Positive framing does not solve the tragedy of the commons

Isaksen, E. T., Brekke, K. A., & Richter, A.

Positive framing does not solve the tragedy of the commons

Elisabeth Thuestad Isaksen[*,†] Kjell Arne Brekke[‡] Andries Richter[§,¶]

October 19, 2018

Abstract

We investigate whether positive framing increases cooperation in three social dilemmas with slightly different properties: a linear public goods (PG) game, a non-linear PG game, and a common pool resource (CPR) game. Results from our laboratory experiments show that contributions to a linear PG are higher if the externality is framed positively, rather than negatively, corroborating earlier findings by Andreoni (1995). By contrast, we find no such framing effects in the non-linear PG game or the CPR game. In these games, the best response in the material payoffs is to contribute less if others contribute more, counteracting effects of pro-social preferences. Positive framing therefore does not help to solve the tragedy of the commons.

Keywords: Public Goods experiment, Common Pool experiment, Framing, Externality, Strategic complements, Strategic substitutes, Rivalry

JEL codes: C92; C72; D70

[*]Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, United Kingdom

[†]The Ragnar Frisch Centre for Economic Research, Norway

[‡]The Department of Economics, University of Oslo, Norway.

[§]Environmental Economics and Natural Resources group, Sub-Department of Economics, Wageningen University, The Netherlands

[¶]Centre for Ecological and Evolutionary Synthesis (CEES), Department of Biosciences, University of Oslo, Norway

1 Introduction

Social dilemmas – a misalignment of individual and group interests – are the root cause of many environmental problems. Cooperation can attenuate such dilemmas, depending on how the game is framed, the marginal benefits of cooperation and how those benefits are shared (van Soest et al., 2016; Apesteguia and Maier-Rigaud, 2006). Andreoni (1995) showed in a seminal study that contributions in a public goods (PG) game were much lower if the identical game was framed in terms of a *negative externality* (i.e. a public bad) rather than the standard *positive* frame (i.e. a public good). He speculated that "the warm glow of contributing must [hence] be stronger than the cold-prickle of imposing cost on others". Further, he pointed out that cooperation is common in public goods games, but rare in oligopoly and common pool resource games, the framing being a salient difference: "It is possible that this difference alone could be generating at least some of the gap between these two bodies of experimental results." (Andreoni, 1995, p.2).

The main goal of this paper is to test whether reframing the common pool resource (CPR) game as a positive externality – not harvesting benefits others – increases cooperation. While the PG and the CPR games are both social dilemmas, they also differ in aspects that might influence the effect of framing. First, in the standard linear PG game, the material incentives to contribute are independent of the contribution of others. As pointed out by van Soest et al. (2016), the marginal per capita return (MPCR)[1] is therefore constant. In a CPR game, however, the MPCR decreases as more players are cooperative. This means that being selfish is most beneficial if many co-players cooperate, and choices are strategic substitutes in the material domain.[2] Second, in the PG game the fruits of cooperation are shared equally among group members – independent of who has contributed. By contrast, the rivalry component of the CPR game implies that benefits are disproportionally reaped by non-cooperative individuals.[3] If a player is "kind" and harvests little, the ones who benefit the most from this kindness are the unkind players who themselves harvest the most.

How do these properties of *strategic substitution* and *rivalry* influence the effect of framing

[1] MPCR is the individual return per unit contributed to the public good divided by the return from the alternative investment. Even though the CPR game does not feature a public good, there is a cooperative choice that benefits others (lower resource extraction). In this case the MPCR is the return per dollar invested in the cooperative option over the alternative investment.

[2] Choices are strategic substitutes if a certain choice induces the co-player to take the opposite action. Hence, the best response of each player is decreasing with the actions of others. For the CPR game, this implies that if cooperation by co-players is high, the best response is to cooperate little and vice versa.

[3] Apesteguia and Maier-Rigaud (2006) have shown that the rivalry component of common pool resource games cannot be represented in a public goods game.

in social dilemmas? To answer this question, we run six different treatments. The first two treatments are a positive and negative framing of the linear PG game similar to that of Andreoni (1995). The next two are a positive and negative framing of the CPR game. Lastly, as a CPR game differs from a linear PG along two dimensions, we also run a positive and negative framing of a non-linear PG game that features strategic substitutes, but no rivalry. In all three games (PG, CPR and non-linear PG) participants are asked to make two active choices: invest a certain endowment of money either in a "kind" account (labeled account A) or in an "unkind" account (labeled account B).[4] The two frames of each of the three games are economically equivalent. In the positive framing, instructions highlight that an investment in account A will make group members better off, essentially posing a positive externality. The negative framing emphasizes that an investment in account B will make other group members worse off, essentially posing a negative externality.[5]

Framing effects in these dilemmas may occur for (at least) two reasons. First, players may hold different preferences for imposing positive or negative externalities on others, as suggested by Andreoni (1995). In such a case, we should observe a framing effect in all games. Second, framing effects may be due to beliefs about behavior of others (Ellingsen et al., 2012; Fosgaard et al., 2014). In the positive frame, the positive externality – good behavior – is highlighted. As a result, individuals may be more inclined to believe that others will cooperate.[6] With pro-social preferences, multiple equilibria can emerge and the frame may serve as a coordination device.

Our main finding from the experimental investigation is that positive framing increases cooperation in the linear PG game, but has no significant effect in the non-linear version of the PG and the CPR game. We therefore reject the conjecture that positive framing generally increases cooperation in social dilemmas. We discuss several behavioral models and mechanisms that may explain why a framing effect only occurs in the linear PG game. In particular, we discuss how strategic substitution in material payoffs may counteract a framing effect stemming from different social preferences.[7]

Our paper adds to the experimental literature testing under which conditions positive or negative framing effects cooperation in social dilemmas.[8] Park (2000) combines Andreoni's

[4]Investing in account A can be thought of as the cooperative action.

[5]To enhance comparability, the instructions and parameterization are made as similar as possible across games.

[6]Put differently, highlighting the negative externality may reinforce the fear that others will act more selfishly.

[7]The social preferences we consider are: (i) two types of inequity-aversion, (ii) social norms, and (iii) reciprocity.

[8]Closely related is a branch of experiments where individuals make a decision about taking from an already established group account vs. contributing to the account; see for example Khadjavi and Lange (2015); Sell and Son (1997); Brewer and Kramer (1986); Messer et al. (2013); McCusker and Carnevale (1995); Dufwenberg et al. (2011). These experiments typically find a similar asymmetry, i.e individuals are more inclined to *give* to a public

framing experiment with eliciting also value-orientation, highlighting that the framing effect is more pronounced for some personality types than for others. Along similar lines, Sonnemans et al. (1998) have framed two strategically equivalent games as a public good or public bad game with discrete stepwise cooperation levels, also eliciting value orientation and beliefs. They find contributions to the public good to be higher than to the public bad, consistent with Andreoni (1995). Fujimoto and Park (2010) replicated Andreoni's findings looking particularly at gender effects and found that framing effects are slightly weaker for females.[9] Willinger and Ziegelmeyer (1999) have replicated Andreoni's key findings with a non-linear version of the public goods game. They find a framing effect, while we find no framing effect for the non-linear PG game. A potential explanation for this difference is that in Willinger and Ziegelmeyer (1999), the non-linearity lies in the private payoff function, while the social optimum is still to allocate everything to the public good. Hence, there is no strategic substitution in the monetary domain in their model, while in ours there is.

This paper is organized as follows. Section 2 presents the theory with the experimental design and procedure, while Section 3 presents the results. Section 4 contains a short discussion, and Section 5 summarizes and concludes.

2 Experimental design

Before presenting the details of our design, we first consider formally how the PG game, non-linear PG game and CPR game can be alternatively framed in terms of positive and negative externalities.

2.1 Public goods game

Each participant receives an endowment E that can be invested in a private account y_i (in the instructions referred to as tokens allocated to B), or a group account x_i (tokens allocated to A), so that $E = y_i + x_i$. In addition, each subject receives a lump sum bonus ("automated

good than refrain from *taking* from it, touching also upon considerations from prospect theory or loss aversion (Kahneman et al., 1991).

[9] We also tested for gender differences in the framing effect, and found no robust or significant differences in the three games when controlling for other observables, such as field of study.

earnings") each round.[10] The payoff function is given as

$$\pi_i = \alpha y_i + \frac{\beta}{N}\sum_{j=1}^{N} x_j + \gamma, \tag{1}$$

where y_i denotes the amount invested in a private account, while x_j denotes individual contributions to the public good, which are shared equally by N individuals. Marginal returns are constant and α for the private account and β for the public account. The automated earnings are given by γ. If $\beta > \alpha > \frac{\beta}{N}$, the Nash strategy is to invest everything in the private account, while the socially optimal solution is to contribute the entire endowment to the public good.

Equation (1) can be decomposed into a pure private part and a pure externality, which yields the decision frame of the first treatment:

$$\pi_i = \gamma + \alpha y_i + \frac{\beta}{N} x_i + \frac{\beta}{N}\sum_{i \neq j}^{N-1} x_j. \tag{2}$$

The term $\frac{\beta}{N}\sum\limits_{i \neq j}^{N-1} x_j$ is the positive externality, and can be used to make a positive frame "*... for each token other group members allocate to account A you earn...*" $\frac{\beta}{N}$.

Using the relationship $E = y_i + x_i$, equation (2) can be modified to obtain a negative frame, which is used in treatment 2 and given as

$$\pi_i = \tilde{\gamma} + \alpha y_i + \frac{\beta}{N} x_i - \frac{\beta}{N}\sum_{i \neq j}^{N-1} y_j, \tag{3}$$

where $\tilde{\gamma} = \gamma + \frac{\beta}{N}\sum\limits_{i \neq j}^{N-1} E$ are the automatic earnings with the negative frame. The last term in equation 3 is the negative externality, and can be used to make a negative frame: "*... for each token other group members allocate to account B you loose...*" $\frac{\beta}{N}$.

2.2 Non-linear public goods game

In contrast to the linear public goods game, the non-linear PG game features decreasing returns to investments in the group account. Hence, there is an element of strategic substitution in material payoffs, i.e. when others contribute to account x_i it weakens the monetary incentive to

[10] The automatic earnings in the positive frame are only included for symmetry purposes, as this is needed for the negative frame.

contribute as well. One specification of a non-linear public goods game payoff is given by

$$\pi_i = \gamma + \alpha y_i + \beta x_i + (\theta - \sum_{j=1}^{N} x_j) \sum_{j=1}^{N} x_j, \tag{4}$$

where θ is a parameter. The latter term in equation 4 can be presented as a positive frame, where x generates a positive, but marginally decreasing externality.[11] Again, using the relationship $E = y_i + x_i$, equation (4) can be modified to obtain a negative frame given as

$$\pi_i = \tilde{\gamma} + \alpha y_i + \beta x_i - (\sum_{j=1}^{N} y_j)^2 + (2EN - \theta) \sum_{j=1}^{N} y_j, \tag{5}$$

where $\tilde{\gamma} = \gamma + EN(\theta - EN)$.[12] Allocations to account y now create a negative externality which is marginally increasing with the total amount allocated. As the two equations 4 and 5 are economically equivalent, the Nash equilibrium (NE) and social optimum (SO) are the same in both cases. In the symmetric equilibrium, $x_i = x^*$ for all i, we get $x^{\text{NE}} = \frac{\beta - \alpha + \theta}{2N}$, which is smaller than the social optimum which is given by $x^{\text{SO}} = \frac{\beta - \alpha + N\theta}{2N^2}$.

2.3 Common pool resource game

In the common pool resource game, it is not possible to separate the pure private part from the externality since the game is rivalrous, giving rise to an interaction term. One specification[13] of a common pool resource game is given by

$$\pi_i = \alpha y_i + (\beta - \sum_{j=1}^{N} x_j) x_i. \tag{6}$$

Here the return to x is decreasing in the total sum $\sum_{j=1}^{N} x_j$, and hence allocating parts of the endowment to x creates a negative externality. Alternatively, the return to x can be re-framed as a positive externality, being increasing in $\sum_{j=1}^{N} y_j$:

$$\pi_i = \alpha y_i + (\tilde{\beta} + \sum_{j=1}^{N} y_j) x_i, \tag{7}$$

[11] See Section 2.6 for details on wording in the experiment.

[12] Note that if we set $\theta = 2EN$, the last term in equation 5 drops out. This is also what we do in the parameterization of the experiment, see Section 2.4.

[13] This can be derived from $\pi_i = \alpha y_i + \frac{x_i}{\sum_{i=j}^{N} x_j} [\beta \sum_{i=j}^{N} x_j - (\sum_{j=1}^{N} x_j)^2]$.

where $\tilde{\beta} = \beta - EN$. As these two frames are economically equivalent, the Nash equilibrium (NE) and social optimum (SO) are the same in both cases. In the symmetric equilibrium, $x_i = x^*$ for all i, we get $x^{\text{NE}} = \frac{\beta-\alpha}{(N+1)}$, which is larger than the social optimum which is given by $x^{\text{SO}} = \frac{\beta-\alpha}{2N}$.

2.4 Parameterization of the experiment

Table 1 summarizes the experimental parameters and Table 2 shows the corresponding payoff functions. Note that for the PG and the non-linear PG game, x_i is the cooperative or "more kind" account, while in the CPR game y_i is the "more kind" account.[14] Payoffs are stated in Experimental Currency Units (ECU). While returns in ECU are higher in the non-linear PG games, this is due to a rescaling to simplify the instruction and avoid non-integers.[15]

Table 1: Experimental parameters

Parameter	Explanation	Value		
		PG	Non-linear PG	CPR
E	Initial endowment	60	60	60
N	Number of players	4	4	4
α	Return private account	40	400	40
β	Parameter	80	80	240
γ	Parameter	400	400	.
θ	Parameter	.	480	.

Table 2: Payoff functions – 6 treatments

Treatment	Payoff using parameter values
(1) Public good	$\pi_i = 40y_i + 20x_i + 20\sum_{i \neq j}^{3} x_j + 400$
(2) Public bad	$\pi_i = 40y_i + 20x_i - 20\sum_{i \neq j}^{3} y_j + 4000$
(3) Non-linear public good	$\pi_i = 400y_i + 80x_i + (480 - \sum_{j=1}^{4} x_j) \sum_{j=1}^{4} x_j + 400$
(4) Non-linear public bad	$\pi_i = 400y_i + 80x_i - (\sum_{j=1}^{4} y_j)^2 + 58000$
(5) CPR-positive	$\pi_i = 40y_i + (\sum_{j=1}^{4} y_j)x_i$
(6) CPR-negative	$\pi_i = 40y_i + (240 - \sum_{j=1}^{4} x_j)x_i$

Notes: Payoffs are stated in Experimental Currency Units (ECU). In the PG and CPR game 1 ECU is worth 1/20 Norwegian Kroner (NOK), while in the non-linear PG game 1 ECU is worth 1/200 NOK. 1 USD $\approx$ 8 NOK. In the PG games, x_i corresponds to the number of tokens allocated to account A and y_i corresponds to the number of tokens allocated to account B. In the CPR games, the opposite is the case.

[14] In the actual experiments the "more kind" account is always labeled account A.

[15] See notes below Table 2 for details.

2.5 Incentives to cooperate in the three games

In Table 3, we give the Nash equilibrium and the social optimum for the three games in terms of allocations to account A and B.[16] We also state the corresponding payoff, π_i, in ECU and NOK. Note that in our design allocation to A is always the "kind" act.[17] Note further that as the payoff is independent of framing, the Nash equilibrium and the social optimum are the same for both frames.

Table 3: Theoretical predictions with standard preferences

	Nash equilibrium				Social optimum			
	A	B	π_i(ECU)	π_i(NOK)	A	B	π_i(ECU)	π_i(NOK)
PG	0	60	2400	120	60	0	4800	240
Non-lin PG	20	40	50000	250	50	10	64400	322
CPR	20	40	4000	200	35	25	4900	245

Notes: 1 USD ≈ 8 NOK. In the PG games, account A corresponds to x_i. In the CPR game, account A corresponds to y_i.

As the Nash equilibria and the social optima differ between the games, the direct allocation of tokens to the kind account A are not directly comparable across games. To make it easier to display and interpret results, we follow Potters and Suetens (2009) and measure the degree of cooperation in terms of deviations from the Nash equilibrium, normalized by what would be socially optimal:

$$\text{Degree of cooperation} = \frac{\text{Allocations to A}_i - \text{Nash}}{\text{Social optimum} - \text{Nash}}.$$

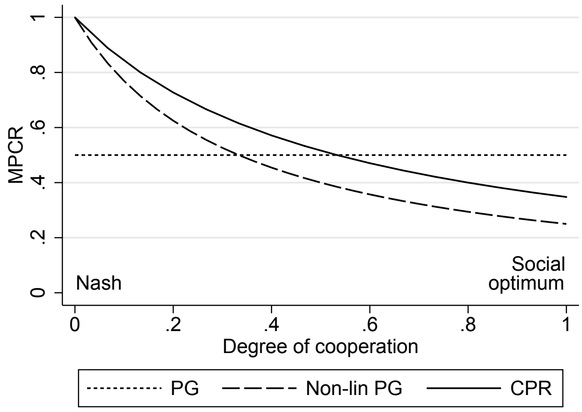
With this normalization, a value of 1 indicates behavior in line with the social optimum, while a value of 0 indicates behavior in line with the Nash equilibrium.

Figure 1 illustrates the marginal per capita return (MPCR) for the three games as a function of the degree of cooperation. The MPCR is defined as the private return on a token to account A over the return to a token to account B.[18] For the linear public goods game, the MPCR is certain and always 0.5. For the non-linear PG and the CPR game, it depends on the investments of other players and is therefore uncertain. In Figure 1, we consider the symmetric case where all players make the same allocation, and evaluate a marginal change in contributions to account A of one player. In the Nash equilibrium, the player has no incentive to reallocate tokens between accounts, thus the MPCR must be 1 in a Nash equilibrium, except for the linear public good

[16] See Appendix A.1 for calculations.
[17] In the PG games x_i represents allocations to A, while in the CPR game y_i represents allocations to A.
[18] See Appendix A.6 for details.

where the Nash equilibrium is a corner solution (at zero) and the marginal returns of the two accounts are not equal. The downward-sloping curves for the non-linear PG game and the CPR game reflect the strategic substitution in material payoffs, i.e., the decreasing incentive to cooperate as other players are more cooperative.[19]

Figure 1: Marginal per capita return (MPCR) for the three games as a function of cooperation.



Only considering monetary incentives, the positive or negative framing of the game should not matter for the degree of cooperation. However, if people have asymmetric preferences, as suggested by Andreoni (1995), framing will influence cooperation. If framing affects behavior through beliefs, as argued by Ellingsen et al. (2012), framing will only play a role when multiple equilibria exist. With only material payoffs, each stage game has a unique Nash equilibrium. In Appendix A.2 - A.5, we analyze the three games under different assumptions about "behavioral" preferences, and whether those give rise to multiple equilibria in the stage game. We find that inequity-aversion (Charness and Rabin, 2002; Fehr and Schmidt, 1999) and reciprocity (Rabin, 1993; Nyborg, 2017) both give rise to multiple equilibria, and hence framing may play a role.

Note that with a unique equilibrium in the stage game, the finitely repeated game has a unique subgame perfect equilibrium. With sequential equilibrium, however, multiple equilibria are possible even in this case (Kreps et al., 1982; Fudenberg and Maskin, 1986). Thus, there is potential role for framing to have an impact through expectation even in such cases.

[19]Note that the MPCR curves reflect marginal changes in allocations to account A while keeping allocations to account B constant. This implies violating the budget constraint, as subjects have a limited number of tokens. As a result, the shape of the MPCR curves, i.e. the *ratio* between the marginal return to account A and B, will differ somewhat between the positive and negative frame. Or put differently; the two frames are not equivalent outside the budget constraint. Note, however, that the *difference* between the marginal return to account A and B will be the same across the two frames. Figure 1 shows the marginal per capita return (MPCR) in the negative frame of the treatments.

2.6 Details of the experimental design

We examine whether a positive or negative frame affects behavior in the public goods (PG) game, the non-linear PG and the common pool resource game (CPR). In all experiments, we ask individuals to allocate 60 tokens between two accounts (A and B) over 10 periods with a non-paid trial period in the beginning. Each group consisted of 4 players, which remained the same throughout the experiment. To ensure independence between rounds, subjects were told that one randomly chosen round will be paid out, which would be revealed at the end of the experiment. The payoff for each treatment is given in Table 2.[20] As noted earlier, the returns in Experimental Currency Units (ECU) are higher in the non-linear PG games due to a rescaling. We made sure that earnings are similar by making each ECU worth less.

The first step was to replicate the two treatments as carried out by Andreoni (1995).[21] In the positive framing of the linear PG game, the payoff stated in Table 2 was explained as follows: "Account A: How much you earn from account A will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account A you earn 20 experimental currency units. *In addition you receive 20 experimental currency units for each token any other member of your group allocates to account A. Note that the tokens you allocate to account A will similarly result in an earning of 20 experimental currency units for each of the other members of your group.* Account B: For every token you allocate to account B you earn 40 experimental currency units." In the negative frame the part in italics was replaced by a similar statement under Account B: *"However, you lose 20 experimental currency units for each token any other member of your group allocates to account B."*[22]

For the non-linear PG game, the numbers are as in Table 2. The italic part in the positive frame reads as: *"In addition, for each token you and anyone else in your group allocate to account A you earn in experimental currency units an amount equal to 480 minus the sum of tokens allocated to account A by all members of the group."* In the negative frame, Account B is described as: *"In addition, for each token you and anyone else in your group allocate to account B you lose, in experimental currency units, an amount equal to the sum of tokens allocated to*

[20] Note that in the linear and non-linear PG games, x_i is the number of tokens allocated to account A and y_i is the number of tokens allocated to account B. By contrast, in the CPR game, y_i is the number of tokens allocated to account A and x_i is the number of tokens allocated to account B.

[21] Our experiment differs slightly from that of Andreoni (1995). First, we use n=4 instead of n=5 (but we keep the same marginal per capita return of 0.5 for the PG game). Second, we use different instructions than Andreoni (1995), partly to make the instructions as close to symmetric as possible for the positive and negative frame. Third, we have included automatic earnings also in the positive PG and non-linear PG frame for symmetry purposes.

[22] Full instructions are available in the online appendix.

account B by all members of the group."

Finally, in the CPR game, there are no fixed earnings from Account B. The return depends on the allocation of the other players and is explained in the positive frame as: *"How much you earn from account B will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn in experimental currency an amount equal to the sum of tokens allocated to account A by all members of the group."* In the negative frame, Account B was explained as *"How much you earn from account B will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn in experimental currency an amount equal to 240 minus the sum of tokens allocated to account B by all members of the group."*

2.7 Experimental procedure and descriptives

The experiment was programmed using z-Tree (Fischbacher, 2007) and each treatment lasted about 45 minutes. Each subject participated in only one treatment. Upon arrival, the participants received instructions, which were also read out loud by the session leader. Participants were then randomly assigned to groups of four, where identities were not known, and one trial-round was played without financial consequences. Throughout the experiment, participants could use a "simulator" that calculated the payoffs for the participant and the group members for different allocations to account A and B.

Treatments were run on five different dates during 2014 and 2015 and included in total 312 subjects; see Appendix Table B.1 for an overview of the number of individuals, groups and observations in each treatment. The subjects were students enrolled at different faculties at the University of Oslo. Around 80 % of subjects were first or second year students at the University, 87% had never taken a course in Economics before, and around 60% were female (see Appendix Figure B.1). There is no significant difference in observable characteristics between the positive and negative framing in the linear PG game and the CPR game. For the non-linear PG game, we have fewer observations, and we find a small difference in age and faculty affiliation across the two frames.[23]

[23] See Appendix B.1 for more details on the subject pool and the different sessions.

