011) to collect choices of redistribution across multiple conditions. We present subjects with a series of combinations of performances and winner(s), and inform them that only one combination represents a real pair of participants, whereas the remaining pairs are hypothetical and predetermined by the experimenters. The order of the pairs is randomized between subjects.[6] Subjects only learn the true pair after their decisions and, indeed, almost all were unable to identify this pair.[7] This method enables us to hold performances and earning distributions constant and exogenous across participants and treatments.

2.3 Treatments

As already outlined above, workers exercise a real-effort task and performance in this task influences their payoffs. The exact mapping of performance to payoffs is varied across treatments in two dimensions in a between-subjects design. The main variation involves the degree of payoff interdependence. Moreover, we vary whether randomness is involved, that is whether the worker with the lower performance has a positive chance of winning a prize. We provide an overview of all treatments in Table 2.

Our first three treatments involve randomness in the payoff allocation and vary in their degree of payoff interdependence. All of these treatments are framed as a lottery. The completion of one task produces one lottery ticket which is thrown into an urn. The number of urns and the composition of tickets represents the treatment variation.

In the baseline treatment RANDOMNESS – ZERO-SUM, both workers compete for a single prize in a Tullock contest (e.g., Tullock, 2001). Accordingly, both workers put all of their tickets into a single urn, whereby one ticket is randomly drawn to

[6] Subjects see between 13 and 24 combinations. The number varies between treatments as in some it is possible that both or none of the workers receive a prize, whereas in other treatments this is not possible. The selected performances and the treatments in which they are used are displayed in Table 1.

[7] We ask subjects to guess the true pair in an incentivized ex post question and only 12 out of 200 (6%) subjects state a correct guess.

Table 1. Hypothetical pairs and their occurrence in treatments

Situation	Winner	Perf. A	Perf. B	Random number	R-ZS	R-CC	R-NC	D-ZS	D-NC
1	A	54	54	51	X	X	X	X	
2	A	35	32	33	X	X	X	X	X
3	A	56	59	58	X	X	X		
4	A	63	31	49	X	X	X	X	X
5	A	39	54	45	X	X	X		
6	A	44	46	37	X	X	X		
7	A	45	55	26	X	X	X		
8	A	30	51	57	X	X	X		
9	A	68	63	65	X	X		X	X
10	A	24	28	–	X	X			
11	A	72	58	69	X	X		X	X
12	A	37	37	–	X	X		X	
13	A&B	61	61	63		X	X		
14	A&B	38	35	36/28		X	X		X
15	A&B	69	29	45/16		X	X		X
16	A&B	47	64	51/27		X	X		X
17	A&B	33	33	30		X			X
18	A&B	58	54	–		X			
19	A	67	67	45			X		
20	A	66	73	55			X		
21	A	42	37	50			X		
22	A&B	49	49	32			X		X
23	A&B	41	37	53			X		
24	A	46	44	–				X	
25	A	55	45	48				X	X
26	A	51	30	34				X	X
27	A&B	46	44	37					X
28	–	58	58	61		X	X		X
29	–	41	36	38/45		X	X		X
30	–	71	31	48/74		X	X		X
31	–	43	62	52/67		X	X		X
32	–	29	29	–		X			
33	–	64	64	–		X			
34	–	48	48	44			X		
35	–	33	29	63			X		

Notes: The table displays all hypothetical pairs presented to the spectators in the different treatments. R-ZS, R-CC, R-NC are abbrevations for treatments Randomness – Zero-sum, Randomness – Chance Competition, Randomness – No Competition, and D-ZS and D-NC for Deterministic – Zero-sum and Deterministic – No Competition, respectively. "X" denotes that the situation is featured in the treatment. Random number indicates the randomly drawn threshold for the No Competition treatments. For decisions 14 to 16, the first number corresponds to Randomness – No Competition, and the second number to Deterministic – No Competition. In addition to the hypothetical pairs, each spectator observed one individual real pair of workers of the first stage.

determine the winner of the contest. This setting resembles a zero-sum environment, where the earnings of one worker automatically determine those of the second one and, in addition, subjects affect each others chances of winning the prize.

Table 2. Treatment overview

Treatment	# potential prizes	# observations
Randomness – Zero-sum	1	40
Randomness – Chance Competition	2	39
Randomness – No Competition	2	43
Deterministic – Zero-sum	1	41
Deterministic – No Competition	2	37

We remove these interdependencies in two steps. First, we remove the zero-sum nature of the environment in treatment Randomness – Chance Competition. Before one ticket is drawn from the urn containing the tickets of both workers, the urn is duplicated. Subsequently, for each worker an independent draw is executed. If the corresponding draw of worker A produces a ticket of worker A, she gains a prize. The same is true for the draw from worker B's urn: if a ticket of worker B is drawn, B receives a prize. Consequently, it is now possible that in addition to one winner, both can win a prize simultaneously, or neither of them. Importantly, compared with Randomness – Zero-sum, the impact of worker A on worker B's chances (and vice versa) does not change. Relative performance still determines a worker's likelihood of winning a prize.

Treatment Randomness – No Competition additionally removes this interdependence of chances of winning a prize. Each worker has her own urn, containing only her own earned tickets. Moreover, an identical number of blanks is added to each urn. The number of blanks is randomly drawn from a predetermined set of previously observed performances by unrelated workers. As in treatment Randomness – Chance Competition, two independent draws are undertaken. The use of blanks implies that the performance of one worker no longer has any influence on the chances of success for the other worker and, thus, both workers' income is determined completely independently from one another.

In addition, we conduct two further treatments that correspond to Randomness – Zero-sum and Randomness – No Competition but eliminate any randomness in the allocation of the prize. In treatment Deterministic – Zero-sum, two workers compete for a single prize, which is allocated to the better-performing worker with certainty.[8] Here, workers again face a zero-sum environment. In the second treatment, Deterministic – No Competition, there is no longer a zero-sum environment and workers' performances do not affect each others' payoffs at all. Each worker receives a prize if she exceeds a randomly-drawn threshold, so either both, one or no worker receive a prize. As before, the threshold corresponds to the performance of a third uninvolved worker and is identical for both workers.

Even though our analysis exclusively focuses on one-winner outcomes, spectators in treatments Randomness – Chance Competition, Randomness – No Com-

[8] If both workers have the same performance, the winner is randomly determined.

petition and Deterministic – No Competition also face hypothetical worker pairs where both or none of the workers win a prize. This is necessary as spectators will expect all three cases to happen and for the real worker pairs such an outcome is potentially quite likely and, thus, the real pair would otherwise stick out. We report all used hypothetical pairs in Table 1.

2.4 Procedures

The experiment was conducted with the subject pool of the BonnEconLab between April and June 2018. Students were recruited using hroot (Bock, Baetge, and Nicklisch, 2014) and both stages were computerized via oTree (Chen, Schonger, and Wickens, 2016). The first stage of the experiment was conducted online. In addition, the subjects filled in a short questionnaire. This part of the study lasted about 20 minutes and subjects earned on average €4.25, including a show-up fee of €1. Spectators were invited to the BonnEconLab to make their redistribution decisions. Spectators received a flat fee of €8 for their participation. They could earn an additional amount of €1 by correctly guessing the non-hypothetical pair of workers once they had made all redistribution decisions. After finishing the redistribution decisions, subjects answered a questionnaire containing locus of control (Rotter, 1966), questions regarding social inequality (Scholz, Heller, and Jutz, 2011) and sociodemographics. The second stage took about 40 minutes and subjects earned on average €8.05.

Participants were assigned within-session to treatments at random. Hence, the sizes of treatments slightly vary, whereby each treatment features between 37 and 43 spectators. For each spectator making a decision, a pair of workers was required to generate the underlying performance and earning distribution. Including all treatments, 200 spectators and 400 workers participated overall.

3 Results

Our experimental design allows to study the causal effect of the interdependence of payoffs on preferences for redistribution. The three main treatments, analyzed in Section 3.1, feature three contexts that vary the interdependence of two workers' earnings. More specifically, they correspond to a winner-take-all contest in a zero-sum environment (Randomness – Zero-sum), a contest in chances to win a prize (Randomness – Chance Competition) and two individual, independent contests against a randomly-determined performance level (Randomness – No Competition). After presenting the results from these treatments, we support our evidence in Section 3.2 with a second set of treatments that remove any randomness in the prize allocation process, but still vary between a zero-sum environment (Deterministic – Zero-sum) and an environment with no competition (Deterministic – No Competition). Finally, concluding our analysis in Section 3.3, we use the Zero-sum and No Competition treatments to identify the impact of randomness per se.

As we are interested in responses to inequality, we focus on those situations where only one worker wins a prize and spectators face unequal earnings.[9] As a consequence, differences between treatments cannot be explained by differing numbers of actual winners. Throughout this section, we look at how much of the €6 prize the spectators redistribute to the loser.

