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A glimpse through the veil of ignorance: Equality of opportunity and support for redistribution☆

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ABSTRACT

This study is an experimental investigation into preference for redistribution of income. It had been hypothesized that (belief in) equality of opportunity in a society diminishes support for the welfare state. This could potentially explain the low taxes and social benefits in the United States vis-a-vis Europe. To verify this hypothesis, participants in an experiment were assigned different "Probabilities of Winning" and matched in groups of four. Next, before finding out who would actually win, they selected preferred transfers to be paid by the winners to the group as a whole. It was found that the average transfers were about 20% lower in the sessions in which winning was determined by performance in a task rather than by sheer luck. This difference cannot be explained by overconfidence in predicting own score. It corroborates the conjecture that perceived determinants of success (i.e. whether poverty results from laziness or bad luck) affect the support for redistribution. On the other hand, greater inequality of opportunity measured simply by dispersion of Probabilities of Winning within a group did not lead to higher transfers.

1. Introduction

One of the important roles of modern governments is to organize transfer of money from the rich to the poor. While the amount of wealth being redistributed is substantial in virtually all developed countries, individual differences are striking (see e.g. Alesina and Glaeser, 2004). This dispersion coincides with cross-country differences in prevailing opinion over necessity and optimal level of redistribution[1] (which, of course, should not be surprising in the democratic regime). Further, it is clear that transfers of wealth are costly, in that they involve substantial efficiency loss (see e.g. Browning, 1993). It is thus interesting to investigate what drives the support for redistribution — these needs could possibly be satisfied in a more cost-effective way.

Several such determinants have been suggested in the literature (see for example Alesina and Glaeser, 2004 for an overview). The most obvious factor is self interest — the "poor" or those who expect to be poor in the future have an incentive to tax the rich (see Meltzer and Richards, 1981; Benabou and Ok, 2001). Support for welfare state might also depend on several other factors, for example social cohesion (see Lee and Roemer, 2006 for a discussion of racial heterogeneity).

A potentially important factor that receives a lot of attention recently is the perceived fairness of the division of wealth. It seems plausible that taxes and transfers are there partly because many citizens find pre-tax income distribution *unfair* and seek to improve upon it. It appears therefore fruitful to identify the factors that could reinforce or inhibit this feeling of injustice, thus weakening or strengthening legitimization of the system. One such factor pertains to the way in which this distribution is generated — to the equality of opportunity for upward-mobility that individuals face.

This line of thinking can be traced back as far as to de Tocqueville and was more recently discussed by Piketty (1998), Fong (2001) and Alesina and Angeletos (2005). It posits that the more individual's lifetime earnings are thought to be determined by his or her place of birth, social status of parents, etc. (that is, the more closed the society appears to be), the less legitimate existing differences in wealth are. This, in turn, creates rich soil for redistribution policies. Whenever, on the other hand, all individuals are believed to be endowed with a fair chance to succeed in attaining high social strata, transfers seize to be

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[1] Corneo and Gr'uner (2002) provide results of a survey in 12 countries. Fraction of respondents who "agreed" or "strongly agreed" that "It is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes" varied from around 40% in the US and Australia, to 60–65% in West Germany and Norway, to over 80% in East Germany and Bulgaria.

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perceived as necessary to restore justice. In this way one can explain relatively strong support for redistribution in European countries and relatively weak observed in the US.

Indeed, according to the World Values Survey, less than 30% of US citizens think that "poor are trapped in poverty". In Europe the rate is about 60%. Interestingly, there is rather little empirical support for these beliefs (see Ayala and Sastre, 2002; Alesina and Glaeser, 2004; Glaeser, 2005). This "false consciousness" has become recently an interesting topic of study on its own (Benabou and Tirole, 2005).

Two aspects of the alleged "entrapment" may be distinguished here, giving rise to two parts of the "fairness–legitimacy" hypothesis regarding the factors affecting the support for redistribution. First, equality of opportunities requires social mobility. Perceived *inequality* may thus result from the fact that citizens face highly divergent probabilities of reaching high social strata. We thus hypothesize that if they do, they will opt for higher redistribution (for short, we will refer to this as "Divergent Chances Hypothesis"). Second, the feeling of unfairness might have to do with the determinants of success being seen as unjustified. For example, climbing up the social ladder may require behavior seen as immoral (such as bribery) or simply pure luck, rather than skills and hard work (cf. Piketty, 1995; Fong, 2001; Alesina and LaFerrara, 2005). In Rawls' terminology, the latter quality is referred to as "equality as careers open to talents" while combination of the two constitutes "equality of fair opportunity" (Rawls, 1999, p. 57). The second part of the fairness-legitimacy hypothesis is thus that support for redistribution is greater when success or failure is determined by factors perceived as justified, such as skill and effort (we will call it the "Luck vs Skill hypothesis"). Fong (2001) and Alesina and LaFerrara (2005) show that those who think that "getting ahead in life" mostly takes effort and talent, generally oppose redistribution more that those who believe it is chiefly determined by luck and help of others. The impact of social mobility is less clear (Fong, 2006). Particularly, Alesina and LaFerrara (2005) find that "generic" measures of social mobility are insignificant when future own expected income is controlled for. Alesina and LaFerrara (2001) also propose (and provide some empirical support in survey data) that these two dimensions interact, i.e. mobility is a better substitute for equality of outcomes when the process is perceived as fair. In any case, it is difficult to verify, using the field data, whether the belief in equality of opportunity is an independent reason to oppose redistribution or merely a useful way to legitimize what is otherwise materially beneficial (Alesina and Glaeser, 2004, chapter 7).

The hypothesis that the difference in support for the welfare state between the US and Europe may be based on different perception of inequality found support in a study on "happiness" by Alesina et al. (2004), who conclude that disutility of inequality is statistically significant among European "poor" as well as leftists, whereas in the US only "rich" leftists seem to care about it. One interpretation is that inequality of outcomes is only troublesome when opportunities are perceived as unequal. Alternative ways of looking at these data are possible, however, and evidence from other studies (Clark, 2003; Schwarze and Härpfer, 2004) appears somewhat contradictory.

It seems thus desirable to investigate this "fairness-legitimacy" hypothesis experimentally. This would let us verify the existence of the link between initial distribution of chances in the society and preference for redistribution in an environment free from cultural and institutional differences, while controlling for monetary incentives.

The experimental design proposed here assumes a "thin" veil of ignorance, which admits a glimpse of one's future: decision makers choose their preferred level of income tax (and resulting benefits) without knowing what their actual income would be but facing different prospects. For one, this approach allows focusing on the impact of ex-ante inequality (inequality of opportunity) on the support for welfare state. Besides, "grand" (or programmatic) redistribution is a long-run phenomenon (see Dixit and Londregan, 1996), it is thus natural to assume that voters have only more or less accurate *predictions* about the income of their families over the whole period during which a policy is effective.

Our results confirm the Luck vs Skill hypothesis in that the nature of determinants of success affects the willingness to support redistribution: higher transfers are favoured if winning depends on a random draw rather than performance in a task. The Divergent Chances Hypothesis finds no support, in that transfer choices do not respond to the dispersion of chances to succeed. It appears thus, as suggested by earlier field studies, that moral worthiness is more important than social mobility in shaping people's perceptions of equality of opportunity. Further than that, we conclude that perceptions of fairness of the process determining income are an independent source of support for redistribution, not merely an epiphenomenon.

The design of the experiment is presented in Section 2, Section 3 reports the results, Section 4 contains a discussion of the results, in relation to some other experimental evidence. Instructions can be found in the Appendix A.

