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Lea Cassar
Arnd H. Klein

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Abstract

We investigate in a laboratory experiment if the experience of economic failure or success shapes people's preferences for redistribution beyond self-interest. Subjects generated a high or a low income either through a lottery or through an effort-based tournament. A sub-set of subjects could then redistribute the income of another sub-set of subjects. We find that individuals who lost the tournament (lottery) redistribute significantly more than all the other types of distributors when the inequality is generated by the tournament (lottery). The effect still holds when controlling for self-selection into different outcomes of the tournament and can be explained by in- or out-group bias and a self-serving bias in responsibility attribution. These findings have implications for public policies and for the design of compensation schemes in organizations.

JEL-Codes: D310, D630, H230, M520.

Keywords: distributive justice, experience, failure, in-group bias, self-serving bias.

Lea Cassar
University of Cologne
Cologne / Germany
lcassar@uni-koeln.de

Arnd H. Klein
Swiss Competition Commission
Bern / Switzerland
mail@arndheinrichklein.com

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1 Introduction

The redistribution of income has been and will presumably remain one of the most debated aspects of public policy in modern economies. In fact, there is much more at stake in these debates than purely monetary outcomes: Empirical evidence has clearly shown that differences in preferences for redistribution are not only driven by different material interests, but also by different views about what is an acceptable level of inequality in society (Fong, 2001; Cappelen et al., 2007; Almås et al., 2010; Alesina and Giuliano, 2011; Cappelen et al., 2010, 2013a; Möllerström et al., 2015). Where do these different views come from? Understanding their origins is key to explaining the persistence of the ideological divide in redistributive preferences and the resulting polarization of political views.

This paper contributes to answering this question by investigating whether individuals' experience of economic failure or economic success shapes their perspectives about distributive justice. We designed a laboratory experiment in which individuals' experience of economic failure or success is varied exogenously. We then tested whether this experience affects individuals' preferences for redistribution beyond material self-interest. More specifically, the experiment consisted of an income generation phase and a distribution phase. The income generation phase is the one in which we varied individuals' experience of failure and success. Participants were matched in pairs and assigned to one of two treatments. In the tournament treatment, the participant in the pair who performed best in a real-effort task (i.e, the winner) received a high income, while the participant who performed worse (i.e., the loser) received a low income. In the lottery treatment, the winner and the loser were randomly determined, and, therefore, the high and the low incomes were randomly assigned within the pair. These two treatments are meant to represent two important sources of experience with economic success or failure in the natural environment: Purely luck-dependent experiences such as growing-up in a rich or poor family, and experiences that are at least partially earned, such as professional failure or success. This distinction allows us to test if and how the source of the experience of failure or success matters for its impact on people's ideological views.

In the distribution phase, we asked a subset of subjects, henceforth "the distributors", to make distributive decisions over the incomes of two other pairs of subjects, one pair in which the inequality was generated by the lottery, and one pair in which the inequality was generated by the effort-based tournament. Hence, consistent with previous studies that elicit subjects' preferences for redistribution beyond a pure self-interest motive (Konow, 2000; Cappelen et al., 2007; Almås et al., 2010; Cappelen et al., 2010, 2013a; Barr et al., 2015, 2016), our distributors were spectators who had no monetary stakes in the redistributive decisions. However, they had participated in the income generation phase and,

therefore, had a history of economic failure or success.

Our main question is whether a distributor's redistributive choice is affected by her experience of failure or success in the income generation phase. Once we control for subjects' *absolute* performance in the tournament task, whether a subject loses or wins the tournament is random–it depends on whether one is randomly matched with a better or worse opponent. Hence, once we control for absolute performance, any observed significant difference in the redistributive choices across the four conditions (winning or losing the lottery or winning or losing the tournament) must come from a causal effect of such experiences.

By comparing the redistributive choices across the different types of distributors, we find that experiencing *failure* affects individuals' views about the appropriate distribution of income. More specifically, we find that individuals who lost the tournament (lottery) redistribute significantly more than all the other types of distributors when the inequality is generated by the tournament (lottery)–while there is no significant difference in the redistributive choices of all the other types. Using different controls for subjects' absolute performance in the task,[1] we then show that this effect is not driven by self-selection into losing the tournament, implying causality. We actually find little or no correlation between subjects' absolute performance and their redistributive choices. This implies that for the distributors who lost the tournament the effect is driven by the bad luck of being matched with an opponent with higher performance. Or, to put it differently, the effect is driven by the bad luck that made own effort not pay off.

We then investigate and discuss the potential mechanisms that explain our results. One potential mechanism is that experiencing economic failure fosters the development of an in-group bias towards individuals who were not successful in the same situation, similarly, it generates an out-group bias against individuals who were more successful in that situation. This in- or out-group bias is consistent with the fact that we do not find spillover effects of failing in one situation towards the redistributive preferences in a different situation: Indeed, there is no significant difference between the redistributive choices of the distributors who lost the lottery (tournament) and the redistributive choices of the other distributors when the inequality is generated by the tournament (lottery). Hence, according to our findings, it is not the case that experiencing failure makes people more egalitarian in general.

Another potential mechanism is that experiencing failure causes individuals to attribute their outcome more to external factors (i.e., factors out of their control) compared to internal factors (i.e., factors under their control). In other words, individuals may

[1]We use several control measures for absolute performance (i.e., their effort), including linear and quadratic specifications, effort ranks, fixed effects for effort bins and propensity score matching.

develop a self-serving bias in responsibility attribution for failure (Miller and Ross, 1975; Bradley, 1978). This self-serving bias may, in turn, change individuals' perceptions about the fairness of the reward structure that generated their outcome: If someone thinks that failing the tournament is mainly due to factors out of an individual's control, she may consider the result of a tournament to be less fair and thus demand more redistribution.[2]

Since the outcome of a lottery is unambiguously the result of chance, the difference in redistributive choices between the distributors who the lost the lottery and all the other types of distributors when the inequality is generated by the lottery cannot be reasonably due to different beliefs, but to an in- or out- groups bias. Our evidence is indeed consistent with this explanation: We find that 30 percent of the distributors who lost the lottery redistribute most income in favor of the original loser of the lottery, thereby reversing the inequality. These extreme redistributive choices must clearly come from distributors who lost the lottery wanting to favor lottery losers or to harm the lottery winners.[3] Consistent with a self-serving bias in responsibility attribution, we find, based on a post-experimental survey, that failing the tournament leads to a shift in beliefs about the degree of individuals' responsibility for the outcome in the tournament: Distributors who lost the tournament attribute the outcome of the tournament significantly more to luck compared to all the other types of distributors. Again, controlling for absolute performance in the task, we show that this effect is not driven by self-selection into losing the tournament. Finally, we show that this self-serving bias in beliefs explains *only parts* of the observed differences in redistributive choices, suggesting that experiencing failure in the tournament affects individuals' ideological view about income distribution through *both* channels: an in- or out-group bias and a self-serving bias in responsibility attribution for failure.

Applied to the natural environment, our results predict that people with different histories, i.e., with different economic experience, will have different perspectives on distributive justice. People whose histories consist mainly of economic failures will be more likely to support income redistribution when the source of inequality is the same as the one that made themselves poor. If someone is poor because of bad luck, such as having grown up in a poor family, this individual will be more supportive of policies aimed at

[2]Recent evidence that self-serving bias can affect preferences for redistribution is given by Deffains et al. (2016). In this experiment, the subjects were not informed about the the source of their success and failure in a real-effort task (i.e., they did not know whether they were assigned to an easy or to a hard task). The purpose of this manipulation of information was to create a self-serving bias in beliefs formation about the role of chance versus effort in generating their outcome. The authors find that subjects who were successful (unsuccessful) in the real-effort task are more (less) likely to attribute their success (failure) to their effort rather than to luck, and, in turn they opt for less (more) redistribution.