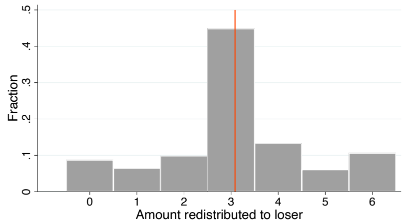
In each subsection, we first focus on the redistribution behavior in those situations that are featured in all analyzed treatments (see Table 1). Accordingly, subjects observe exactly the same combinations of work performances and resulting earnings allocations. In a second step, we include those situations that are not featured in all treatments (including the actual worker pairs). Due to the differing performance levels, they are not comparable one-to-one; rather, we control for the different performance levels and study their impact for each treatment separately.

3.1 The effect of payoff interdependence on redistribution

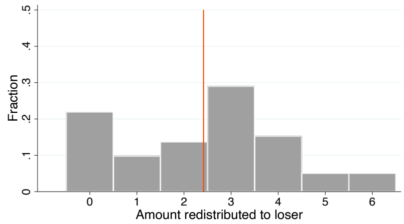
Figure 1 illustrates our main result, displaying histograms of redistribution decisions for those situations 1 to 8 of Table 1 that are featured in all three Randomness treatments. In the zero-sum environment (Randomness – Zero-sum), spectators redistribute, on average, €3.08 to the loser. In slightly less than half of all situations (44.5%), spectators choose to equalize earnings between the two workers. Once the zero-sum nature is removed, spectators redistribute less. The average amount redistributed to the loser drops to €2.42 (Randomness – Chance Competition) and €2.66 (Randomness – No Competition), respectively. Figure 1 already reveals that the reduction has different sources. In Randomness – Chance Competition, in only 29% of the decisions earnings are equalized and in 22% of all cases nothing is transferred to the loser at all. By contrast, without any competition at all, close to half of the decisions (49.5%) result in equal shares. In treatment Randomness – No Competition, spectators redistribute less often in such a way that the loser receives more than €3. Accordingly, all three distributions are significantly different using a Kolmogorov-Smirnow test.

We present the estimates from the corresponding regression analyses in Table 3. Column (1) includes only situations 1 to 8 that are featured in all three treatments. Removing the zero-sum nature but keeping the competition in chances (Randomness – Chance Competition) significantly lowers the transfer to the loser by €0.67, a decrease by 22%. In the absence of any competition (Randomness – No Competition), the coefficient is −0.43 (a decrease by 14%) and thus somewhat

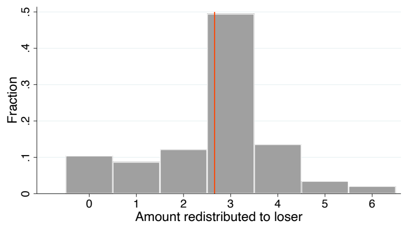
[9] Equal earnings cannot arise in Zero-sum. Naturally, other tournament outcomes are possible in treatments Chance Competition and No Competition. Corresponding situations are shown to the spectators, see Table 1 for the situations with two and zero winners. However, these situations are markedly different. If both workers win, the total sum of earnings is doubled. Redistribution decisions for these situations are analyzed in Appendix C. We do not observe many decision to redistribute and no treatment differences. If no worker receives a prize, redistributing the prize money is impossible.



(a) RANDOMNESS – ZERO-SUM



(b) RANDOMNESS – CHANCE COMPETITION



(c) RANDOMNESS – NO COMPETITION

Figure 1. Amount redistributed to the loser for treatments with randomness

Notes: The figure presents the histograms of the money transferred to the loser for the three main treatments. The vertical red lines indicate the mean level of money transferred. The figures include only transfers for those situations that were featured in all three treatments.

smaller in size, but does not significantly differ from RANDOMNESS – CHANCE COMPETITION.

Result 1. *Removing the zero-sum nature of the environment decreases average redistribution by up to 22%. Removing the interdependence in chances of winning has, on average, no additional effect.*

These treatment effects are robust once we include all decisions in which only one worker receives a prize, and control for the winning performance as well as the performance difference between the winner and loser (column (2)).[10] This column highlights that spectators tend not to condition their redistribution decision on the absolute performance level; rather, they strongly respond to the performance differences between the two workers. In RANDOMNESS – ZERO-SUM, if both workers

[10] The performance of the winner is centered around the mean performance in situations 1 to 8. This means that the constant represents the amount redistributed in RANDOMNESS – ZERO-SUM if both workers have an average performance and the main effects (column (1)) are also evaluated at this mean.

Table 3. Impact of payoff interdependence on redistribution for treatments with randomness

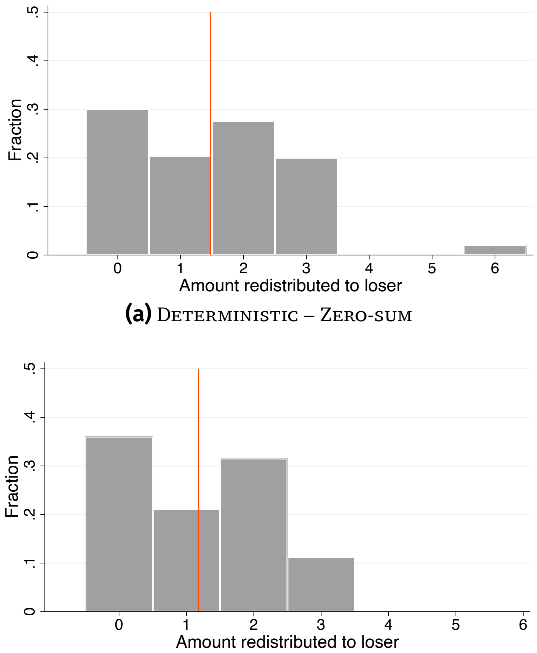
	Amount redistributed to loser		
	(1)	(2)	(3)
CHANCE COMPETITION	−0.668***	−0.563**	−0.617***
	(0.231)	(0.225)	(0.231)
NO COMPETITION	−0.425**	−0.281*	−0.310*
	(0.188)	(0.168)	(0.170)
Performance Winner (cent.)		−0.002	−0.002
		(0.002)	(0.002)
Δ Performance		−0.041***	−0.054***
		(0.004)	(0.008)
CHANCE COMPETITION × Δ Performance			0.024**
			(0.011)
NO COMPETITION × Δ Performance			0.016*
			(0.009)
Constant	3.084***	2.949***	2.979***
	(0.136)	(0.122)	(0.124)
N	805	1326	1326
Subjects	122	122	122
R^2	.03	.18	.19
p-value: CC vs. NC	.29	.21	0.37
Avg. Redistribution	2.7	2.6	2.6

Notes: This table presents OLS regressions for treatments RANDOMNESS – ZERO-SUM, RANDOMNESS – CHANCE COMPETITION, and RANDOMNESS – NO COMPETITION, using the money redistributed to the loser as the dependent variable. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses and clustered at the participant level. Performance is centered on the average performance of those situations that are featured in all three treatments, see Table 1. Δ Performance is the difference between the performance of the winner and the loser. CC vs. NC tests the difference of treatments RANDOMNESS – CHANCE COMPETITION and RANDOMNESS – NO COMPETITION. Average redistribution indicates redistribution to the loser across all three treatments. Column (1) only includes decisions of situations featured in all three treatments. Column (2) features all decisions. Column (3) shows a joint test of the treatment effect and interaction effect with the performance difference.

perform equally, the predicted transfer is very close to the equal split (€2.95). *Ceteris paribus*, an additional performance difference of ten tasks leads to a reduction of €0.40 in the transfer to the loser. Symmetrically, a higher performance of ten tasks by the loser is also associated with a €0.40 increase in transfer to the loser.

Notably, the impact of performance differences changes across treatments (column (3)): if the zero-sum nature is removed, the impact of the workers' performance differences is weakly significantly muted; spectators' reaction to a ten-task change in the performance difference drops from €0.54 to €0.30 or €0.38, respectively.

Result 2. *Spectators consider performance differences between workers in their redistribution decisions. This effect is muted if there is no zero-sum environment.*



(a) Deterministic – Zero-sum

(b) Deterministic – No Competition

Figure 2. Amount redistributed to the loser for deterministic treatments

Notes: The figure presents the histogram of the money transferred to the loser for the two deterministic treatments. The vertical red lines indicate the mean level of money transferred. The figures include only transfers for those situations that were featured in both treatments.

In summary, the absence of a zero-sum environment affects redistribution behavior in two separate ways. First, if high earnings for one person prohibit high earnings for another, inequality is significantly less accepted compared with a situation in which both can win simultaneously. Second, without this interdependence, redistribution decisions react less to individuals' performance differences. Hence, inequality is more frequently accepted irrespective of performances.