2. Design, procedures, predictions

2.1. Design

In order to test the hypotheses described above, we endowed the subjects with a "Probability of Winning" (winning a fixed prize of 30 euros) kept constant throughout the experiment. Next, in each of six periods, subjects were rematched in groups of four, such that dispersion of Probabilities of Winning (PoW) differed across periods. In this way dispersion of chances was manipulated within-individual and the observed impact on behavior allowed us to verify the Divergent Chances Hypothesis. The Luck vs Skill Hypothesis was verified by manipulating, between subjects, the determinants of success, as described in Section 2.2.

In each period the groupmates' probabilities of winning were revealed to everyone. Participants were asked to indicate their favorable redistribution scheme — a transfer $t \in [0,1]$ determining what part of the prize V each winner should share with the losers. These decisions were not revealed. After all the decisions were made, one period was picked to determine real payment. Prizes V were individually allocated, either randomly or based on performance in a task (see Section 2.2), in accordance with PoWs, such that each group had exactly 2 winners. Then, for each group one person's choice determined the transfer.[2] The earnings were given by the formula:

$$earnings_i = \begin{cases} SF + V(1-t_j) + \frac{(1-\lambda)Vt_j w}{4} & \text{for winners} \\ SF + \frac{(1-\lambda)Vt_j w}{4} & \text{for losers,} \end{cases}$$

where SF equal to 5 euro denotes the show-up fee, V equal to 30 euro denotes the prize, t_j is the transfer rate chosen by the selected participant j, ($t_j \in [0,1]$), λ is the efficiency loss parameter and $w = 2$ is the number of winners in the group, such that $\frac{(1-\lambda)Vt_j w}{4}$ is the transfer obtained by every group member.

The proposition that proportional taxes are charged and the proceeds divided evenly (as lump sum benefit) is a standard, if

[2] Two alternative ways to elicit the preferred transfers suggest themselves: first, one could let participants vote on a redistribution scheme, second, some order statistics (preferably median) could determine the actual transfer level. The first strategy, used in several related experiments (e.g. Tyran and Sausgruber, 2002), is difficult to implement directly if more than two redistribution schemes are possible. In the current experiment there were 31 options, thus voting would require additional complexity, e.g. some participants taking role of politicians choosing platforms to vote for. The median, on the other hand, is not well-defined in a group of four and other order statistics (e.g. second highest) are less natural. Besides, participants with extreme Probabilities of Winning could feel their (extreme) choices would not matter anyway.

simplistic, way of modeling redistribution (cf. Meltzer and Richards, 1981).

Parameter λ represents losses inherent in the process of collecting and redistributing taxes as well as losses due to distortionary effect of taxes on income base.

Each of the two values of lambda, $\lambda=0$ and $\lambda=0.3$, was used in a block of three consecutive periods. The first value is a natural benchmark. The other is to some extent arbitrary, partly because empirical literature does not seem to offer a reasonably narrow range of plausible estimates of efficiency losses involved in taxing and transferring of income (see Allgood and Snow, 1998). In any case, it is sufficient to make (contrary to $\lambda=0$) transfers unprofitable for players with intermediate Probabilities of Winning (PoW = 0.4 and PoW = 0.5). It is thus a moderate value: high enough to change monetary incentives for a large group of participants but low enough to avoid making transfers unacceptable. Including two different values of the parameter could possibly help discover an important interaction effect between the perceived inequality of opportunities and efficiency of the redistribution system. It also served as a robustness check.

Up to four levels of PoW were used in each session: these were either 0.2, 0.4, 0.6 and 0.8 or 0.1, 0.5, 0.5 and 0.9 (so in the latter case the two middle "classes" collapsed into one). These two varieties will be referred to as "distributions of PoWs".

To assess the impact of dispersion of chances on support for redistribution, each individual faced different combination of groupmates' PoWs in each round. The most equalized group type in the first distribution of PoWs included two participant with PoW equal to 40% and two with PoW equal to 60% (0.4, 0.4, 0.6, 0.6), the intermediate one was (0.2, 0.4, 0.6, 0.8) and the most unequal (0.2, 0.2, 0.8, 0.8). Note that each player could only participate in the intermediate group and one of the "extreme" groups (for instance, a player with PoW of 0.8 could not participate in the most equalized group) and indeed each participant played in each of the two feasible group types at least once for each value of λ.[3] We can thus check the impact of increased dispersion of chances by comparing choices made by each individual in the less equal group with the choices in the more equal group, for example comparing the choice made by an individual with a PoW of 0.6 in the intermediate group and the most equal group. The same design was used and analogous inference can be made for the other distribution of PoWs.

2.2. Treatments

In order to verify the Luck vs Skill Hypothesis two conditions were used. Under "Random" condition, after the 6 periods of redistribution choices, winning/losing was determined by a random draw, in accordance with subjects' probabilities of winning. Under "Task" condition, after the 6 periods, individuals had to complete a competitive task (a quiz of 10 general knowledge and IQ-type questions). The number of correct answers and the response time were combined in the final score. The low-PoW subjects generally had to score higher in the quiz than the high-PoW subjects in order to win the prize, such that, under the assumption of equal skill and effort, actual probabilities of winning were as assigned.

An anonymous referee has suggested that the PoW may better be called "baseline PoW" or "average skill and effort PoW" or (my term) "unconditional PoW", because, *conditional on heterogenous individual skill and effort*, the actual chances to win may diverge from PoW, perhaps substantially. This is very true but also this is a necessary consequence of implementing a real task. Also outside of the lab, "equality of opportunity" in a society should in my view never be taken to mean identical probability distribution on outcomes for everyone *regardless of skill and effort*. This discussion is however beyond the scope of this paper. In any case, one has to consider that, as will be shown below, it was in fact difficult for the participants to judge in which way their actual probability would diverge from the PoW. In this sense PoW was their primary decision input. With this important caveat in mind, I will continue to use the concise term of "PoW".

The specific procedure was as follows. Each participant's score in the task determined his or her rank, ranging from 1 (top scorer in a given session) to 20 or 24, depending on the total number of subjects participating. Because response time, a quasi-continuous variable, was considered in the score, there were no ties. Consider now, for example, a group with PoWs (.1, .5, .5, .9). The two participants with probabilities .5 compete for one of the prizes — it is assigned to the one with the better score (lower rank). Obviously, *a priori* (again: disregarding individual difference in skill and effort) their chances are then identical, equal to .5. For the other two participants, a "relative rank" is computed. It is defined as the ratio of the rank of the participant with $p=.1$ to the rank of the participant with $p=.9$. A low relative rank means that the former did relatively well. For example, if participant with PoW of .1 obtained the sixth score in the group, while the other — the 18th, the relative rank will be equal to 1/3. Because obtaining any rank is *a priori* equally likely, the probability distribution of the variable "relative rank" can be identified. For example, if $n=20$, the chance that relative rank is lower than 1/12 is equal to 8/380 (the rank of the participant with PoW of .1 must be 1, which happens with a probability of 1/20, and that of the other one — at least 13, a 8/19 chance, given that the rank cannot be 1. If rank of the participant with PoW of .1 was 2 or higher, relative rank would be at least 1/10, even if the other participant had the lowest score.)

We then set the cut-off point at the tenth percentile of the distribution — if relative rank was lower than this threshold (obviously, a 10% chance) participant with $p=.1$ won and otherwise the participant with $p=.9$.[4] In this way every participant was facing the appropriate probability of winning. Analogous procedure was used for other distributions of PoW.

The sessions differed also on two other dimensions: first, the two different distributions of PoW were used as described in the previous subsection and, second, the order of the three-period blocks with a fixed value of λ was manipulated.