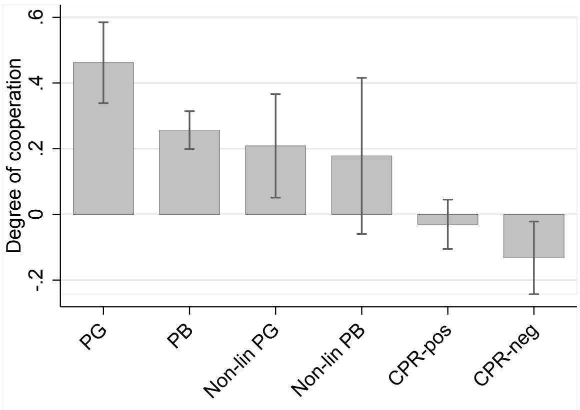
3 Empirical Results

In the following we show the results from the six treatments. All results in the following sections are presented in terms of the degree of cooperation rather than absolute contributions. Within each game this does not affect the measured impact of framing, as the same game is rescaled the same way in the positive and negative frame.

3.1 Cooperation over frames

Figure 2 shows the average degree of cooperation in each of the six treatments. The bars represent the level of cooperation in each treatment, averaged across groups and periods. The vertical lines represent 95% confidence intervals and are based on play in groups (averaged over all periods) as the unit of observation.

Figure 2: The degree of cooperation, by treatments



Notes: The bars represent the average degree of cooperation in each treatment. The vertical lines indicate 95% confidence intervals, and are calculated using play in groups (averaged over all periods) as independent observations. PG = Public Good, PB= Public Bad.

For the PG game, the average degree of cooperation in the positive frame is 46 % of the socially optimal degree of cooperation, while it is 26% in the negative frame. For both treatments the mean level of cooperation is significantly different from zero (see Table 4 and Appendix Table B.9). We test the difference in mean cooperation levels across the two frames using a Mann-Whitney U test and find that the difference of 21 percentage point is significant at a 1% level (see Appendix Table B.9, column (3)).[24] In an additional test we exploit the panel structure of the data by using a GLS random effects model to test for the framing effect. Using individuals as

[24]The Wilcoxon-Mann-Whitney U test is a non-parametric analog to the independent samples t-test. It is often used when it is assumed that the dependent variable is a normally distributed interval variable.

the unit of observation, but clustering the standard errors at the group level, we find a positive and significant framing effect.[25] The results are presented in Table 4 column (1). The finding of a significant framing effect means that we replicate Andreoni (1995). The positive frame induces a higher degree of cooperation, i.e., individuals contribute more to the "kind" account.

Table 4: The effect of negative framing on the degree of cooperation

	PG (1)	Non-lin PG (2)	CPR (3)
Constant	0.462***	0.209***	-0.0301
	(0.0608)	(0.0718)	(0.0372)
Negative	-0.205***	-0.0306	-0.102
	(0.0671)	(0.137)	(0.0663)
R^2 (between)	0.14	0.00	0.01
Obs	1080	480	1560
Groups	27	12	39
p-value (cluster)	0.002	0.823	0.123
p-value (wild bootstrap)	0.014	0.876	0.130

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The coefficients are from a random-effects model using data at the individual level. Significance levels are based on standard errors clustered at the group level. The p-values in the last row (wild bootstrap) are generated from the wild cluster bootstrap-t method and are robust to clustering with a small number of groups.

Moving to the non-linear version of the public goods game, we find no significant difference between the positive and the negative frame. While the level of cooperation in the positive frame (21%) is slightly higher compared to the negative frame (18%), a Mann-Whitney U test as well as a GLS panel regression reveal that the difference is not statistically different at any reasonable level of significance (see Table 4 and Appendix Table B.9).

For the CPR game the conclusion is less clear. While the level of cooperation in the positive frame (-3%) is higher than the level of cooperation in the negative frame (-13%), the two different test statistics give conflicting results. Testing the difference of 10 percentage points using the Mann-Whitney U tests reveals that the difference is significant at a 5 % level (p-value=0.0492; see Appendix Table B.9). However, running a random-effects model at the individual level with standard errors clustered at the group level, we cannot reject the null hypothesis of no framing effect (p-value=0.123; see Table 4). The two tests hence give conflicting results. Overall, the findings can be summarized as follows:

[25] Due to the low number of clusters, we also generate p-values based on a bootstrap procedure that is robust to clustering with a small number of sampling units (wild cluster bootstrap-t method, see Cameron et al. (2008)).

Result 1: (Positive vs. negative framing) We find a significant framing effect in the linear public goods game, but no framing effect in the non-linear public goods game. For the common pool resource game there is less cooperation in the negative frame, but the difference is not significant when we account for correlated error terms within groups.

3.2 Cooperation over time

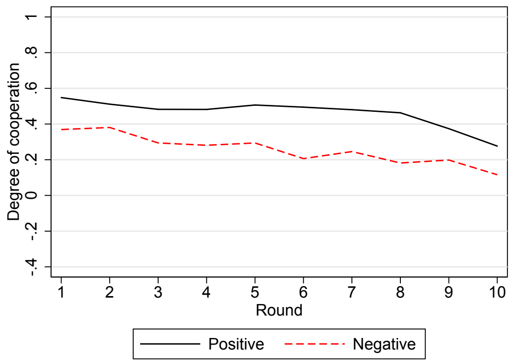
In a next step we investigate the development in cooperation over time. Figure 3 shows the development in the degree of cooperation over the 10 rounds for each of the six different treatments.[26] While each of the three panels on the left-hand side (3a,c and e) show the level of cooperation in the positive and negative frame, the three panels on the right-hand side (3b,d and f) show the difference in the level of cooperation between the two frames (with 95 % confidence bands marked by the vertical lines).

We see the common downward trend in cooperation in the linear public goods game, well known from the literature, but with no apparent trend in the size of the framing effect. There is however no clear trend in the non-linear public goods game, neither in level of cooperation, nor in the effect of framing. For the CPR game the picture is less clear with a slight drop in cooperation after round 3 in the negative frame and a corresponding increase in the effect of framing. Note that while there is a small framing effect in the CPR, there is no effect initially. The level of cooperation starts out at the same level in the two treatments, and the difference emerges only later. If the frame serves as a coordination device, we would expect to see a difference in the first round(s) of the game.

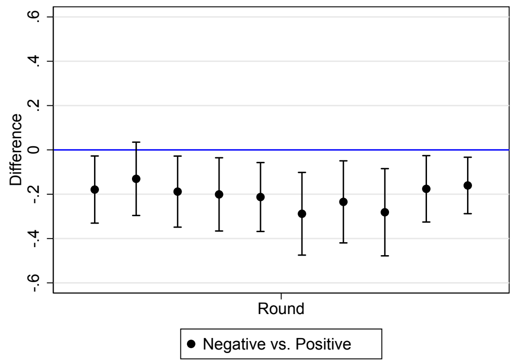
Result 2: (Dynamics) For the PG game the level of cooperation stays above the Nash equilibrium, and falls over time. For the non-linear PG game, the level of cooperation fluctuates at a level above the Nash equilibrium. For the CPR game the level of cooperation is stable around the Nash equilibrium for the positive frame, while it falls below the Nash equilibrium in the negative frame.

[26] See Appendix Figures B.3 - B.9 for how cooperation evolves over time per group.

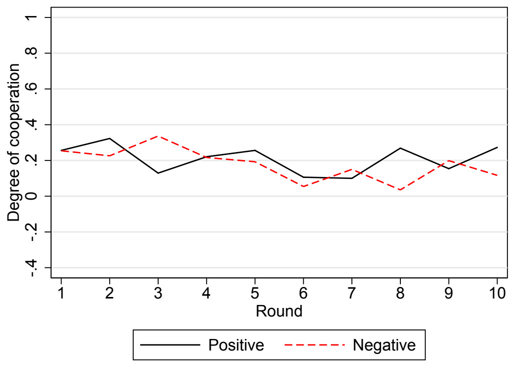
Figure 3: Degree of cooperation - positive and negative framing.



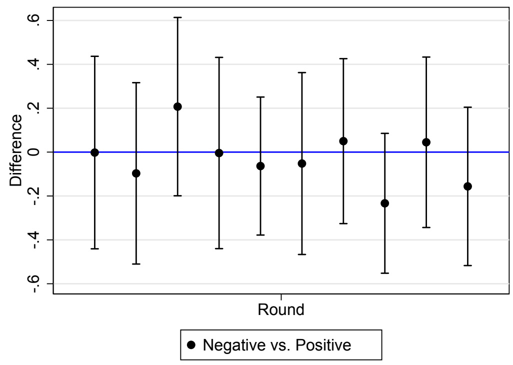
(a) Public goods game



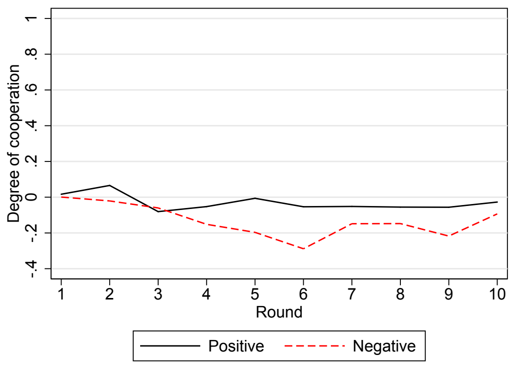
(b) Public goods game



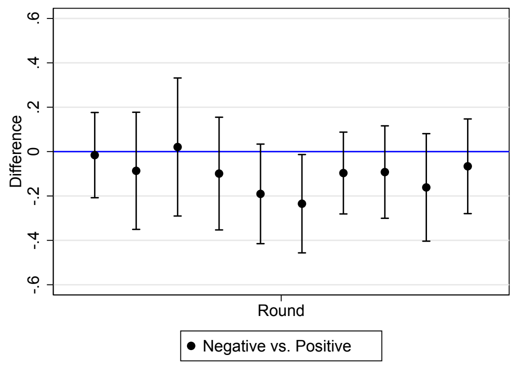
(c) Non-linear public goods game



(d) Non-linear public goods game



(e) Common pool resource game



(f) Common pool resource game

Notes: Panels (a), (c) and (d) show the average level of cooperation in each round for the positive and negative frame. Each of the panels (b), (d) and (f) show the coefficients from 10 different regressions with the level of cooperation in a particular period as the dependent variable and a binary variable indicating the negative frame as the independent variable. The regressions are based on individual level data, with standard errors clustered at the group level. The vertical bars indicate a 95% confidence interval.

As discussed above, there is a small effect of framing in the common pool resource game, but it is not significant when standard errors are clustered at the group level and it appears only from the fourth round on. To further investigate this we look at potential strategic interaction among the group members. Table 5 shows how investments depend on the degree of cooperation by the other group members in the two previous rounds. Both the dependent variable and the independent variables are measured as the change from the previous period. The coefficients are hence interpreted as the effect of a *change* in the average level of cooperation by the other three group members in the previous period on the *change* in the focal group member's level of cooperation.

Table 5: The effect of other's average contribution on own contribution

Dep.var.: Δ*Degree of cooperation*	PG		Non-lin PG		CPR	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Other's cooperation t–1	0.144**	0.203**	-0.0502	-0.0485	0.0416	-0.0675
	(0.0723)	(0.0833)	(0.0899)	(0.0801)	(0.0704)	(0.0520)
Δ Other's cooperation t–2		0.240**		0.0193		-0.213***
		(0.102)		(0.0704)		(0.0620)
R^2 (between)	0.01	0.01	0.03	0.02	0.00	0.01
Obs	864	756	384	336	1248	1092
Groups	27	27	12	12	39	39

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The coefficients are from a random-effects model using data at the individual level. Test statistics are based on standard errors clustered at the group level.

Table 5 shows the results with two different specification for each game; one with one lag and one with two lags. Column (1) and (2) show the results for the linear PG game. The sign of coefficients are consistent with actions being strategic complements, which is expected under social preferences. The more others in the group contribute, the more the focal subject also tends to contribute. For the non-linear public goods game the negative coefficient for the first lag indicates that material interests dominate over social preferences, as subjects tend to contribute less when others contribute more. However, the coefficients are not significant, perhaps exactly because strategic substitutes and complements pull in opposite directions and cancel each other out. The results for the common pool game are more puzzling. With only one lag, the coefficient hints at strategic complements, although not significantly so. With two lags, however, the sign changes to negative but only the second lag is both large and highly significant (p=0.0003). This seems to suggest that individuals do not respond immediately to changes in cooperation levels by co-players. Thus, the presence of strategic substitutes seem to dominate in the CPR game.

Result 3: (Strategic interaction) In the PG game subjects' allocation to A (the 'kind' account) is increasing in other's allocation to A in the previous round. In the non-linear PG game subjects' allocation to A does not depend on other's allocation to A in previous rounds. In the CPR game subjects' allocation to A is decreasing in others past allocation to A – but only if we go back two rounds.

The finding of a negative and significant effect is in line with the nature of the strategic interaction in the CPR game – the best response would be to harvest more (less) if co-players harvest relatively little (much). So not pro-sociality, but selfishness dominates behavior in the CPR game. This intuition is confirmed in Appendix Table B.11, which uses the best response (to the change in aggregate contributions in the previous round) as explanatory variable and finds the coefficient to be positive and significant.

4 Discussion

Our findings have shown that positive framing increases cooperation in the PG game, while no such effect can be observed for the CPR game. The two games differ in two respects: (i) the degree of strategic substitution, and (ii) rivalry. The results from the intermediate game – a nonlinear public goods game – indicate that the presence of strategic substitution is sufficient to remove the effect of framing. This is in line with earlier work showing that strategic substitutes in material payoffs tend to generate aggregate outcomes that are in line with theoretical predictions from standard game theory, i.e. closer to the Nash equilibrium (Fehr and Tyran, 2005; Potters and Suetens, 2009).

Our results cast doubt over Andreoni's explanation of a preference asymmetry, as this would suggest a positive framing effect in all three games.[27] By contrast, the results are consistent with the idea that framing effects occur because of beliefs (Ellingsen et al., 2012; Fosgaard et al., 2014). In games with multiple equilibria, the optimal strategy is to coordinate on an equilibrium, so a framing effect may unfold. Several theories of social preferences yield multiple equilibria in our stage games. With reciprocal preferences subjects want to be kind when others are kind, while preferences for fair distribution also favors choosing the same action as others. In the CPR and the non-linear PG game, however, the presence of strategic substitution in the material domain counteract the effect of pro-sociality. Strategic substitution implies that when

[27] His finding also seems counterintuitive in the light of the many psychological studies indicating that individuals are much less likely to do harm by imposing a negative externality than they are to do good by imposing a positive externality (Hauser, 2006). Also, the willingness to pay / willingness to accept gap points in the other direction, namely that individuals require much higher compensation to accept harm done to others than they are willing to pay for preventing it from happening (Horowitz and McConnell, 2002; Biel et al., 2011).

others cooperate, it is more profitable for a player to deviate, making it either more difficult to coordinate on the cooperative equilibrium in the stage game or making multiple equilibria in the stage game disappear altogether if social preferences are not sufficiently strong. In both cases, the positive framing no longer serves as a coordination device.

Our findings are somewhat sobering in the sense that social dilemmas that are more complex than the linear PG game cannot be easily overcome by positive framing alone. Unfortunately, this probably has implications for most environmental dilemmas that occur in the real world. Problems of deforestation, overfishing and pollution all feature strategic substitution in monetary payoffs as it is more profitable to pursue own self-interest when others are cooperating. Our results suggest that in order for framing effects to work, we need institutional arrangements that counteract the presence of strategic substitution in the material domain (e.g. taking turns or communicating about which strategy to pursue). Without such arrangements, positive framing effects are not likely to be effective in solving these types of dilemmas.

While our experiments are primarily designed to test the impact of positive and negative framing, an interesting topic for future research is the level of cooperation, which varies across games. A striking observation in Figure 2 is the steady decline in cooperation as we move from left to right. There is a stark contrast between the positively framed public goods game with subjects contributing 46% of their endowment to the public good and the negatively framed common pool resource game, where subjects are more unkind than even the Nash equilibrium predicts. Consider also Appendix Figure B.2, where we have averaged the degree of cooperation for each of the three games. The figure clearly illustrates the deterioration in cooperation when moving from the PG game to the non-linear PG to the CPR game. Significant contributions in the linear public goods game are well known in the literature; see Zelmer (2003). For the common pool resource game the results are more mixed, but negative cooperation is observed in many other studies (Vyrastekova and van Soest, 2007; Stoop et al., 2013; van Soest and Vyrastekova, 2007)

The difference in cooperation is no less striking if we consider the MPCR as shown in Figure 1. At the observed levels of cooperation the MPCR is more than 100% in the CPR, around 65% in the non linear public goods game and constant at 50% in the linear public goods game. It is counterintuitive that cooperation is lowest in the games where the marginal incentives to increase cooperation is highest. It is tempting to speculate that the low levels of cooperation are due to the presence of (i) strategic substitution (i.e. uncertainty about the marginal benefits of being cooperative) and (ii) rivalry (i.e. uncertainty about who benefits from cooperative actions), but as our design does not allow a clean comparison, this is a question for future studies. For example, it would be interesting to investigate the role of uncertainty about the marginal per capita return on cooperation by comparing a linear PG game with uncertainty about the MPCR and a linear game without such uncertainty.

5 Conclusion

In this paper we have extended the results of Andreoni (1995), who found a positive framing effect in a public goods (PG) game. We replicated Andreoni's results and investigated whether a positive re-framing of a common pool resource (CPR) game would similarly have a positive impact on the contribution and thus mitigate the tragedy of the commons. While we do find a difference between the positive and negative frame, we cannot conclude that it helps overcoming the tragedy of the commons, for several reasons. First, the difference is not statistically significant when we cluster standard errors at the group level. Second, it does not appear in the first three rounds of the game, which one would have expected if frames serve as coordination devices. Third, and most importantly, cooperation is negative in both frames for the CPR. Even if subjects are more cooperative in the positive frame, they are still less cooperative than even the standard Nash equilibrium in material payoff would predict.

To further investigate the difference between the two games we considered an intermediate case; a non-linear PG game. This game is intermediate as it shares common features with both the other games. In both the linear and non-linear PG game the return from the public good is shared equally between all players. This is not the case in the CPR game as it exhibits rivalry. Rivalry implies that those whose who cooperate least will benefit most from others being cooperative. However, in both the CPR game and the non-linear PG game the material payoff induces strategic substitution; the more others in the group cooperate, the higher is the incentive to pursue self-interest. There are no such incentives in the linear PG game. Conducting experiments with a positive and negative framing of the intermediate case (i.e., the non-linear PG game), we find no framing effect. This further indicates that the weak framing effect we observe in the CPR game is either spurious or unrelated to the framing effect in the linear PG game. If there is a framing effect in both games for similar reasons, we should also observe it in the intermediate case.

Overall, our findings suggest that positive framing will have limited effect on cooperation in social dilemmas, when these are characterized by strategic substitution and rivalry. Most real world environmental dilemmas unfortunately have these features. Hence, trying to nudge people into more cooperation by emphasizing that ”giving benefits others” rather than ”not giving harms others” will likely not be effective.

References

Andreoni, J. (1995). Warm-glow versus cold-prickle: The effects of positive and negative framing on cooperation in experiments. *The Quarterly Journal of Economics*, 110(1):1–21.

Apesteguia, J. and Maier-Rigaud, F. P. (2006). The role of rivalry: Public goods versus common-pool resources. *The Journal of Conflict Resolution*, 50(5):646–663.

Biel, A., Johansson-Stenman, O., and Nilsson, A. (2011). The willingness to pay-willingness to accept gap revisited: the role of emotions and moral satisfaction. *Journal of Economic Psychology*, 32(6):908–917.

Brewer, M. B. and Kramer, R. M. (1986). Choice behavior in social dilemmas - effects of social identity, group-size, and decision framing. *Journal of Personality and Social Psychology*, 50(3):543–549.

Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3):414–427.

Charness, G. and Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, 117(3):817–869.

Dufwenberg, M., Gächter, S., and Hennig-Schmidt, H. (2011). The framing of games and the psychology of play. *Games and Economic Behavior*, 73(2):459–478.

Ellingsen, T., Johannesson, M., Mollerstrom, J., and Munkhammar, S. (2012). Social framing effects: Preferences or beliefs? *Games and Economic Behavior*, 76:117–130.

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817–868.

Fehr, E. and Tyran, J.-R. (2005). Individual irrationality and aggregate outcomes. *The Journal of Economic Perspectives*, 19(4):43–66.

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

Fosgaard, T. R., Hansen, L. G., and Wengström, E. (2014). Understanding the nature of cooperation variability. *Journal of Public Economics*, 120(0):134–143.

Fudenberg, D. and Maskin, E. (1986). The folk theorem in repeated games with discounting or with incomplete information. *Econometrica*, 54(3):533–554.

Fujimoto, H. and Park, E.-S. (2010). Framing effects and gender differences in voluntary public goods provision experiments. *The Journal of Socio-Economics*, 39(4):455–457.

Hauser, M. D. (2006). *Moral minds*. Springer.

Horowitz, J. K. and McConnell, K. E. (2002). A review of wta/wtp studies. *Journal of Environmental Economics and Management*, 44(3):426–447.

Kahneman, D., Knetsch, J. L., and Thaler, R. H. (1991). Anomalies: The endowment effect, loss aversion, and status quo bias. *The Journal of Economic Perspectives*, 5(1):193–206.

Khadjavi, M. and Lange, A. (2015). Doing good or doing harm: experimental evidence on giving and taking in public good games. *Experimental Economics*, pages 432–441.

Kreps, D. M., Milgrom, P., Roberts, J., and Wilson, R. (1982). Rational cooperation in the finitely repeated prisoners' dilemma. *Journal of Economic theory*, 27(2):245–252.

McCusker, C. and Carnevale, P. J. (1995). Framing in resource dilemmas: Loss aversion and the moderating effects of sanctions. *Organizational Behavior and Human Decision Processes*, 61(2):190–201.

Messer, K., Suter, J., and Yan, J. (2013). Context effects in a negatively framed social dilemma experiment. *Environmental and Resource Economics*, 55(3):387–405.

Nyborg, K. (2017). Reciprocal climate negotiators. *Journal of Environmental Economics and Management*, (doi:10.1016/j.jeem.2017.08.008).

Park, E.-S. (2000). Warm-glow versus cold-prickle: a further experimental study of framing effects on free-riding. *Journal of Economic Behavior & Organization*, 43(4):405–421.

Potters, J. and Suetens, S. (2009). Cooperation in experimental games of strategic complements and substitutes. *The Review of Economic Studies*, 76(3):1125–1147.

Rabin, M. (1993). Incorporating fairness into game theory and economics. *American Economic Review*, 83(5):281–302.

Sell, J. and Son, Y. (1997). Comparing public goods with common pool resources: Three experiments. *Social Psychology Quarterly*, 60(2):118–137.

Sonnemans, J., Schram, A., and Offerman, T. (1998). Public good provision and public bad prevention: The effect of framing. *Journal of Economic Behavior & Organization*, 34(1):143–161.

Stoop, J. T. R., van Soest, D. P., and Vyrastekova, J. (2013). *A tale of two carrots: the effectiveness of multiple reward stages in a common pool resource game*, chapter 10, pages 291–318. Edward Elgar Publishing.

van Soest, D., Stoop, J., and Vyrastekova, J. (2016). Toward a delineation of the circumstances in which cooperation can be sustained in environmental and resource problems. *Journal of Environmental Economics and Management*, 77:1–13.

van Soest, D. and Vyrastekova, J. (2007). Peer enforcement in CPR experiments: the relative effectiveness of sanctions and transfer rewards, and the role of behavioural types. In List, J., editor, *Using experimental methods in environmental and resource economics*, chapter 6, pages 113–136. Edward Elgar Publishing.

Vyrastekova, J. and van Soest, D. (2007). A note on peer enforcement by selective exclusion: An extended abstract. In Oda, S. H., editor, *Developments on Experimental Economics: New Approaches to Solving Real-world Problems*, pages 187–192. Springer Berlin Heidelberg, Berlin, Heidelberg.

Willinger, M. and Ziegelmeyer, A. (1999). Framing and cooperation in public good games: an experiment with an interior solution. *Economics Letters*, 65(3):323–328.

Zelmer, J. (2003). Linear public goods experiments: A meta-analysis. *Experimental Economics*, 6(3):299–310.