[3]This result is consistent with previous evidence of spite: In a different experimental setting, Rustichini and Vostroknutov (2014) find that individuals are willing to reduce the lottery winnings of others at a cost to themselves.

reducing inequalities which result from luck, such as inheritance taxes or equalizing opportunities through public education. On the other hand, if someone is poor because of professional failure, we expect this individual to be more supportive of policies targeting inequalities generated by work earnings, such as regular income taxes.

These findings have relevant implications for both public policies and the design of compensation schemes in organizations. First, the effect of experiencing economic failure on people's ideological views increase polarization of political preferences in society, making it harder to reach a consensus about the optimal level of redistribution in the long run. Second, it generates a potential for growing discontent within organizations that rely heavily on high-powered incentive schemes, because the inequality in compensation that may result from them will not be perceived as fair by the least successful employees. Such discontent is likely to negatively affect workers' motivation and can potentially lead to sabotage.

Our findings are consistent with recent empirical evidence that points towards a positive correlation between a individuals' economic status and their fairness views about the distribution of income. In an international fairness experiment, Cappelen et al. (2013b) study how people trade off entitlements and needs motives when making their redistributive decisions. They find that individuals from low-income countries assign more weight in their redistributive preferences to needs considerations than people from high-income countries. Almås et al. (2016) show that children from low economic backgrounds have more egalitarian fairness views compared to other children. Our paper contributes to this literature by showing that the relationship between individuals' economic status and ideological views observed in field data is likely to be causal, and by underpinning its underlying mechanisms, namely the formation of an in- or out-group bias and of a self-serving bias in responsibility attribution for failure.

The paper also adds to the empirical studies revealing a negative relationship between preferences for redistribution and income (Fong, 2001; Alesina and La Ferrara, 2005; Alesina and Fuchs-Schündeln, 2007; Alesina and Giuliano, 2011; Luttmer and Singhal, 2011; Kataria and Montinari, 2012; Giuliano and Spilimbergo, 2014; Owens and Pedulla, 2014; Powdthavee and Oswald, 2014; Durante et al., 2014; Agranov and Palfrey, 2015). While self-interest is an obvious and simple explanation for this pattern, our results suggest that it does not represent the full story. Experiencing economic failure affects individuals' preferences for redistribution for reasons that go beyond the self-interest channel. Our results are also related to previous empirical papers that emphasize an effect of economic regimes and macroeconomic shocks, such as communism (Alesina and Fuchs-Schündeln, 2007) and recessions (Giuliano and Spilimbergo, 2014), on individuals' beliefs and preferences for redistribution. Consistent with these studies, our findings point to

the effect of *negative* experiences on preferences for redistributions: It is the experience of failure and not the experience of success that affects people's perspectives on distributive justice. Finally, the paper relates to previous experimental work that also varies subjects' experiences in the laboratory and studies how this experience shapes social preferences. Most notably, Peysakhovich and Rand (2016) show that experiencing an environment that supports cooperation makes people more prosocial, more likely to punish selfishness, and more trusting in general.

In the following, we describe the design and experimental procedures in greater detail (Section 2), show the results (Section 3), and conclude (Section 5).

2 The experiment

2.1 Design

The experiment consisted of two phases: An *income generation phase* and a *distribution phase*. At the beginning of the experiment, we instructed the participants only about the income generation phase, while telling them that the second phase would concern the distribution of the incomes generated in the first phase. After the income generation phase had been completed, we explained details of the distribution phase. This follows the approach of Cappelen et al. (2013a), which proved successful in eliciting fairness motives of spectators while avoiding to deceive the subjects. We describe the two phases below.

2.1.1 Income generation phase

At the beginning of the income generation phase, the participants were randomly paired. Next, they executed a real effort task. To this end, we used the slider task introduced by Gill and Prowse (2012). This computerized task consists of a screen containing 48 sliders, which are initially positioned at zero and can be moved as far as 100 using the mouse cursor (see instructions on page 23).[4] The goal is to set as many sliders as possible to exactly 50 within 120 seconds. In our experiment, we confronted the participants with a series of five of these screens, each for 120 seconds. The total number of sliders adjusted to 50 in the five screens represented the participants' *effort* (performance) in the task. Before the sequence of five screens started, the participants had 60 seconds to practice the task. After the time was up, the participants saw their effort on the computer screen.

After all participants had completed the task and had seen their effort, every pair of participants was randomly assigned to one of two treatments – a lottery treatment and a

[4]We deactivated the mouse wheels and keyboards by software, so that the participants could only use the mouse cursor to manipulate the sliders.

tournament treatment. More specifically, half of the pairs within a session were assigned to the tournament treatment, while the other half were assigned to the lottery treatment.

Each treatment implied a different income generation process in assigning a high and a low income within a pair. In the tournament treatment, a high income was assigned to the participant in the pair with higher effort in the task, and a low income to the other participant. In the lottery treatment, the two incomes were randomly assigned within the pair. The income levels were constant across both treatments. We paid 25 Swiss Francs (CHF) as high income and CHF 5 as low income.[5] At the end of the income generation phase, the participants observed their own income, the income of the participant they were paired with, and the process that had generated the incomes within their pair. They did not observe the efforts of any other participant in the real effort task.

The income generation phase thus produced four types of participants (see Table 1), each with a different type of experience: Those with high income from the lottery (HiLot), those with low income from the lottery (LoLot), those with high income from the tournament (HiTour), and those with low income from the tournament (LoTour).

Table 1: Types in the income generation phase

	Lottery	Tournament
High income (CHF 25)	HiLot	HiTour
Low income (CHF 5)	LoLot	LoTour

2.1.2 Distribution phase

In the subsequent distribution phase, we randomly selected two pairs of subjects in each session (one from the tournament and one from the lottery) to be *non-distributors*. The incomes of the non-distributors were subject to redistributive decisions made by all the remaining pairs, the *distributors*, who kept their income from the first phase.

More specifically, the distributors were asked to distribute the total income that was earned within each non-distributor pair between both members of that pair. That is, every distributor made two distributive decisions: One for the pair from the lottery treatment, and one for the pair from the tournament treatment. The order of presentation was random and the decisions were such that for each pair, the distributors had to enter how much of the total income (CHF 30) should be distributed to the participant who had earned CHF 25, and how much of it should be distributed to the one who had earned CHF 5. The amounts given to both participants had to sum up to CHF 30 and were entered in multiples of CHF 0.5.[6] Before confirming the redistributive choices, the distributors had

[5] At the time of the experiment, the exchange rate was CHF 1.22 per € and CHF 0.89 per US$.
[6] See instructions on page 27 and page 28 for screenshots of the computer interface.

the opportunity to go back and change the choices for both pairs if desired. At the end of the experiment, the non-distributors received what had been distributed to them by one randomly chosen distributor, while the distributors received their income from the first phase.

Hence, consistent with previous studies that elicit subjects' preferences for redistribution beyond a pure self-interest motive (Konow, 2000; Cappelen et al., 2007; Almås et al., 2010; Cappelen et al., 2010, 2013a; Barr et al., 2015, 2016), our distributors were spectators who had no monetary stakes in the redistributive decisions. However, they had participated in the income generation phase and, therefore, had am economic "history".