The eight sessions were thus run in a $2\times2\times2$ (task/random × distribution of PoWs × order of λ-blocks[5]) full factorial design.

2.3. Procedures

The experiment was run in the CREED laboratory at the University of Amsterdam in March 2007. It was computerized using Z-tree (Fischbacher, 2007). In total, 184 subjects, mostly undergraduate students participated in eight session, 20 or 24 subjects in each. Thirty-nine percent of the participants were women; 62% studied economics or business, while the others came from a variety of other disciplines. The mean age was 23 years.

The subjects, recruited via E-mail announcements and registered on the CREED website, were seated in the lab and given general written instructions, including tables (see Appendix A) describing the decision task. It was not revealed to subjects that periods 4–6 would

[3] The exact schedule is available from the author.

[4] Appropriate randomization was performed for relative rank exactly equal to the threshold if necessary. Data analysis revealed that the procedure indeed worked, in a sense that the actual success rates were very close to the PoWs.

[5] Order of λs was found not to affect the choices significantly (at 5% level). This variable is thus disregarded in the analysis.

involve a different efficiency loss than periods 1–3. Further, in two out of four Task treatments the nature of the task was not revealed — it was generally described as one requiring “some skills, some effort and some good decisions”.[6] Once the subjects had read the instructions, the experimenter answered all arising questions and started the computer program. The subjects were first asked to report their height, based on which PoW was assigned. This seemingly peculiar procedure was used in order to assign PoWs randomly but still make the differences between PoWs perceived as unjustified. Manipulation checks confirmed that the latter goal was achieved — two thirds of participants thought it was unfair that different subjects faced different probabilities of winning.

After three periods of transfer choices the experimenter distributed a new handout explaining that in the remaining periods only 70% of the Group Account would be redistributed (or, conversely, 100% would be distributed from now on, depending on the session). Directly before and right after having the risk resolved, the subjects answered several questions regarding their decisions and the evaluation of the procedures used in the experiment (see Appendix A).

The experiment took about 60 min. Earnings, including a guaranteed show-up fee of 5 euro, ranged from 5 to 35 euro with an average equal to 18.45 euro.

2.4. Predictions

2.4.1. Dispersion of the probabilities of winning

Discussing the predictions regarding behavior in the game we start with the most strict set of assumptions and gradually relax some of them. First consider a *risk-neutral selfish subject i* (an expected value maximizer). Denoting *i*'s PoW by p_i, her expected utility in the game (disregarding the show-up fee) is given as:

$$EU_i = p_i\left(V(1-t) + \frac{(1-\lambda)Vt}{2}\right) + (1-p_i)\frac{(1-\lambda)Vt}{2} = p_iV(1-t) + \frac{(1-\lambda)Vt}{2}. \quad (1)$$

Maximizing with respect to the height of transfer[7] we find that such a subject will always opt for full redistribution ($t=1$) if their probability of winning is lower than a threshold $\hat{p} = \frac{(1-\lambda)}{2}$, and for no redistribution ($t=0$) if $p_i > \hat{p}$. Given the values of λ used, $\hat{p}$ is equal to 0.35 (for $\lambda=0.3$) or 0.5 (for $\lambda=0$).

Note that the expected value maximizer's decision is unaffected by the current composition of the group, as long as the sum of probabilities of success remains constant.

A subject who is sufficiently *risk-averse* (in terms of the curvature of the utility function)[8] will opt for some redistribution also if his p_i is above the threshold. Allowing for *limited computing capacities* (for instance applying the Quantal Response model), we would expect *t* to decrease in p_i only gradually. Neither of these effects should be affected by the dispersion of others' probabilities.

Subjects displaying *outcome-based inequality aversion* will generally opt for even more redistribution, as transfers from the rich to the poor obviously decrease inequality. Assume the Fehr and Schmidt (1999) model.[9] If we denote individual incomes by y_i, y_j etc. and parameters of disadvantageous and advantageous inequity aversion by α and β respectively, the utility is given as:

$$U_i = y_i - \frac{\alpha}{n-1}\sum_{j\neq i} max(y_j - y_i, 0) - \frac{\beta}{n-1}\sum_{j\neq i} max(y_i - y_j, 0) \quad (2)$$

To apply the model to the problem at hand, first note that the difference between payoff of a winner and a loser is $V(1-t)$ and there are always exactly two players better off than *i* or two players worse off than *i*. It is then easy to compute the expected utility of player *i* and take the first derivative with respect to transfer *t*:

$$EU_i = p_iV(1-t) + \frac{(1-\lambda)Vt}{2} - \frac{2}{3}p_i\beta V(1-t) - \frac{2}{3}(1-p_i)\alpha V(1-t) = p_iV(1-t) + \frac{(1-\lambda)Vt}{2} - \frac{2}{3}V(1-t)(p_i\beta + (1-p_i)\alpha)$$

Thus First Order Condition becomes:

$$\frac{\partial EU_i}{\partial t} = \left(-p_i + \frac{(1-\lambda)}{2}\right)V + \frac{2}{3}V(p_i\beta + (1-p_i)\alpha). \quad (3)$$

Because $\alpha \geq \beta$, the marginal value of transfers decreases in *p*, similar to the “selfish” benchmark. It can also be seen by putting $\alpha, \beta = 0$ as in the classical model, that inequity aversion increases support for redistribution. For sufficiently high parameter values, the individual will support full redistribution regardless of his or her probability of winning. For intermediate values of α and β, the “switching probability” will be between $\frac{(1-\lambda)}{2}$ and 1.

Specifically, taking the median values from Fehr and Schmidt (1999) we have $\alpha = 0.5$ and $\beta = 0.25$. Then solving for p_i

$$\frac{\partial EU_i}{\partial t} = \left(-p_i + \frac{(1-\lambda)}{2}\right)V + \frac{2}{3}V(0.25p_i + 0.5(1-p_i)) = 0 \quad (4)$$

we find that when $\lambda = 0$, only for a PoW equal to 80 or 90% will the majority of participants opt for no redistribution, while for $\lambda = 0.3$ most participants with PoW equal to 60% will also do so.

Note that because utility is linear in transfers, each participant will either support full redistribution or no redistribution at all. This is a special feature of the Fehr–Schmidt formulation of inequity aversion. Again, the composition of the group has no effect on behavior (as long as the sum of all probabilities is held constant).

This is not the case under the *process Fehr–Schmidt model* considered by Trautmann (2009), which provides a simple way to allow for the “equality of opportunity” effect. The author assumes that individuals use expected rather than actual payoffs when judging the fairness of the distribution. Denote the expected payoff of player *i* by $E(y_i) = p_iV(1-t) + \frac{(1-\lambda)Vt}{2}$. Expected utility of player *i* is then given by:

$$EU_i = p_iV(1-t) + \frac{(1-\lambda)Vt}{2} - \frac{\alpha}{n-1}\sum_{j\neq i} max(E(y_j) - E(y_i), 0) - \frac{\beta}{n-1}\sum_{j\neq i} max(E(y_i) - E(y_j), 0)$$

[6] In two other sessions the subjects were told that the task involved answering questions as quickly and as correctly as possible. The reason was twofold — first, it could be that an unknown task triggered different attitude than a known task and second, some participants could have learned the nature of the task from their peers participating in earlier sessions anyway.

[7] For ease of exposition I assume that participant *i* is selected to decide about transfers (while in fact any group member was equally likely to be decisive). The strategy which *i* is optimal under this assumption will obviously remain optimal in all of the models considered below in which final allocations are carriers of utility (as in the classical model and e.g. Fehr and Schmidt, 1999). It is easy to show that it also holds true for the Process Fehr–Schmidt model (Trautmann, 2009) considered below, because ordering of expected earnings depends only on probabilities and not on selected transfers (thus the same choice is optimal, no matter what the group-mates are opting for).