3.2 Payoff interdependence in a deterministic setup

We support our results with a second set of treatments. Here, we again vary the degree of payoff interdependence between a zero-sum environment (Deterministic – Zero-sum) and an environment with no competition (Deterministic – No Competition) but eliminate the impact of randomness. This means that in the zero-sum condition the better-performing worker wins with certainty and in the absence of competition the workers receive a prize if their performance exceeds a randomly-drawn threshold. This also implies that the lower-performing worker can never receive the prize at the expense of the better-performing one. We therefore expect a lower baseline level of redistribution.

Figure 2 displays redistribution decisions featured in both treatments.[11] If the two workers face a zero-sum environment, the spectators transfer, on average, €1.48 to the loser. This is much lower than in the previously presented treatments, which involve randomness. Almost no spectator transfers more than half of the prize to the loser; rather, in 30% decisions, there is no redistribution at all, while in 20% equal earnings are chosen. Once the two workers no longer compete against each other but against the same threshold, the average transfer is reduced by 20.2% to €1.18. Earnings are rarely equalized (11.2%) and in more than one-third of decisions nothing is transfered.

The corresponding estimations are presented in Table 4. Equivalent to Table 3, column (1) includes only directly comparable situations that are featured in both treatments. While this estimation indicates that under no competition redistribution is reduced by €0.30, this effect is not significant ($p = 0.165$). However, once we include all situations with one winner and control for the performance level of the winner[12] and performance difference (column (2)), we find a significant effect of the zero-sum nature of the environment on inequality acceptance. Again, performance difference has a significant impact and the estimated coefficients are close to those estimated for the treatments including randomness. Column (3) allows the impact of performance to differ by treatment. We find the same pattern as before: if payoffs are independent, the performance differences of workers have significantly less impact on redistribution decisions.

Result 3. *Removing the zero-sum environment reduces redistribution in a deterministic setting.*

In summary, the results of our second set of treatments support our findings: even without any randomness in the allocation process, a zero-sum environment causes spectators to less accept inequality in payoffs and prompts them to react more strongly to the workers' performances.

3.3 The role of randomness for redistribution

In addition to investigating the effect of payoff interdependence, our design allows to identify the causal impact of the pure presence of randomness in a prize allocation process on the demand for redistribution. In previous studies, the involvement of luck usually was accompanied by an uncertainty about the performance rank of the winner of the prize. In our design, since the spectators are fully informed about the workers' performances, they know for sure whether the high- or low-performing subject wins the prize. In particular, we can compare tournament situations where the higher-performing worker always wins with certainty with those in which a lower-performing worker can also win. Here, we consider only those situations where the

[11] These are situations 2, 4, 9, 11, 25, and 26 of Table 1.
[12] The performance of the winner is centered around the mean performance in situations that are featured in both treatments.

Table 4. Impact of payoff interdependence on redistribution for deterministic treatments

	Amount redistributed to loser		
	(1)	(2)	(3)
No Competition	−0.295	−0.410**	−0.612***
	(0.211)	(0.197)	(0.225)
Performance Winner (cent.)		−0.004**	−0.004*
		(0.002)	(0.002)
Δ Performance		−0.044***	−0.049***
		(0.003)	(0.004)
No Competition × Δ Performance			0.015**
			(0.006)
Constant	1.476***	2.261***	2.318***
	(0.171)	(0.147)	(0.148)
N	468	644	644
Subjects	78	78	78
R^2	.02	.23	.23
Avg. Redistribution	1.3	1.5	1.5

Notes: This table presents OLS regressions for treatments Deterministic – Zero-sum and Deterministic – No Competition, using the money redistributed to the loser as the dependent variable. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses and clustered at the participant level. Performance is centered on the average performance of those situations that are featured in both treatments, see Table 1. Δ Performance is the difference between the performance of the winner and the loser. Average redistribution indicates redistribution to the loser across all three treatments. Column (1) only includes decisions of situations featured in both treatments. Column (2) features all decisions. Column (3) shows a joint test of the treatment effect and interaction effect with the performance difference.

higher-performing worker wins. Hence, in these cases the tournaments are outcome-equivalent, whereby from an ex post perspective randomness makes no difference on the prize allocation.[13]

Table 5 displays our results. Column (1) includes only the decisions made for situations 2 and 4 from Table 1, as they are the only situations featured in all four treatments. If performances and the resulting payoffs are kept entirely constant, randomness in the allocation process increases the amount redistributed to the low-performing worker by €0.61, marking an 46% increase compared with the treatments without randomness. As in the previous sections, the remaining columns include further decisions that are not entirely identical between treatments but control for the performances of the workers. Columns (2) and (3) conduct the analysis separately for the treatments with zero-sum environment (Zero-sum) and without any competition (No Competition), respectively. Column (4) pools all treatments,

[13] We compare Randomness – Zero-sum and Randomness – No Competition with the two equivalent Deterministic treatments. Naturally, there cannot be a counterpart for competition in chances without the presence of randomness. Hence, treatment Randomness – Chance Competition is dropped from the subsequent analysis.

Table 5. Impact of randomness without uncertainty on redistribution

	Amount redistributed to loser				
	(1) ZS & NC	(2) ZS	(3) NC	(4) ZS & NC	(5) ZS & NC
Randomness	0.614***	0.410**	0.911***	0.588***	0.516***
	(0.161)	(0.202)	(0.177)	(0.140)	(0.151)
Performance winner (cent.)		−0.006***	0.004	−0.003	−0.003
		(0.002)	(0.003)	(0.002)	(0.002)
Δ Performance		−0.043***	−0.037***	−0.042***	−0.048***
		(0.004)	(0.004)	(0.003)	(0.004)
No Competition				−0.228*	−0.289*
				(0.135)	(0.147)
Randomness × Δ Performance					0.007
					(0.005)
No Competition × Δ Performance					0.006
					(0.005)
Constant	1.314***	2.269***	1.684***	2.171***	2.235***
	(0.114)	(0.149)	(0.149)	(0.132)	(0.132)
N	322	677	460	1137	1137
Subjects	161	81	80	161	161
R^2	.06	.20	.32	.24	.24
Avg. Redistribution	1.6	1.9	1.7	1.8	1.8

Notes: This table presents OLS regressions for treatments Randomness – Zero-sum, Randomness – No Competition, Deterministic – Zero-sum, and Deterministic – No Competition, using the money redistributed to the loser as the dependent variable. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. ZS denotes Zero-sum treatments and NC denotes No Competition treatments, respectively. Standard errors are displayed in parentheses and clustered at the participant level. Performance is centered on the average performance of the featured treatments. Δ Performance is the difference between the performance of the winner and the loser. Average redistribution indicates redistribution to the loser across all considered treatments. Columns (1)-(3) only include decisions of situations featured in all respectively indicated treatments. Column (4) features all decisions. Column (5) shows a joint test of the treatment effect and interaction effect with the performance difference.

controlling for the zero-sum nature of the environment. All specifications show a significant positive impact of the presence of randomness on the amount transferred to the loser. Finally, column (5) reveals that the impact of the workers' performance differences is not affected by the presence of randomness.

Result 4. *The mere presence of randomness increases demand for redistribution.*

In summary, randomness influences inequality acceptance beyond making it more difficult to discern whether the inequality is based on merit or performance. Rather, the mere presence of randomness in an allocation process – allowing the low-performing individual a chance of success – makes spectators redistribute more, independent of the payoff interdependence.

Table 6. Survey: summary statistics

	Survey		CPS
	Mean	SD	Mean
Female	0.511	0.500	0.508
Age brackets			
18–29	0.270	0.444	0.266
30–39	0.213	0.410	0.220
40–49	0.193	0.395	0.202
50–59	0.221	0.415	0.210
60–65	0.103	0.304	0.103
Regional distribution			
Northeast	0.178	0.383	0.171
Midwest	0.218	0.413	0.208
South	0.373	0.484	0.383
West	0.231	0.412	0.237

Notes: Summary statistics of the survey sample and representative statistics of the Current Population Survey (CPS) 2019, own calculations.

4 Survey

In Section 3, using a lab experiment, we have presented causal evidence for the impact of payoff interdependence on demand for redistribution. To provide external validity for our experimental results, we conducted a representative survey in the US which consists of two parts. In the first part, we present participants with vignettes describing different bonus schemes and let them make decisions similar to our experiment. In many real-life situations, people will only have a limited idea whether the environment is zero-sum or not. Nonetheless, they might hold beliefs about the nature of the environment that correlate with their preferences for redistribution. In the second part, we therefore measure the belief in a zero-sum world and other beliefs about the world and political attitudes of our participants.