Appendix

Positive framing does not solve the tragedy of the commons

Content:

Section A: Theoretical results

Section B: Supplementary results and descriptives

Section C: Supplementary Instructions for experiments

A Theoretical results

Here, we derive the Nash equilibrium of all games, and analyze the games with different assumptions about "behavioral" preferences, and whether those give rise to multiple equilibria.

A.1 Nash Equilibrium with standard preferences

Using the payoff functions given in Table 2, we can compute all Nash equilibria.

Let x_i be the amount allocated to account A by individual i, and x_{-i} the average contribution by others. In the PG game profits to individual i are given by

$$\pi_i = 20x_i + 40(60 - x_i) - 60x_{-i} + 400.$$

Assuming subjects maximize payoff, computing the Nash equilibrium is straightforward. For the PG game we find $\frac{\partial \pi_i}{\partial x_i} = 20 - 40 < 0$ so $x_i = 0$ is the dominant strategy and the only Nash equilibrium.

In the non-linear PG game profits to individual i are given by

$$\pi_i = 80x_i + 400(60 - x_i) + (480 - 3x_{-i} - x_i)(3x_{-i} + x_i) + 400.$$

Then, the best response of individual i is given as

$$\begin{aligned}\frac{\partial \pi_i}{\partial x_i} &= 80 - 400 + (480 - 3x_{-i} - x_i - (3x_{-i} + x_i)) \\ &= 80 - 3x_{-i} - x_i = 0.\end{aligned}$$

The symmetric Nash equilibrium is 20. Note that once the aggregate Nash equilibrium (80) is reached, no one has an incentive to change irrespective of how unfair the allocation is.

In the CPR game, profits to individual i are given by

$$\pi_i = 40x_i + (60 - x_i)(3x_{-i} + x_i).$$

Then, the best response of individual i is given as

$$\begin{aligned}\frac{\partial \pi_i}{\partial x_i} &= 40 + (60 - x_i) - (3x_{-i} + x_i) \\ &= 100 - 3x_{-i} - 2x_i = 0 \text{ if } x_i = x_{-i} = 20.\end{aligned}$$

The symmetric Cournot-Nash equilibrium is $x_j = x_e = 20$. Note that there are some interesting differences compared to the non-linear PG game. If the other players collectively invest the Nash equilibrium 80, there is still an incentive to contribute, as it is individually optimal to contribute as long as $x_{-i} < 100$.

Theoretical prediction with standard preferences: All games have one unique Nash equilibrium. Framing should not play a role.

A.2 Nash equilibrium with inequity-aversion (Fehr-Schmidt preferences)

Inequity aversion is the preference for fairness and resistance to incidental inequalities. The model of inequity-aversion developed by Fehr and Schmidt (1999) typically comprises an additive utility function, where utility is the sum of material payoff and a non-material part, as given in

$$u_i = \pi_i + G_i, \tag{1}$$

where G_i is given as

$$G_i = -\alpha \sum_{j:\pi_j > \pi_i} (\pi_j - \pi_i) - \beta \sum_{j:\pi_j < \pi_i} (\pi_i - \pi_j).$$

If we start out with a symmetric equilibrium, $x_j = x_k$ for all j and k, then if $x_i < x_{-i}$ player i is better off than the other players, so $\pi_i > \pi_j$ and

$$\frac{\partial G_i}{\partial x_i} = -3\beta(\frac{\partial \pi_i}{\partial x_i} - \frac{\partial \pi_{-i}}{\partial x_i}).$$

While for $x_i > x_{-i}$ player i is worse off than the others, so $\pi_i < \pi_j$ and

$$\frac{\partial G_i}{\partial x_i} = -3\alpha(\frac{\partial \pi_{-i}}{\partial x_i} - \frac{\partial \pi_i}{\partial x_i}).$$

Note that for any value of x_i and x_{-i}, we have $\frac{\partial \pi_{-i}}{\partial x_i} > 0$. Thus in the neighborhood of a Nash equilibrium where $\frac{\partial \pi_i}{\partial x_i} \approx 0$, we see that

$$\frac{\partial G_i}{\partial x_i} \begin{cases} < 0 & \text{for} \quad x_i > x_{-i} \\ > 0 & \text{for} \quad x_i < x_{-i}. \end{cases}$$

Theoretical prediction with inequity-aversion (Fehr-Schmidt): All symmetric allocations in the neighborhood of the standard Nash equilibrium are Nash equilibria with Fehr-Schmidt preferences.

A.3 Nash equilibrium with inequity-aversion (Charness and Rabin preferences)

Charness and Rabin (2002) extend the difference-aversion model by Fehr and Schmidt (1999) and suggest the preferences

$$u_i = \begin{cases} (\sigma - \theta q)\,\pi_j + (1 - \sigma + \theta q)\pi_i & \text{if} \quad \pi_i < \pi_j \\ (\rho - \theta q)\,\pi_j + (1 - \rho + \theta q)\pi_i & \text{if} \quad \pi_i > \pi_j. \end{cases} \tag{2}$$

Here $q = 1$ if j has "misbehaved". We want to look at equilibrium behavior, and thus disregard this term to obtain

$$u_i = \begin{cases} \sigma\pi_j + (1 - \sigma)\pi_i & \text{if} \quad \pi_i < \pi_j \\ \rho\pi_j + (1 - \rho)\pi_i & \text{if} \quad \pi_i > \pi_j. \end{cases} \tag{3}$$

Charness and Rabin assume $0 < \sigma \leq \rho \leq 1$ and argue that $\sigma < 1/2$. This implies that individuals maximize a weighted sum of own and other's utility, and with $\sigma < 1/2$ players put more weight on their own payoff, at least when they are worse off. A possible extension to our four player setting is to assume that utility is a sum of total payoff and own payoff:

$$u_i = \sum \pi_j + \phi\pi_i.$$

Here, ϕ is higher when $\pi_i < \pi_{-i}$. Maximizing own payoff will give the traditional Nash equilibrium, while maximizing the total payoff will yield the Pareto efficient allocation as a dominant strategy. Moreover, as the weight attached to own payoff jumps as x_i crosses x_{-i} we will have a kink just like with Fehr-Schmidt model, and hence:

Theoretical prediction with inequity-aversion (Charness Rabin): The Nash equilibrium with these preference will be in between the traditional Nash equilibrium and the social optimum, and there may be multiple equilibria.

A.4 The Nash equilibrium with social norms

There are different models of social norms. Brekke et al. (2003) develop a social norm model in terms of a moral ideal. The utility function $u_i = \pi_i + S_i$ comprises monetary payoffs and a self-image S term of the form

$$S_i = -\gamma(x_i - x^*)^2,$$

where x^* is the morally ideal contribution. Using a utilitarian principle rule as in Brekke et al. (2003) x^* would be the Pareto efficient alternative, which is 60 for the linear public goods game, and 35 for the CPR game and 50 for the non-linear PG game. This adds a marginal utility

$$\frac{\partial S_i}{\partial x_i} = 2\gamma(x^* - x_i),$$

which is positive for $x_i < x^*$. This will induce contributions above the standard Nash equilibrium, but not multiple equilibria, as the marginal utility here is independent of other players' behavior.

Alternatively, the norm could evolve over time and be history-dependent. If we add a period index t to all variables,

$$x^*_{i,t} = \lambda x^*_{t-1} + \lambda x_{t-1} \text{ with } x_{t-1} = \frac{1}{4}\sum_j x_{j,t-1},$$

the norm moves toward the average contribution of the last period. A dynamic equilibrium would be one where the norm and actual allocation to A are equal such that the norm does no longer change. Note that

$$\frac{\partial S_i}{\partial x_i} = 2\gamma(x^* - x_i) = 0 \text{ if } x_i = x^*.$$

Hence, if $x_j = x^*$ for all j is a Nash equilibrium if and only if

$$\frac{\partial u_i}{\partial x_i} = \frac{\partial \pi_i}{\partial x_i} + \frac{\partial S_i}{\partial x_i} = \frac{\partial \pi_i}{\partial x_i} + 0 = 0$$

Theoretical prediction with social norms: All symmetric allocations in the neighborhood of the standard Nash equilibrium are Nash equilibria with inequality-aversion preferences a la Fehr-Schmidt. That is, the equilibrium with social norms coincide with the equilibrium in the absence of these norms. Framing will not play a role.

A.5 The Nash equilibrium with reciprocity

This model is inspired by Rabin (1993) and Nyborg (2017). Starting point is separable utility

$$u_i = \pi_i + \omega R_i, \tag{4}$$

where R_i is the reciprocity term depending on kindness of all players and ω is a weighting parameter, reflecting how important the reciprocity part is. If $\omega = 0$, the case with standard preferences can be recovered. Nyborg (2017) extends Rabin's two player model in a straightforward way by defining reciprocity as

$$R_i = \frac{1}{(N-1)} \left(\sum_{j \neq i} \tilde{k}_{j,i} + \sum_{j \neq i} \tilde{k}_{j,i} k_{i,j} \right). \tag{5}$$

Rabin (1993) defines kindness by first looking at what is the worst and the best thing you can do to your opponent, given the beliefs about the opponents' actions. In our calibration the worst is always to give everything to B and the best to give everything to A.[1]

Let $\pi_j(x_i, \tilde{x}_{-i})$ denote j's payoff when i chooses x_i and believes that the other players will choose $\tilde{x}_{-i}$. For all games the strategy set for player i is given as $S_i = \{0, 1, ..., 60\}$ and consequently the equitable payoff is defined as

$$\pi_j^e = \frac{\pi_j(60, \tilde{x}_{-i}) + \pi_j(0, \tilde{x}_{-i})}{2}. \tag{6}$$

If $\partial \pi_i / \partial x_j$ is constant, the equitable payoff reduces to $\pi_j^e = \pi_j(30, \hat{x}_{-i})$. This implies that

[1] Alternatively, one may think about using the Nash equilibrium and the social optimum as relevant benchmarks. However, this would ignore the possibility of anti-social sanctions and excessive kindness – both are inefficient but regularly observed in the field and the lab. This implies that we relax Rabin‘s assumption that the payoff lies necessarily in the Pareto Frontier.

kindness can be given as

$$k_{ij} = \frac{\pi_j(x_i, \tilde{x}_{-i}) - \pi_j(30, \hat{x}_{-i})}{\pi_j(60, \tilde{x}_{-i})}. \tag{7}$$

In the linear public good case, if player i provides $x_i < 30$, this is perceived as unkind and responded with an unkind act as well. Any contributions $x_i > 30$ are perceived to be as kind. Since payoff is linear in x_i it is optimal to either invest $x_i = 0$ or $x_i = 60$. So there are two equilibria, the unkind one, which is the standard Nash equilibrium ($x = 0$) and the kind equilibrium, where everything is contributed ($x = 60$) for all players.

The CPR case is slightly more complicated. In its general form, utility is given as

$$u_j = ax_j + (b - x_j)\left(\sum_{j \neq i} x_i + x_j\right) + \frac{\omega}{(N-1)}\left(\sum_{j \neq i} \tilde{k}_{ji} + \sum_{j \neq i} \tilde{k}_{ji} k_{ij}\right). \tag{8}$$

If we follow Rabin's two player definition for each player separately, kindness is given as

$$k_{ij} = \frac{(x_i - 30)(60 - x_j)}{60(60 - x_j)} = \frac{(x_i - 30)}{60}.$$

For simplicity, let us assume that $\sum_{j \neq i} = (n-1)x_i$. Then, the best response of individual j is given as

$$\frac{\partial \pi_j}{\partial x_j} = a - (n-1)x_i - 2x_j + b + \omega \frac{x_i - 30}{60^2},$$

which can be solved to obtain

$$x_j = \frac{3600(a + b - (n-1)x_i) + \omega(x_i - 30)}{7200}. \tag{9}$$

The left part of the nominator shows the strategic substitute part of the CPR game – if other players invest more (less), it is best to invest less (more). Reciprocity – the right part of the nominator – works in the opposite direction, as one typically would like to invest more if others invest more. The non-linear PG game will give rise to a very similar pattern.

Theoretical prediction with reciprocity: There are multiple equilibria in all games. Framing may play a role, though the effect will be weaker in the CPR and in the non-linear PG game because of material incentives pulling in the other direction.

A.6 Marginal per capita return (MPCR)

We define the MPCR as the ratio of the marginal returns of tokens to the "kind" account A and the marginal return the subject would get from account B:

$$\text{MPCR}=\frac{\text{marginal return on account A}}{\text{marginal return on account B}}.$$

In the linear PG games the marginal returns on account A and B are independent of what others are doing. This is not the case in the non-linear PG and CPR game, where MPCR depends on the level of own contribution and also the contributions of others. To make it comparable across games, we consider the symmetric case where all subjects contribute the same amount to account A. In the PG games, this corresponds to the case where $x_j = x_i$ for all i, j. For the CPR games, it corresponds to $y_j = y_i$ for all i, j. The marginal returns ($\frac{\partial \pi_i}{\partial x_i}$ or $\frac{\partial \pi_i}{\partial y_i}$) capture the effects of a marginal change in contribution of the focal individual on payoffs, while keeping the contribution of other group members constant.

Below, we derive the MPCR for the different treatments by using the calibrations in Table 2 of the main text. For the linear PG game, the MPCR is the same across frames. In the non-linear PG game and the CPR game, however, the MPCR will differ slightly between the two frames. This is due to the fact that the MPCR reflects a marginal change in allocations to account A while keeping allocations to account B constant, which violates the budget constraint. Differences in the MPCR across frames, hence, reflect that the two frames are not economically equivalent *outside the budget constraint.* However, within the budget constraint, the two frames are economically equivalent. The MPCR will also be the same when allocations correspond to the Nash equilibrium, i.e., when the degree of cooperation is 0. It is also worth noting that the *difference* between the marginal return to account A and B will always be the same across the positive and negative frame for all levels of cooperation.

A.6.1 Linear public good (positive and negative frame)

The marginal return from account B is given by $\frac{\partial \pi_i}{\partial y_i} = 40$, while the marginal return from the "more kind" account A is given by $\frac{\partial \pi_i}{\partial x_i} = 20$. Therefore,

$$\text{MPCR}=\frac{\partial \pi_i}{\partial x_i}/\frac{\partial \pi_i}{\partial y_i} = \frac{20}{40} = 0.5.$$

A.6.2 Non-linear public good (positive frame)

The marginal return from account B is given by $\frac{\partial \pi_i}{\partial y_i} = 400$. The marginal return from the "more kind" account A is given by $\frac{\partial \pi_i}{\partial x_i} = 560 - 8x$. Therefore,

$$\text{MPCR}{=}\frac{\partial \pi_i}{\partial x_i}/\frac{\partial \pi_i}{\partial y_i} = \frac{560 - 8x}{400}.$$

Now let z be the degree of cooperation. Then for the non-linear PG game $x = 20 + 30z$ and

$$\text{MPCR} = \frac{560 - 8(20 + 30z)}{400} = 1 - \frac{3}{5}z.$$

A.6.3 Non-linear public good (negative frame)

The marginal return from account B is given by $\frac{\partial \pi_i}{\partial y_i} = 400 - 8y$. The marginal return from the "more kind" account A is given by $\frac{\partial \pi_i}{\partial x_i} = 80$. Therefore,

$$\text{MPCR}{=}\frac{\partial \pi_i}{\partial x_i}/\frac{\partial \pi_i}{\partial y_i} = \frac{80}{400 - 8y} = \frac{80}{400 - 8(60 - x)} = \frac{80}{8x - 80} = \frac{10}{x - 10}.$$

Now let z be the degree of cooperation. Then for the non-linear PG game $x = 20 + 30z$ and

$$\text{MPCR} = \frac{1}{1 + 3z}.$$

A.6.4 Common pool resource game (positive frame)

The marginal return from account B is given by $\frac{\partial \pi_i}{\partial x_i} = 4y$. The marginal return from the "more kind" account A is given by $\frac{\partial \pi_i}{\partial y_i} = 40 + x$. Therefore,

$$\text{MPCR}{=}\frac{\partial \pi_i}{\partial y_i}/\frac{\partial \pi_i}{\partial x_i} = \frac{40 + x}{4y} = \frac{40 + (60 - y)}{4y} = \frac{100 - y}{4y} = \frac{25}{y} - \frac{1}{4}.$$

The degree of cooperation z is for the common pool resource game given as $y = 20 + 15z$ and

$$\text{MPCR} = \frac{25}{20 + 15z} - \frac{1}{4}.$$

A.6.5 Common pool resource game (negative frame)

The marginal return from account B is given by $\frac{\partial \pi_i}{\partial x_i} = (240 - 4x) - x = 240 - 5x$. The marginal return from the "more kind" account A is given by $\frac{\partial \pi_i}{\partial y_i} = 40$. Therefore,

$$\text{MPCR}{=}\frac{\partial \pi_i}{\partial y_i} / \frac{\partial \pi_i}{\partial x_i} = \frac{40}{240 - 5x} = \frac{40}{240 - 5(60 - y)} = \frac{40}{5y - 60}.$$

The degree of cooperation z is for the common pool resource game given as $y = 20 + 15z$ and

$$\text{MPCR} = \frac{40}{5(20 + 15z) - 60} = \frac{40}{40 + 75z}$$

References

Brekke, K. A., Kverndokk, S., and Nyborg, K. (2003). An economic model of moral motivation. *Journal of Public Economics*, 87(9-10):1967–1983.

Charness, G. and Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, 117(3):817–869.

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817–868.

Nyborg, K. (2017). Reciprocal climate negotiators. *Journal of Environmental Economics and Management*, (doi:10.1016/j.jeem.2017.08.008).

Rabin, M. (1993). Incorporating fairness into game theory and economics. *American Economic Review*, 83(5):281–302.

B Supplementary results and descriptives

B.1 Descriptives

Table B.1: Individuals, groups and observations - six treatments

Treatment	Individuals	Groups	Observations
Public good	56	14	560
Public bad	52	13	520
Non-linear public good	16	4	160
Non-linear public bad	32	8	320
CPR-positive	76	19	760
CPR-negative	80	20	800
Total	312	78	3120

Table B.2: Experimental procedure

Date	Treatment order and number of subjects
Oct 14th 2014	PG at 9:00 (12 subjects), PB at 10:30 (12 subjects), CPR-pos at 12:30 (16 subjects), CPR-neg at 14:15 (20 students).
Nov 4th 2014	CPR-neg at 9:00 (24 subjects), CPR-pos at 10:30 (24 subjects), PB at 12:30 (24 subjects), PG at 14:15 (28 students).
Mar 5th 2015	PG at 9:00 (16 subjects), PB at 10:30 (16 subjects), CPR-pos at 12:30 (20 subjects), CPR-neg at 14:15 (20 students).
Apr 28th 2015	Non-lin PG at 10:30 (16 subjects)*, Non-lin PB at 12:30 (16 subjects)
Oct 20th 2015	Non-lin PB at 08:30 (16 subjects), CPR-pos at 10:00 (16 subjects), Non-lin PG at 12:00 (16 subjects), CPR-neg at 13:30 (16 subjects)

Notes: *The non-lin PG treatment on April 28th crashed in the middle of the session due to technical problems in the lab. Observations from this session were therefore dropped from the analysis.

Table B.3: Characteristics of the subjects, by treatment.

	PG			Non-lin PG			CPR		
	Pos	Neg	Diff	Pos	Neg	Diff	Pos	Neg	Diff
Age	22.93	21.88	1.04	20.25	24.69	-4.44**	21.67	22.38	-0.70
Female	0.63	0.58	0.05	0.94	0.75	0.19	0.55	0.55	0.00
Economics (>0)	0.16	0.15	0.01	0.00	0.09	-0.09	0.17	0.11	0.06
Years (>1)	0.50	0.44	0.06	0.13	0.56	-0.44***	0.26	0.42	-0.16*
MatNat	0.43	0.33	0.10	0.88	0.31	0.56***	0.59	0.44	0.15

Notes: Statistical tests are based on individual level data as units of observation. The reported significance levels are based on two-sided t-tests. Economics (>0) indicates at least 1 course in economics at the University level. Years (>1) indicates more than one year of studies at the University level. MatNat indicates a study in the natural sciences. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B.1: Characteristics of subject pool. All treatments.

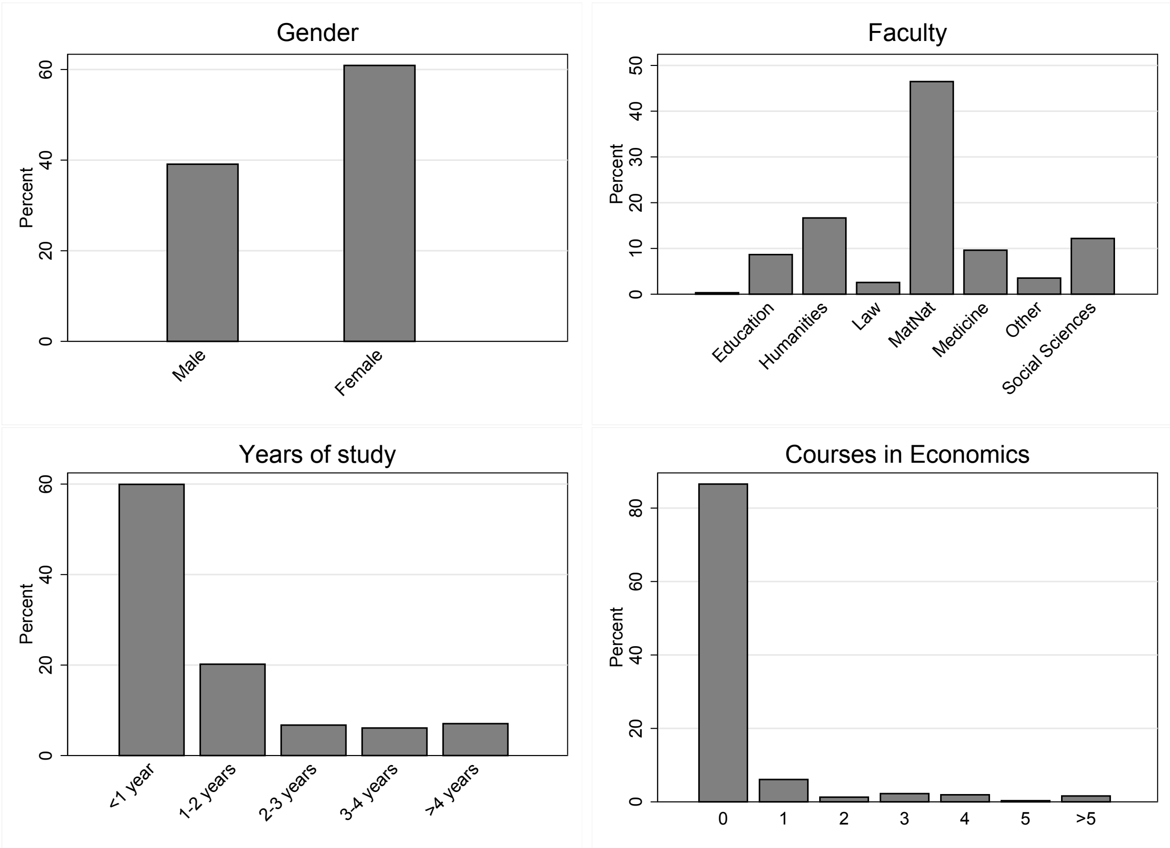


Table B.4: Characteristics of the subjects, by game.