[8] A non-linear probability weighting function alone has limited impact on the predictions as distortion of probabilities is typically not very high in our “threshold” range of 0.35–0.5.

[9] Employing another inequality aversion, e.g. Bolton and Ockenfels (2000) would yield similar results, except for the fact that intermediate choices of transfers would generally obtain for high-PoW participants.

This expression can be simplified by substituting:

$$E(y_j)-E(y_i) = V(1-t)(p_j-p_i) \quad (5)$$

which yields:

$$EU_i = p_iV(1-t) + \frac{(1-\lambda)Vt}{2} - \frac{1}{3}V(1-t)\sum_{j\neq i}|p_j-p_i|(1_{p_j>p_i}\alpha + 1_{p_j<p_i}\beta),$$

where 1_a is an indicator function taking value 1 when condition a is satisfied and 0 otherwise. Maximization with respect to t now yields:

$$\frac{\partial EU_i}{\partial t} = -p_iV + \frac{(1-\lambda)V}{2} + \frac{1}{3}V\sum_{j\neq i}|p_j-p_i|(1_{p_j>p_i}\alpha + 1_{p_j<p_i}\beta) \quad (6)$$

Again, due to linearity of the model, extreme values of t are predicted. This time however, the composition of the group affects behavior. It is easy to see that a mean-preserving spread of others' probabilities increases the marginal utility of transfer.[10] This result corresponds to the general hypothesis discussed in the introduction, regarding the link between the dispersion of opportunities and support for redistribution. It is also quite intuitive. Consider an individual with $p_i = 0.5$ participating in groups with the following probabilities: (0.1, 0.5, 0.5, 0.9) and (0.5, 0.5, 0.5, 0.5). Even though financial incentives are identical for person i in either group, we would predict the choice of a higher t in group 1 (transfers are likely to go from the privileged person with $p_i = 0.9$ to the unfortunate person with $p_i = 0.1$), than in group 2, where initial probabilities seem fair. Generally, we can expect that (controlling for own probability of winning), greater dispersion of p_i's within a group will lead to greater transfers.

The FS-types of models are based on the notion of self-centered aversion to inequality — comparisons are made only between the decision maker and other individuals. An alternative way of thinking allows subjects to be concerned about *inequality between others*[11] (be it: inequality of outcomes or inequality of prospects). Such models lead to similar predictions as they "self-centered" counterparts, because e.g. the (.5.5.5.5) obviously involves less (ex-ante) both self-centered and between-others inequality than (.1,.5,.5,.9). Distinguishing between the two approaches would require additional experimental data, e.g. comparing (.1,.5,.5,.9) and (.1,.5,.7,.7) (as, from the viewpoint of any of the first two participants, there is less between-others inequality but not self-centered inequality, at least as it is defined by the FS model, in the latter case). I will come back to this issue in the Results section.

2.4.2. Deadweight loss

It is immediately obvious that by increasing the efficiency loss involved in the redistribution (represented by parameter λ), we diminish monetary incentives to opt for high transfer. Fairness concerns are not affected here, as the difference between subjects' incomes (or expected incomes) is independent of λ. However, efficiency-oriented individuals might find the reduction of total earnings unattractive. If participants are susceptible to self-serving bias, this concern might be more prevalent among the high-PoW subjects, as it delivers a good excuse not to support the "fairer" but individually irrational policy. If so, the impact of the increase in efficiency loss can be greatest in this group of participants.

2.4.3. Luck vs skill

Incorporating the two treatments makes distinguishing different fairness motivations and perceptions possible. The question is what can serve as a basis for legitimate payoff differentiation. We speculate that superior performance in a task (presumably depending on skills and effort) may play this role, even though probabilities of success are still differentiated. If this is indeed the case, we should generally observe higher transfers in the Random Treatment than in the Task Treatment, as outcome inequality will be more justified in the latter case. This effect may be particularly strong for high-PoW subjects (self-serving bias). It is also possible that we observe a differentiated impact of the dispersion of probabilities. For example, subjects may feel that the difference in probabilities is less important if success is determined by pure luck anyway (see also Alesina and LaFerrara, 2001). In such a case the impact of inequality of opportunity will be stronger under Task Treatment. If both procedures create equal entitlements, that is, if subjects are exclusively concerned about the distribution of opportunities, no treatment effect will be observed.

Further, some participants in the Task treatment may feel that their chances are higher (lower) than PoW, because they expect to do better (worse) than a typical subject. Optimistic subjects are then likely to choose lower transfers, while the opposite is true for the pessimistic subjects. Voluminous research shows that most people have a tendency to display some overconfidence most of the time (although the heterogeneity across tasks and individuals tends to be large, see Klayman et al., 1999 for a discussion).

Finally, an anonymous referee has also pointed out that the relevance of efficiency loss concern could vary between Task and Random. For example, it could be that some participants would see it as more of a concern in the latter condition — it may be a greater shame to let some of the joint payoff go to waste after everyone has worked for it. On the other hand, the sense that some minimum income should be guaranteed for everyone who worked on the task could work in the opposite direction. While both of these motivations are a possibility worth addressing in a dedicated experiment, I do not think they played a very important role in the current design. First, I do not observe any trace of them in the post-experiment questionnaire. Besides, I think that the very short task used in this experiment was not considered as a tedious kind of work. It could well have been more akin to amateur sports competitions where teams or individuals exhibiting more skill and effort (which need not be unpleasant) earn their prizes.

3. Results

We first analyze individual transfer choices. Fig. 1 presents frequencies and summary statistics of transfer choices made in the four conditions — in the Random and Task treatments and under high or low efficiency loss and Fig. 2 shows choices made in particular probability classes.

It is immediately clear from Fig. 2 that participants respond to the monetary incentives by choosing high transfers if their probability of winning is low and low transfers if their probability of winning is high. There is also a great deal of heterogeneity, with only low-PoWs predominantly choosing very high transfers.[12] However, individual transfer choices display internal consistency — in the cases where two choices were made in the same circumstances (same group type and same value of λ), the second choice was identical with the first 63% of the time and differed by at most 5 euro 85% of the time.

Averaging over the three decisions made by each subject under fixed efficiency loss and comparing matched pairs, we find that transfer choices were significantly lower for positive deadweight loss ($p < 0.01$, one-sided sign test). Interestingly, looking across probability classes, we find that only participants with PoW of 40 or 50%, so those whose expected-value maximizing choice was altered by the introduction of the efficiency loss, actually reacted to it. It suggests

[10] This is not a prediction of all "procedural fairness" models. For example, when the model developed in Krawczyk (2007), built on the model by Bolton and Ockenfels (2000), is applied, the dispersion of others' probabilities can be shown to be irrelevant.

[11] I am grateful to an anonymous referee for suggesting this possibility.

[12] These participants, particularly those with PoW equal to 10% also took least time to make their decisions.

