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Cooperation of Pairs

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Abstract: To examine the stability of prosocial behavior in groups and pairs, we use an indirect approach. We conducted linear public good experiments with two and four subjects repeatedly three times at intervals of one week. All experiments were carried out without providing feedback and used a payment mechanism promoting stable behavior. We study the dynamics of behavior in repeated sessions and find that pairs are much better at establishing and stabilizing cooperation than groups of four. Furthermore, we conducted all experiments in a partner and a stranger design. As is known from the literature, cooperation in a stranger design should be lower than in a partner design. Once again, we are interested in the differences of the strength of this cooperation reducing effect between pairs and groups. Unlike pairs, groups show very low contributions to the public good in the stranger treatment and display a strong tendency to decrease cooperation in the partner treatment. The results in all treatments demonstrate that decreasing cooperation is a stable pattern of behavior in dynamic social dilemma contexts. Finally, we conducted a norm elicitation experiment using a method introduced by Krupka and Weber (2013) and find that in pairs symmetric behavior plays a very important role.

Keywords: repeated public good experiments; group size effects; moral self-licensing

JEL Classification: C91; C73

1. Introduction

In the last two decades, experimental and theoretical work on "social preferences" has produced a vast number of interesting new insights. One of the focal points is the question of how to overcome a fundamental cooperation problem paradigmatically described by the prisoner's dilemma. Modern societies face this cooperation problem in many variations and in very important contexts. Environmental problems, the stability of democratic systems, or more generally, the pursuit of efficiency gains in situations characterized by the fundamental conflict between individually rational, selfish behavior, and collectively rational (efficient) behavior, are examples of social dilemmas. These types of cooperation problems always affect groups of people and the size of these groups ranges from two to seven billion (in cases where the whole of mankind is involved in a global public good problem). We can characterize cooperative behavior as a person's willingness to sacrifice individual benefit for the sake of increasing the group's prosperity. Therefore, the opposite of cooperative behavior is the readiness to withhold contributions while at the same time accepting the share of benefits created by the other group members' sacrifices. Thus, a group's success in solving a cooperation problem crucially depends on the willingness of its members to forego their own payoffs and to behave unselfishly.

The standard experimental setting in which cooperation is studied is the public good game, in which the public good is created by a particular payoff function displaying the so called *voluntary*

contribution mechanism introduced by [1]. Let z_i denote the initial endowment of group member i, b_i the individual contribution to the provision of the public good and α the return every group member receives if one monetary unit is invested in the production of the public good. The marginal return on the share of z_i that is not invested in the public good is normalized to 1. Then α is identical to the marginal per capita return (*MPCR*) of investments in the public good. If N is the number of group members, group member i's payoff π_i is

$$\pi_i = (z_i - b_i) + \alpha \sum_{j=1}^{N} b_j \, . \tag{1}$$

A cooperation problem arises if the following holds:

$$\alpha \langle 1; N\alpha \rangle 1 \text{ and thus } \alpha > \frac{1}{N} \tag{1a}$$

An individual investing one monetary unit in the public good receives a return of α. Since $\alpha < 1$, not investing is, from the individual's point of view, more profitable because the return of a monetary unit he keeps is equal to 1. However, since $\alpha > 1/N$, from the group perspective, the efficient solution is to invest the complete endowment in the public good.

Given the payoff Function (1) there is the obvious question whether or not and how the coordination performance of the subjects can depend on the group size N and the *MPCR* [2] investigate public good experiments with large groups of up to 100 subjects and show that even large groups with very small *MPCR* are capable of the same cooperative performance as the small groups working in the laboratory with high *MPCR*.

Large groups of 100 players are an extreme value for N. In this paper we look at the opposite, the smallest group size for which a public good problem can arise, N = 2. We believe that "pairs" are particularly interesting because two-person relationships with recurring cooperation problems play an important and peculiar role in the life of human beings. In most societies, for example, a couple starts a family and the partners remain in a two-person relationship throughout their lives. Two-person interactions are also important in market interactions, where most exchanges are made between two parties, albeit in this context people usually interact with many different partners. A peculiar kind of symmetry is characteristic for pairs: the "rest of the group" is "worth" as much as oneself.

We do not study the behavior of pairs and groups in a single experimental session, but focus on the dynamic of behavior in a series of four experimental sessions conducted with one week between the three repetitions of the starting experiment. We use the first experimental session in this sequence as a calibration device. That means that we compare the dynamics of pair and group behavior relative to the first session. We then conducted an additional treatment with conditions, which are known to have the tendency to reduce the willingness to cooperate. Our hypothesis is that the decrease of cooperation will be stronger in the groups than in the pairs because the cooperation norm is stronger in pairs.