	PG vs. Non-lin PG			Non-lin PG vs. CPR			PG vs. CPR		
	PG	Non-lin PG	Diff	Non-lin PG	CPR	Diff	PG	CPR	Diff
Age	22.43	23.21	-0.78	23.21	22.03	1.18	22.43	22.03	0.39
Female	0.60	0.81	-0.21**	0.81	0.55	0.26***	0.60	0.55	0.05
Economics (>0)	0.16	0.06	0.09	0.06	0.14	-0.08	0.16	0.14	0.02
Years (>1)	0.47	0.42	0.06	0.42	0.35	0.07	0.47	0.35	0.13*
MatNat	0.38	0.50	-0.12	0.50	0.51	-0.01	0.38	0.51	-0.13*

Notes: Statistical tests are based on individual level data as units of observation. The reported significance levels are based on two-sided t-tests. Economics (>0) indicates at least 1 course in economics at the University level. Years (>1) indicates more than one year of studies at the University level. MatNat indicates a study in the natural sciences.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.5: Summary statistics: PG

	count	mean	sd	min	max
Allocations to A	27	21.79	12.41	4.63	48.10
Degree of cooperation	27	0.36	0.21	0.08	0.80
Age	27	22.43	2.59	19.75	31.00
Female	27	0.60	0.25	0.25	1.00
Economics (>0)	27	0.16	0.20	0.00	0.75
Years (>1)	27	0.47	0.29	0.00	1.00
Education	27	0.18	0.21	0.00	0.75
Humanities	27	0.19	0.25	0.00	0.75
MatNat	27	0.38	0.31	0.00	1.00

Notes: The observations are averaged across groups and rounds. Economics (>0) indicates at least 1 course in economics at the University level. Years (>1) indicates more than one year of studies at the University level. MatNat indicates a study in the natural sciences.

Table B.6: Summary statistics: non-linear PG

	count	mean	sd	min	max
Allocations to A	12	25.65	8.47	7.65	40.08
Degree of cooperation	12	0.19	0.28	-0.41	0.67
Age	12	23.21	3.16	19.00	28.25
Female	12	0.81	0.22	0.50	1.00
Economics (>0)	12	0.06	0.16	0.00	0.50
Years (>1)	12	0.42	0.34	0.00	1.00
Education	12	0.02	0.07	0.00	0.25
Humanities	12	0.19	0.22	0.00	0.50
MatNat	12	0.50	0.38	0.00	1.00

Notes: The observations are averaged across groups and rounds. Economics (>0) indicates at least 1 course in economics at the University level. Years (>1) indicates more than one year of studies at the University level. MatNat indicates a study in the natural sciences.

Table B.7: Summary statistics: CPR

	count	mean	sd	min	max
Allocations to A	39	18.76	3.23	12.32	26.90
Degree of cooperation	39	-0.08	0.22	-0.51	0.46
Age	39	22.03	2.48	19.00	31.50
Female	39	0.55	0.26	0.00	1.00
Economics (>0)	39	0.14	0.19	0.00	0.50
Years (>1)	39	0.35	0.23	0.00	0.75
Education	39	0.04	0.10	0.00	0.25
Humanities	39	0.15	0.20	0.00	0.75
MatNat	39	0.51	0.35	0.00	1.00

Notes: The observations are averaged across groups and rounds. Economics (>0) indicates at least 1 course in economics at the University level. Years (>1) indicates more than one year of studies at the University level. MatNat indicates a study in the natural sciences.

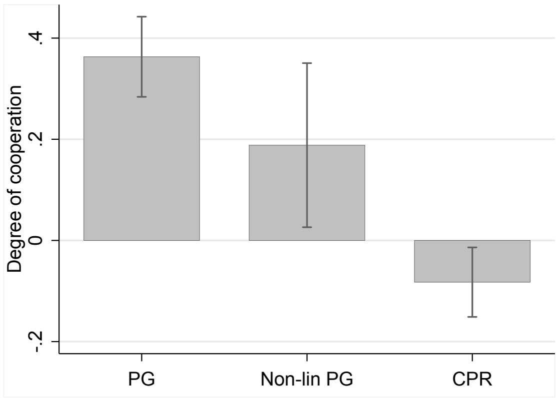
Table B.8: Individual payoffs, by treatment

	count	mean	sd	min	max
PG	56	173	42	81	285
PB	52	154	29	81	213
Non-lin PG	16	282	32	204	341
Non-lin PB	32	256	63	128	345
CPR-pos	76	243	42	158	350
CPR-neg	80	236	39	170	363
Total	312	217	58	81	363

Notes: The table shows the summary statistics for the individual payoffs. 1 USD $\approx$ 8 NOK. The CPR-pos and CPR-neg includes a fixed show-up fee of NOK 50.

B.2 Supplementary results

Figure B.2: Mean degree of cooperation, by game.



Notes: Bars represent the average level of cooperation in each game/dilemma. Observations are averaged over groups and periods before the average level of cooperation is calculated. The vertical lines indicate 95% confidence intervals.

Table B.9: Degree of cooperation, by treatments

	PG			Non-lin PG			CPR		
	Pos	Neg	Diff	Pos	Neg	Diff	Pos	Neg	Diff
Degree of cooperation	0.46***	0.26**	0.21***	0.21*	0.18	0.03	-0.03	-0.13**	0.10**
	(0.06)	(0.03)	(0.07)	(0.08)	(0.12)	(0.14)	(0.03)	(0.06)	(0.07)
	[0.23]	[0.10]		[0.16]	[0.34]		[0.16]	[0.25]	

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The table shows the average values by treatment, as well as the pairwise difference between the negative and the positive frame. Standard errors in parentheses and standard deviations in brackets (with group averages as unit of observation). Test statistics are based on standard t-tests using play in groups (averaged over all periods) as independent observations. Significance levels are based on t-test for the levels, and Mann-Whitney U tests for the differences in levels.

Table B.10: The effect of positive framing on the degree of cooperation

	PG (1)	Non-lin PG (2)	CPR (3)
Constant	0.257***	0.178	-0.132**
	(0.0283)	(0.117)	(0.0549)
Positive	0.205***	0.0306	0.102
	(0.0671)	(0.137)	(0.0663)
R^2 (between)	0.14	0.00	0.01
Obs	1080	480	1560
Groups	27	12	39
P-value (cluster)	0.002	0.823	0.123
P-value (wild bootstrap)	0.014	0.834	0.134

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The coefficients are from a random-effects model using data at the individual level. Significance levels are based on standard errors clustered at the group level. The p-values in the last row (wild bootstrap) are generated from the wild cluster bootstrap-t method and are robust to clustering with a small number of groups.

Table B.11: The effect of other's average contribution on own best response

Dep.var.: ΔBest response	Non-lin PGG		CPR	
	(1)	(2)	(3)	(4)
Δ Best response (t-1)	0.0562	0.0412	-0.0279	0.0495
	(0.0518)	(0.0420)	(0.0488)	(0.0358)
Δ Best response (t-2)		-0.0183		0.148***
		(0.0359)		(0.0426)
R^2 (between)	0.02	0.02	0.00	0.01
Obs	384	336	1248	1092
Groups	12	12	39	39

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The coefficients are from a random-effects model using data at the individual level. Test statistics are based on standard errors clustered at the group level.

Table B.12: Average degree of cooperation, by treatment and round

	1	2	3	4	5	6	7	8	9	10
Public Good	0.55	0.51	0.48	0.48	0.51	0.49	0.48	0.46	0.37	0.28
Public Bad	0.37	0.38	0.29	0.28	0.29	0.21	0.25	0.18	0.20	0.12
Non-lin PG	0.26	0.32	0.13	0.22	0.26	0.11	0.10	0.27	0.15	0.27
Non-lin PB	0.25	0.23	0.34	0.22	0.19	0.05	0.15	0.04	0.20	0.12
CPR-pos	0.02	0.07	-0.08	-0.05	-0.01	-0.05	-0.05	-0.06	-0.06	-0.03
CPR-neg	0.00	-0.02	-0.06	-0.15	-0.20	-0.29	-0.15	-0.15	-0.22	-0.09

Notes: The table shows the means by treatment and round.

Figure B.3: Degree of cooperation in PG, by group and round

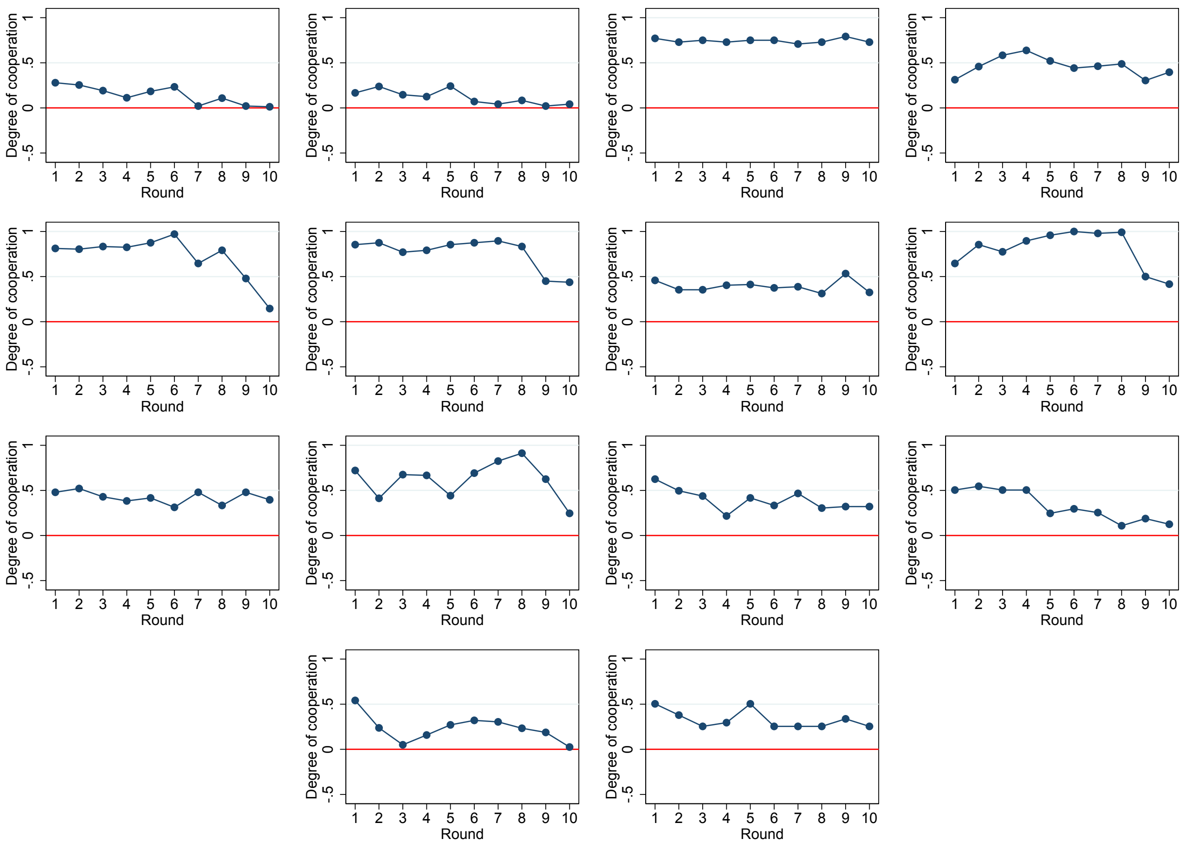


Figure B.4: Degree of cooperation in PB, by group and round

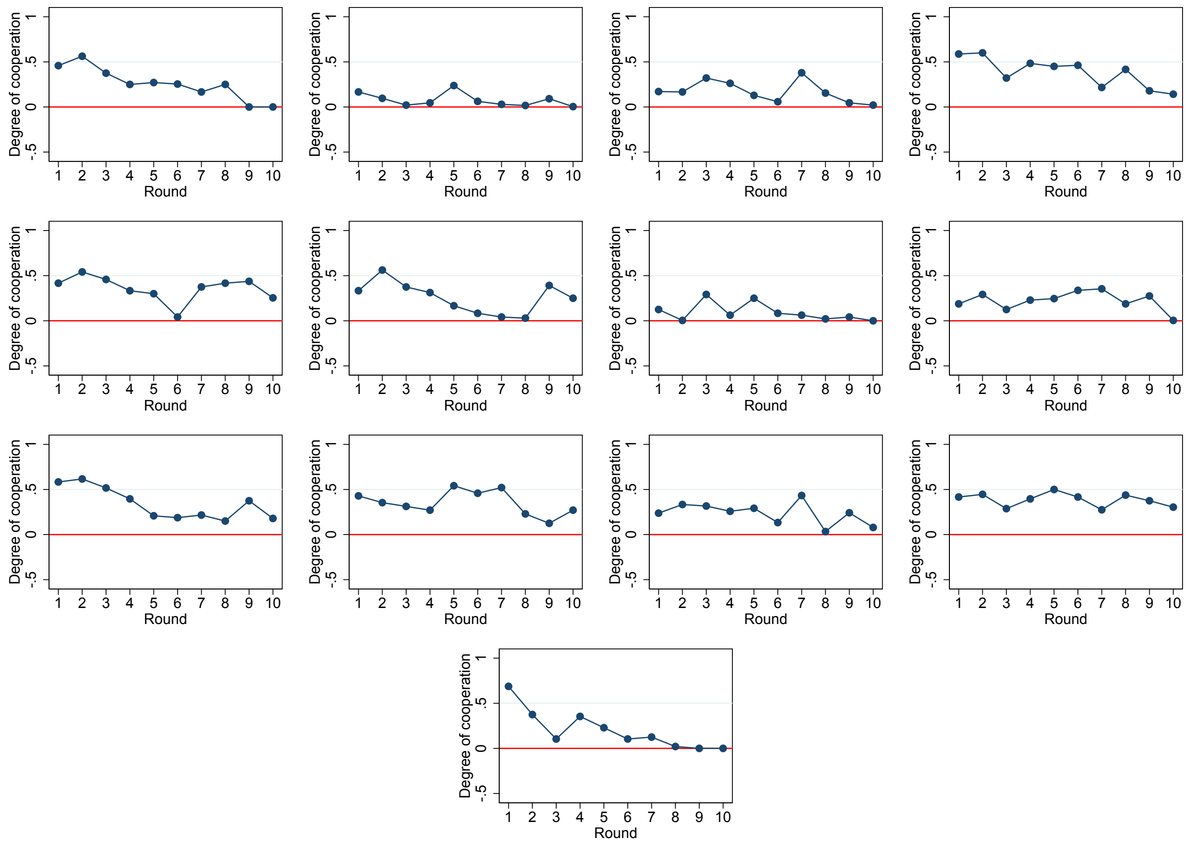


Figure B.5: Degree of cooperation in CPR-pos, by group and round

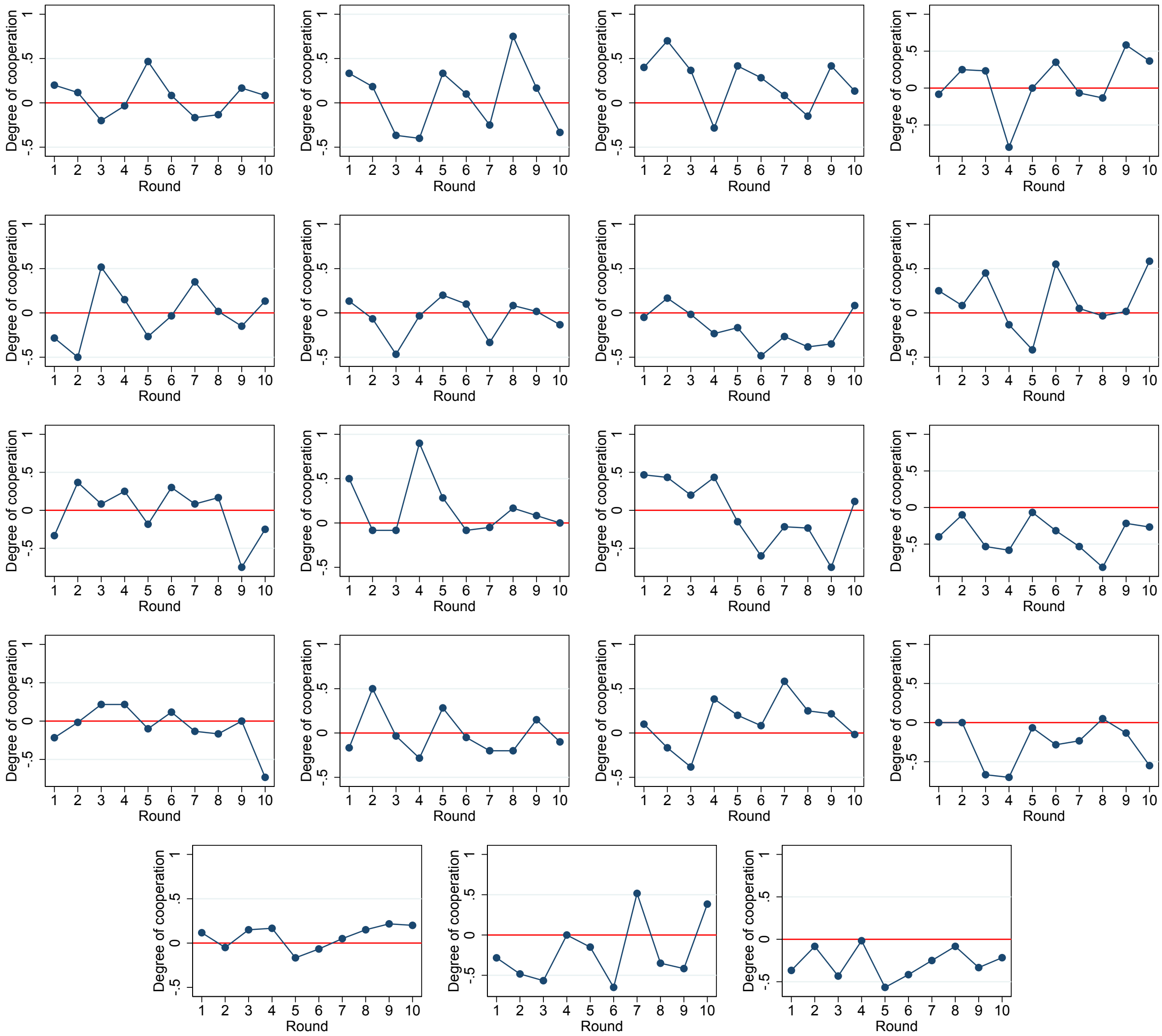


Figure B.6: Degree of cooperation in CPR-neg, by group and round

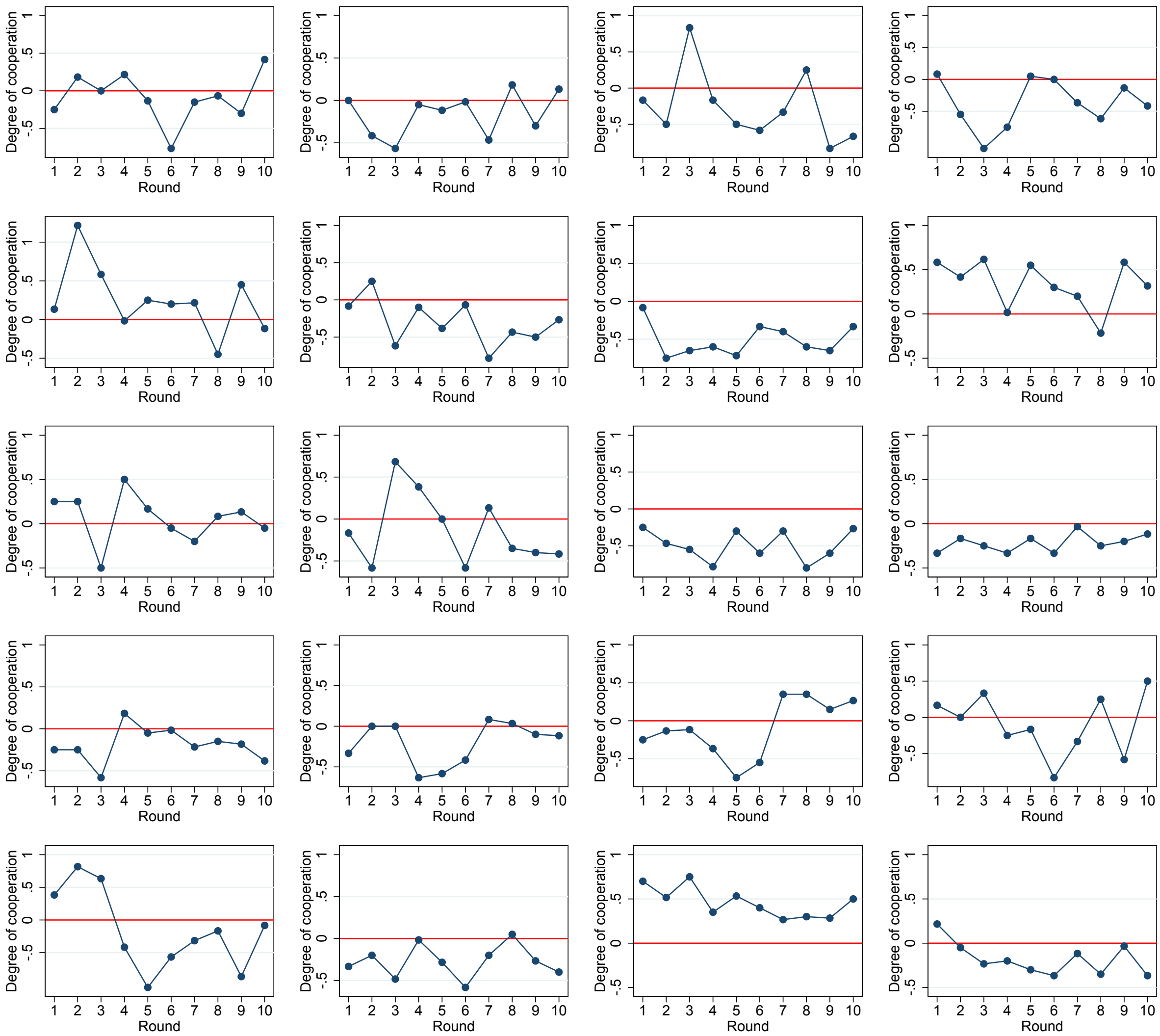


Figure B.7: Degree of cooperation in non-lin PG, by group and round

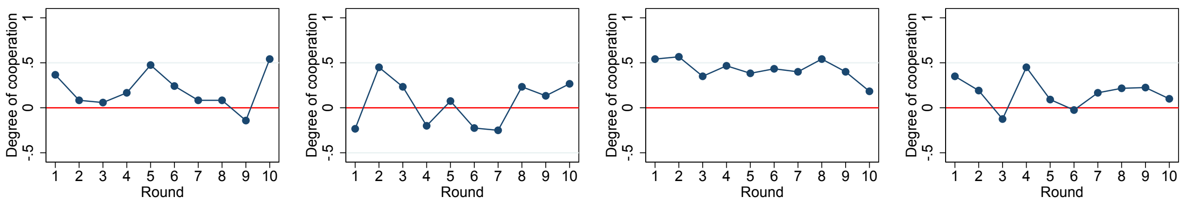


Figure B.8: Degree of cooperation in non-lin PB, by group and round

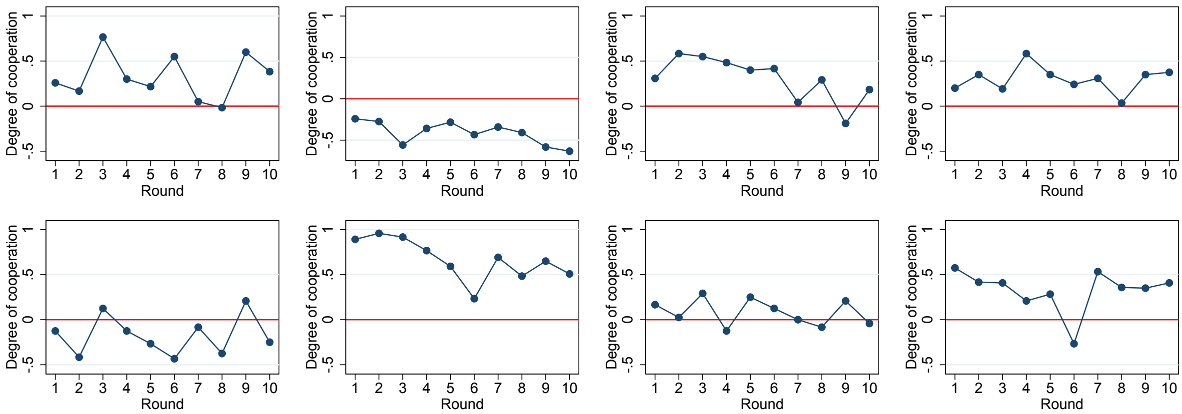
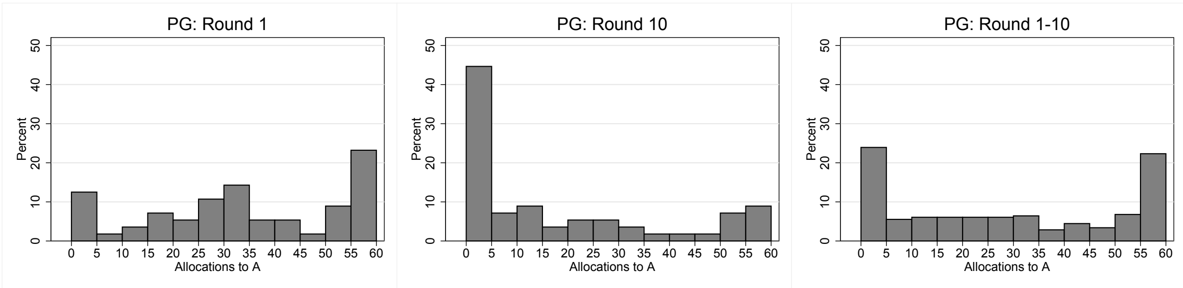
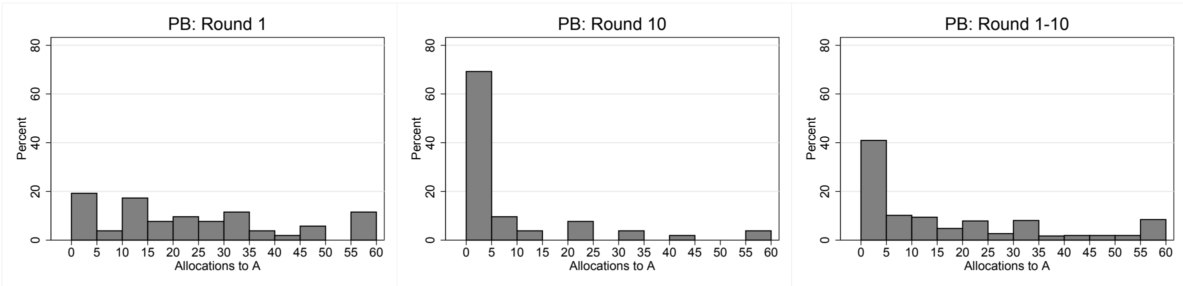