2.2 Procedural details

In total, 262 subjects participated in the experiment. We conducted 8 sessions with 32 to 34 participants each. The experiment lasted about an hour. It took place at the computer lab of the University of Zurich, Switzerland, in March and April 2014. We recruited our participants from local university students, excluding economics and psychology majors.[7] To program and conduct the experiment, we used the software z-Tree (Fischbacher, 2007). The instructions used neutral language, avoiding terms like "tournament", "winner", or "distributor".[8] We kept the participants' identity and their decisions anonymous throughout the experiment. The average payoff was CHF 25 (ca. US$ 28), including a participation fee of CHF 10 (ca. US$ 11). We paid all payoffs individually and in private immediately after the experiment.

3 Results

In the following empirical analysis we test whether the experience in the income generation phase, i.e., whether a subject experiences failure or success in the lottery or in the tournament, affects her redistributive decisions. We focus on two decisions–a redistributive decision when the inequality is generated by the lottery, and a redistributive decision when the inequality is generated by the tournament. The test is straightforward for the subjects who experienced the lottery. In fact, any difference in the redistributive decisions between the winners and the losers of the lottery must come from a causal effect of winning/losing the lottery. In the tournament, however, there could be self-selection into winning or losing based on one's ideological preferences–or based on a third variable which is correlated with it. Hence, before making any claim of causality with respect to winning or losing the tournament, one needs to properly control for self-selection.

[7]The recruitment was conducted with the software hroot (Bock et al., 2012).
[8]The instructions are contained in Appendix A.2.

The analysis is divided in three parts. First, we compare the redistributive decisions of different types of distributors when the inequality is generated by the lottery, i.e., our first dependent variable. Second, we compare the redistributive decisions of different types of distributors when the inequality is generated by the tournament, i.e. our second dependent variables. Third, we investigate the mechanisms behind our findings.

3.1 Redistribution of income from the lottery

Out of our 230 distributors, we observe 59 of type HiLot and 59 of type LoLot, as well as 56 of type HiTour and 56 of type LoTour. Figure 1 shows the distributive decision of all four types of distributors for the pair where the income inequality was generated by the lottery (left panel) and for the pair where the income inequality was generated by the tournament (right panel). Note that we confirm the previous well-established result that demand for redistribution is generally higher when the inequality is generated by luck than by effort(Cappelen et al., 2007; Almås et al., 2010; Cappelen et al., 2010; Krawczyk, 2010; Rustichini and Vostroknutov, 2014; Kataria and Montinari, 2012; Vostroknutov et al., 2012; Cappelen et al., 2013a; Durante et al., 2014). This holds true for all types of distributors. Thus, we can be confident that the distributive situations induced by our experiment are comparable to those in earlier studies, and that even though the distributors did not have any material interest at stake, their fairness motives were strong enough to incentivize their redistributive choices. We now focus on the left panel.

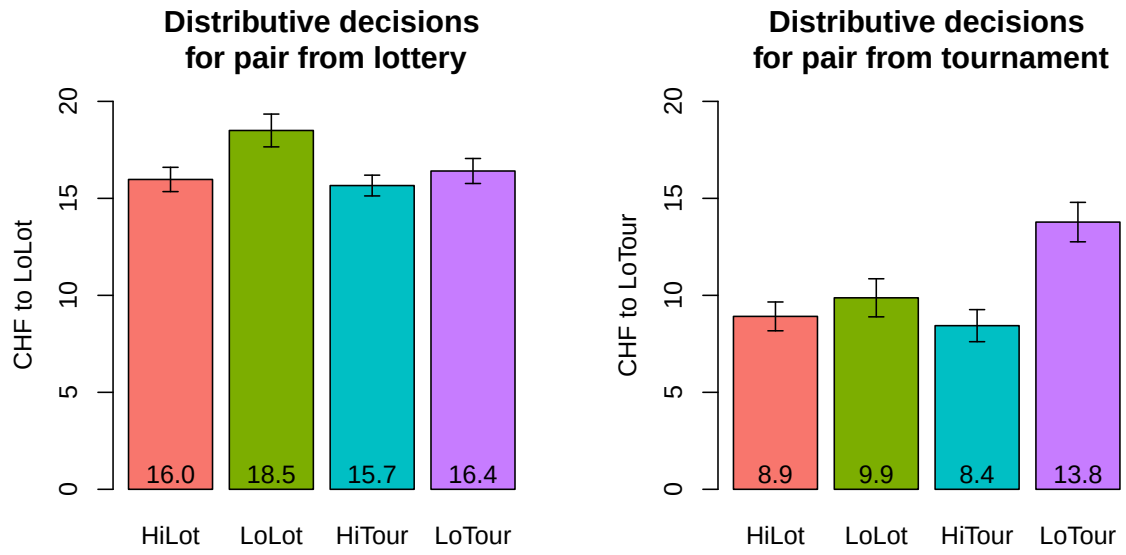


Figure 1: Distributive decisions of the four types. Heights of bars and values at bottom of bars correspond to means of amount (in CHF) distributed to the participant with low income. Lengths of whiskers at top of bars are equal to standard errors of the means.

As can be seen, the losers of the lottery redistribute on average about 2 to 3 CHF (11 to 16 percent) more to the losers of the lottery than all the other types of distributors do. These differences are significant for all comparisons, whether comparing the choices of LoLot with the ones of HiLot (rank-sum $p = 0.01$), with the ones of LoTour (rank-sum $p = 0.10$) or with the ones of HiTour (rank-sum p=0.01). On the contrary, we find no significant differences in the redistributive choices made by distributors of type HiLot, HiTour and LoTour (rank-sum: $p > 0.26$ for all comparisons)

Hence, the experience of losing the lottery seems to affect individuals' ideological preferences about the distribution of income generated by luck. However, while the difference between the distributive choices of LoLot and HiLot is unambiguously caused by this experience, to ensure causality for all the other comparisons we need to control for self-selection into winning or losing the tournament. We do so by regressing our variable of interest, the amount redistributed to the losers of the lottery, on dummy variables for each of the four types of distributors (so that LoLot is the reference category) and on various controls for the distributors' effort in the income generation phase.[9] We use linear and quadratic specifications, as well as the subjects' effort rank within their session. In the latter case, we rank the subjects within each session based on their effort level and control for their rank rather than for their absolute effort. These controls keep the distributors' effort level or, respectively, their effort rank constant, so that the dummy variables capture only the variation that is caused by switching from low income in the lottery to high income in the lottery (coefficients of HiLot) or to low or high income in the tournament (coefficients of LoTour and to HiTour). This variation is purely exogenous. To see this, consider a set of distributors with the same effort level or rank. *Within this group*, whether a distributor receives a high income from the tournament depends only on two random events: Whether the subject was assigned to the tournament treatment, and whether he was randomly matched with a partner with lower effort. As a result, the coefficients of the dummy variables are, respectively, unbiased estimates of the effect of winning or losing the tournament compared to losing the lottery. On the other hand, the coefficients for the various controls measure the selection effect.

Table 2 shows the regression results. Overall, the results suggest that the difference in the redistributive decisions between LoLot and the other types of distributors is casual and not driven by selection into different outcomes of the tournament. As can be seen, the coefficients of the dummy variables are substantially positive and highly significant independently of the way we control for selection. Furthermore, with the exception of regression 3, the coefficients of the controls not significant, suggesting that effort, and

[9]Note that this is possible because we elicited effort also for the subjects in the lottery treatment–only after performing the task, they learned that their income would be determined by the lottery.