We conducted the survey via *Dynata* (formerly known as *Research Now*) in September 2020 with a total of 601 participants.[14] The recruited sample is representative for the US population regarding age (from 18 to 65), gender, and geographical location, see Table 6 for a comparison with the Current Population Survey.[15] The average participant is 41 years old and 51% are female.

4.1 Hypothetical Scenarios and measured characteristics

In the first part of the survey, we present participants with vignettes that describe hypothetical scenarios of two co-workers having the opportunity to receive a bonus

[14] We excluded participants who failed at least two of three attention checks.
[15] The sample is also balanced across our variation (the order of the vignettes), see Table D.4 in the appendix.

payment. Similar to our experiment, only one of them receives a bonus in the end. Participants then rate the fairness of the resulting inequality and redistribute the bonus between the two workers. Equivalent to the main experiment, we vary whether only one worker can receive a bonus (zero-sum scenario), or both workers can obtain a bonus simultaneously (non-zero-sum scenario). In addition, there is also a situation where we do not specify how many workers can gain a bonus (ambiguous scenario). The idea is to match participants' decisions in the ambiguous scenario to the other two scenarios to identify individuals who, in an ambiguous situation, have a zero-sum-world or non-zero-sum-world mindset. For this purpose, the ambiguous situation is either presented first or last, whereas the other two scenarios are presented in a random order. We thus employ a within-subject design and every participant observes all three types of scenarios. Each vignette seen by the participants has a slightly different setup, where occupation, the amount of the bonus, and the timespan differ.[16] The mapping of the setup to the scenario is random to control for setup-specific effects on participants' choices. The vignettes are reported in Appendix D.2.

We also elicit demographics, attitudes, and beliefs of our respondents. Prior to the vignettes, we ask participants for their age, nationality, education, income level, and region of residence. After the vignettes, we first elicit an eight-item scale of the belief of a zero-sum world based on Różycka-Tran, Boski, and Wojciszke (2015) and three items about attitudes towards redistribution (Linos, 2003). We further elicit the three-item short module of the moral universalism measure by Enke, Rodríguez-Padilla, and Zimmermann (forthcoming). Finally, we use questions of the World Values Survey (Inglehart et al., 2014) regarding preferences for equality, competitiveness, whether success is due to luck or effort, a second measure for a belief in a zero-sum world, and political and religious attitudes. In the analysis, we use averages of the multiple-items measures and all variables are standardized.

4.2 Results

The size of the bonus differs between settings (values are \$20, \$50, and \$2,000), which makes absolute values not directly comparable across scenarios. In the first part of the survey, we therefore standardize the amount redistributed to the worker not receiving the bonus. We standardize our measure of fairness as well. The first observation is that participants judge inequality as fairer in the non-zero-sum scenario than in the zero-sum scenario (the latter is perceived to be 0.2 of a standard deviation less fair, $p<0.001$) and accordingly redistribute 0.14 of a standard deviation more in the zero-sum scenario ($p<0.001$). This corroborates the results of our experiment where the interdependence of payoffs also leads to more redistribution. The third, ambiguous scenario is perceived as less fair than both other scenarios and redistribution is significantly higher as well, see Table 7. Both observations are

[16] We do not use names but only first letters to avoid any gender effects.

Table 7. Survey: impact of payoff interdependence on redistribution and fairness

	Redistribution (std.)		Perceived Fairness (std.)	
	(1)	(2)	(3)	(4)
Zero-sum	0.139***	0.141***	−0.203***	−0.200***
	(0.046)	(0.046)	(0.038)	(0.039)
Ambiguous	0.256***	0.225***	−0.350***	−0.347***
	(0.047)	(0.054)	(0.044)	(0.043)
Constant	−0.132***	−0.004	0.184***	0.152**
	(0.044)	(0.077)	(0.038)	(0.069)
Controls	No	Yes	No	Yes
N	1803	1803	1803	1803
Individuals	601	601	601	601
R^2	.01	.03	.02	.03
p-value: ZS vs. amb.	.0079	.092	.0003	.0003

Notes: This table presents OLS regressions using the money redistributed to the loser as the dependent variable in Columns (1) and (2), and perceived fairness of the initial allocation in Columns (3) and (4). ZS indicates the zero-sum scenario. All dependent variables are standardized. Controls indicated the inclusion of fixed effects for setting, variation order of scenarios, and decision number. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses and clustered at the participant level.

robust to controlling for the specific setting seen in each scenario, the order of the scenarios, and the decision round, as reported in Columns (2) and (4). A potential reason for participants redistributing the most in the ambiguous setting is that they are uncertain about the specific allocation process of the bonus, and might even think that it is also unclear to the pair of workers and, hence, evaluate this environment as less fair compared to the other two.

So far, we have provided evidence that zero-sum environments affect fairness perceptions and redistributional preferences. In the second part, we now want to investigate whether people differ in their beliefs in a zero-sum world and how such a belief is related to other important beliefs about the world as well as political orientation.

We use two different measures for a belief in a zero-sum world as well as for demand for redistribution. First, we use the same items as in the World Values Survey. Second, we use a multiple-items module for a more robust measure. In the World Values Survey, there is a highly significant correlation of 0.13 between a belief in a zero-sum world and demand for redistribution. For the US, this correlation is even stronger with 0.22. In our US sample, the same questions have a correlation of 0.34 which is slightly stronger but in the same range. The alternative measures, however, show an even stronger correlation of 0.54, see also Table 8 Column (1).[17] In the

[17] The two zero-sum measures of our sample have a correlation of 0.55 and the two redistribution measures a correlation of 0.50, respectively.

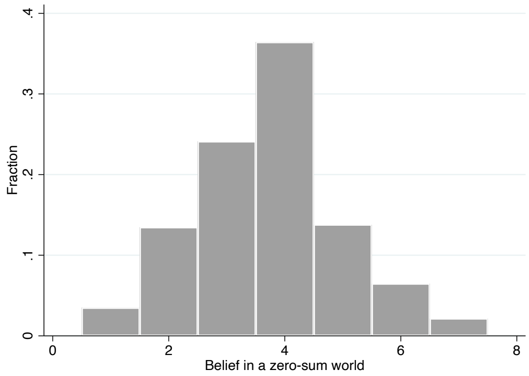


Figure 3. Survey: Distribution of the belief in a zero-sum world

following, we further investigate the relationship of the eight-item measure based on Różycka-Tran, Boski, and Wojciszke (2015) (henceforth BZSW) with other personal characteristics as reported in Table 8.[18]

As displayed in Figure 3, people vary in their beliefs in a zero-sum world. About 17% believe that individual payoffs are strongly independent, whereas 9% have a pronounced zero-sum view of the world. Consequently, the majority of respondents seems to believe that there are both aspects present in the world but still to a varying degree.

A belief in a zero-sum world is also positively related to the belief that success is more due to luck than hard work, a one-standard-deviation increase significantly changing BZSW by 0.167 of a standard deviation. Both states of the world, zero-sum and success by luck, are perceived to be unfair as shown in our experiment and, for instance, in Cappelen, Konow, et al. (2013). Seeing competition as good is weakly negatively correlated with BZSW. In other words, people who think that success comes at the cost of others are more likely to dislike competition which might be seen as a prototypical zero-sum situation.

The concept of moral universalism (Enke, Rodríguez-Padilla, and Zimmermann, forthcoming; Enke, Rodriguez-Padilla, and Zimmermann, 2020) describes the tendency to spread one's altruism to a wider range of people; in the extreme, treating strangers in the same way as friends and neighbors. We observe that an increase of one standard deviation in moral universalism is associated with a significant increase of 0.248 of a standard deviation in BZSW. This could be interpreted as people who think that life is zero-sum feel a greater need to care about all people as they might be (negatively) affected by the success of oneself or, respectively, of one's own community or country.

Finally, identifying oneself on the right of the political spectrum is associated with a less pronounced belief in a zero-sum world, but this effect is not robust when

[18] For the raw correlations see Table D.5 in Appendix D.

Table 8. Survey: belief in a zero-sum world

	Belief in a zero-sum world						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Redis.	0.536***						0.508***
	(0.034)						(0.038)
Luck		0.167***					0.071*
		(0.040)					(0.040)
Comp.			−0.073*				0.072*
			(0.041)				(0.040)
Univ.				0.248***			0.104***
				(0.040)			(0.037)
Pol. orient.					−0.187***		0.015
					(0.040)		(0.038)
Rel. strength						−0.058	−0.043
						(0.041)	(0.036)
N	601	601	601	601	601	601	601
Individuals	601	601	601	601	601	601	601
R^2	.29	.03	.01	.06	.04	.00	.30

Notes: This table presents OLS regressions using the belief in a zero-sum world as the dependent variable. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses. All variables are standardized.

regressing the belief in a zero-sum world on all discussed variables simultaneously. Being more religious, irrespective of the religion, is not linked to believing in a zero-sum world.