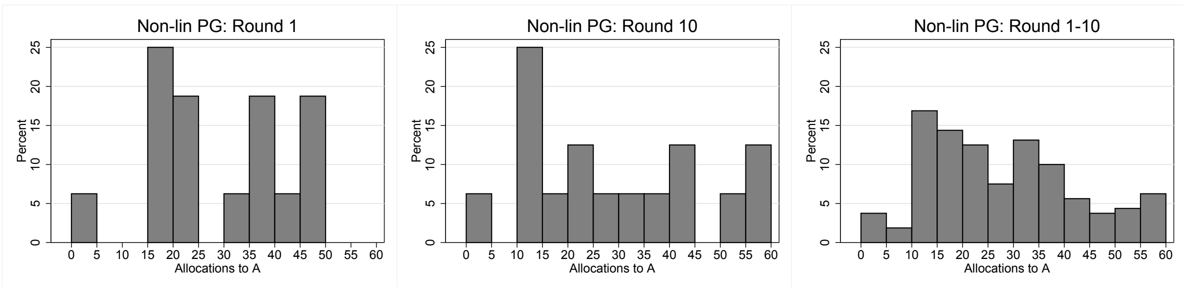
Figure B.9: Allocations to A, by round and treatment



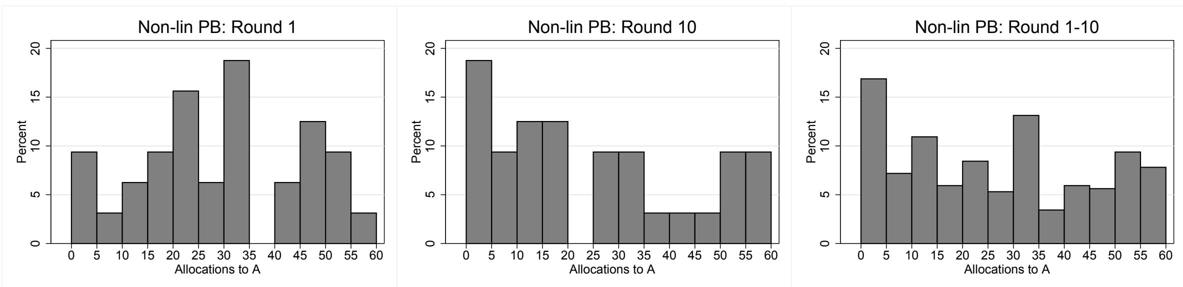
(a) Public good



(b) Public bad

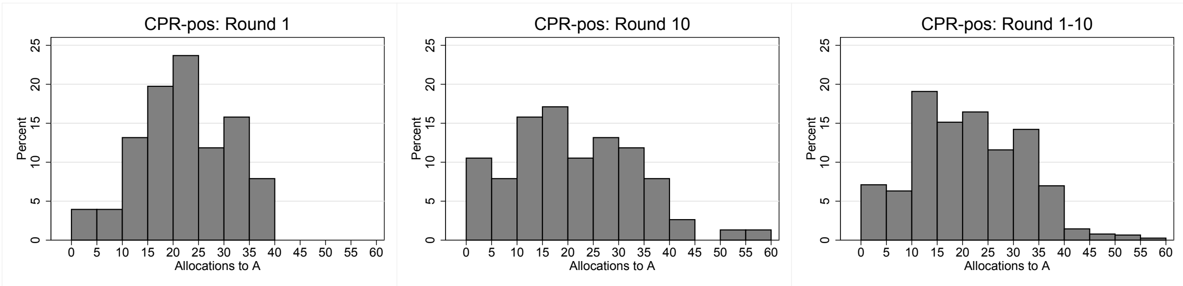


(c) Non-linear public good

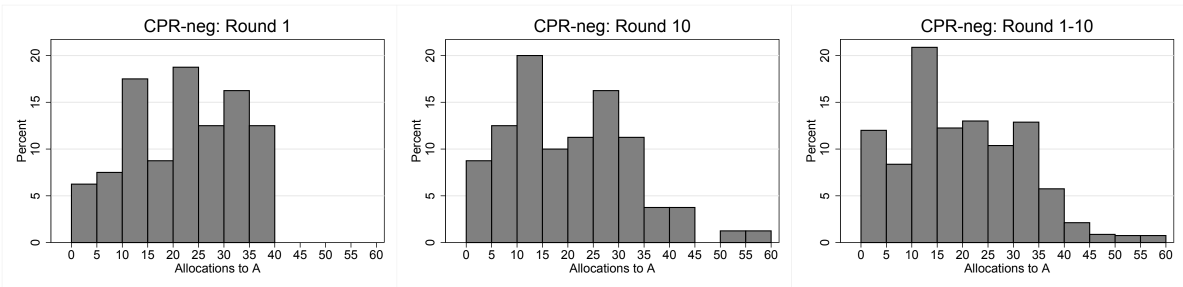


(d) Non-linear public bad

Figure B.9: Allocations to A, by round and treatment



(e) Common pool resource (negative)



(f) Common pool resource (positive)

C Supplementary Instructions for experiments

Explanations:

Session 1100: Linear Public Goods Game – positive framing

Session 1200: Linear Public Goods Game – negative framing

Session 1300: Common Pool Resource Game– positive framing

Session 1400: Common Pool Resource Game– negative framing

Session 1500: Non-linear Public Good – positive framing

Session 1600: Non-linear Public Good – negative framing

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 20 experimental currency units are worth 1 krone.

The decisions

Account A:
How much you earn from account A will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account A you earn 20 experimental currency units. In addition you receive 20 experimental currency units for each token any other member of your group allocates to account A.

Note that the tokens you allocate to account A will similarly result in an earning of 20 experimental currency units for each of the other members of your group

Account B:
For every token you allocate to account B you earn 40 experimental currency units.

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 20 ECU per token YOU allocate to A + 20 ECU per token OTHERS allocate to A
Account B: Earnings = 40 ECU per token YOU allocate to B

Automatic earning
In addition to the earnings from account A and account B you get an automatic earning of 400 experimental currency units per round.

<u>Example 1:</u>

Account A: Earnings = 20 ECU per token YOU allocate to A **+** 20 ECU per token OTHERS allocate to A **Account B**: Earnings = 40 ECU per token YOU allocate to B

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B.

Your earnings would then be the following:
You earn 20 ECU per token allocated to A, hence you earn 20 ECU x 40 tokens = <u>800 ECU from A.</u>
You earn 20 ECU per token others allocate to A, hence you earn 20 ECU x (15+15+15) tokens = <u>900 ECU.</u>
You earn 40 ECU per token allocated to B, hence you earn 40 ECU x 20 tokens = <u>800 ECU from B.</u>

Similarly the average earnings of others would be the following:
Others earn 20 ECU per token allocated to A, hence they earn 20 ECU x 15 tokens = <u>300 ECU from A.</u>
Others earn 20 ECU per token others allocate to A, hence they earn 20 ECU x (40+15+15) tokens =<u>1400 ECU.</u>
Others earn 40 ECU per token allocated to B, hence they earn 40 ECU x 45 tokens = <u>1800 ECU from B.</u>

Everyone in the group also gets an automatic earning of 400 ECU.

The calculations are summarized in the table below. Note that you earn 2900 ECU while other members of your group on average earn 3900 ECU.

	You	**Others**
Allocation to A	40	15
Allocation to B	20	45
Earnings from your allocation to A	800	300
Earnings from others allocation to A	900	1400
Earnings from A in total	**1700**	**1700**
Earnings from B	**800**	**1800**
Automatic earnings	**400**	**400**
Total earnings in experimental currency units	**2900**	**3900**

<u>Example 2:</u>

Account A: Earnings = 20 ECU per token YOU allocate to A **+** 20 ECU per token OTHERS allocate to A
Account B: Earnings = 40 ECU per token YOU allocate to B

Suppose that you allocated 10 tokens to A and 50 to B, and that the 3 other members of your group allocate on average 35 tokens to A and 25 to B.

Your earnings would then be the following:
You earn 20 ECU per token allocated to A, hence you earn 20 ECU x 10 tokens = <u>200 ECU from A.</u>
You earn 20 ECU per token others allocate to A, hence you earn 20 ECU x (35+35+35) tokens = <u>2100 ECU.</u>
You earn 40 ECU per token allocated to B, hence you earn 40 ECU x 50 tokens = <u>2000 ECU from B.</u>

Similarly the average earnings of others would be the following:
Others earn 20 ECU per token allocated to A, hence they earn 20 ECU x 35 tokens = <u>700 ECU from A.</u>
Others earn 20 ECU per token others allocate to A, hence they earn 20 ECU x (10+35+35) tokens =<u>1600 ECU.</u>
Others earn 40 ECU per token allocated to B, hence they earn 40 ECU x 25 tokens = <u>1000 ECU from B.</u>

Everyone in the group also gets an automatic earning of 400 ECU.

The calculations are summarized in the table below. Note that you earn 4700 ECU while other members of your group on average earn 3700 ECU.

	You	**Others**
Allocation to A	10	35
Allocation to B	50	25
Earnings from your allocation to A	200	700
Earnings from others allocation to A	2100	1600
Earnings from A in total	**2300**	**2300**
Earnings from B	**2000**	**1000**
Automatic earnings	**400**	**400**
Total earnings in experimental currency units	**4700**	**3700**

Conducting the experiment on the computer

When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

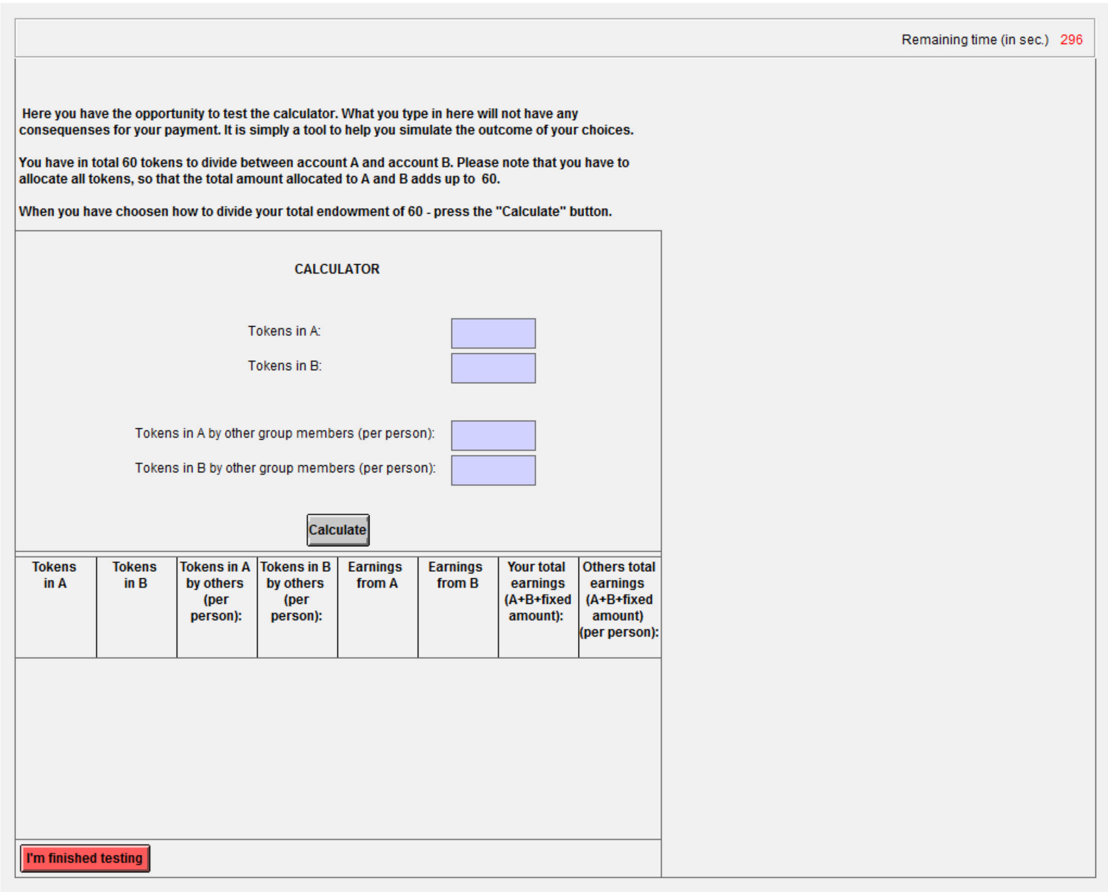
The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

In the following the three different stages are described, with a copy of the computer screen.

Stage 1: Testing the calculator

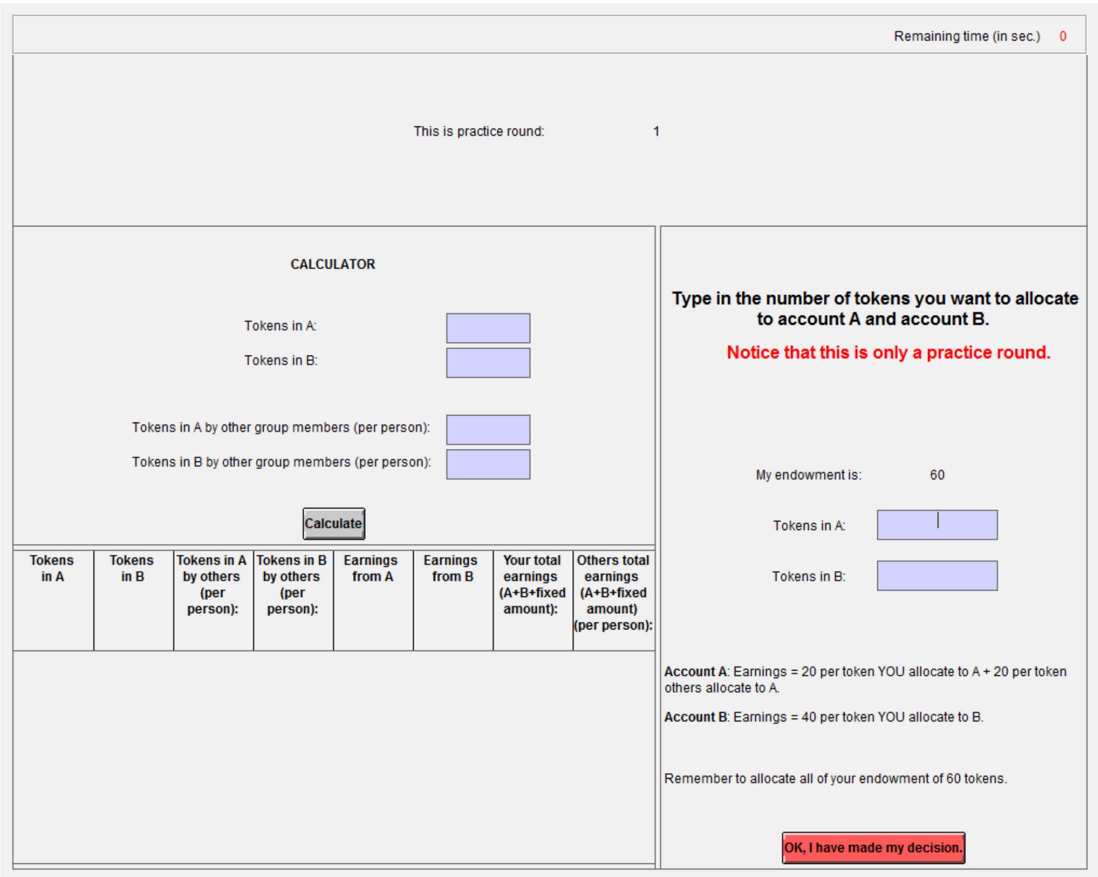
Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

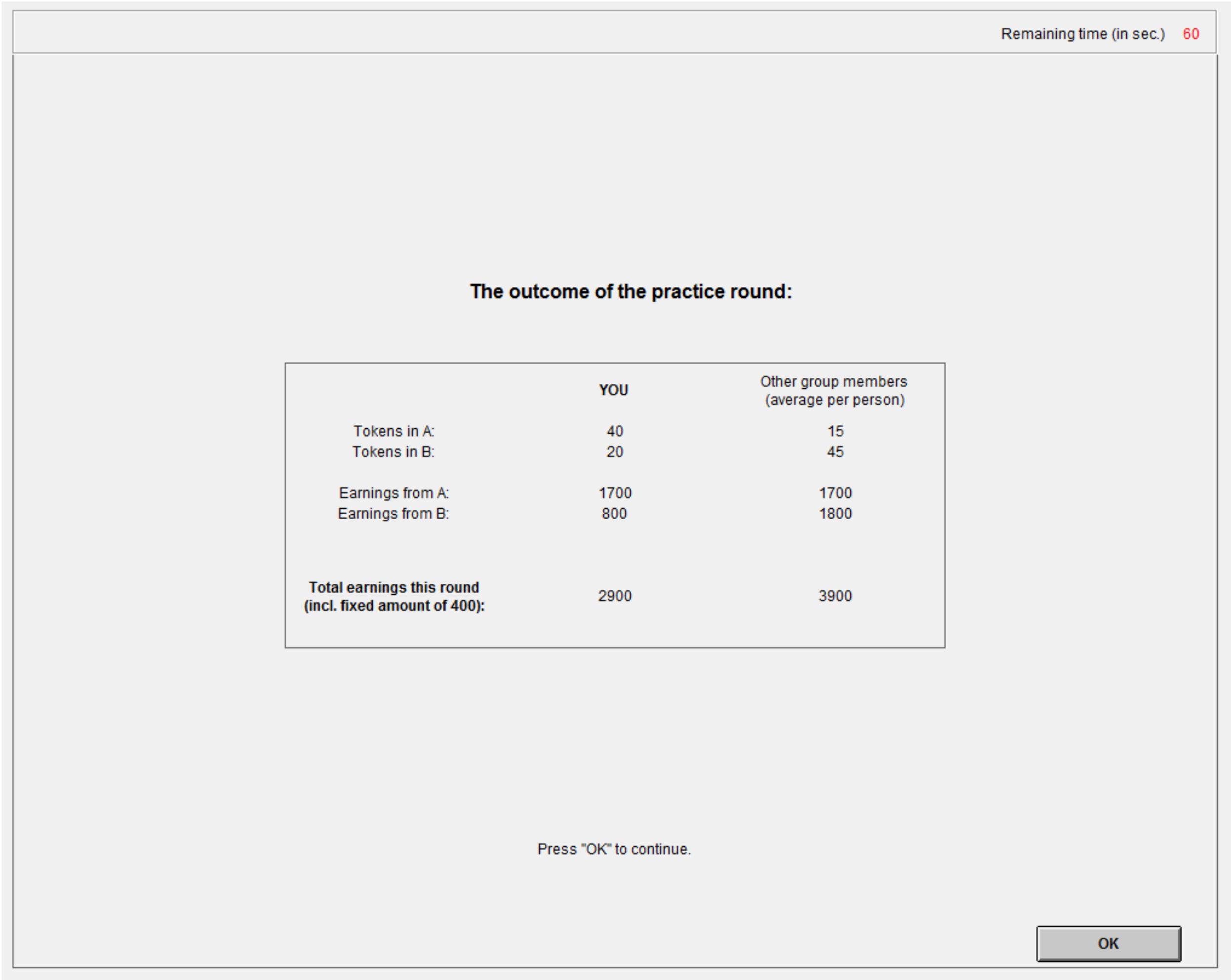
Stage 2: Practice round (1 round)

Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator on the left hand side of the screen. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.


Remaining time (in sec.) 60

The outcome of the practice round:

	YOU	Other group members (average per person)
Tokens in A:	40	15
Tokens in B:	20	45
Earnings from A:	1700	1700
Earnings from B:	800	1800
Total earnings this round (incl. fixed amount of 400):	2900	3900

Press "OK" to continue.

OK

Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)
The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. You will remain in the same group as in the practice round. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of your payment. Which round is chosen for payment will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 20 experimental currency units are worth 1 krone.

The decisions

Account A:
For every token you allocate to account A you earn 20 experimental currency units.

Account B:
How much you earn from account B will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn 40 experimental currency units. However, you lose 20 experimental currency units for each token any other member of your group allocates to account B.

Note that the tokens you allocate to account B will similarly result in a loss of 20 experimental currency units for each of the other members of your group

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 20 ECU per token YOU allocate to A
Account B: Earnings = 40 ECU per token YOU allocate to B **-** 20 ECU per token OTHERS allocate to B

Automatic earning
In addition to the earnings from account A and account B you get an automatic earning of 4000 experimental currency units per round.

<u>Example 1:</u>

Account A: Earnings = 20 ECU per token YOU allocate to A **Account B**: Earnings = 40 ECU per token YOU allocate to B **-** 20 ECU per token OTHERS allocate to B

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B.

Your earnings would then be the following:
You earn 20 ECU per token allocated to A, hence you earn 20 ECU x 40 tokens = <u>800 ECU from A.</u>
You earn 40 ECU per token allocated to B, hence you earn 40 ECU x 20 tokens = <u>800 ECU from B.</u>
You lose 20 ECU per token others allocate to B, hence you lose 20 ECU x (45+45+45) tokens = <u>-2700 ECU.</u>

Similarly the average earnings of others would be the following:
Others earn 20 ECU per token allocated to A, hence they earn 20 ECU x 15 tokens = <u>300 ECU from A.</u>
Others earn 40 ECU per token allocated to B, hence they earn 40 ECU x 45 tokens = <u>1800 ECU from B.</u>
Others lose 20 ECU per token others allocate to B, hence they lose 20 ECU x (20+45+45) tokens= <u>-2200 ECU.</u>

Everyone in the group also gets an automatic earning of 4000 ECU.

The calculations are summarized in the table below. Note that you earn 2900 ECU while other members of your group on average earn 3900 ECU.