We study the stability of cooperation in pairs and groups. It is worth noticing, that a direct comparison of pairs and groups is difficult. The reason is that a variation of group size unavoidably also alters other parameters that can potentially influence cooperation. For example, if the group size is varied (and no other parameter of Equation (1)), the effectiveness of contributions to the public good varies too, so that it is not possible to decide what causes a change in the cooperation level. On the other hand, if the *MPCR* is changed in order to compensate the group size effect on effectiveness, the individual costs of contribution to the public good are altered. Moreover, it is well known, that in small groups a higher *MPCR* leads to higher cooperation.

It is well known from the literature that in public good experiments, which are repeated *within one session*, contributions do fall[1] [4] introduced a theory, which explains this decay of

[1] This is also true for prisoner dilemma games (e.g., [3]).

contributions by focusing on the behavior of conditional cooperators. To repeat session is something different from repeating a game within one session. Two differences are obvious. First, a game repeated in a session is perceived by the players as a supergame and not as independent, recurring events. In the real world, however, only very rarely supergames are played. Much more often, people have to make very similar decisions at different times, which is more like repeating sessions. Secondly, the average opportunity costs in a one session repeated game drop with every replay. In this respect, these are no identical repetitions. This is different for repeated sessions, where the opportunity costs are identical for each session. Due to these differences, it is not easy to conclude from the observations of repeated games in one session what happens if *sessions* are repeated. For this reason, the experimental design used in this paper has the advantage that it allows not only to observe the different dynamics in pairs and groups, but also to inform about how the repetition of sessions generally affects cooperation behavior. Reference [5] have shown that in modified dictator game experiments the repetition of session leads to a strong erosion of social behavior. The question therefore arises as to whether this can also be observed for cooperative behavior. Our conjecture is that this will be the case and that the decay of cooperation is stronger in groups than in pairs.

Additionally, we conducted each series of experiments in a partner and a stranger treatment. In the partner treatment, group/pair composition did not change over the course of the four waves, whereas in the stranger treatment our main participants were matched with three/one freshly recruited new subject(s) in each wave. It is conceivable that the group bonding and the resulting behavioral norm to contribute to the public good is slightly less strong in the stranger treatments. Thus, employing a partner vs. stranger design enabled us to vary the cooperation norm in pairs and groups. Once again, the comparison with the benchmark treatment (partner, first of four waves) shows us where the easing of the cooperation norm has a stronger effect. Our conjecture is that subjects in pairs feel a stronger obligation to cooperate than subjects in groups even if they are matched with a newly recruited subject in each wave.

Our conjecture is that two-person relationships should be exceptionally powerful in the context of cooperation problems. This should result in higher and more stable cooperation in pairs. Evidence for this conjecture can be taken from oligopoly experiments, which demonstrate that subjects in a duopoly situation are more likely to collude than subjects in markets of more than two firms ([6–9]). Reference [10] observe a higher degree of cooperation in pairs than in groups of three in the context of n-person prisoner's dilemma experiments. Reference [11] conducted public good experiments with varying group sizes and reported that the average contribution to the public good is highest for pairs, followed by groups of four, three and eight. Reference [12] show theoretically that the contribution to a public good decreases with the group size.

Our experiments confirm our conjectures. Pairs show more stable cooperation than groups. While the average contribution to the public good is reduced by 42% in groups over the course of four waves, the reduction in pairs is only 21%. To gain a deeper understanding of the underlying norms determining cooperative behavior in pairs and groups, we conducted a norm elicitation experiment using the method introduced by [13]. We elicit both, social approval for a series of contributions over the course of four weeks and social approval for some conditional contributions. Group size serves as a treatment variable. We find that social approval of cooperative moves in general do not differ a lot between pairs and groups but that symmetric behavior plays a very important role in pairs. This finding is in line with the suggestion that the special form of symmetry, which is characteristic for pairs, drives the particular power of the cooperation norm.

Section 2 provides a detailed explanation of our experimental design and exemplifies each aspect with respect to our research question. We report the results of our experiments in Section 3. Section 4 presents the norm elicitation task and in Section 5 we discuss our results.

2. Experimental Design

We employed a setup in this study, which uses the voluntary contribution mechanism represented by Equation (1) (see, e.g., [1] for the stranger treatment and [14] for the partner treatment). Subjects are either interacting in pairs (N = 2) or groups (N = 4) with each subject receiving a monetary endowment of EUR 10. Subjects were assigned randomly to the other subject(s). Subjects then decide on the fraction of the endowment they wish to contribute to a public account. The amount of money that is *not* contributed to the public account is paid out to the subjects at a rate of 1:1. For each EUR 1 contributed to the public account, each of the 2 (4) group members receives an *MPCR* of EUR 0.80 (EUR 0.40). The cooperation dilemma arises because the *MPCR* is smaller than the private return of not contributing ($0.8 < 1$ and $0.4 < 1$), while at the same time $N \times MPCR$ is larger than the private return ($2 \times 0.8 > 1$ and $4 \times 0.4 > 1$). Rational payoff-maximizing subjects will therefore not contribute to the public account, while total return to the group is maximized by contributing the entire endowment. Contributing is thusly interpreted as cooperative, prosocial behavior.