As reported in Figure 4, we observe a stronger belief in a zero-sum world for Democrats than for Republicans. This effect stays significant on the 5%-level when controlling for the characteristics reported in Table 8 except political orientation. Davidai and Ongis (2019) find that both liberals and conservatives can have beliefs in a zero-sum world—whenever this might benefit them. However, the underlying reasons are different. Conservatives hold such a belief when the status quo is challenged, whereas liberals tend to believe in a zero-sum world when the status quo is being upheld, for instance in the domain of inequality. This suggests that at the time of the survey, in autumn 2020, the overall perception in the US was of a relatively stable status quo, leading Democrats to a stronger belief in a zero-sum world.

5 Conclusion

In this paper, we experimentally provide evidence that more inequality is accepted when payoffs are independent and workers do not compete in a zero-sum environment. When two individuals compete for one high outcome, on average 25% to 50%

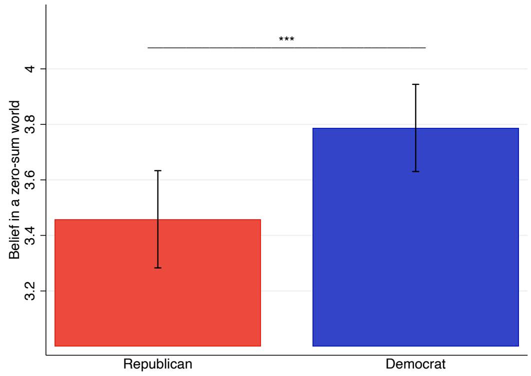


Figure 4. Survey: political party

Notes: The figure presents the histogram of the belief in a zero-sum world for republicans and democrats.

of the prize is redistributed to the losing person ending up with the low outcome. Removing the zero-sum nature of the environment, namely allowing both persons to win simultaneously, reduces redistribution by 14% to 22%. Also eliminating interdependence in chances of winning a prize has no additional impact on the demand for redistribution. This holds true for situations with and without randomness being present in the allocation process. A representative survey in the US corroborates these results.

Our findings suggest that people do not solely focus on realized states; rather, they seem to take all states into account that are possible ex ante, irrespective of their actual realization. Accordingly, once payoffs are not totally interdependent, spectators seem to include the possibility that both workers could have won simultaneously in their redistribution decisions. By contrast, whenever only one worker can win at a time, the winner's high income is perceived as being taken away from the loser. This is not consistent with existing models of social preferences that incorporate fairness notions into the utility function (e.g., Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002). These models solely consider inputs and outcomes but do not regard the underlying payoff-generating mechanisms and hence do not incorporate the interdependence of payoffs into the utility functions. The tendency to include unrealized states into one's future decision making therefore hints at a broader behavioral mechanism that is currently missing in the theoretical literature on social preferences.

Our results indicate a novel channel through which the perception of the societal environment and context might shape institutions. This complements the findings of Alesina and Angeletos (2005) who document a correlation of social spending and redistribution with beliefs about the importance of luck and effort for wealth and income across countries. In light of our results, the belief in a zero-sum world in a given society might similarly affect the social welfare system. Furthermore, as discussed by Frank and Cook (1996) and Frank (2016), technological change and the increasing prominence of bonus schemes make winner-take-all and zero-sum situations more common in everyday life. This development might contribute to a raised sense of unfairness, beyond the actual level of earnings inequality.

In this respect, our findings should not only matter in the abstract sense of beliefs about the interdependence of earnings and optimal levels of redistribution within society, but they might even be relevant for the optimal setting of wages within firms. Forced rankings by supervisors, promotion tournaments, and fixed bonus pools always imply that one employee succeeds at the cost of others. These strategies are frequently employed as they allow principals to set incentives if effort is not verifiable (Rajan and Reichelstein, 2006). On the flip side, such incentive schemes could constitute an important source of discontent and envy within the firm. This might explain the ambiguous effect of forced ranking schemes on individual performance observed by Berger, Harbring, and Sliwka (2013). In the long run, zero-sum environments might harm employees' willingness to exert effort in the first place. By contrast, employees might be willing to accept unequal pay within a division or firm more eagerly if advanced positions are not exogenously limited and bonus pools are not fixed. That would allow firms to set steeper incentives or even reduce overall payment.

In sum, this paper highlights a novel source for fairness views and demand for redistribution. The perception of the state of the economy – whether growth exists or wealth is only possible at the expense of others – affects political attitudes towards redistribution. Thus, informing people about the actual interdependence of payoffs can also have major consequences for these attitudes.

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Appendix

A World Values Survey

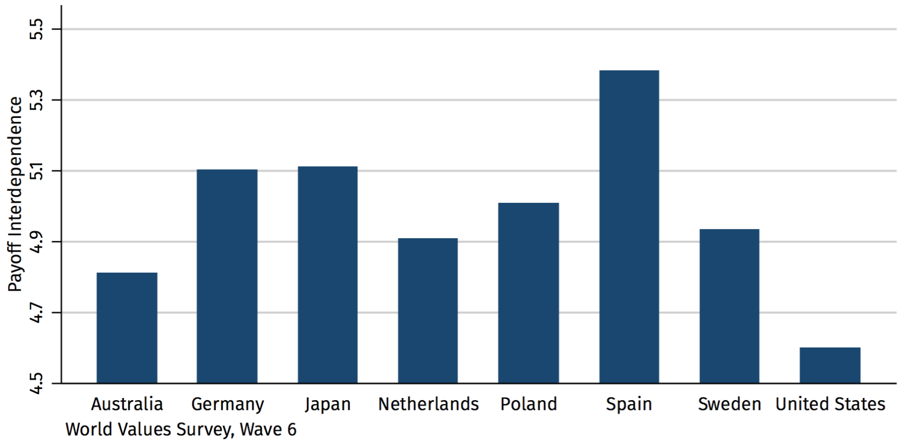


Figure A.1. Beliefs in the interdependence of payoffs of western countries

Notes: The figure presents the mean beliefs in the interdependence of payoffs in the western countries that are featured in wave 6 of the World Values Survey (Inglehart et al., 2014).

B Worker behavior across treatments

The analysis of the redistribution decisions does not rely on the worker behavior elicited in the first stage of the experiment, but rather on the hypothetical pairs. Nonetheless, we can analyze the extent to which the different treatments induce variation in performance. Since the workers are not invited to the lab but rather take part via an online study, all of them have a true outside option and can spend their time freely. In addition, we elicit workers' expectations for the average amount redistributed for each treatment.

Looking at Table B.1, we find that the average performance slightly varies across treatments. Notably, we find that workers in treatments without any luck work more than in the other treatments. The regression in Table B.2 reveals that these differences are only statistically significant for the comparison of treatment Randomness – Zero-sum with Deterministic – No Competition, controlling for demographics of the subjects.

Similarly, workers expect levels of redistribution to be lower in the treatments without any randomness involved. Since we only elicit an average belief without mentioning specific performance levels, this clearly has mechanical reasons. Focusing on the beliefs for the treatment with luck, we find that workers expect a slightly,

Table B.1. Summary statistics for workers

	R-ZS	R-CC	R-NC	D-ZS	D-NC	Total
Performance	44.10	47.21	45.15	47.23	50.18	46.70
	(18.95)	(18.50)	(18.44)	(18.72)	(18.69)	(18.68)
Expected	2.84	2.55	2.58	2.21	2.31	2.50
Redistribution	(1.01)	(1.02)	(1.26)	(0.93)	(1.40)	(1.15)

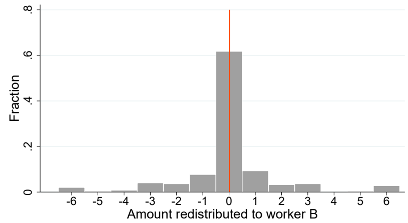
Notes: This table reports the average number of tasks solved by treatment and average amount of redistribution workers expect to be redistributed in their treatment. R-ZS, R-CC, R-NC are abbreviations for treatments Randomness – Zero-sum, Randomness – Chance Competition, Randomness – No Competition, and D-ZS and D-NC for Deterministic – Zero-sum and Deterministic – No Competition, respectively. Standard deviations are displayed in parentheses.