Table 2: Amount distributed to LoLot by distributor's type

	(1)	(2)	(3)	(4)
HiTour	–2.866***	–2.621**	–2.744***	–2.871***
	(0.997)	(1.039)	(1.051)	(1.053)
HiLot	–2.525**	–2.615**	–2.418**	–2.523**
	(1.049)	(1.052)	(1.042)	(1.047)
LoTour	–2.116**	–2.362**	–2.174**	–2.111**
	(1.066)	(1.065)	(1.059)	(1.069)
Effort		–0.016	–0.105**	
		(0.014)	(0.050)	
Effort^2			0.001**	
			(0.000)	
Effort rank				0.001
				(0.047)
Constant	17.386***	19.098***	22.312***	17.370***
	(1.207)	(1.930)	(2.689)	(1.423)
Adj. R^2	0.024	0.026	0.037	0.020
Observations	230	230	230	230

Ordinary least squares regressions. Dependent variable: Amount distributed to LoLot. Robust standard errors in parentheses. Session fixed effects are controlled for in each regression. Significance levels: *** p<.01, ** p<.05, * p<.1.

thus selection, has no or little predictive power. Finally, no matter which regression specification we use, there is no difference in the coefficients of the dummy variables (Wald tests: $p > 0.65$ for all comparisons). That is, there is no difference in the redistributive choices of type HiTour, HiLot and LoTour.

We also run several robustness checks. First, we exclude subjects with the two highest and the two lowest efforts within their sessions. In fact, for subjects with highest (lowest) efforts within their session the probability of being matched with a better (worse) opponent is relatively low–although it is not zero given that there is the randomization of the treatment assignment. The results are reported in regressions **1** and **2** in Table A.1. Second, we control for self-selection using fixed effects for effort bins of different sizes. An effort bin of size x means that we split the range of observed effort levels (0 to 169) into intervals of size x, and allow for a common fixed effect among all distributors whose effort levels are in the same interval. We use effort bins of size 10 and 5. The results are reported in regressions 3 and 4 in Table A.1. As can been, the coefficients of the dummy variables are again substantially positive and significant in all four regressions.

Finally, we compare the amount redistributed to the loser of the lottery by each type of distributors using the method of propensity score matching (Rosenbaum and Rubin, 1983). This method directly compares the redistributive choices of subjects with similar effort

levels in the task. Consistent with our previous results, we find a significant difference in the amount distributed to the loser of the lottery between LoLot and HiTour ($p = 0.02$), between LoTour and LoLot ($p = 0.04$) and between LoLot and HiLot ($p = 0.01$). On the contrary, we find no significant difference in the redistributive choices between all the other subjects ($p > 0.30$ for all comparisons). Hence, we conclude:

Result 1. *Losing the lottery affects individuals' ideological preferences by increasing their support for redistribution of income that is generated by luck.*

3.2 Redistribution of income from the tournament

We now focus on the redistributive decisions when the inequality is generated by the tournament, i.e., on the right panel of Figure 1. As can be seen, the distributors who lost the tournament redistribute on average about 4 to 5.5 CHF (29 to 40 percent) more to the loser of the tournament than all the other types of distributors do. These differences are significant for all comparisons, whether comparing the choices of LoTour with the ones of HiTour (rank-sum $p = 0.00$), with the ones of LoLot (rank-sum $p = 0.00$) or with the ones of HiLot (rank-sum $p = 0.00$). On the contrary, we find no significant difference in the redistributive choices made by distributors of type HiLot, HiTour and LoLot (rank-sum: $p > 0.28$ for all comparisons)

Hence, the experience of losing the tournament seems to affect individuals' ideological preferences about the distribution of income generated by the tournament. However, again, to ensure causality, we need to control for self-selection into winning or losing the tournament. As before, we do so by regressing our variable of interest, the amount redistributed to the loser of the tournament, on dummy variables LoLot, HiLot and HiTour (so that LoTour is the reference category) and on various controls for the distributors' effort in the income generation phase. Again, we use linear and quadratic specifications, as well as the subjects' effort rank within their session. Ín this way, the dummy variables capture only the variation that is caused by switching from low income in the tournament to high income in the tournament (coefficient of HiTour) and to low or high income in the lottery (coefficients of LoLot and HiLot, respectively). As explained above, this variation is purely exogenous. As a result, the coefficients of the dummy variables are, respectively, unbiased estimates of the effect of of winning or losing the lottery and of winning the tournament compared to losing the tournament. On the other hand, the coefficients for the various controls measure the selection effect.

Table 3 shows the regression results. Overall, the results suggest that the difference in the redistributive decisions between LoTour and the other types of distributors is casual and not driven by selection into different outcomes of the tournament. As can be seen,

Table 3: Amount distributed to LoTour by distributor's type

	(1)	(2)	(3)	(4)
HiTour	–5.339***	–4.102***	–4.158***	–4.126***
	(1.302)	(1.432)	(1.426)	(1.445)
HiLot	–4.886***	–4.493***	–4.491***	–4.504***
	(1.271)	(1.286)	(1.291)	(1.292)
LoLot	–3.928***	–3.309**	–3.343**	–3.283**
	(1.402)	(1.442)	(1.435)	(1.455)
Effort		–0.040**	–0.056	
		(0.017)	(0.065)	
Effort^2			0.000	
			(0.000)	
Effort rank				–0.117**
				(0.057)
Constant	12.446***	16.142***	16.748***	13.707***
	(1.290)	(2.038)	(3.267)	(1.417)
Adj. R^2	0.084	0.102	0.098	0.096
Observations	230	230	230	230

Ordinary least squares regressions. Dependent variable: Amount distributed to LoTour. Robust standard errors in parentheses. Session fixed effects are controlled for in each regression. Significance levels: *** p<.01, ** p<.05, * p<.1.

the coefficients of the dummy variables are substantially positive and highly significant independently of the way we control for selection. Finally, no matter which regression specification we use there is no difference in the coefficients of the dummy variables (Wald tests: $p > 0.32$ for all comparisons). That is, there is no difference in the redistributive choices of type HiTour, HiLot and LoLot.

As before, we run several robustness checks as we did for the income generated by the lottery. The results are reported in the regressions in Table A.2. As can been, the coefficients of the dummy variables remain substantially positive and significant even when excluding subjects with the two highest and the two lowest efforts within their sessions (regressions 1 and 2) and when controlling for selection using fixed effects for effort bins (regressions 3 and 4).

Finally, we compare the amount redistributed to the loser of the tournament by each type of distributors using the method of propensity score matching. Aside from the comparison between LoTour and LoLot which is not significant ($p = 0.18$), we find a highly significant difference in the comparison between LoTour and HiTour ($p = 0.01$), and between LoTour and HiLot ($p = 0.01$). Consistent with our other results, we find no significant difference in the redistributive choices between all the other subjects ($p > 0.30$ for all the other comparisons). Hence, we conclude:

Result 2. *Losing the tournament affects individuals' ideological preferences by increasing their support for redistribution of income that is generated by the tournament.*

Results 1 to 2 jointly suggest that it is the experience of failure that shapes individuals' perspectives on distributive justice. More specifically, the experience of failure increases people's support for income redistribution when the source of inequality is the same as the one that they experienced themselves. This is quite evident by looking jointly at the right and left panel of Figure 1: It is always the losers who redistribute more to the losers in the same situation.

4 Mechanisms: In- or out- group bias and self-serving bias

Two mechanisms, not necessarily mutually exclusive, can account for our findings. One potential mechanism is that experiencing economic failure fosters the development of an in-group bias towards individuals who were not successful in the same situation, or, similarly, it generates an out-group bias against individuals who were more successful in that situation. Previous evidence on redistributive choices has indeed shown the effect of in-group favoritism based on race (Luttmer, 2001), age and gender (Cardenas and Sethi, 2010), risk-taking choices (Costard and Bolle, 2011), and field of studies (Klor and Shayo, 2010). This mechanism of in- or out-group bias is consistent with the fact that we do not find spillover effects of failing in one situation towards the redistributive preferences in a different situation: There is no significant difference between the redistributive choices of the distributors who lost the lottery (tournament) and the redistributive choices of other distributors when the inequality is generated by the tournament (lottery).