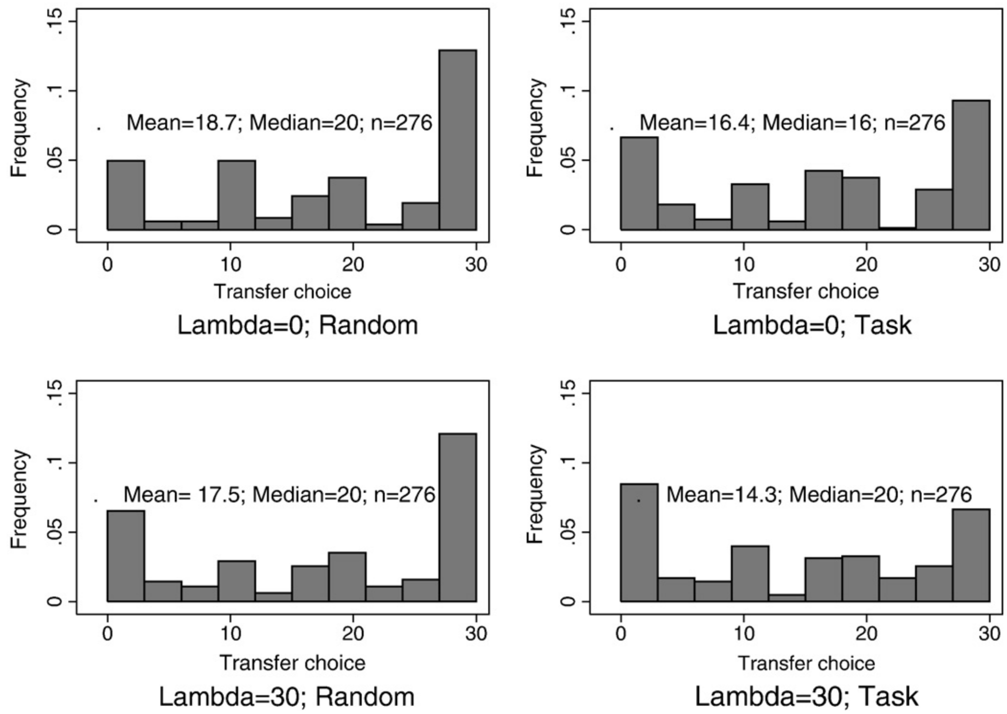

Fig. 1. Frequencies of transfer choices.

that efficiency concern was not a strong motivator in this task. Looking at the average value of the Group Account (net of efficiency losses) resulting from proposed transfer levels, we observe a substantial decrease from 35.0 to 22.3, most of which, however, results directly from the application of the efficiency loss. These findings are consistent with theoretical predictions that an increase in deadweight loss leads to a smaller government (see Becker and Mulligan, 2003; and Crutzen and Sahuguet, 2007).

3.1. Task vs random

Entries in Fig. 1 show that transfers are generally lower in the task condition. A formal test confirms this conjecture at $p=0.065$ (MWW; whereas $p=0.028$ in a *t*-test). Similar results are obtained if means for high and low λ are computed separately, the difference between transfers under "Task" and "Random" being somewhat more pronounced under positive deadweight loss ($p=0.05$ for high λ, n.s. for

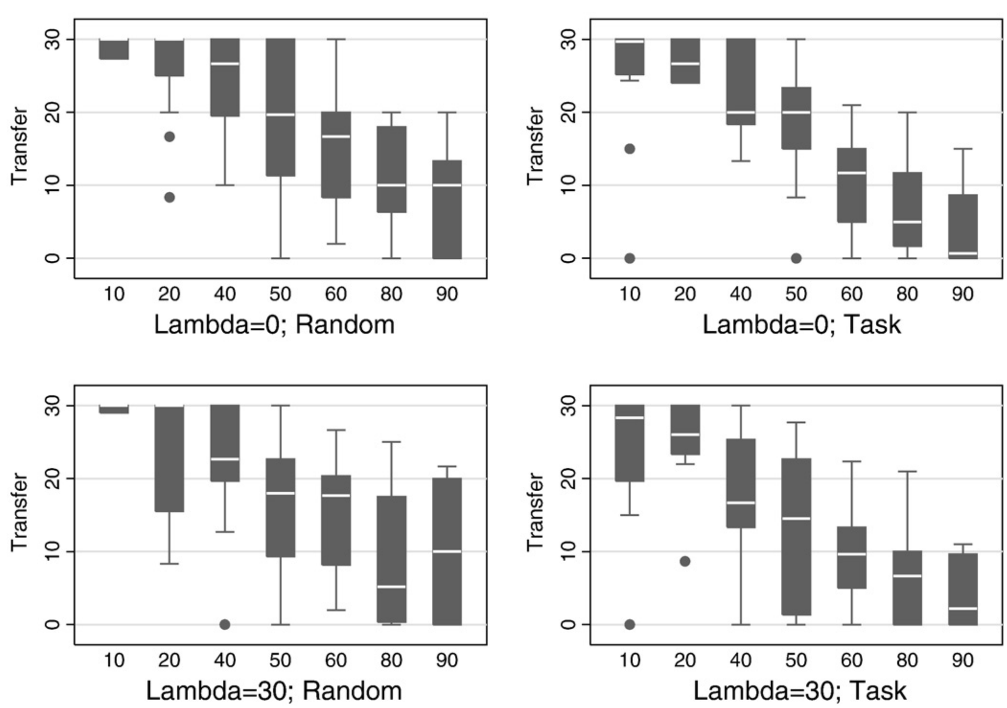

Fig. 2. Transfer choices in different probability classes. The line in the box signifies the median, the hinges – the first and third quartiles; the adjacent lines – adjacent values of the distribution.

the low λ; whereas $p = 0.019$, $p = 0.065$, for the high λ and low λ respectively when *t*-test is used instead). The treatment effect is particularly driven by female participants, who redistribute much more than males, but only in the Random condition (21.8 vs 15.5 euro).

Looking across probability groups, we see that the transfers in the Task treatment are always lower, although generally, due to smaller sample sizes, not significantly so. We also note that the treatment effect is somewhat weaker in the lowest probability groups: 2.1 euros for PoW < .3, 2.7 euros for .3 < PoW < .7 and 3.6 euros for PoW > .7 — which however could be explained by the fact that transfers under Task treatment are already very high in the low probability groups. What is interesting, in the Random treatment a majority of low-PoW participants (56%) consistently chooses maximal transfers, whereas other choices are roughly equally spaced between 10 and 30 (suggesting some randomness in the choice). In the Task treatment, only 35% always chooses transfers of 30, whereas another 48% choose high-but-not-maximum transfers (average between 20 and 30), as if they thought it fair for the winners in the task to earn somewhat more than the losers.

As mentioned in the previous section, two potential reasons for the observed treatment effect suggest themselves. First, it is possible that participants in the Task treatment overestimated their chances of success, thus adjusting transfer choice downwards.[13] To verify this possibility we asked the participants what their subjective belief about the probability of winning was (explaining that it should be higher (lower) than their PoW if they expected to do better (worse) than a typical student would). The results showed slight overconfidence: average subjective anticipated probability of winning was 55.8%, while average probability was equal to 50% by design.[14] We also asked (before the assessment of own subjective probability) whether they took into account, while making choices, their expectation to perform better or worse than a typical student would. Again, average entries for the question about superior performance where somewhat higher than for the question about inferior performance (4.45 vs 3.48 on a 7-point scale, a significant difference).[15]

To sum up, we do observe some overconfidence. It appears, however, that it cannot account for the observed difference in transfers between Task and Random treatments. First, we have seen that this difference is actually greatest for high PoW (i.e. when there is least room for being overconfident). More importantly, when included in a regression model, the two questions about expected performance in the task do not significantly affect transfers. The subjective probability of winning is not significant either when the assigned probability is controlled for. Actually, even if the *assigned* probability of winning was 5.8 percentage points higher in the Task treatment, the value of the coefficient obtained in a regression suggests that level of transfer could increase by about 1.3, rather than 2.8 euro. It is thus likely that overconfidence plays some role in the behavior under Task treatment, but it is most probably not the main force behind the observed difference.[16]

The second possibility is that unequal allocation following low transfers was considered more acceptable when it resulted from a task, which required, as stated in the instructions, "some effort, some skill and some good decisions". Indeed, there is a huge experimental literature confirming that earned income is more legitimate than randomly assigned income. In the current experiment, participants reported having substantially higher influence on the earnings in the experiment under Task treatment ($p < 0.01$ in a Mann–Whitney–Wilcoxon test). Those in the Random treatment, on the other hand, scored higher on the question "It was important to me to equalize everyone's earnings" and lower on "I think the differences assigned probabilities are irrelevant. Everyone has earned his money by participating". We also asked about perceived fairness of the procedure used to identify "winners" and "losers" (see Lind and Tyler, 1992). No significant difference was observed. However, repeated questions from the participants suggested that there could have been substantial confusion about its precise meaning. Moreover, the between-subject design resulted in lack of a clear benchmark for comparison.