Table B.2. Worker behavior across treatments

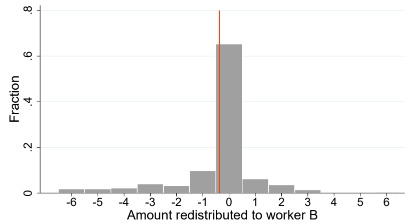
	(1) Performance	(2) Expected Redistribution
Randomness – Chance Competition	2.673	−0.269
	(2.879)	(0.180)
Randomness – No Competition	1.825	−0.275
	(2.811)	(0.176)
Deterministic – Zero-sum	4.094	−0.654***
	(2.846)	(0.178)
Deterministic – No Competition	5.737**	−0.516***
	(2.916)	(0.182)
Male	9.787***	−0.257**
	(1.846)	(0.115)
Age	−0.100	−0.007
	(0.178)	(0.011)
Constant	42.078***	3.117***
	(4.701)	(0.294)
N	400	400
R^2	.08	.05

Notes: This table presents OLS regressions using the workers' performance (Column (1)) and the elicited expected redistribution (Column (2)) as outcomes. R-CC and R-NC are abbrevations for treatments Randomness – Chance Competition and Randomness – No Competition, and D-ZS and D-NC for Deterministic – Zero-sum and Deterministic – No Competition, respectively. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses and clustered at the participant level.

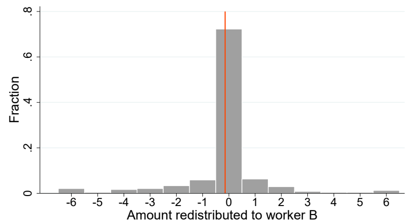
but not significantly, lower level of redistribution for the treatments without direct interdependence in payoffs.



(a) Randomness – Chance Competition



(b) Randomness – No Competition



(c) Deterministic – No Competition

Figure C.2. Amount redistributed between workers when both win a prize

Notes: The figure presents the histogram of the money transferred to worker B when both workers receive a prize. The vertical red lines indicate the mean level of money transferred. Negative values imply that the spectator transfers money from worker B to worker A. The figures include only decisions for those situations that were featured in all three treatments.

C Redistribution if both workers receive a prize

In the treatments without direct interdependence of payoffs (Randomness – Chance Competition, Randomness – No Competition, and Deterministic – No Competition), both workers can receive high earnings simultaneously. In order to identify the specific impact of this interdependence, in our main analysis of the paper we focus on those situations where only one player actually wins. As explained in Section 2, we also present the spectators with situations where two workers win. Naturally, the spectators might still want to redistribute earnings. However, here equality in payoffs is the default setting. If spectators care about (monetary) equality, they will not change the allocation in these situations. Hence, we do not expect any treatment differences.

Table C.3. Impact of treatments on redistribution when both workers win a prize

	Deviation from equal split		
	(1)	(2)	(3)
Randomness – No Competition	−0.202	−0.128	−0.153
	(0.240)	(0.187)	(0.217)
Deterministic – No Competition	−0.225	−0.225	−0.267
	(0.257)	(0.190)	(0.219)
Δ Performance		0.040***	0.038***
		(0.005)	(0.009)
Randomness – No Competition × Δ Performance			0.002
			(0.011)
Deterministic – No Competition × Δ Performance			0.004
			(0.013)
Constant	1.333***	0.466***	0.488***
	(0.170)	(0.150)	(0.176)
N	357	758	758
R^2	.00	.16	.16

Notes: This table presents OLS regressions using the absolute deviation from the equal split as the dependent variable. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively. Standard errors are displayed in parentheses and clustered at the participant level.

The redistribution decisions for the three treatments with two potential prizes are displayed in Figure C.2. Here, the x-axis denotes the amount of money distributed to worker B. Accordingly, if spectators choose to redistribute nothing, worker B receives her prize of €6. In general, we find very little redistribution in these situations. In all treatments, spectators choose to not redistribute anything at all in more than 60% of the situations. Spectators deviate on average from the equal split by less than €1: they redistribute €0.91 in Randomness – Chance Competition, €0.77 in Randomness – No Competition, and €0.66 in Deterministic – No Competition (either from worker A to worker B, or the other way around). In Table C.3, we present the results of a corresponding regression analysis. As redistribution is not one-directional (from worker A to B) but can go both ways, we use the deviation from the equal split as the dependent variable, such that we treat workers A and B symmetrically. We do not find any significant effect of the treatments, which implies that the treatments do not influence the redistribution decisions differentially. Column (3) additionally interacts the influence of performance differences with the treatment and does not reveal any significant effect either.

D Survey

D.1 Additional tables

Table D.4. Survey: balance across order variation

	AZN $n = 144$	ANZ $n = 142$	ZNA $n = 156$	NZA $n = 159$	p-value
Female	0.569	0.486	0.500	0.491	0.448
Age brackets					
18-29	0.229	0.282	0.250	0.314	0.359
30-39	0.243	0.204	0.231	0.176	0.490
40-49	0.236	0.141	0.205	0.189	0.226
50-59	0.188	0.275	0.224	0.201	0.230
60-65	0.104	0.099	0.090	0.119	0.852
Regional distribution					
Northeast	0.174	0.183	0.147	0.208	0.577
Midwest	0.208	0.289	0.179	0.201	0.119
South	0.396	0.303	0.429	0.358	0.134
West	0.222	0.225	0.233	0.178	0.973

Notes: Summary statistics of the survey sample divided by order variation (the order of the scenarios). A, Z, and N indicate ambiguous, zero-sum and non-zero-sum, respectively. p-values indicate significance of a one-way ANOVA.

Table D.5. Survey: Correlations

	BZSW	Redis	WVS_BZSW	WVS_redis	WVS_comp	WVS_luck	Universalism	Pol_orien	Religiosity	Age
BZSW	1									
Redis	0.536***	1								
WVS_BZSW	0.546***	0.389***	1							
WVS_redis	0.319***	0.504***	0.339***	1						
WVS_comp	−0.073	−0.182***	−0.100**	−0.119***	1					
WVS_luck	0.167***	0.219***	0.201***	0.094**	−0.497***	1				
Universalism	0.248***	0.288***	0.211***	0.200***	−0.197***	0.186***	1			
Pol_orien	−0.187***	−0.325***	−0.202***	−0.345***	0.180***	−0.187***	−0.243***	1		
Religiosity	−0.058	−0.010	−0.019	−0.027	−0.024	−0.087**	−0.057	0.270***	1	
Age	−0.185***	−0.256***	−0.166***	−0.122***	0.205***	−0.172***	−0.230***	0.152***	0.041	1

Notes: This table reports correlations of the continuous variables in the survey. *, ** and *** denote significance at the 10, 5 and 1 percent level, respectively.

D.2 Vignettes

We use three different situations for the description of the scenarios. These situations differ in occupation, size of the bonus, and the considered time span. All situations are randomly matched to one of the three scenario types used in the survey. Below, each situation is exemplarily used for one scenario type.

D.2.1 Ambiguous scenario. K and B are part of the sales force for a big tool manufacturer. The sales force is of great importance for the company as most of the revenue is done by those employees. Most of their working time requires a direct contact with customers. They do not only present new products but are also responsible for negotiating terms such as prices and delivery times. Therefore, their sales numbers depend on a good contact to the customers, the overall economic situation and to some degree on luck. The company has a bonus system that provides its employees in the sales force the opportunity to receive a bonus of $2,000 in addition to their monthly wage. This month, K realizes revenues of $62,500 and receives his monthly wage. B realizes revenues of $75,000 and receives, in addition to his monthly wage, a bonus of $2,000.

D.2.2 Zero-sum scenario. Z and H work for a catering service in Philadelphia. Their usual task is to organize and to execute caterings for weddings. This week, the firm celebrates its 10-year-anniversary. For this special occasion, some of their frequent business partners, including wedding planers and suppliers, are supposed to receive gift boxes. Z and H are asked to package these gift boxes. Since this is not part of their regular tasks, the shop uses a bonus system that provides its employees the opportunity to receive a bonus of $50 in addition to their weekly wage. Z and H know that the one who packages more gift boxes over the course of the week receives the bonus payment. That is, exactly one of the two receives a bonus payment. Z packages 142 gift boxes and H 105 gift boxes. Consequently, Z receives the bonus of $50.

D.2.3 Non-zero-sum scenario. M and K are students who work, during term break, as a bike courier for a start-up that cooperates with local restaurants. Both enjoy cycling as they prefer exercising to video gaming or watching netflix. This job gives them the opportunity to earn money whilst spending time outside. The start-up has a bonus system that provides its employees the opportunity to receive a bonus of $20 in addition to their daily wage. Each courier knows that he receives a bonus at the end of the day if he delivers at least 15 orders. That is, both can in principle receive a bonus at the same time, as well as only one or even none of them. Today, M delivers 17 orders and K delivers 13 orders. Consequently, M receives the bonus of $20.

E Instructions of the Experiment

These are the instructions (translated from the German original, which is available upon request) for the first stage (workers) and the second stage (spectators). We indicate differences between treatments within each screen.

E.1 Workers

Screen 1–Welcome. You are now participating in a study of the BonnEconLab.