The second potential mechanism is that experiencing failure distorts people's beliefs about the relative importance of chance versus effort in generating an outcome and, therefore, about the fairness of that reward structure. More specifically, the losers of the tournament may have developed a self-serving bias in attribution of responsibility for failure: Compared to the other types of distributors, they may tend to attribute the outcome of the tournament more to external factors, i.e., factors under their control, than to internal factors, i.e., factors not under their control. Such denial of the relevance of factors under their control would reduce the perceived responsibility of the subjects for the outcome of the tournament.

Since the outcome of a lottery is unambiguously the result of chance, the difference in redistributive choices between the distributors who the lost the lottery and all the other types of distributors when the inequality is generated by the lottery cannot be reasonably

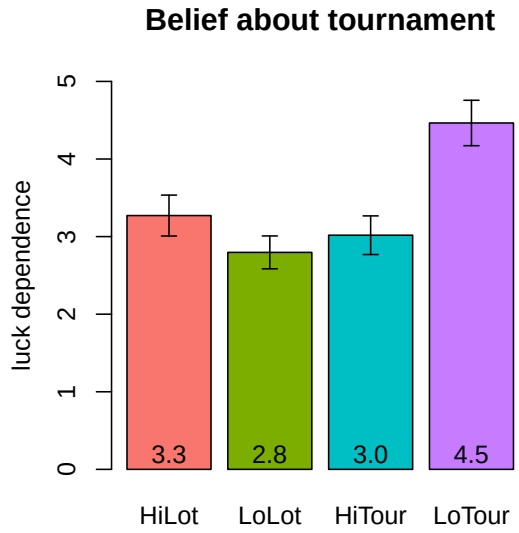


Figure 2: Beliefs about the tournament. Heights of bars and values at bottom of bars correspond to means of belief about luck dependence of the process. Lengths of whiskers at top of bars are equal to standard errors of the means.

due to different beliefs, but must be due to an in- or out-groups bias. Our evidence is indeed consistent with this explanation: We find that 30 percent of the distributors who lost the lottery redistribute most income in favor of the original loser of the lottery, thereby reversing the inequality. These extreme redistributive choices must clearly come from distributors who lost the lottery and intended to favor lottery losers or to harm the lottery winners.

In the case of the tournament, however, both mechanisms could be at work. We test the hypothesis of self-serving bias by analyzing the participants' responses to a survey conducted at the end of the experiment. Participants were asked to state, on a scale from 1 to 10, to what extent they think that the outcome in the tournament treatment was due to effort rather than to luck, where "1" represented "all due to effort" and "10" represented "all due to luck".

Figure 2 shows the average beliefs of all four types of distributors regarding the outcome generated by the tournament. Consistent with the self-serving bias hypothesis, we find that LoTour believes significantly more in the luck dependence of the tournament than all the other types (rank-sum: $p = 0.00$ for all comparisons). On the contrary, there is no difference in the beliefs of HiTour, HiLot and LoLot (rank-sum $p \geq 0.35$ for all comparisons).

Furthermore, regressions 1, 2 and 3 in Table 4 show that self-selection is not driving these results: We do not find any relationship between the individuals' effort and their beliefs, while the dummy variables for HiTour, LoLot and HiLot remain significant when

controlling for effort. Hence, in this experiment, it is not the case that individuals who believed more in the luck dependence of the tournament exerted less effort. This suggests that losing the tournament has a causal negative effect on beliefs. Lastly, the coefficients of the dummy variables in regressions 1, 2 and 3 are not significantly different suggesting that there is no significant difference between the beliefs of HiTour, HiLot and LoLot (Wald tests: $p > 0.15$ for all comparisons). This gives us the next result:

Result 3. *Losing the tournament has a causal negative effect on beliefs: It distorts beliefs in a way consistent with a self-serving bias in responsibility attribution for failure.*

Table 4: Beliefs and amount distributed to LoTour

	(1)	(2)	(3)	(4)	(5)
HiTour	–1.446***	–1.346***	–1.319***	–4.064***	–3.014**
	(0.391)	(0.433)	(0.450)	(1.339)	(1.432)
HiLot	–1.199***	–1.149***	–1.159***	–3.829***	–3.515***
	(0.399)	(0.417)	(0.416)	(1.293)	(1.302)
LoLot	–1.673***	–1.629***	–1.605***	–2.453*	–1.959
	(0.368)	(0.394)	(0.403)	(1.426)	(1.424)
Effort		–0.020			–0.039
		(0.022)			(0.059)
Effort^2		0.000			0.000
		(0.000)			(0.000)
Effort rank			–0.012		
			(0.018)		
Belief				0.882***	0.849***
				(0.244)	(0.240)
Constant	4.370***	5.393***	4.503***	8.592***	12.167***
	(0.461)	(1.032)	(0.487)	(1.732)	(3.183)
Adj. R^2	0.072	0.070	0.070	0.140	0.149
Observations	230	230	230	230	230

Ordinary least squares regressions. Dependent variable for regressions (1), (2) and (3): Beliefs about the role of chance in the tournament. Dependent variable for regressions (4) and (5): Amount distributed to LoTour. Robust standard errors in parentheses. Session fixed effects are controlled for in each regressions. Significance levels: *** p<.01, ** p<.05, * p<.1.

Finally, we test to what extent this self-serving bias in responsibility attribution explains the difference in the redistributive choices between distributors of type LoTour and the other subjects. In regressions 4 and 5 in Table 4 we control for beliefs and find that, with the exception of the coefficient of LoLot in regression 5, which is not significant ($p = 0.17$), all the other coefficients of the dummy variables remain large and significant. As hypothesized, the coefficient of the belief is negative and significant. We conclude:

Result 4. *The causal effect of losing the tournament on individuals' ideological views is only partially mediated by a self-serving bias in responsibility attribution.*

Hence, we conclude that losing the tournament affects individuals' ideological views about income distribution through both mechanisms: An in- or out- group bias that increase their support for redistribution towards other losers of the tournament (i.e., keeping their beliefs as given), and a self-serving bias in beliefs formation that affects the extent to which they attribute the outcome of the tournament to chance (i.e., allowing their beliefs to vary).

5 Conclusion

In this experiment, we vary the participants' experience of economic failure and economic success by generating winners and losers in a tournament and in a lottery. We then elicit their preferences for redistribution in the absence of personal monetary stakes. After controlling for self-selection into the outcome of the tournament, we find that experiencing *failure* affects individuals' views about the appropriate distribution of income. More specifically, we find that individuals who lost the tournament (lottery) redistribute significantly more than all the other types of distributors when the inequality is generated by the tournament (lottery)–while there is no significant difference in the redistributive choices of all the other types. We then show that these results can be explained by an in- or out- group bias and a self-serving bias in responsibility attribution for failure. These findings have important implications for the design of public policies and for the design of remuneration schemes in organizations.

References

Agranov, M. & Palfrey, T. R. (2015). Equilibrium tax rates and income redistribution: A laboratory study. *Journal of Public Economics*, 130, 45–58.

Alesina, A. & Fuchs-Schündeln, N. (2007). Good-bye Lenin (or not?): The effect of communism on people's preferences. *American Economic Review*, 97(4), 1507–1528.