	You	**Others**
Allocation to A	40	15
Allocation to B	20	45
Earnings from A	**800**	**300**
Earnings from your allocation to B	800	1800
Loss from others allocation to B	-2700	-2200
Earnings or loss from B in total	**-1900**	**-400**
Automatic earnings	**4000**	**4000**
Total earnings in experimental currency units	**2900**	**3900**

Example 2:

Account A: Earnings = 20 ECU per token YOU allocate to A	
Account B: Earnings = 40 ECU per token YOU allocate to B **-** 20 ECU per token OTHERS allocate to B	

Suppose that you allocated 10 tokens to A and 50 to B, and that the 3 other members of your group allocate on average 35 tokens to A and 25 to B.

Your earnings would then be the following:
You earn 20 ECU per token allocated to A, hence you earn 20 ECU x 10 tokens = <u>200 ECU from A.</u>
You earn 40 ECU per token allocated to B, hence you earn 40 ECU x 50 tokens = <u>2000 ECU from B.</u>
You lose 20 ECU per token others allocate to B, hence you lose 20 ECU *(25+25+25) tokens = <u>- 1500 ECU.</u>

Similarly the average earnings of others would be the following:
Others earn 20 ECU per token allocated to A, hence they earn 20 ECU x 35 tokens = <u>700 ECU from A.</u>
Others earn 40 ECU per token allocated to B, hence they earn 40 ECU x 25 tokens = <u>1000 ECU from B.</u>
Others lose 20 ECU per token others allocate to B, hence they lose 20 ECU x (50+25+25) tokens= -<u>2000 ECU.</u>

Everyone in the group also gets an automatic earning of 4000 ECU.

The calculations are summarized in the table below. Note that you earn 4700 ECU while other members of your group on average earn 3700 ECU.

	You	**Others**
Allocation to A	10	35
Allocation to B	50	25
Earnings from A	**200**	**700**
Earnings from your allocation to B	2000	1000
Loss from others allocation to B	-1500	-2000
Earnings or loss from B in total	**500**	**-1000**
Automatic earnings	**4000**	**4000**
Total earnings in experimental currency units	**4700**	**3700**

Conducting the experiment on the computer

When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

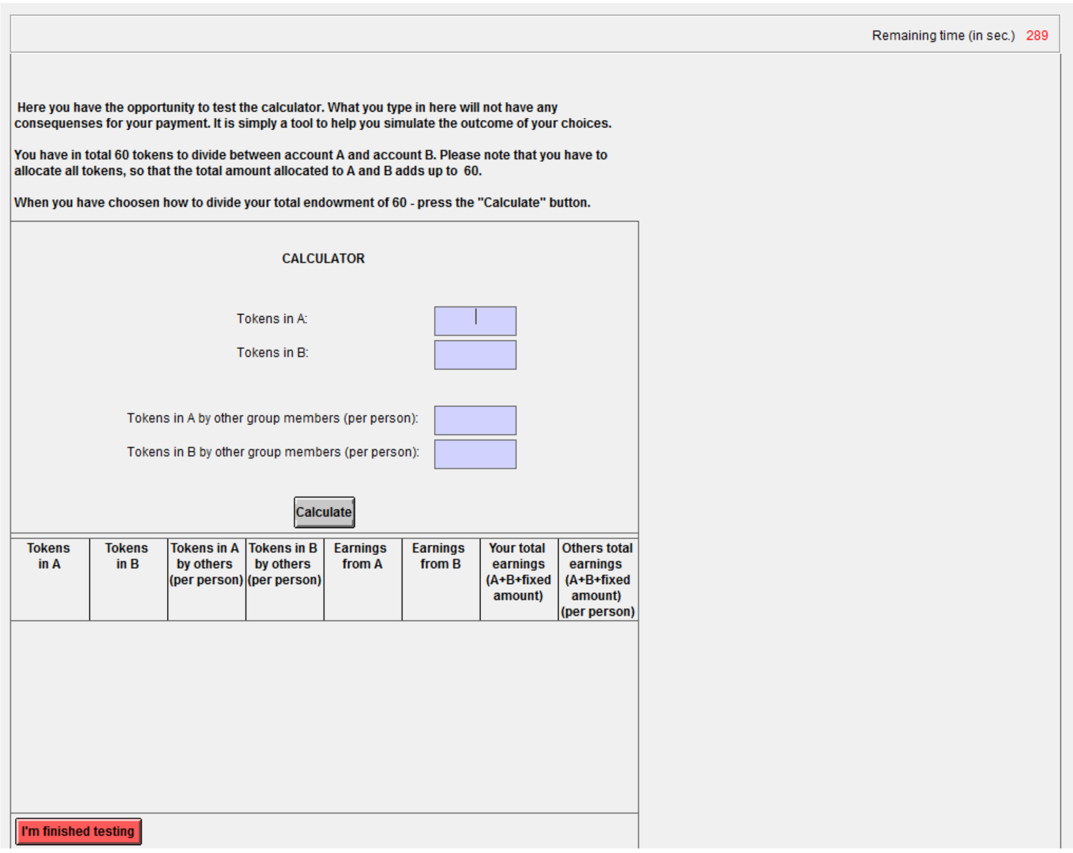
The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

In the following the three different stages are described, with a copy of the computer screen.

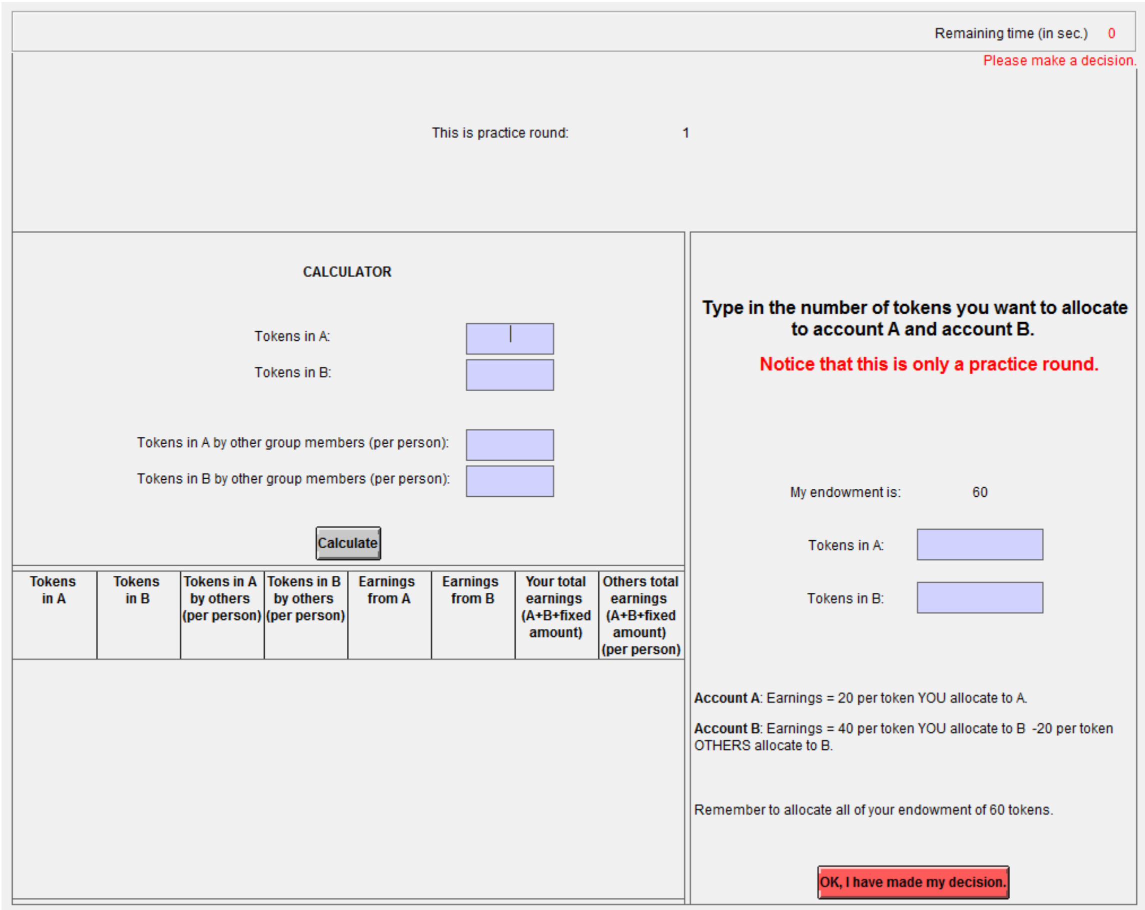
Stage 1: Testing the calculator

Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



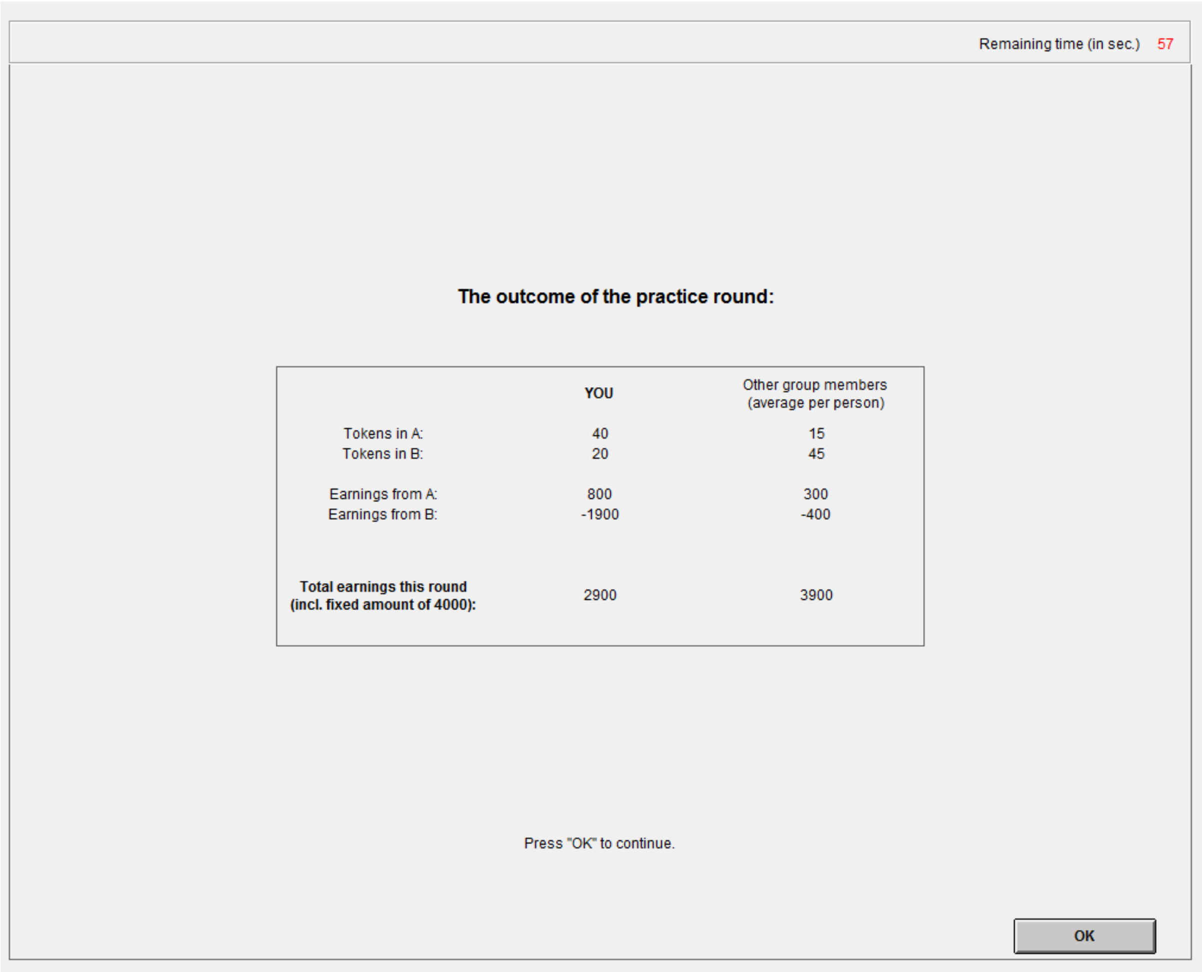
You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

Stage 2: Practice round (1 round)
Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator on the left hand side of the screen. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.



Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)
The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. You will remain in the same group as in the practice round. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of your payment. Which round is chosen for payment will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 20 experimental currency units are worth 1 krone.

The decisions

Account A:
For every token you allocate to account A you earn 40 experimental currency units.

Account B:
How much you earn from account B will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn in experimental currency an amount equal to the sum of tokens allocated to account A by all members of the group.

Note that the tokens you allocate to account A will thus increase the amount everyone else in the group earns from tokens they allocate to account B.

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 40 ECU per token YOU allocate to **A**
Account B: Earnings = (Total tokens in **A** by all group members) multiplied by tokens YOU allocate to **B**

Example 1:

Account A: Earnings = 40 ECU per token YOU allocate to A
Account B: Earnings = (Total tokens in A by all group members) multiplied by tokens YOU allocate to B

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B. The total allocation to A would then be the 40 tokens from you plus 3 x 15 tokens from the others, which equals a total of 85 tokens to A.

Your earnings would then be the following:
You earn 40 ECU per token allocated to A, hence you earn 40 ECU x 40 tokens = 1600 ECU from A.
You earn 85 ECU per token allocated to B, hence you earn 85 ECU x 20 tokens= 1700 ECU from B.

Similarly the average earnings of others would be the following:
Others earn 40 ECU per token allocated to A, hence they earn 40 ECU x 15 tokens = 600 ECU from A.
Others earn 85 ECU per token allocated to B, hence they earn 85 ECU x 45 tokens=3825 ECU from B.

The calculations are summarized in the table below. Note that you earn 3300 ECU while other members of your group on average earn 4425 ECU.

	You	**Others**
Allocation to A	40	15
Allocation to B	20	45
Earnings *per token* from A (fixed)	40	40
Earnings *per token* from B (depends on allocations to A)	85	85
Earning from A	1600	600
Earning from B	1700	3825
Total earning in experimental currency units	**3300**	**4425**

<u>Example 2:</u>

Account A: Earnings = 40 ECU per token YOU allocate to A **Account B**: Earnings = (Total tokens in A by all group members) multiplied by tokens YOU allocate to B

Suppose that you allocated 10 tokens to A and 50 to B, and that the other members of your group allocate on average 35 tokens to A and 25 to B. The total allocation to A would then be the 10 tokens from you plus 3 x 35 tokens from the others, which equals a total 115 tokens to A.

Your earnings would then be the following:
You earn 40 ECU per token allocated to A, hence you earn 40 ECU x 10 tokens = <u>400 ECU from A.</u>
You earn 115 ECU per token allocated to B, hence you earn 115 ECU x 50 tokens = <u>5750 ECU from B.</u>

Similarly the average earnings of others would be the following:
Others earn 40 ECU per token allocated to A, hence they earn 40 ECU x 35 tokens = <u>1400 ECU from A.</u>
Others earn 115 ECU per token allocated to B, hence they earn 115 ECU x 25 tokens =<u>2875 ECU from B.</u>

The calculations are summarized in the table below. Note that you earn 6150 ECU while other members of your group on average earn 4275 ECU.

	You	**Others**
Allocation to A	10	35
Allocation to B	50	25
Earnings *per token* from A (fixed)	40	40
Earnings *per token* from B (depends on allocations to A)	115	115
Earning from A	400	1400
Earning from B	5750	2875
Total earning in experimental currency units	**6150**	**4275**

Conducting the experiment on the computer

When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

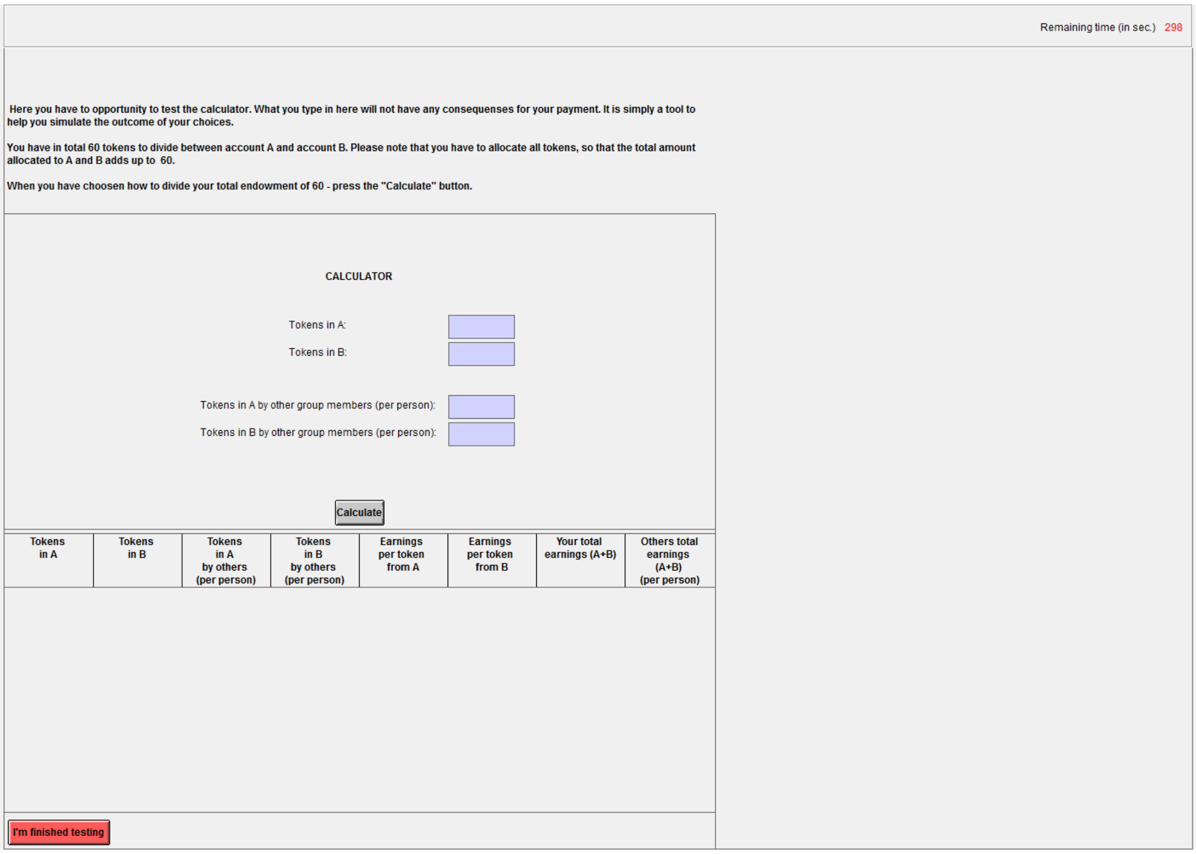
The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

In the following the three different stages are described, with a copy of the computer screen.

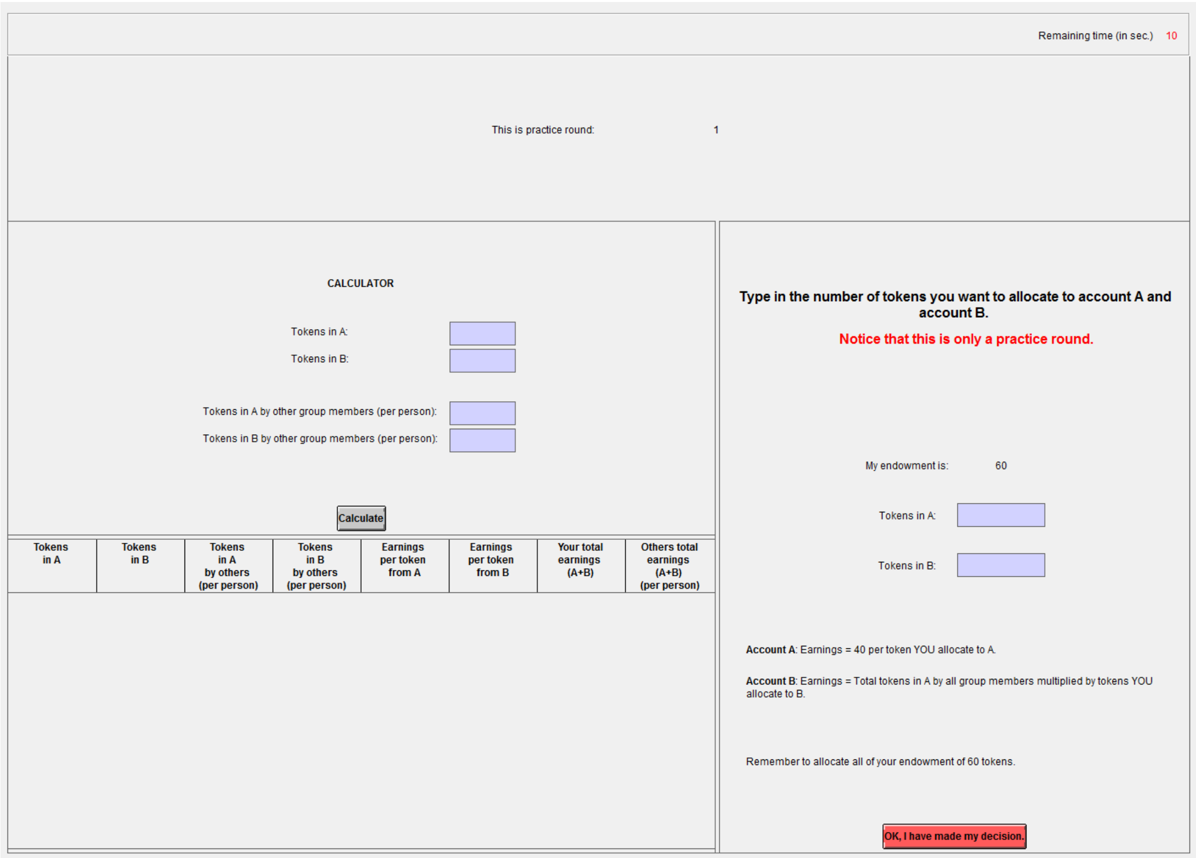
Stage 1: Testing the calculator

Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



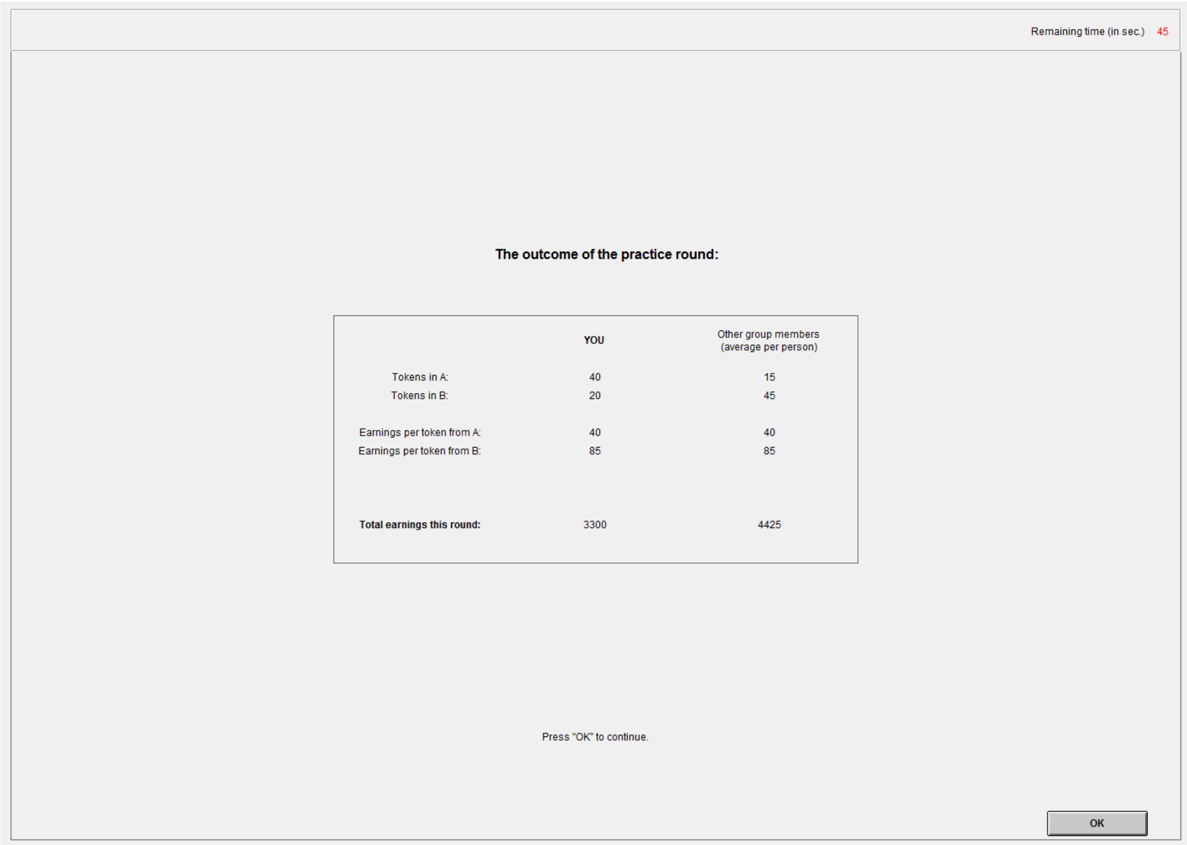
You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

Stage 2: Practice round (1 round)
Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.



Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)

The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of you payment. Which round is chosen will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 20 experimental currency units are worth 1 krone.

The decisions

Account A:
For every token you allocate to account A you earn 40 experimental currency units.

Account B:
How much you earn from account B will depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn in experimental currency an amount equal to 240 minus the sum of tokens allocated to account B by all members of the group.

Note that the tokens you allocate to account B will thus reduce the amount everyone else in the group earns from tokens they allocate to account B.

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 40 ECU per token YOU allocate to **A**
Account B: Earnings = (240 **-** total tokens in **B** by all group members) multiplied by tokens YOU allocate to **B**

Example 1:

Account A: Earnings = 40 ECU per token YOU allocate to A
Account B: Earnings = (240 **-** total tokens in B by all group members) multiplied by tokens YOU allocate to B

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B. The total allocation to B would then be the 20 tokens from you plus 3 x 45 tokens from the others, which equals a total 155 tokens to B.

Your earnings would then be the following:
You earn 40 ECU per token allocated to A, hence you earn 40 ECU x 40 tokens = 1600 ECU from A.
You earn (240-155) = 85 ECU per token allocated to B, hence you earn 85 ECU x 20 tokens= 1700 ECU from B.

Similarly the average earnings of others would be the following:
Others earn 40 ECU per token allocated to A, hence they earn 40 ECU x 15 tokens = 600 ECU from A.
Others earn (240-155) = 85 ECU per token allocated to B, hence they earn 85 ECU x 45 tokens=3825 ECU from B.

The calculations are summarized in the table below. Note that you earn 3300 ECU while other members of your group on average earn 4425 ECU.

	You	**Others**
Allocation to A	40	15
Allocation to B	20	45
Earnings *per token* from A (fixed)	40	40
Earnings *per token* from B (depends on allocations to B)	85	85
Earnings from A	1600	600
Earnings from B	1700	3825
Total earnings in experimental currency units	**3300**	**4425**

<u>Example 2:</u>

Account A: Earnings = 40 ECU per token YOU allocate to A **Account B**: Earnings = (240 **-** total tokens in B by all group members) multiplied by tokens YOU allocate to B

Suppose that you allocated 10 tokens to A and 50 to B, and that the other members of your group allocate on average 35 tokens to A and 25 to B. The total allocation to B would then be the 50 tokens from you plus 3 x 25 tokens from the others, which equals a total 125 tokens to B.

Your earnings would then be the following:
You earn 40 ECU per token allocated to A, hence you earn 40 ECU x 10 tokens = <u>400 ECU from A.</u>
You earn (240-125)=115 ECU per token allocated to B, hence you earn 115 ECU x 50 tokens = <u>5750 ECU from B.</u>

Similarly the average earnings of others would be the following:
Others earn 40 ECU per token allocated to A, hence they earn 40 ECU x 35 tokens = <u>1400 ECU from A.</u>
Others earn (240-125) =115 ECU per token allocated to B, hence they earn 115 ECU x 25 tokens =<u>2875 ECU from B.</u>

The calculations are summarized in the table below. Note that you earn 6150 ECU while other members of your group on average earn 4275 ECU.

	You	**Others**
Allocation to A	10	35
Allocation to B	50	25
Earnings *per token* from A (fixed)	40	40
Earnings *per token* from B (depends on allocations to B)	115	115
Earnings from A	400	1400
Earnings from B	5750	2875
Total earnings in experimental currency units	**6150**	**4275**

Conducting the experiment on the computer

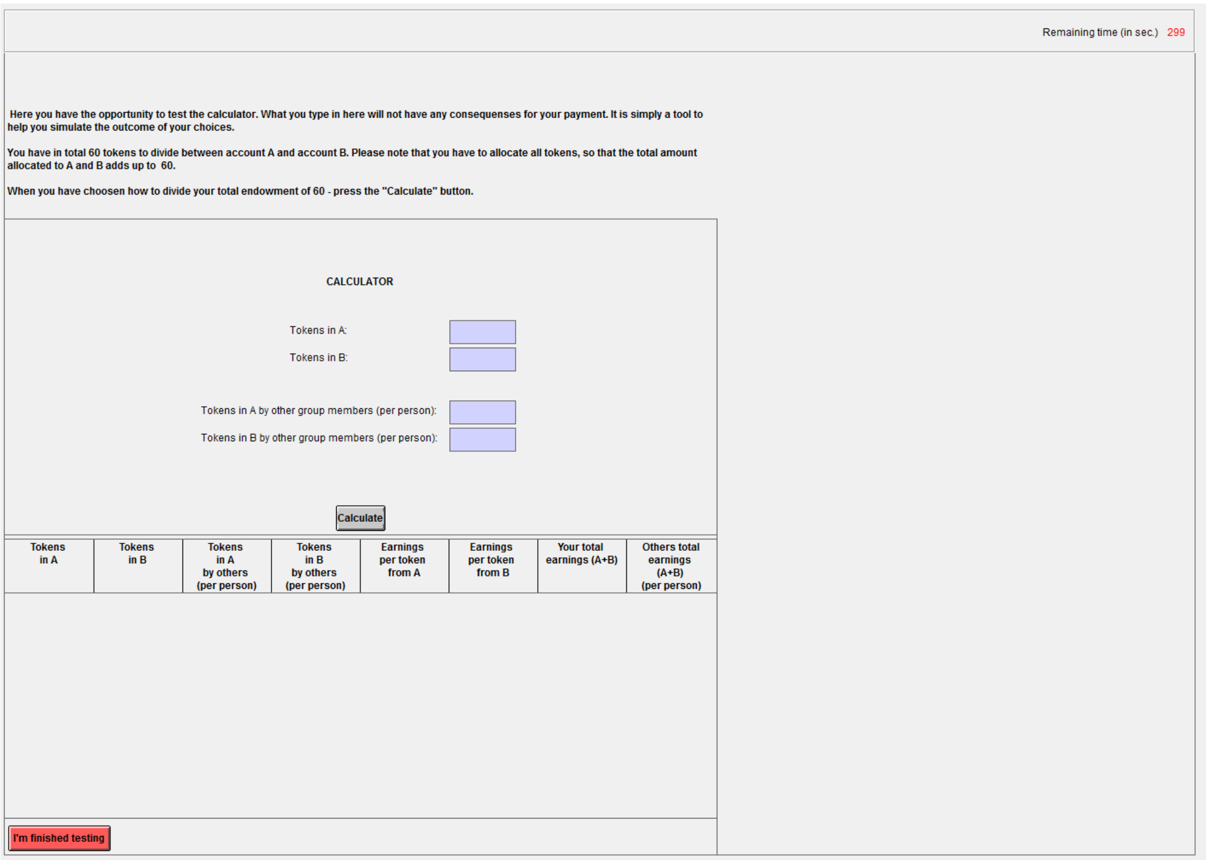
When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

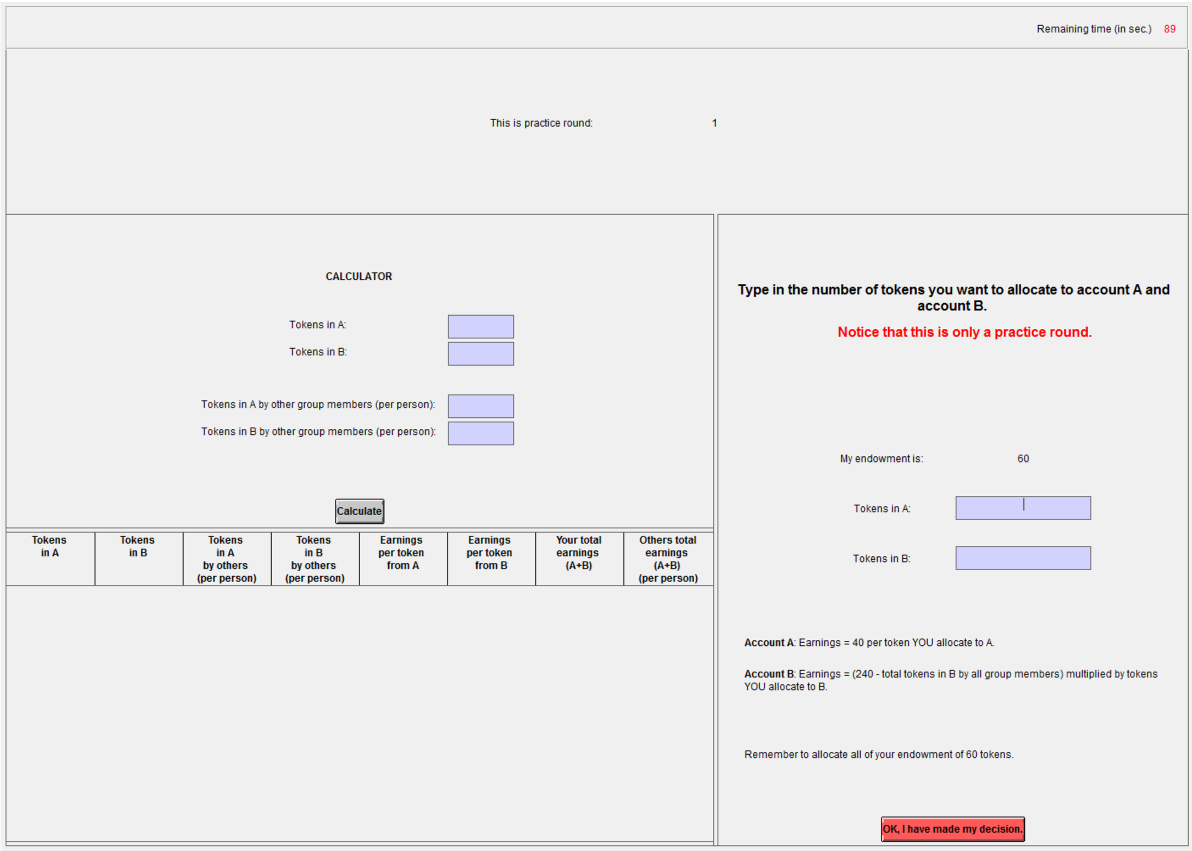
In the following the three different stages are described, with a copy of the computer screen.

Stage 1: Testing the calculator
Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



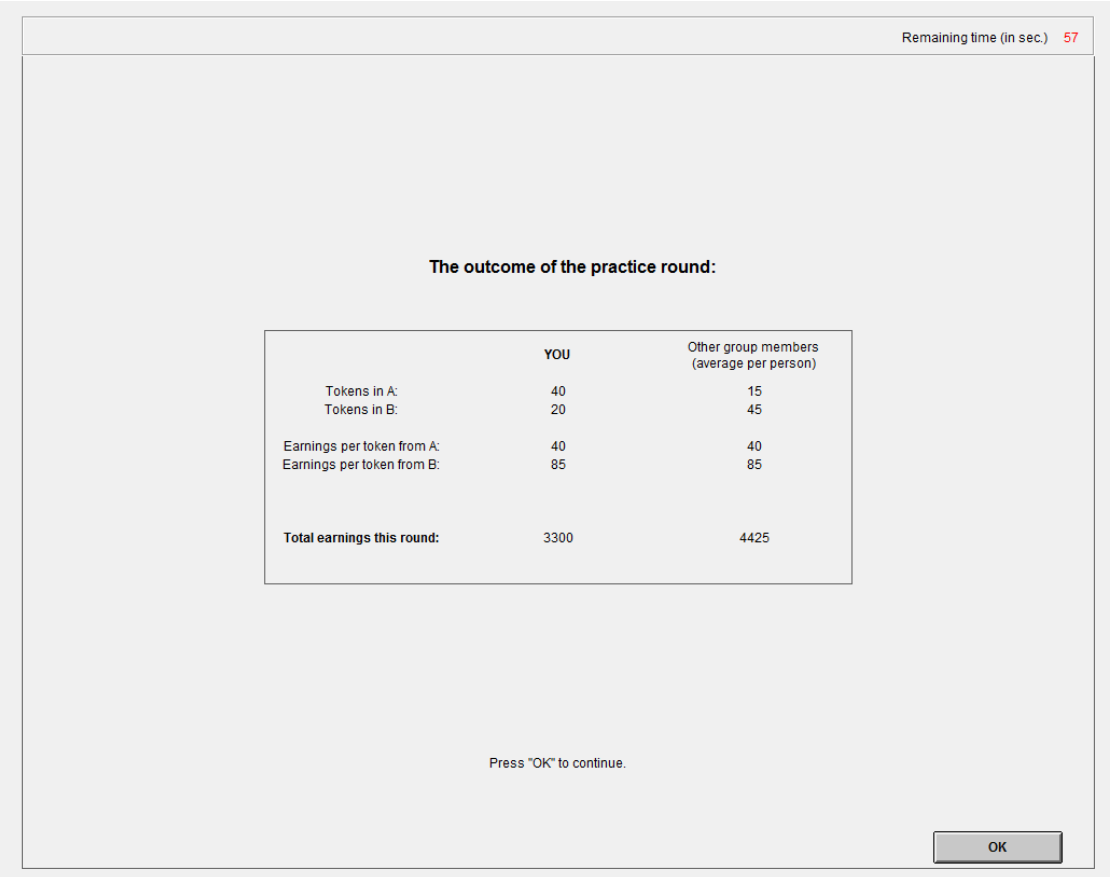
You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

Stage 2: Practice round (1 round)
Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator on the left hand side of the screen. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.



Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)

The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. You will remain in the same group as in the practice round. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of your payment. Which round is chosen for payment will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 200 experimental currency units are worth 1 krone.

The decisions

Account A:
How much you and everyone else earn from tokens allocated to account A depend on both your decision and the decisions of the other members of your group. For every token you allocate to account A you earn 80 experimental currency units. In addition, for each token you and anyone else in your group allocate to account A you earn in experimental currency units an amount equal to 480 minus the sum of tokens allocated to account A by all members of the group.

Note that the tokens you allocate to account A will cause a similar earning to everyone else in the group.

Account B:
For each token you allocate to account B you earn 400 experimental currency units.

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 80 ECU per token YOU allocate to **A**
+ (480 minus total tokens in **A** by all group members) multiplied by total tokens in **A** by all group members
Account B: Earnings = 400 ECU per token YOU allocate to **B**

Automatic earning
In addition to the earnings from account A and account B you get an automatic earning of 400 experimental currency units per round.

Example 1:

The earnings from account A and account B can be summarized like this:

Account A: Earnings = 80 ECU per token YOU allocate to **A**
+ (480 minus total tokens in **A** by all group members) multiplied by total tokens in **A** by all group members
Account B: Earnings = 400 ECU per token YOU allocate to **B**

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B. The total allocation to A would then be the 40 tokens from you plus 3 x 15 tokens from the others, which equals a total of 85 tokens to A.

Your earnings would then be the following:
You earn 80 ECU per token allocated to A, hence you earn 80 x 40 = 3 200 ECU from A.
You earn (480-85) = 395 ECU per token you and others allocate to A; hence you earn 395 x 85 = 33 575 ECU
You earn 400 ECU per token allocated to B, hence you earn 400 x 20 = 8 000 ECU from B.

Similarly the average earnings of others would be the following:
Others earn 80 ECU per token allocated to A, hence they earn 80 x 15 = 1 200 ECU from A.
Others earn (480-85)=395 ECU per token you and others allocate to A; hence they earn 395 x 85= 33 575 ECU
Others earn 400 ECU per token allocated to B, hence they earn 400 x 45 = 18 000 ECU from B.

Everyone in the group also gets an automatic earning of 400 ECU.

The calculations are summarized in the table below. Note that you earn 45 175 ECU while other members of your group on average earn 53 175 ECU.

		You	**Others**
Allocation to A		40	15
Allocation to B		20	45
Earnings *per token* you allocate to A	(fixed)	80	80
Earnings *per token* your group allocate to A	(depends on allocations to A)	395	395
Earnings *per token* from B	(fixed)	400	400
Private earning from A		3 200	1 200
Common earning from A		33 575	33 575
Private earning from B		8 000	18 000
Automatic earning		400	400
Total earning in experimental currency units		**45 175**	**53 175**

Example 2:

The earnings from account A and account B can be summarized like this:

Account A: Earnings = 80 ECU per token YOU allocate to **A**
+ (480 minus total tokens in **A** by all group members) multiplied by total tokens in **A** by all group members
Account B: Earnings = 400 ECU per token YOU allocate to **B**

Suppose that you allocated 10 tokens to A and 50 to B, and that the 3 other members of your group allocate on average 35 tokens to A and 25 to B. The total allocation to A would then be the 10 tokens from you plus 3 x 35 tokens from the others, which equals a total of 115 tokens to A.

Your earnings would then be the following:
You earn 80 ECU per token allocated to A, hence you earn 80 x 10 = 800 ECU from A.
You earn (480-115)=365 ECU per token you and others allocate to A; hence you earn 365 x 115= 41 975 ECU
You earn 400 ECU per token allocated to B, hence you earn 400 x 50 = 20 000 ECU from B.

Similarly the average earnings of others would be the following:
Others earn 80 ECU per token allocated to A, hence they earn 80 x 35 = 2 800 ECU from A.
Others earn (480-115)=365 ECU per token you and others allocate to A; hence they earn 365 x 115= 41 975 ECU
Others earn 400 ECU per token allocated to B, hence they earn 400 x 25= 10 000 ECU from B.

Everyone in the group also gets an automatic earning of 400 ECU.

The calculations are summarized in the table below. Note that you earn 63 175 ECU while other members of your group on average earn 55 175 ECU.

		You	**Others**
Allocation to A		10	35
Allocation to B		50	25
Earnings *per token* you allocate to A	(fixed)	80	80
Earnings *per token* your group allocate to A	(depends on allocations to A)	365	365
Earnings *per token* from B	(fixed)	400	400
Private earning from A		800	2 800
Common earning from A		41 975	41 975
Private earning from B		20 000	10 000
Automatic earning		400	400
Total earning in experimental currency units		**63 175**	**55 175**

Conducting the experiment on the computer

When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

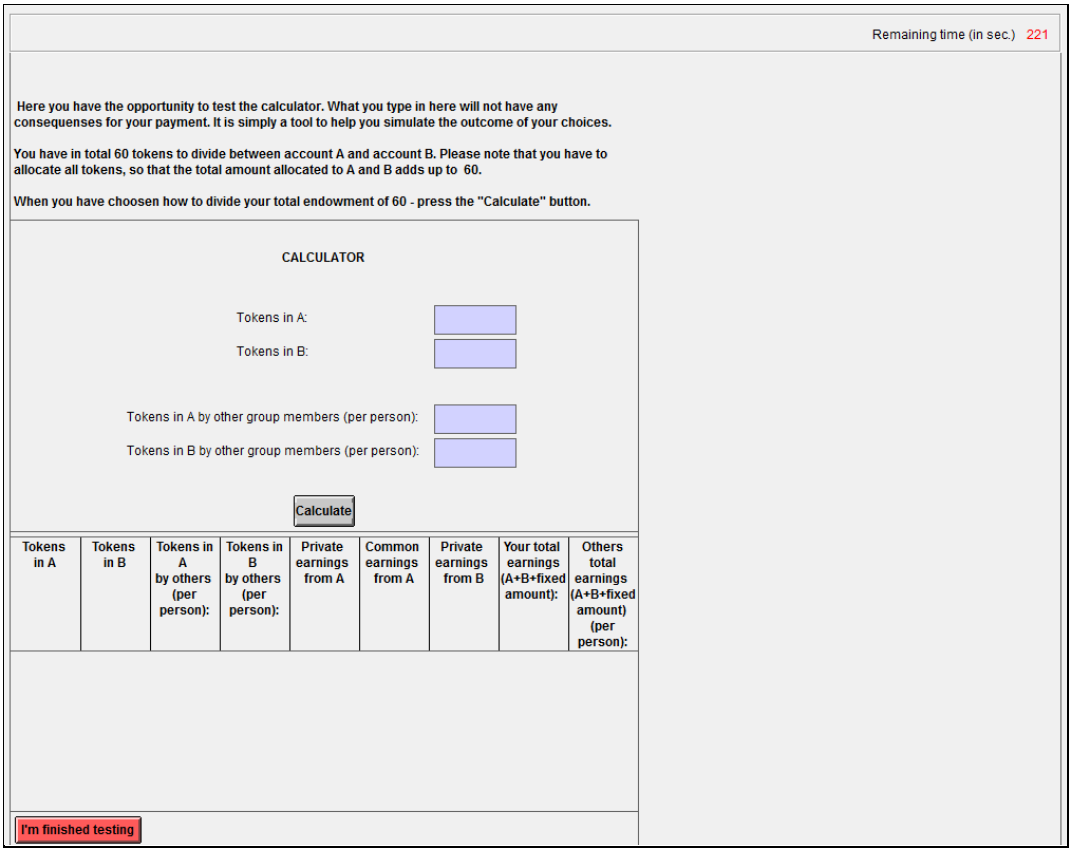
The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

In the following the three different stages are described, with a copy of the computer screen.