Finally, regression analysis shows that the estimated value of the coefficient on treatment decreases when responses to questions pertaining to the fairness judgments are introduced into the regression, providing additional indication that part of the difference can be explained by differentiated justification of the unequal allocation (in other words, the treatment effect is partly mediated by the fairness perception). Further, it shows that clear impact of inequality aversion can be found for high-probability participants under Random but not under Task treatment. It appears thus that the enhanced legitimacy of the unequal allocation contributed to lower transfer choices under Task treatment.

3.2. Effect of dispersion of chances

As mentioned before, dispersion of probabilities of winning took two levels within each 3-period block with specific value of λ. We can thus, separately for λ equal to 0 and λ equal to 30%, compare for each participant the mean transfer selected under high dispersion with mean transfer selected under low dispersion (there is always one entry for one of these two categories and two entries for the other). Running a sign test we find no significant difference: under λ equal to 0 transfer choices are slightly higher when dispersion is high ($p = 0.33$), whereas they are not different at all under λ equal to 30% ($p = 0.58$). When probability classes are considered separately (or pooled into three groups to increase sample size), test results never approach significance either. The same conclusion obtains if Task and Random treatments are considered separately. Interestingly though, the *difference* between the treatments approaches significance in a one-sided test ($t = -1.18$, $p = 0.12$): in line with Alesina and LaFerrara (2001) the dispersion of opportunities impacts redistribution choices more positively when the process might be deemed as fair. That is, the mean difference between choices in high-dispersion groups and choices in low-dispersion groups is higher under Task treatment than under Random treatment (.58 vs −.46). This difference is particularly pronounced for low efficiency loss ($t = -1.63$, $p = .05$).

Considering the distribution of the difference between mean choice in high dispersion groups and low dispersion groups we find that it is

[13] Robin Cubitt has pointed it out to me that participants could have displayed a differentiated attitude towards Task vs Random due to ambiguity aversion — while Probability of Winning clearly determines the chances under Random, it only gives a more or less vague clue under Task. This effect should make the subjects favor relatively higher transfers (thus reduced uncertainty) in the latter treatment. The observed treatment effect can be thus thought of as a lower bound on the impact of the other forces considered.

[14] While overall subjects were somewhat overconfident, high-PoW participants generally underrated their chance of success (the coefficient in the regression of subjective PoW on the assigned PoW was just .41). It is interesting to see whether this de-polarization of perceived probabilities of winning could lead to lower (or higher) transfer choices. Comparing transfers across broad probability classes, we find that the middle class (PoW between 40 and 60%) in the Task treatment on average chose transfers of 15.5 euros, compared to the overall average of 15.3 euros (the respective values were 18.5 and 18.1 in the Random treatment). I thus claim that this convergence toward intermediate perceived probability of winning could not significantly affect the transfer choice.

[15] Regrettably, these two questions were presented always in the same order (better–worse), possibly inflating the difference.

[16] We also note that the subjectively perceived PoW was not correlated with the score in the task, not even in the sessions in which the nature of the task was revealed before the decisions. It is thus not the case that (many) participants correctly recognized their superior ability, upon which redistribution decisions could be based.

equal to 0 for about 45–50% of participants. This large proportion of zeros suggests a possibility that some subjects considered conditioning the choice of transfer on the group composition as "irrational" and thus tried to choose consistently. If this was the case, each participant's first-period choice would reveal her "true" preference, while subsequent choices would merely be its replications. We therefore tested, in a between-subject manner, the effect of dispersion of probabilities on transfers in the first period only. The transfers were actually slightly higher if dispersion of probabilities was low but not significantly so ($p=0.17$ Mann–Whitney–Wilcoxon).

We also checked for the possibility that the hypothesized effect only appears in subjects who took sufficient time to think about particular group composition. No relationship between the total thinking time and the difference between transfer choices in high- and low-dispersion groups was found. Interestingly however, even though we found no systematic impact of dispersion on behavior, it did affect the decision time — subjects significantly took more time to choose in the high-dispersion groups.

A regression analysis also confirms that standard deviation of within-group probabilities is not a significant predictor of the level of transfers. We can thus conclude with confidence that dispersion of chances does not make our participants opt for greater redistribution, as long as their individual probability of winning remains unchanged. This appears contradictory with the predictions of both the process FS model and the idea of diminishing ex-ante differences between other individuals. There is therefore no possibility and, indeed, no need to further disambiguate between the two along the lines contemplated in subsection 2.4. Of course, this does not preclude that the models allowing for ex-ante inequality between others provide superior predictions, as it is the case in Karni et al. (2008). Certainly more data on decision making involving simultaneously fairness concerns and risk is needed.

Analysis of the responses to the open-end question about the strategy employed by the subjects suggests one reason of this negative result. It indicates that some of them might have, intuitively but incorrectly, perceived their own chances as higher when the dispersion of PoWs was high. Two quotations representative of this tendency are reported here: "I had a 60% chance of winning, so in groups of 40, 40, 60, 60 probabilities I acted as a loser, i.e. chose 30 (...) In groups of 20, 40, 60, 80 probabilities I saw myself more likely a winner, so chose a lower transfer"; "When I was the only high probability I would pick lower transfers, and when another 0.8 was with me I would pick a little higher in case I lost. After the fact [I realized that] I probably should have always picked low numbers regardless since there are always 2 winners and I suppose statistically I should win every time."

4. Discussion

In recent years the issue of support for redistribution appears to attract some attention of experimentalists. Two studies which are perhaps most closely related to mine are by Hörisch (2007) and Durante and Putterman (2007). The former elegantly confirms the intuitive notion that choice from behind the veil of ignorance is driven by social concerns, not only risk aversion (but mostly so for the female participants). The latter, more comprehensive study, also finds that redistribution choices are governed by inequality and risk aversion and additionally illustrates that people are affected by the way in which outcomes are determined (transfers being higher when allocation of (pre-tax) income is random or based on the income of the place of origin, rather on performance in a task (a game of Tetris or a SAT-like quiz)). This effect can be ascribed to apparently greater legitimacy of earnings in the latter case. Both studies also find that female participants tend to redistribute more.