Alesina, A. & Giuliano, P. (2011). Preferences for redistribution. In J. Benhabib, M. O. Jackson, & A. Bisin (Eds.), *Handbook of Social Economics*, Vol. 1A (pp. 93–131). Amsterdam: North-Holland.

Alesina, A. & La Ferrara, E. (2005). Preferences for redistribution in the land of opportunities. *Journal of Public Economics*, 89(5-6), 897–931.

Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E. Ø., & Tungodden, B. (2016). Fairness and family background. *Forthcoming in Philosophy, Politics and Economics*.

Almås, I., Cappelen, A. W., Sørensen, E. Ø., & Tungodden, B. (2010). Fairness and the development of inequality acceptance. *Science*, 328(5982), 1176–1178.

Barr, A., Burns, J., Miller, L., & Shaw, I. (2015). Economic status and acknowledgement of earned entitlement. *Journal of Economic Behavior & Organization*, 118, 55 – 68.

Barr, A., Miller, L., & Ubeda, P. (2016). Moral consequences of becoming unemployed. *Proceedings of the National Academy of Sciences*, 113(17), 4676–4681.

Bock, O., Nicklisch, A., & Baetge, I. (2012). hroot: Hamburg registration and organization online tool. WiSo-HH Working Paper No. 1.

Bradley, G. W. (1978). Self-serving biases in the attribution process: A reexamination of the fact or fiction question. *Journal of Personality and Social Psychology*, 36(1), 56–71.

Cappelen, A. W., Hole, A. D., Sørensen, E. Ø., & Tungodden, B. (2007). The pluralism of fairness ideals: An experimental approach. *American Economic Review*, 97(3), 818–827.

Cappelen, A. W., Konow, J., Sørensen, E. Ø., & Tungodden, B. (2013a). Just luck: An experimental study of risk-taking and fairness. *American Economic Review*, 103(4), 1398–1413.

Cappelen, A. W., Moene, K. O., Sørensen, E. Ø., & Tungodden, B. (2013b). Needs versus entitlements—an international fairness experiment. *Journal of the European Economic Association*, 11(3), 574–598.

Cappelen, A. W., Sørensen, E. Ø., & Tungodden, B. (2010). Responsibility for what? Fairness and individual responsibility. *European Economic Review*, 54(3), 429–441.

Cardenas, J. C. & Sethi, R. (2010). Resource allocation in public agencies: Experimental evidence. *Journal of Public Economic Theory*, 12(4), 815–836.

Costard, J. & Bolle, F. (2011). Solidarity, responsibility and group identity. European University Viadrina Frankfurt (Oder), Department of Business Administration and Economics Discussion Paper No. 309.

Deffains, B., Espinosa, R., & Thöni, C. (2016). Political self-serving bias and redistribution. *Journal of Public Economics*, 134, 67 – 74.

Durante, R., Putterman, L., & van der Weele, J. (2014). Preferences for redistribution and perception of fairness: An experimental study. *Journal of the European Economic Association*, 12(4), 1059–1086.

Fischbacher, U. (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2), 171–178.

Fong, C. (2001). Social preferences, self-interest, and the demand for redistribution. *Journal of Public Economics*, 82(2), 225–246.

Gill, D. & Prowse, V. (2012). A structural analysis of disappointment aversion in a real effort competition. *American Economic Review*, 102(1), 469–503.

Giuliano, P. & Spilimbergo, A. (2014). Growing up in a recession. *Review of Economic Studies*, 81(2), 787–817.

Kataria, M. & Montinari, N. (2012). Risk, entitlements and fairness bias: Explaining preferences for redistribution in multi-person setting. Jena Economic Research Paper No. 2012,061.

Klor, E. F. & Shayo, M. (2010). Social identity and preferences over redistribution. *Journal of Public Economics*, 94(3-4), 269–278.

Konow, J. (2000). Fair shares: Accountability and cognitive dissonance in allocation decisions. *American Economic Review*, 90(4), 1072–1091.

Krawczyk, M. (2010). A glimpse through the veil of ignorance: Equality of opportunity and support for redistribution. *Journal of Public Economics*, 94(1-2), 131–141.

Luttmer, E. F. P. (2001). Group loyalty and the taste for redistribution. *Journal of Political Economy*, 109(3), 500–528.

Luttmer, E. F. P. & Singhal, M. (2011). Culture, context, and the taste for redistribution. *American Economic Journal: Economic Policy*, 3(1), 157–179.

Miller, D. T. & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, 82(2), 213–225.

Möllerström, J., Reme, B.-A., & Sørensen, E. Ø. (2015). Luck, choice and responsibility: An experimental study of fairness views. Forthcoming in Journal of Public Economics.

Owens, L. A. & Pedulla, D. S. (2014). Material welfare and changing political preferences: The case of support for redistributive social policies. *Social Forces*, 92(3), 1087–1113.

Peysakhovich, A. & Rand, D. G. (2016). Habits of virtue: Creating norms of cooperation and defection in the laboratory. *Management Science*, 62(3), 631–647.

Powdthavee, N. & Oswald, A. J. (2014). Does money make people right-wing and inegalitarian? A longitudinal study of lottery winners. IZA Discussion Paper No. 7934.

Rosenbaum, P. R. & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41–55.

Rustichini, A. & Vostroknutov, A. (2014). Merit and justice: An experimental analysis of attitude to inequality. *PLoS ONE*, 9(12), e114512.

Vostroknutov, A., Tobler, P. N., & Rustichini, A. (2012). Causes of social reward differences encoded in human brain. *Journal of Neurophysiology*, 107(5), 1403–1412.

Appendix

A.1 Tables and figures

Table A.1: Robustness checks

	(1)	(2)	(3)	(4)
HiTour	–2.447**	–2.493**	–3.087***	–3.401***
	(1.094)	(1.141)	(1.018)	(1.068)
HiLot	–2.278**	–2.235**	–2.299**	–2.860***
	(1.119)	(1.123)	(0.970)	(1.015)
LoTour	–1.938*	–1.892*	–2.228**	–2.625**
	(1.124)	(1.111)	(1.016)	(1.072)
Effort		0.005		
		(0.020)		
Constant	16.587***	16.025***	17.631***	17.599***
	(1.290)	(2.479)	(1.134)	(1.156)
Effort bin FE	No	No	Yes	Yes
Adj. R^2	0.012	0.007	–0.043	–0.099
Observations	198	198	230	230

Ordinary least squares regressions. Dependent variable: Amount distributed to LoLot. Regressions 1 and 2 leave out subjects with the two highest and two lowest efforts within their sessions. Regression 3 and 4 allow for fixed effects of effort bins of size 10 and 5, respectively. Robust standard errors in parentheses. Significance levels: *** p<.01, ** p<.05, * p<.1.

Table A.2: Robustness checks

	(1)	(2)	(3)	(4)
HiTour	–5.175***	–4.508***	–3.705**	–3.507**
	(1.447)	(1.511)	(1.473)	(1.572)
HiLot	–4.300***	–4.281***	–3.875***	–3.465**
	(1.385)	(1.385)	(1.335)	(1.393)
LoLot	–4.071***	–3.737**	–3.281**	–2.643*
	(1.493)	(1.514)	(1.341)	(1.423)
Effort		–0.038		
		(0.023)		
Constant	11.583***	15.362***	11.935***	11.626***
	(1.270)	(2.809)	(1.527)	(1.609)
Effort bin FE	No	No	Yes	Yes
Adj. R^2	0.077	0.082	–0.023	–0.124
Observations	198	198	230	230

Ordinary least squares regressions. Dependent variable: Amount distributed to LoTour. Regressions 1 and 2 leave out subjects with the two highest and two lowest efforts within their sessions. Regression 3 and 4 allow for fixed effects of effort bins of size 10 and 5, respectively. Robust standard errors in parentheses. Significance levels: *** p<.01, ** p<.05, * p<.1.