Please read the following instructions carefully. In this study, you can earn money depending on your own choices and those made by other participants. It is therefore very important that you read pay attention while reading the instructions.

The amount of money you will receive at the end of this study depends on your own decisions as well as those made by other participants.

For this study, you will be put in a group of three participants. That is, your group gets assigned another two participants.

On the next page, you will learn your role in this group and your task.

Please click on "Next".

Screen 2–Detailed information about the procedure of the study

In this study, you and a second participant from your group have the opportunity to work on tasks for up to twelve minutes.

Randomness:

For every completely solved task you will receive one lottery ticket. At the same time, the second participant receives one lottery ticket for every task he solved.

After the task-solving-phase, a lottery will determine your income.

In the following, you will get to know how this income is being determined:

Randomness – Zero-sum:

All lottery tickets, that is, yours as well as the ones from the other participant, will be placed in one urn. Out of this urn one ticket is randomly drawn. That means that for every task you solved you put one ticket into the urn. At the same time, for every task the second participant solved, he puts one ticket into the urn. Subsequently, one ticket is randomly drawn from the urn and the owner of this ticket receives a prize.

The owner of the drawn ticket receives a prize of 7 euro and the other participant receives 1 euro.

Example: Assume that you solved 30 tasks and the second participant solved 20 tasks. This means you put 30 tickets into the urn and the second participant puts 20 tickets into the urn. The possibility that one of your tickets is being drawn then amounts to $30/(30+20) = 30/50 = 60\%$.

Randomness – Chance Competition:

Each of you has his own urn. Inside your urn are your tickets as well as a number of blanks corresponding to the number of tickets in the other participant's urn.

That means that for every task you solved you put one ticket into your urn and one blank into the other participant's urn. At the same time, for every task the second participant solved, he puts one ticket into his urn and one blank into your urn.

Subsequently, one ticket is drawn from every urn; one from your urn and one from the other participant's urn. In the case that one of your tickets is being drawn from your urn you will receive a prize. If a blank is drawn you will not receive a prize. For the other participant, a random draw is taken from his urn as well.

If one of your tickets is being drawn you receive a prize of 7 euro. Otherwise, you receive 1 euro. The same applies to the other participant. This means that it is possible that either both of you receive a prize, as well as only one or even none of you.

Example: Assume that you solved 30 tasks and the second participant solved 20 tasks. This means you put 30 tickets in your urn and the second participant puts 20 blanks in your urn. The possibility that one of your tickets is being drawn then amounts to $30/(30+20) = 30/50 = 60\%$.

Randomness – No Competition:

Each of you has his own urn. Inside your urn are only your tickets and not those of the other participant.

This means that for every task you solved, you put one ticket into your urn. In addition, both urns contain as many blanks as the number of tasks another participant, who is not part of your group, solved. This participant is not part of your group and his income does not depend on yours. This participant and therefore the number of blanks inside your urn is chosen randomly.

Subsequently, one ticket is drawn from every urn; one from your urn and one from the other participant's urn. In the case that a ticket is being drawn from your urn, you will receive a prize. If a blank is drawn you will not receive a prize. For the other participant, a random draw is taken from his urn as well.

If one of your tickets is being drawn you receive a prize of 7 euro. Otherwise, you receive 1 euro. The same applies to the other participant. This means that it is possible that either both of you receive a prize, as well as only one or even none of you.

Example: Assume you solved 30 tasks and the randomly chosen participant solved 20 tasks. This means you put 30 tickets in your urn and the randomly chosen participant puts 20 blanks in your urn. The possibility that one of your tickets is being drawn then amounts to $30/(30+20) = 30/50 = 60\%$.

Deterministic:

After the task-solving-phase, the number of completed tasks will be compared and your incomes will be determined.

The number of completed tasks will be compared as follows:

Deterministic – Zero-sum:

The one of you who solved the most tasks will receive a prize.

If you solved more tasks than the other participant you receive 7 euro. If you solved less, you receive 1 euro.

Example: Assume you solved 30 tasks and the second participant solved 20 tasks. As you solved more tasks than the second participant you receive a prize.

DETERMINISTIC – NO COMPETITION:

Both, the number of tasks solved by you and by the second participant will be compared to the number of tasks solved by another participant. This participant is not part of your group and his income does not depend on your solved tasks. This participant and therefore the amount of solved tasks is chosen randomly.

You receive a prize in the case that you solved more tasks than this randomly chosen participant. The same applies to the other participant from your group.

If you solved more tasks than the randomly chosen participant you receive 7 euro. Otherwise, you receive 1 euro. The same applies to the other participant. This means that it is possible that either both of you receive a prize, as well as only one or even none of you.

Example: Assume you solved 30 tasks and the randomly chosen participant solved 20 tasks. As you solved more tasks than the randomly chosen participant you receive a prize.

Decisions of the third participant

You will not be informed about your and the other participant's income directly after the study.

Before that, the third participant of your group, who does not participate in this part of the study, has the chance to reallocate your incomes. He knows the task that you had to solve but did not solve any tasks himself. However, this participant will be informed about the exact process of the study and the amount of tasks solved by you and the second participant. This means that he knows your income and that of the second participant as well as the number of tasks solved by each of you.

The third participant has the opportunity to reallocate the incomes. He can redistribute up to 6 euro among you. Of course, he can also choose to not change the incomes.

After the decision of the third participant and the completion of the study, your payment will be transferred to your bank account. Please note that this might take some time and you will receive the money in about two weeks. We will inform you as soon as the transfer has been commissioned. At the same time, you will receive information about the choice of the third participant.

On the next screen the task will be explained. Please click on "Next".

Screen 3–Detailed information about the task

Your task is to change the position of sliders. For each task, five sliders will be presented to you on one screen. Each slider starts on the very left (position 0) and can be moved until the far right end of the scale (position 100). The current position of the slider is shown on the slider. The slider can be moved in three different ways: **by making use of the arrow keys, by moving the mouse or by clicking on the scale.**

Your task is to move the slider to the **middle position (position 50)**. The sliders can be worked on in any order. You can move a slider as many times as you want to and correct its position. Only after all five sliders have been moved to position 50, you will be able to reach the next task by clicking on the "Next"-button. In total, you will have 12 minutes time to solve as many tasks as possible. After that, this part of the study ends. Please click "Next" to start with the solving of the task.

Screen 4–Slider task

No instructions.

Screen 5–Feedback

You solved X tasks.

Your payment depends on the result of the second participant as well as on the choice of the third participant in your group.

We kindly ask you to answer some further questions. After this, your part of the study ends. We will inform you once your transfer has been commissioned.

E.2 Spectators

Screen 1–Welcome. You are now participating in a scientific study. You will receive at least 8 euro for your participation. We ask you to carefully read the following instructions. If you have any question, please raise your hand and we will come to you.

In this study, you have the possibility to reallocate the income of two participants. For this, we will show you the income of several pairs of participants. These participants had the opportunity to solve tasks and gain a prize of 7 euro. The participants who did not gain a prize received 1 euro. Whether the participants received a prize or not, depended on the number of tasks solved by both participants. Participants had twelve minutes to solve the following tasks:

For each task, the participant faced a screen with five sliders. Each slider starts on the very left (position 0) and can be moved until the far right end of the scale (position 100). The task is to move the slider to the middle position (position 50) by making use of the arrow keys, moving the mouse or clicking on the scale.

Once all five sliders were in the correct position and the participant clicked "Next", the task was counted as solved.

In order to get a better understanding of the task, you will now be able to test the task for one minute.

Screen 2–Slider task

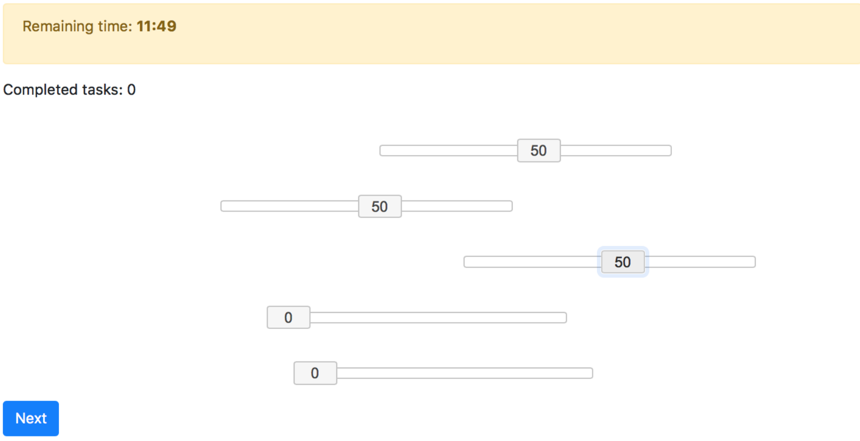


Figure E.4. Screenshot of the slider task in the experiment.