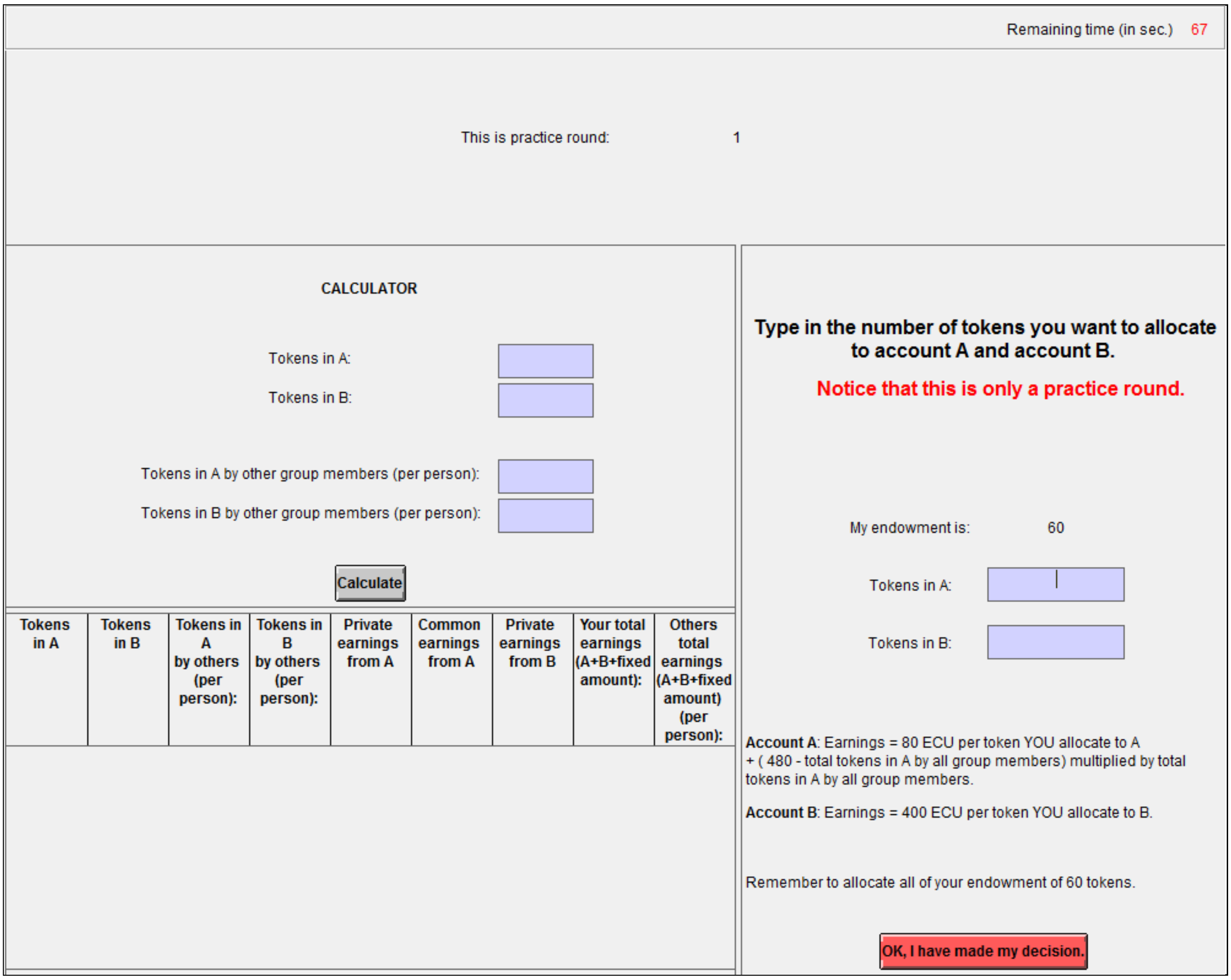
Stage 1: Testing the calculator

Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



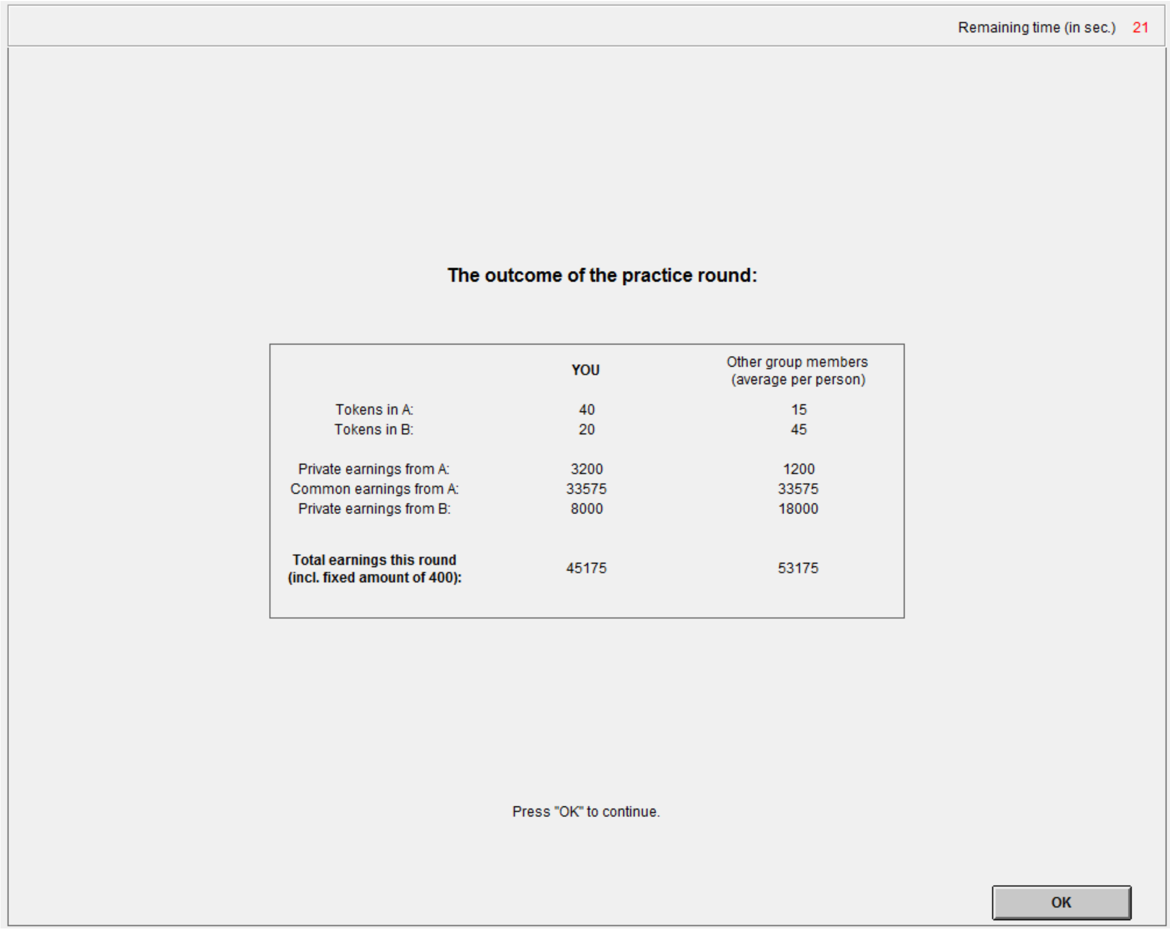
You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

Stage 2: Practice round (1 round)
Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.



	YOU	Other group members (average per person)
Tokens in A:	40	15
Tokens in B:	20	45
Private earnings from A:	3200	1200
Common earnings from A:	33575	33575
Private earnings from B:	8000	18000
Total earnings this round (incl. fixed amount of 400):	45175	53175

Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)
The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of you payment. Which round is chosen will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.

Instructions

Welcome to this economic experiment.

The results from this experiment will be used in a research project. Therefore, it is important that you follow certain rules. It is important that you do not talk or in other ways communicate with any of the other participants during the experiment. Please turn off mobile phones, and use only pre-opened software on the computer. The experiment will last ca 1 hour.

Each participant will make decisions on individual computers. The choices you make are anonymous. The researchers behind the experiment will only see your ID-number, and the person doing the transfers of the money does not know what is going on in the experiment. Thus, nobody can link your behavior to your name. It is important for us that you trust the information we provide you, and hence we underline that all information we provide is true; deception is not allowed in economic experiments. It is also important that you understand the rules of the game in the experiment, hence we ask you to read these instructions carefully. Note also that all participants get exactly the same instructions as you do. You will be notified when the experiment starts, and when you can start entering your answers using the computer in front of you.

In this experiment you will make several decisions and enter them on the PC in front of you. The choices you and others make will determine how much you earn in this experiment, but everybody is guaranteed a minimum earning. After the experiment we will transfer the money to your account. For this purpose you have to fill in the form in front of you. You put this form in a locked box as you leave the room. *Note that you get your ID-number at the end of the experiment. You have to wait until the end of the experiment to fill in this part of the form.*

Note that only the person who does the payment has the lock to the box, thus this person is the only one who can link your ID-number to your name. However, this person does not know what happened in the experiment. The researchers who analyze the data will only see the ID-numbers and not your name, and thus we cannot link your decisions to your name.

The experiment

The experiment consists of one practice round and **10 actual rounds**. In each round you will be in a group with three other participants, hence the group consists of **4 members**. The group will remain the same throughout the whole experiment, including the practice round. At no point in the experiment will the identities of the other members of the group be made known to you, nor will your identity be made known to them.

At the beginning of each round, you receive **60 tokens.** Your task is to decide how to divide these 60 tokens between two accounts: **Account A** and **Account B.** The possible earnings from the two accounts are described below.

Only one of the ten actual rounds will be chosen for payment. The experimental software will pick a random round at the end of the experiment, and this round will be used for payment. All payments are stated in experimental currency units (ECU). 200 experimental currency units are worth 1 krone.

The decisions

Account A:
For each token you allocate to account A you earn 80 experimental currency units

Account B:
How much you and everyone else earn from tokens allocated to account B depend on both your decision and the decisions of the other members of your group. For each token you allocate to account B you earn 400 experimental currency units. In addition, for each token you and anyone else in your group allocate to account B you lose, in experimental currency units, an amount equal to the sum of tokens allocated to account B by all members of the group.

Note that the tokens you allocate to account B will cause a similar loss to everyone else in the group.

The earnings from account A and account B can then be summarized like this:

Account A: Earnings = 80 ECU per token YOU allocate to **A**
Account B: Earnings = 400 ECU per token YOU allocate to **B**
- (total tokens in **B** by all group members) multiplied by total tokens in **B** by all group members

Automatic earning
In addition to the earnings from account A and account B you get an automatic earning of 58 000 experimental currency units per round.

Example 1:

The earnings from account A and account B can be summarized like this:

Account A: Earnings = 80 ECU per token YOU allocate to **A**
Account B: Earnings = 400 ECU per token YOU allocate to **B**
- (total tokens in **B** by all group members) multiplied by total tokens in **B** by all group members

Suppose that you allocated 40 tokens to A and 20 to B, and that the 3 other members of your group allocate on average 15 tokens to A and 45 to B. The total allocation to B would then be the 20 tokens from you plus 3 x 45 tokens from the others, which equals a total of 155 tokens to B.

Your earnings would then be the following:
You earn 80 ECU per token allocated to A, hence you earn 80 x 40 = 3 200 ECU from A.
You earn 400 ECU per token allocated to B, hence you earn 400 x 20 = 8 000 ECU from B.
You lose 155 ECU per token you and others allocate to B, hence you lose 155 x 155 = 24 025 ECU

Similarly the average earnings of others would be the following:
Others earn 80 ECU per token allocated to A, hence they earn 80 x 15 = 1 200 ECU from A.
Others earn 400 ECU per token allocated to B, hence they earn 400 x 45 =18 000 ECU from B.
Others lose 155 ECU per token you and others allocate to B, hence they lose 155 x 155 = 24 025 ECU

Everyone in the group also gets an automatic earning of 58 000 ECU.

The calculations are summarized in the table below. Note that you earn 45 175 ECU while other members of your group on average earn 53 175 ECU.

	You	**Others**
Allocation to A	40	15
Allocation to B	20	45
Earnings *per token* you allocate to A (fixed)	80	80
Earnings *per token* from B (fixed)	400	400
Loss *per token* your group allocate to B (depends on allocations to B)	-155	-155
Private earning from A	3 200	1 200
Private earning from B	8 000	18 000
Common loss from B	-24 025	-24 025
Automatic earning	58 000	58 000
Total earning in experimental currency units	**45 175**	**53 175**

<u>Example 2:</u>

> The earnings from account A and account B can be summarized like this:
>
> **Account A**: Earnings = 80 ECU per token YOU allocate to **A**
> **Account B**: Earnings = 400 ECU per token YOU allocate to **B**
> - (total tokens in **B** by all group members) multiplied by total tokens in **B** by all group members

Suppose that you allocated 10 tokens to A and 50 to B, and that the 3 other members of your group allocate on average 35 tokens to A and 25 to B. The total allocation to B would then be the 50 tokens from you plus 3 x 25 tokens from the others, which equals a total of 125 tokens to B.

Your earnings would then be the following:
You earn 80 ECU per token allocated to A, hence you earn 80 x 10 = <u>800 ECU from A.</u>
You earn 400 ECU per token allocated to B, hence you earn 400 x 50 = <u>20 000 ECU from B.</u>
You lose 125 ECU per token you and others allocate to B; hence you lose 125 x 125 <u>= 15 625 ECU</u>

Similarly the average earnings of others would be the following:
Others earn 80 ECU per token allocated to A, hence they earn 80 x 35 = <u>2 800 ECU from A.</u>
Others earn 400 ECU per token allocated to B, hence they earn 400 x 25 =<u>10 000 ECU from B.</u>
Others lose 125 ECU per token you and others allocate to B; hence they lose 125 x 125 <u>= 15 625 ECU</u>

Everyone in the group also gets an automatic earning of 58 000 ECU.

The calculations are summarized in the table below. Note that you earn 63 175 ECU while other members of your group on average earn 55 175 ECU.

	You	**Others**
Allocation to A	10	35
Allocation to B	50	25
Earnings *per token* you allocate to A (fixed)	80	80
Earnings *per token* from B (fixed)	400	400
Loss *per token* your group allocate to B (depends on allocations to B)	-125	-125
Private earning from A	800	2 800
Private earning from B	20 000	10 000
Common loss from B	-15 625	-15 625
Automatic earning	58 000	58 000
Total earning in experimental currency units	**63 175**	**55 175**

Conducting the experiment on the computer

When we start the experiment you are met by a welcome screen. Note the red button at the lower right corner, asking you to state OK when you are ready, in this case when we tell you to do so. There will be screens later in the experiment with similar OK buttons that you are asked to press when you have read the information on the screen. Please press this button once you are ready as all others in the room will have to wait for the last one to press OK in some instances. Pressing OK once you are ready makes a smoother experiment with less waiting time.

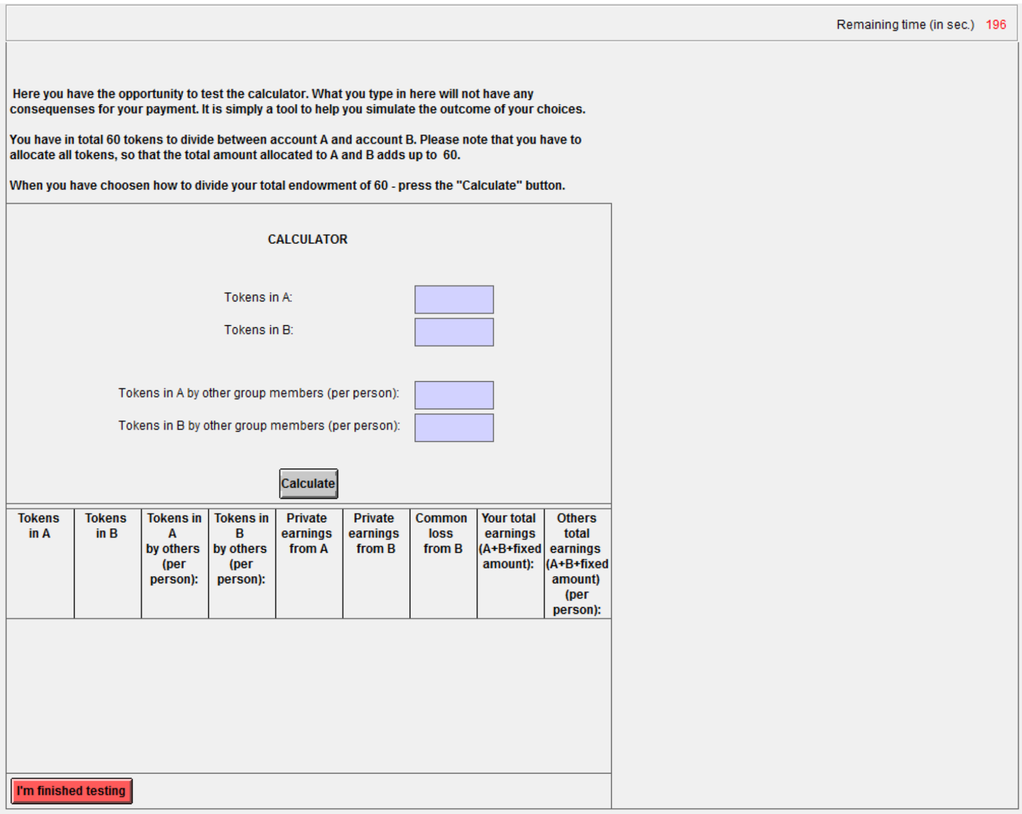
The different stages of the experiment – a detailed description

The experiment will consist of 3 stages:
Stage 1: Testing the calculator
Stage 2: Practice round (1 round)
Stage 3: The paid experiment starts (10 rounds)
After the experiment is finished you will be asked to fill out a short questionnaire.

In the following the three different stages are described, with a copy of the computer screen.

Stage 1: Testing the calculator

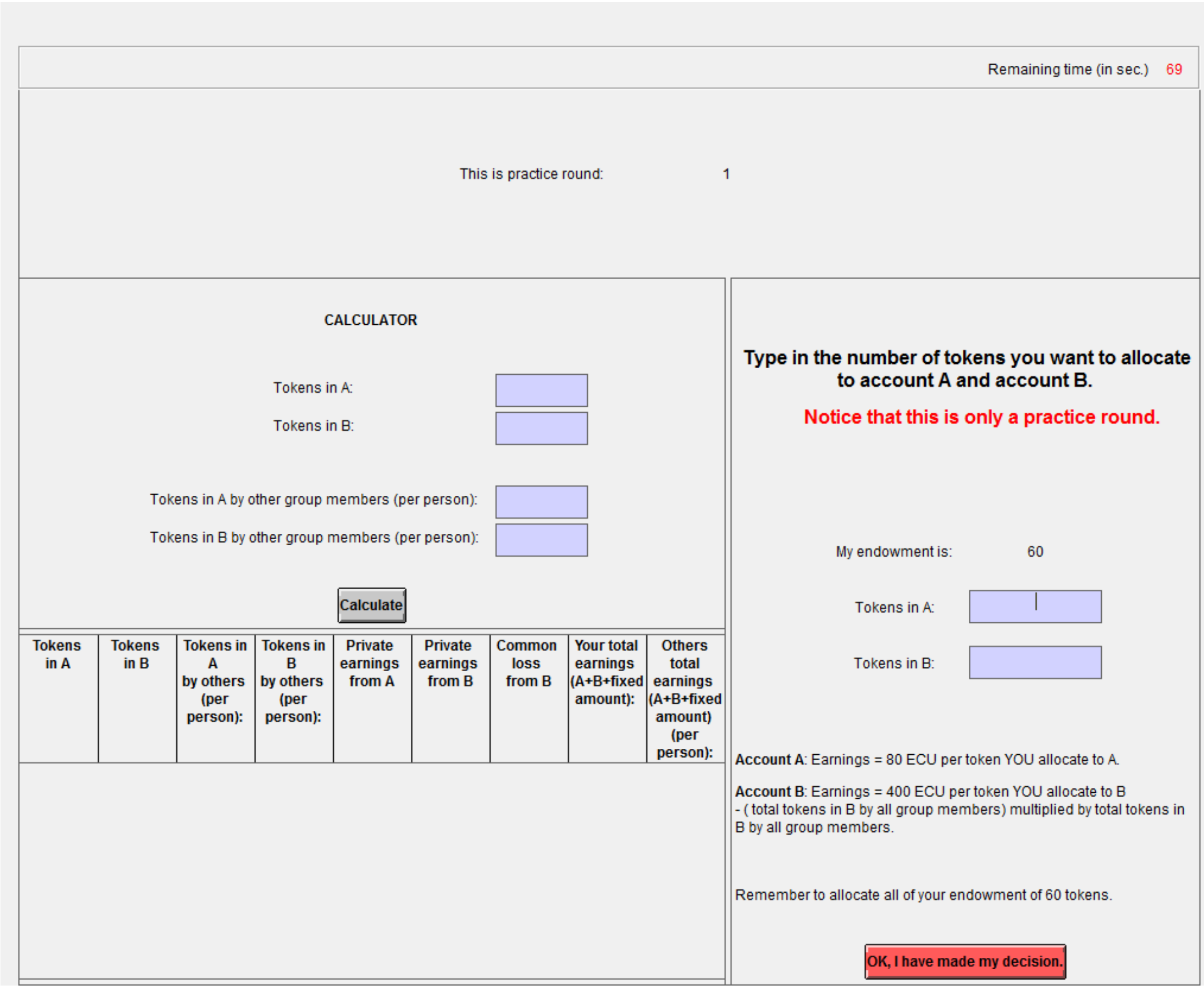
Before we start the actual experiment you will have the opportunity to familiarize yourself with the "calculator/simulator". On the computer screen the calculator will look like this:



You may enter your allocation to A and B, and others' average allocation to A and B. Note that the sum in both cases must be 60 tokens. When you press calculate, the results appear in the columns below. Once you understand how the calculator works, press the red button. Note that the calculator will still be available after you press the red button.

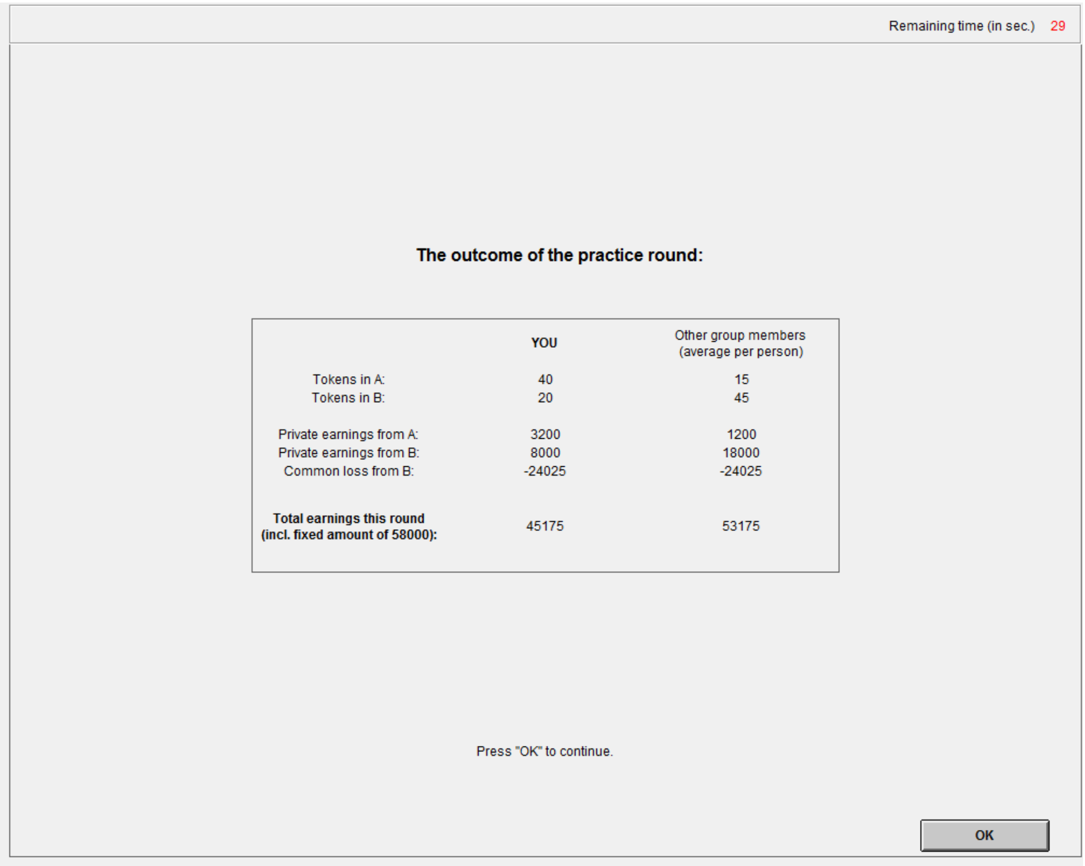
Stage 2: Practice round (1 round)

Before we start on the paid experiment everyone will play 1 practice round. The outcome of this round does not matter for your final payment. When the practice round starts you will first get the following picture on your computer.



On the right hand side of the screen you can enter your own actual allocation. In deciding how to allocate the tokens you can still use the calculator. Once you have entered your allocation on the right hand side of the screen, press the red button to submit your allocation.

When all members of your group have entered their allocation, a screen presenting the results of the round will appear.


Remaining time (in sec.) 29

The outcome of the practice round:

	YOU	Other group members (average per person)
Tokens in A:	40	15
Tokens in B:	20	45
Private earnings from A:	3200	1200
Private earnings from B:	8000	18000
Common loss from B:	-24025	-24025
Total earnings this round (incl. fixed amount of 58000):	45175	53175

Press "OK" to continue.

OK

Please press OK when you have read this information so the experiment can continue.

Stage 3: Round 1- 10 (the paid experiment starts)

The paid part of the experiment will now start. This part of the experiment consists of 10 rounds. After all 10 rounds are finished one of the 10 rounds will randomly be chosen by the computer to be the basis of you payment. Which round is chosen will be announced at the end of the experiment.

The screens and procedure in the paid rounds are exactly as in the practice round.