A.2 Instructions

General Instructions

Introduction

Welcome and thank you for participating in this experiment. During the next 60 minutes, you will make decisions that determine your earnings and the earnings of other participants. You will also receive a fixed **participation fee** of CHF 10. Upon completion of the experiment, you will be paid all of your earnings and the participation fee, individually and in private.

Anonymity

All of your interactions with other participants are completely anonymous. You will never learn the identity of the participants with whom you interact. They will also never learn your identity. You will not know which choices were made by a specific participant and no other participant will know which choices were made by you.

Rules of Conduct

During the experiment, you are not allowed to communicate with other participants, exclaim, use personal electronic devices, or use the computer in a way not specified by the experimenter. If you are not following these rules, you may be excluded from the experiment

Phases

In this experiment, there are two phases. We will now describe Phase 1. Details about Phase 2 will be provided after Phase 1 is completed.

1

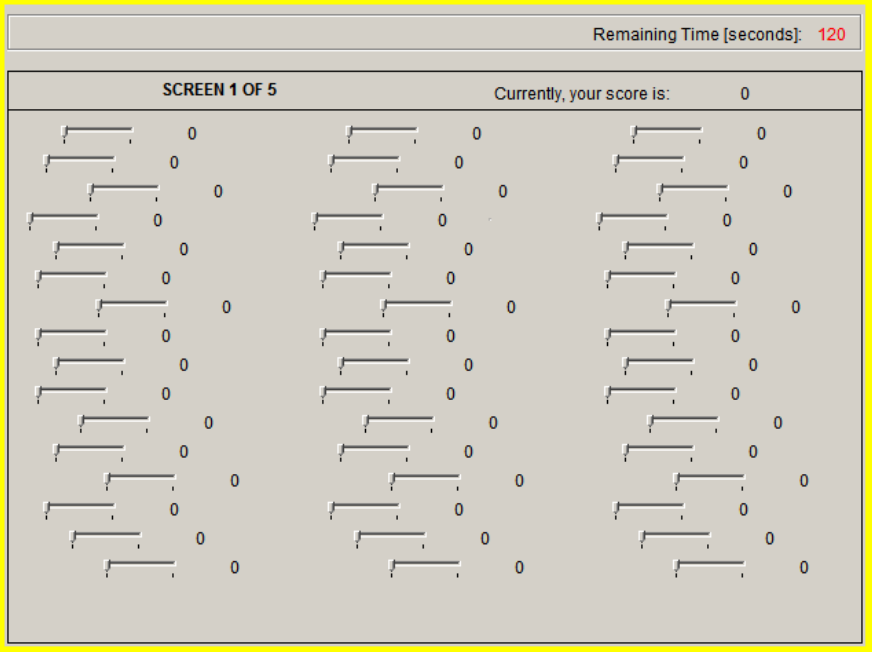
Instructions for Phase 1

Pairs

At the beginning of Phase 1, you will be randomly paired with another participant. In the following, we will refer to the participant you are paired with as "*your paired participant.*"

Task

At the beginning of Phase 1, all participants will individually complete a **task**. The task will consist of a sequence of 5 screens with 48 sliders each (see picture of the computer screen below).



Each slider is initially positioned at 0 and can be moved as far as 100. Each slider has a number to its right showing its current position. You can use the mouse in any way you like to move each slider. You can readjust the position of each slider as many times as you wish. **Your goal is to position as many sliders as possible at exactly 50**. For each screen, you have **120 seconds** to position all the sliders. After the 120 seconds are over, a new screen will appear. In total, 5 screens will be presented to you. The total number of sliders positioned at exactly 50 in the 5 screens represents your **score** in the task.

Earnings generation

After all participants have completed the task, the computer will randomly assign your pair, namely you and your paired participant, to one out of two earning rules. Each pair is equally likely to be assigned to each of the two earning rules. The earning rule to which your pair is assigned will then determine your earnings and the earnings of your paired participant. The two rules are the following:

1) SCORE RULE

If your pair is randomly assigned to the Score Rule, the participant in your pair who achieved a higher score in the task receives earnings of CHF 25, and the participant who achieved a lower score in the task receives earnings of CHF 5. Thus, two cases are possible, depending on your score and the score of the other:

- Case 1: If your score in the task is **higher** than the score of your paired participant:

Your earnings are **CHF 25**
The earnings of your paired participant are **CHF 5**

- Case 2: If your score in the task is **lower** than the score of your paired participant:

Your earnings are **CHF 5**
The earnings of your paired participant are **CHF 25**

- In the case that your score and the score of your paired participant are equal, the computer will randomly determine who receives earnings of CHF 25 and who receives earnings of CHF 5.

2) LOTTERY RULE

If your pair is randomly assigned to the Lottery Rule, the computer will randomly determine who receives earnings of CHF 25 and who receives earnings of CHF 5. Thus, two cases are possible. Both cases are equally likely.

- Case 1 (probability 50%)

Your earnings are **CHF 25**
The earnings of your paired participant are **CHF 5**

- Case 2 (probability 50%)

Your earnings are **CHF 5**
The earnings of your paired participant are **CHF 25**

3

Therefore, if your pair is randomly assigned to the Lottery Rule, **your score in the task has no effect on your earnings or on the earnings of your paired participant in Phase 1.**

Remember that which of the two rules will generate the earnings in your pair will be randomly determined after the task has been completed. More specifically, the computer will randomly assign half of the pairs in the experiment to the Score Rule and half of the pairs in the experiment to the Lottery Rule. In case of an uneven number of pairs, the remaining pair will be randomly assigned either to the Score Rule or to the Lottery Rule.

Practice round

Before you complete the actual task, all participants will be asked to practice the task for a period of 60 seconds. The screen will look exactly as in the actual task. The purpose of the practice round is to make participants familiar with the task. Thus, the score that you achieve during the practice round has no effect on your earnings or on the earnings of your paired participant in Phase 1.

Overview of Phase 2

Phase 2 of the experiment concerns the distribution of earnings from Phase 1. Details of Phase 2 will be provided after Phase 1 is complete.

This concludes the General Instructions and the Instructions for Phase 1.

If there are any questions now or at any point during the experiment, please raise your hand, and one of us will approach you individually.

Summary of Phase 1

- All participants complete the task.
- Computer randomly assigns pairs either to the Score Rule or to the Lottery Rule.
- Earnings in Phase 1 are determined according to the assigned rule.

Instructions for Phase 2

Types

At the beginning of Phase 2, the computer will randomly assign your pair, consisting of you and your paired participant, to one of two types: **Type D (Distributors)** or **Type N (Non-Distributors)**.

More specifically, all pairs will be of Type D, with the exception of two randomly selected pairs who will be of Type N: one pair whose earnings in Phase 1 were generated through the Score Rule and one pair whose earnings in Phase 1 were generated through the Lottery Rule.

To summarize, there will be two pairs who are of Type N: one pair from the Score Rule and one pair from the Lottery Rule. These two pairs will be randomly selected.

Participants in the other pairs will be of Type D.

Decisions and Earnings of Type N participants

Type N participants will NOT make any decisions in this phase. However, their earnings may be affected by decisions made by Type D participants in Phase 2.