Screen 3–Your Result

You solved X tasks in one minute.

Screen 4–Determination of incomes

In the following, we explain how incomes are determined.

RANDOMNESS

Receipt of tickets

Both participants (participant A and participant B) could gain tickets by solving the task you tested. For each solved task, they received one ticket. That means that the more tasks one participant solved, the more tickets he received. The allocation of the prize was being determined by drawing tickets.

RANDOMNESS – ZERO-SUM

Allocation of the prize

For this, all tickets were placed in an urn. Out of this urn, one ticket was drawn. The owner of this ticket received a prize of 7 euro, the other participant received 1 euro. Therefore, always exactly one of the two participants received a prize.

Example: If participant A solved 25 tasks he received 25 tickets. If participant B solved 15 tasks, he received 15 tickets. Therefore, a total of 40 tickets were in the urn. The probability of receiving the prize amounted to 25/(25+15)=62.5% for participant A and 37.5% for participant B.

RANDOMNESS – CHANCE COMPETITION

For this, the tickets were placed in two urns. The tickets from participant A were placed into an urn for participant A, the tickets from participant B into an urn for participant B. However, for every ticket that was placed into the urn of participant A, one blank was placed into the urn of participant B. The same procedure was applied to the tickets of participant B and the urn of participant A. This means that the urn of participant B included as many tickets as he solved tasks and as many blanks as participant A solved tasks.

Allocation of the prizes

One draw was conducted from each urn. If a ticket of participant A was drawn from participants A's urn, he received a prize of 7 euro. If a blank was drawn, he received 1 euro. If a ticket was drawn from participant B's urn, he as well received a prize of 7 euro. If a blank was drawn, he received 1 euro. Therefore, both participants could receive a prize, as well as only one or even none of them.

Example: If participant A solved 25 tasks, 25 tickets were placed in his urn. If participant B solved 15 tasks, 15 blanks were placed in the urn of participant A. Therefore, a total of 25 tickets and 15 blanks were in the urn of participant A. With this, the probability of receiving a prize amounted to 25/(25+15)=25/40=62.5% for participant A. At the same time, 15 lots and 25 blanks were in the urn of participant B. With this the probability of receiving a prize amounted to 15/(15+25)=15/40=37.5% for participant B.

Randomness – No Competition

For this, the tickets were placed into two urns. The tickets from participant A were placed into an urn for participant A, the tickets from participant B into an urn for participant B. In addition, a random number of blanks was placed in both urns. The number of blanks corresponded to the number of tasks solved by another participant. This randomly chosen participant did not have any other connection to participants A and B.

Allocation of the prizes

One draw was conducted from each urn. If a ticket of participant A was drawn from participants A's urn, he received a prize of 7 euro. If a blank was drawn, he received 1 euro. If a ticket was drawn from participant B's urn, he as well received a prize of 7 euro. If a blank was drawn, he received 1 euro. Therefore, both participants could receive a prize, as well as only one or even none of them.

Example: If participant A solved 25 tasks, 25 tickets were placed into his urn. If participant B solved 15 tasks, 15 tickets were placed into the urn of participant B. An additional 20 blanks were placed into each urn. Therefore, a total of 25 tickets and 20 blanks were in the urn of participant A. With this, the probability of receiving a prize amounted to 25/(25+20)=25/45=55.5% for participant A. A total of 15 tickets and 20 blanks were in the urn of participant B. With this, the probability of receiving a prize amounted to 15/(15+20)=15/35=42.8% for participant B.

Randomness

To summarize: the more tasks a participant solved, the more tickets he received and the bigger were his chances of receiving a prize.

Randomness – Zero-sum

For both participants (participant A and participant B) the number of solved tasks was counted. The participant with the higher number of solved tasks received a prize of 7 euro. The other participant received 1 euro. In the case that both participants had solved exactly the same number of tasks, the prize was allocated randomly. Therefore, always exactly one of the participants received a prize.

Example: Assume that participant A solved 25 tasks and participant B solved 15 tasks, then participant A received the prize.

Randomness – No Competition

For both participants (participant A and participant B) the number of solved tasks was counted. At the same time, a number of tasks was chosen randomly. The number of tasks corresponded to the number of tasks another participant had solved. This randomly chosen participant did not have any other connection to participants A and B.

If participant A had solved more tasks than the randomly chosen number, he received a prize of 7 euro. If he had solved fewer tasks, he received 1 euro. The same was applied to participant B. Therefore, both participants could receive a prize, as well as only one or even none of them.

Example: Assume participant A had solved 25 tasks and participant B had solved 15 tasks. 20 tasks were chosen randomly. Consequently, participant A received a prize.

Deterministic

To summarize: the more tasks a participant solved, the bigger were his chances of receiving a prize.

Screen 5–Hypothetical pairs

We will present to you a total of X pairs of participants. For every pair, we will show you how many tasks participant A and participant B solved, respectively, as well as the current income of both participants.

Out of all the pairs that we will present to you, one pair is from the BonnEconLab. All the other pairs are fictional and do not represent real pairs. When you are making your decision you do not know which one of the pairs is not fictional. Please note that each of your decisions might become relevant for two participants of the BonnEconLab. You thus determine the payment for those two participants.

Both participants have not yet been informed about their current income and will only get to know their payment as determined by you.

If you have any questions please hold your hand out of the cabin.

Screen 6–Control questions

Before the study starts, we ask you to answer some control questions:

1.) When does a task count as solved?

a. Once the time is over.

b. Once all sliders have been moved to position 50 and the "Next" button has been clicked.

c. Once at least one slider has been moved to position 50 and the "Next" button has been clicked.

2.) How many participants can win a prize at most?

a. None.

b. One participant.

c. Two participants.

DETERMINISTIC

Assume that participant A solved 24 tasks and participant B solved 12 tasks.

DETERMINISTIC – NO COMPETITION

A random third participant with 6 solved tasks is chosen.

DETERMINISTIC

3.) Which income does each of the participants receive?

RANDOMNESS

Assume that participant A solved 24 tasks and participant B solved 12 tasks.

3.) How many tickets did each of the participants receive?

RANDOMNESS – NO COMPETITION

By random choice it is determined that 6 blanks will be added to each urn.

RANDOMNESS

4.) What is the probability to win for participant A?

RANDOMNESS – ZERO-SUM & CHANCE COMPETITION

a. Number of tickets participant A / Number of tickets participant B.

b. Number of tickets participant B / (Number of tickets participant A + participant B).

c. Number of tickets participant A / 100.

d. Number of tickets participant A / (Number of tickets participant A + participant B).

RANDOMNESS – NO COMPETITION

a. Number of tickets participant A / Number of blanks.

b. Number of tickets participant B / (Number of tickets participant B + number of blanks).

c. Number of tickets participant A / (Number of tickets participant A + number of blanks).

d. Number of tickets participant A / (Number of tickets participant A + participant B).

Screen 8–Redistribution Decision

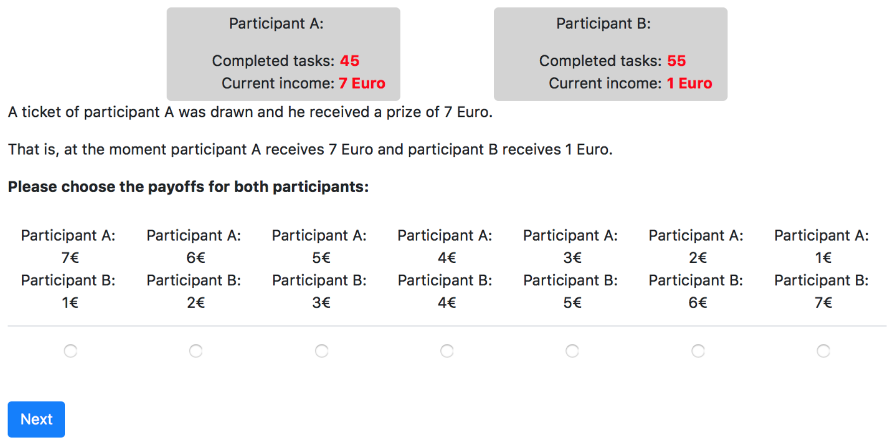


Figure E.5. Screenshot of the decision screen in the experiment.

Screen 9–Choice real pair

In the following, we once again show you all pairs for which you just determined the payment. As already explained, only one of those pairs is a non-fictional pair. Please indicate which of those pairs you consider to be the non-fictional one. If you choose the right pair, you will receive an additional payment of 1 euro. If you do not choose the right pair you will not receive any additional payment.
[list of pairs]

Screen 10–Feedback real pair

You chose the right pair and will receive an additional payment of 1 euro.
or

You did not choose the right pair.