The current study is, to our knowledge, the first which experimentally tests the impact of differentiated opportunities on preference for redistribution. We verified two aspects of the hypothesis that inequality of opportunity calls for a compensation by ex-post redistribution. The notion that greater dispersion of chances leads to increased support for welfare state finds no support in the collected data. This negative result might to some extent be driven by the fact that, strange as it might be, some participants perceived their own chance as greater (and thus did not want to share) when the dispersion of chances increased. Another potential reason is that participants failed to notice the changes in groupmates' probabilities of winning or were not able to take this bit of information into account in a relatively difficult decision making task. However, the distribution of PoWs was actually the only thing that changed between the rounds (except between rounds 3 and 4 where deadweight loss parameter changed), its variation thus being made salient. Further, the increased response time in the cases of greater dispersion of chances suggests that subjects did notice a difference and made some cognitive effort to choose the best response. The result could be driven by the fact that chances to decide were distributed equally (because anybody's preference for redistribution was equally likely to be implemented), thus making the un-equal distribution of chances to win less important. However, it was obvious that participants did not disregard the Probabilities of Winning altogether; further, in responses to the open-end question, consideration of what other might do if they have a choice was basically never mentioned, suggesting that the subjects did not focus on the fact that there is only a chance of 1/4 that their choice determines the outcomes. Finally, it is possible that subjects did not consider ex-post redistribution as the right way to restore justice, shaken by unequal allocation of chances. Indeed, responding to the question about "what would be the fair thing to do", a few participants suggested it could only be fair if all had equal chances to win in the first place. In this sense, it may be that subjects do care about equality of expected payoffs, but prefer to restore it by manipulating chances, not outcomes.

Whatever the exact reason of this null result is, it gives a hint regarding the right way to model preference for equality of opportunity. Namely, it suggests that, at least in contexts similar to the one considered here, individuals focus predominantly on their own chance of winning, largely disregarding the dispersion of others' prospects. It thus speaks for the models of "self-centered" preferences. Of course, with the scarce evidence at hand, it would be very unwise to immediately discard other models.

What regards the second focal dimension studied in our experiment, we observe higher redistribution choices when the income is determined randomly rather than by performance in a task (and it cannot be reduced to the effect of overconfidence). This finding corroborates suggestions made in field studies and some very recent experimental evidence (such as the above-mentioned by Durante and Putterman, 2007). The context is somewhat different, however, in that in the current study the chances of succeeding in the task are exogenously controlled (and differentiated) between the subjects. In other words the two aspects of equality of opportunity are manipulated in an independent way.

As an anonymous referee rightly pointed out, it would be interesting to consider in future research the question of how behavior depends on the relative importance of skill and effort required to do well in the task. Indeed, it may well be relevant for the perception of fairness, e.g. when skill is perceived as something innate and thus "un-earned".

Preliminary as they may be, these findings suggest two policy implications. First, that the perceived equality of opportunity is an important factor affecting the demand for government's assistance. Taxing bequests, equalizing access to quality schooling, fighting nepotism or racial and gender discrimination may not only make the society fairer and open more positions to talents but also eventually lighten the tax burden by facilitating acceptance of income differences. Second, that social mobility per se might not be as important as the feeling that the professional and financial success is primarily based on merit.

Appendix A. Instructions

A.1. Handout 1 [here: task, λ = 0 in periods 1–3]

This is an experiment in which you may earn money.

NB: all instructions in all handouts distributed in this experiment apply equally to all participants (others' handouts are identical to yours).

You have already earned 5 euros as a show-up fee.

Whenever earnings are mentioned in the handout, they are earnings on top of this show-up fee. These earnings will depend on your decisions, decisions by other participants as well as on your score in a task.

The experiment consists of three closely inter-related parts. We shall call them: Assignment, Decisions and Task respectively. It will be easiest to explain the “Assignment” first, then the “Task” and finally the “Decisions”.

A.1.1. Part 1: assignment

In this very short part your individual Probability of Winning will be determined and shown on your screen. We will base your Probability of Winning on your reported height. This Probability of Winning will remain constant throughout the experiment and will represent your chances in Part 3 (Task) of the experiment. Because you will not know how the Probability of Winning is generated given your reported height, you cannot benefit from providing false information.

A.1.2. Part 3: task

In Part 3 of the experiment your score in a task will determine whether or not you win a prize of 30 euros. (To perform well in task will take some effort, some knowledge and some good decisions — you will learn about the nature of the task after Part 2). This will be done in such a way that:

1. To win the prize, you will need to score sufficiently high in the task. What will be “sufficient” will depend on your Probability of Winning and scores of other participants in your 4-person group (in the explanation of “Part 2: Decisions” you will find out how the groups are formed).
2. Assuming that you put just as much effort and skill in the task as any other student, your probability of winning the prize will (not surprisingly) be identical with your assigned Probability of Winning.
3. There will always be exactly two winners in each 4-person group (this can be any two of the four group members, yet, due to point 2, not with identical probabilities).

A.1.3. Part 2: decisions

Your earnings will not be entirely determined by the results of the task in Part 3. Rather, you may influence your earnings and earnings of other participants by choosing Transfers in Part 2 of the experiment (that is, before the task of Part 3 is played).

The procedure will be the following. Part 2 will consist of 6 periods. In each period you will be matched with three other participants. You will not know the identity of your group-mates and they will not know yours. In every period you will have new group mates. It may happen that you will be matched with the same person twice (but not more than twice) during the course of the experiment, but you will not be able to find out. In every period you will learn the Probabilities of Winning of your group-mates.

The sum of probabilities in each group is identical (necessarily equal to 2), but the individual Probabilities of Winning of your group-mates will be different in each period. For example, if your Probability of Winning is equal to 0.5, you might face a group in which one participant has a PoW of just 0.1, you and another participant have PoW of 0.5 each, and one participant has a PoW of 0.9 (it will be shown as (0.1, 0.5, 0.5, 0.9) on the screen). In another period, all your group-mates' Probabilities of Winning might be equal to yours (0.5, 0.5, 0.5, 0.5).

You will be asked to choose a Transfer (a number between 0 and 30 euros) for your group. The Transfer is an amount that every participant who wins in Part 3 pays to the Group Account. Out of every euro in the Group Account, 25 cents will be paid to each of four participants in the group.

Not all decisions on Transfers will actually affect the earnings. One period has already been selected and, within each group formed in this period, one participant has been chosen. This participant's choice of Transfer will affect the earnings of the whole group (every “winner” in this group will pay the Transfer chosen by the selected participant). Because it may always be you and because you do not know which period's decisions will matter, it is important to make a careful decision in each period.

Example 1. Suppose that the Transfers postulated by the four group members, A3, B9, A1 and C9 are 7, 25, 10 and 0 respectively. Now assume that A1 had been selected in this group so the choice of 10 is implemented. Suppose that A3 and C9 win. Each of them earns 30 euros, yet transfers 10 to the Group Account, keeping 20. The amount collected is $2 \times 10 = 20$. Each group member (including the “winners”) receives 25 cents per each euro collected in the group account or 5 euros in total. The “winners” earn 25 and “losers” earn 5.

Example 2. In another group, B3, B1, C7 and A5 chose Transfers of 30, 30, 22 and 5 respectively. Choice of B3 (Transfer of 30) is selected. Everybody earns 15 euros.

The exact formulas for earnings (in euros) are:

$$\text{WINNERS}: \textit{earnings} = 30 - \textit{Transfer} + 2 \bullet \textit{Transfer} \bullet 0.25 = 30 - \tfrac{1}{2}\textit{Transfer}$$

$$\text{LOSERS}: \textit{earnings} = 2 \bullet \textit{Transfer} \bullet 0.25 = \tfrac{1}{2}\textit{Transfer}$$

Of course, the “2” in the formulas refers to the number of winners, and “0.25” to 25-cents-per-1-euro paid out of the Group Account.

The table at the end of the handout gives an overview of winners' and losers' earnings for each possible Transfer (remember there are always 2 winners and 2 losers in a group) (Tables 1 and 2).