Decisions and Earnings of Type D participants

All **Type D** participants will be asked to make decisions about the distribution of earnings of Type N participants from Phase 1 (a detailed explanation of how these choices will be made follows below). The earnings of Type D participants will remain fixed, as they were at the end of Phase 1. This means that the earnings of Type D participants are not affected by anything that happens in Phase 2.

At the end of the experiment, the computer will randomly select one Type D participant whose decisions will then be applied to determine the final earnings of Type N participants. Therefore, Type D can affect the earnings of Type N participants, but nobody can affect the earnings of Type D participants.

Type D participants will make the following decisions about the distribution of earnings of Type N participants: **for each of the two randomly selected Type N pairs, Type D participants will be asked to divide the sum of earnings within the pair, namely CHF 30 (25+5), between the two participants forming the pair.**

So overall, Type D participants will make two decisions about the distribution of earnings from Phase 1:

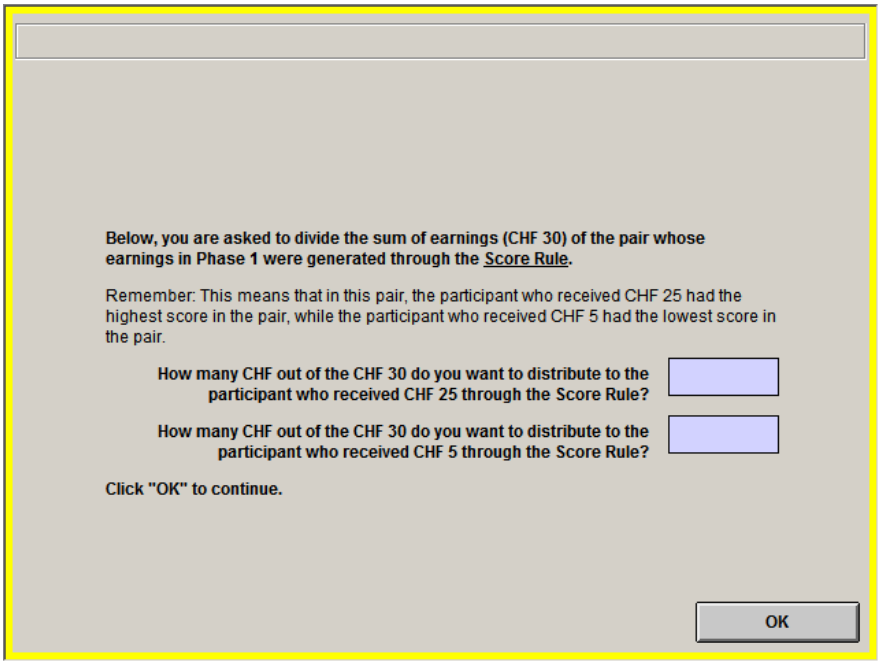
- Each Type D participant will make one decision for the pair of Type N participants whose earnings in Phase 1 were generated through the *Score Rule*.

- Each Type D participant will make one decision for the pair of Type N participants whose earnings in Phase 1 were generated through the *Lottery Rule*.

Recall that each Type N pair ended Phase 1 with one participant whose earnings were CHF 25 and one participant whose earnings were CHF 5, so the sum of earnings within each pair is CHF 30. So Type D participants can distribute any amount between CHF 0 and CHF 30 to the two Type N participants in the pair, but the amounts distributed to both Type N participants must sum up to the sum of earnings of the pair, which is CHF 30. Note that all amounts must be multiples of CHF 0.5.

So for the pair of Type N participants whose earnings in Phase 1 were generated through the Score Rule, Type D participants will be asked to decide (see picture of the screen below)

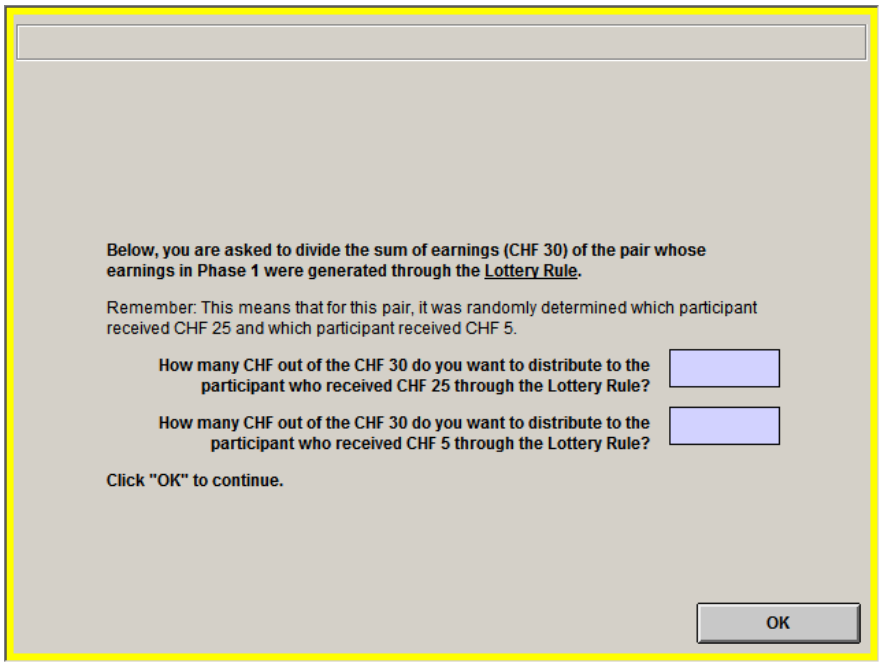
- how many CHF out of the CHF 30 to distribute to the participant who received earnings of CHF 25 through the Score Rule, and
- how many CHF out of the CHF 30 to distribute to the participant who received earnings of CHF 5 through the Score Rule.



Similarly, for the pair of Type N participants whose earnings in Phase 1 were generated through the Lottery Rule, Type D participants will be asked to decide (see picture of the screen below)

6

- how many CHF out of the CHF 30 to distribute to the participant who received earnings of CHF 25 through the Lottery Rule, and
- how many CHF out of the CHF 30 to distribute to the participant who received earnings of CHF 5 through the Lottery Rule.



Remember that after all Type D participants have made their decisions, one Type D participant will be randomly selected, and **only** the decisions of this randomly selected Type D participant will be applied to determine the earnings of the Type N participants. This means that, if you are a Type D participant, your decisions may end up entirely determining which earnings each of the four Type N participants receives. At the end of the experiment, Type D participants will be informed whether their decisions were selected to count or not.

Final payments to Type D participants after the experiment

After the experiment, Type D participants will be paid their earnings from Phase 1, plus the participation fee of CHF 10. Phase 2 has **no** effect on their payments.

Final payments to Type N participants after the experiment

After the experiment, the participants in the two Type N pairs that were randomly selected by the computer will be paid the earnings that were distributed to them by one randomly selected Type D participant in Phase 2, plus the participation fee of CHF 10.

End of the experiment

Once everyone has completed Phase 2, the amount that will be paid to you will appear on your computer screen. Then, you will be asked to answer a few questions. When you are finished answering the questions, please wait patiently at your seat until you are called to collect your payment in private.

Summary of Phase 2

- The computer randomly selects 2 pairs, one from the Score Rule and one from the Lottery Rule, to be of Type N. The remaining pairs are of Type D.
- All Type D participants make decisions about the distribution of earnings of the two pairs of Type N participants from Phase 1.
- The computer randomly selects one Type D participant whose distributive decisions will count for the payment of the four Type N participants after the experiment.
- Experiment ends.
- Type D participants are paid their earnings from Phase 1.
- Type N participants are paid the amount distributed to them by the randomly selected Type D participant