For instance, the numbers mentioned in Example 1 above (5.00 euros for losers and 25.00 euros for winners) can be found in the row corresponding to Transfer of 10. Similarly, numbers from Example 2 are in the last row (Transfer of 30).

You must consider that, while you are deciding upon the Transfer, you do not know yet who will actually pay it (but you do know the probability that you and everyone else in your group will become a winner and thus a Transfer-payer).

During the course of the experiment, your decision will not be revealed to anyone, including your group-mates. Of course, you will not learn others' decisions either. You will only learn the Transfer actually implemented in your group in the relevant period.

Also note that the experimenter, while knowing your earnings, will not be able to infer from them anything about any of your decisions nor your score in the task.

Summary:

- In part 1 you will learn what your Probability of Winning is.

Table 1
Earnings for “winners” and “losers”.

Transfer	Loser	Winner
0	0.00	30.00
1	0.50	29.50
2	1.00	29.00
3	1.50	28.50
4	2.00	28.00
5	2.50	27.50
6	3.00	27.00
7	3.50	26.50
8	4.00	26.00
9	4.50	25.50
10	5.00	25.00
11	5.50	24.50
12	6.00	24.00
13	6.50	23.50
14	7.00	23.00
15	7.50	22.50
16	8.00	22.00
17	8.50	21.50
18	9.00	21.00
19	9.50	20.50
20	10.00	20.00
21	10.50	19.50
22	11.00	19.00
23	11.50	18.50
24	12.00	18.00
25	12.50	17.50
26	13.00	17.00
27	13.50	16.50
28	14.00	16.00
29	14.50	15.50
30	15.00	15.00

Please raise your hand if you have any questions.

- In Part 2, in every period you will see the Probabilities of Winning of three other participants with whom you will be matched in this period and you will make a decision regarding the Transfer (how much money should be transferred from each winner to the Group Account).
- Then you will move to the next period, where you will be matched with other participants and the same pattern will be repeated.
- After the final period, winners and losers will be identified by means of the Task (Part 3), according to everyone's chances.
- Then you will find out whose decisions from which period will actually determine Transfers. Your earnings including transfers and show-up fee will be computed and you will see them on your screen.
- We will also ask you to answer some questions about the game. These will be asked before and after Part 3.

Table 2
Earnings for “winners” and “losers”.

Earnings		
Transfer	Loser	Winner
0	0.00	30.00
1	0.35	29.35
2	0.70	28.70
3	1.05	28.05
4	1.40	27.40
5	1.75	26.75
6	2.10	26.10
7	2.45	25.45
8	2.80	24.80
9	3.15	24.15
10	3.50	23.50
11	3.85	22.85
12	4.20	22.20
13	4.55	21.55
14	4.90	20.90
15	5.25	20.25
16	5.60	19.60
17	5.95	18.95
18	6.30	18.30
19	6.65	17.65
20	7.00	17.00
21	7.35	16.35
22	7.70	15.70
23	8.05	15.05
24	8.40	14.40
25	8.75	13.75
26	9.10	13.10
27	9.45	12.45
28	9.80	11.80
29	10.15	11.15
30	10.50	10.50

A.2. Handout 2 [distributed after the third period]

In the periods played so far, every group member would obtain 25 cents out of every euro transferred to the Group Account, i.e. 100% of the collected money would be used. In the remaining 3 periods, only 70% of the amount collected in the Group Account will be transferred to the group members. In other words, each group member will obtain 17.5 cents out of every euro in the Group Account (when one of these periods is selected to be played for real).

Other than that, the rules remain exactly as they were before.

Example 1 (revised version of Example 1 from Handout 1). Suppose that the Transfers postulated by the four group members are 7, 25, 10 and 0. The transfer of 10 is selected and implemented. Each winner earns 30 euros, yet transfers 10 to the group, keeping 20. The amount collected in the Group Account is $2\times10=20$. Each group member (including the “winners”) receives 17.5 cents per each euro in the Group Account, or euro 3.5. Winners earn 23.50 and “losers” earn 3.50.

Example 2. (revised from Example 2 in Handout 1). In another group chosen Transfers are 30, 30, 22 and 5. Suppose that the Transfer of 30 is selected. 60 euros is collected in the Group Account. Everybody earns 10.50.

The formulas for earnings (in euros) are:

$$\text{WINNERS}: \textit{earnings} = 30 - \textit{Transfer} + 2\cdot\textit{Transfer}\cdot 0.175 = 30 - 0.65\cdot\textit{Transfer}$$

$$\text{LOSERS}: \textit{earnings} = 2\cdot\textit{Transfer}\cdot 0.175 = 0.35\cdot\textit{Transfer}$$

The table below gives an overview of winners' and losers' earnings for each possible Transfer. The numbers mentioned in the Example 1 can be found in the row corresponding to Transfer of 10: the earnings are 3.50 euros for losers and 23.50 euros for winners. Similarly, the last row shows earnings from Example 2.

A.2.1. Post-decision questionnaire [task treatment]

Before the two winners are determined in each group, we ask you to answer a few questions regarding your decisions in the experiment.

There are no correct or incorrect answers. Your answers will remain anonymous.

First, please describe in one or a few sentences how you decided about the level of Transfers in particular periods. You can answer this question in Dutch if you wish.

For each of the following factors indicate how important they were when you were making your decisions regarding transfers. [Answers on a 1–9 scale from “not important” to “very important”]

- Your Probability of Winning.
- Probabilities of Winning of your group-mates in particular period
- Equalizing everyone's earnings
- Increasing transfers in periods in which some participants had very low Probability, to compensate for their misfortune
- Whether 17.5 or 25 cents out of every euro in the Group Account would be paid to each of group members

- Maximizing the expected (average in the long run) value of your own earnings
- Making sure (by choosing somewhat higher transfers) that you earn something even if you lose
- Your expectation to do better in the task than a typical student would
- Your expectation to do worse in the task than a typical student would

Please answer the following question

You know your assigned Probability of Winning. However, if you expect to do better (or worse) in the task than a typical students, you may conclude that your actual probability to win money might be different from your assigned Probability of Winning. To the best of your judgment, what is your actual probability to win the prize? (in percentage points: 0–100)

For each of the following statements please indicate whether or not they are true when applied to you. [Answers on a 1–9 scale from "not true" to "very true"]

- I think there is no place for transfers in this game. Every winning participant has earned their prize by investing their time and performing well in the task.
- In the end some people will win and others will lose. The question is then if and how much of the earnings the lucky ones should share with the unlucky ones. The initial chances of succeeding are irrelevant here.
- I think the fair thing to do is to equalize the final earnings by choosing maximal transfers.
- I think it is unfair that different participants have different Probabilities of Winning
- I didn't like the fact that Transfers could go to the participants who had high Probability of Winning in the first place.
- I felt sorry for participants who had lower chance of winning than I did.
- I felt irritated by the fact that my chance of winning was lower than those of (some) other participants.
- I felt irritated by the fact that my chance for winning was low

A.2.2. Post-resolution questionnaire

Please answer the following questions

- How fair was the procedure used to determine who would win a prize?
- How satisfied are you with the procedure used to determine who would win a prize?
- How fair was the procedure used to determine how much money everyone would earn in the experiment?
- How satisfied are you with the procedure used to determine how much money everyone would earn in the experiment?
- How much influence did you have in determining how much you earned in the experiment?

Please answer these two questions

- In political matters, people talk of "the left" and "the right". How would you place your views on this scale, generally speaking?
- Many governments tax the rich and subsidize the poor. People have different opinions about the extent to which this should be done. In your view, should the taxes and the transfers to the poor be generally low or high?

Personal data

- sex
- age
- number of experiments in which you have participated

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