The individual payoff function for subject i in EUR is given by:

$$N = 2: \ \pi_i = (10 - x_i) + 0.8 \sum_{j=1}^{2} x_j \tag{2}$$

$$N = 4: \pi_i = (10 - x_i) + 0.4 \sum_{j=1}^{4} x_j \tag{3}$$

where x_i denotes the amount of money contributed to the public account. Equations (2) and (3) do not only differ with respect to group size, but also with respect to the *MPCR*. The *MPCRs* are chosen in a way that the extent of the efficiency gain from contributing to the public account is identical in both treatments ($2 \times 0.8 = 4 \times 0.4$). However, the private costs of contributing ($1 - MPCR$) are higher for N = 4 than for N = 2. On the other hand, leveling the private costs of contribution between treatments would lead to a significant difference with respect to the efficiency gain of contribution. Because of the interaction of group size, the *MPCR* and the effectiveness of contribution and the costs of contribution, it is not possible to create two or more treatments in a public good experiment that solely differ with respect to group size. Therefore, we concentrate on the stability of cooperation within a particular group size. For small groups lowering the *MPCR* leads to a sharp decrease in contribution [15]). To test our conjecture even though the *MPCR's* differ, we focus on the dynamics of behavior and not on the absolute level of contributions. To examine the behavioral dynamics over time, our experiments were repeated three times at intervals of one week between each *wave*. Our conjecture is that the stronger social norms developed in pairs lead to a stabilization of cooperative behavior. Thus, if contribution declines the decay should appear stronger in groups than in pairs.

The key feature of our design is a series of four *identical* one-shot experiments. Subjects live through the entire experience of taking part in an experiment in each wave, which includes coming to the laboratory, reading instructions and making choices within the very same decision context each time. The benefit of such a setup is that subjects are more likely to perceive all the experiments as completely independent events as compared to a setup where the same decision is made repeatedly within a single session. The downside is a loss of control, because we cannot know whether or not behavior is influenced by events happening outside the laboratory between waves. Under the premise that potentially relevant effects happen randomly, we therefore concentrated on treatment effects when interpreting our results.

All experiments were conducted at the MaXLab (Otto-von-Guericke-University of Magdeburg). We used ORSEE [16] and hroot [17] for the recruitment of subjects. In the invitation, subjects were asked to commit to the total duration of the series of experiments if they wished to participate and were told that failure to show up for any wave would result in all earnings from the experiment being forfeited. In the stranger treatment, each subject was matched with a stranger who took part in the

experiment in only one wave. Subjects were not told that they were to face the same decision situation in each wave.

In order to rule out systematic effects on behavior due to subjects discussing the experiments with each other, every subject was assigned an individual meeting point inside the faculty building, picked up by an experimenter and escorted to the laboratory. Subjects were then led into individual soundproof and opaque booths. After the end of each wave, all subjects left the laboratory on their own. This procedure ruled out the possibility that two subjects learned about each other's participation in the same experiment.

To avoid confusion on the subjects' behalf with regard to the actual public good game, every participant had to complete a set of control questions before the start of each experiment (Appendices B1 and B2). The experiments started only after each subject had answered all control questions correctly.

Four treatments were conducted. In the partner treatments which were conducted for both N = 2 and N = 4, the composition of pairs and groups never changed over the course of the experiment. This was made known to all subjects through written instructions (see Appendices A1–A4). However, subjects never learned the identity of the other participants, which ensured total anonymity. In the stranger treatments, which were also conducted for both N = 2 and N = 4, the main participants who took part in all four waves were matched with freshly recruited new subjects in each wave. These subjects could only take part once and this was also made known to the main participants through written instructions. In contrast to other well-known experiments from the literature, we did not employ a partner vs. stranger design based on random re-matching after each round of play, but instead recruited completely new subjects for each new wave. Total anonymity was ensured for everybody involved in the stranger treatments as well. Table 1 lists all treatments including the number of participants[2] in all treatments and average earnings per wave.

Table 1. Treatment overview.

		Group Composition	
		Partner Treatments	**Stranger Treatments**
Group size	N = 2	Independent observations: 22 ⌀ Earnings per wave: EUR 12.71	Independent observations: 24 ⌀ Earnings per wave: EUR 13.13
	N = 4	Independent observations: 25 ⌀ Earnings per wave: EUR 11.75	Independent observations: 21 ⌀ Earnings per wave: EUR 13.09

In each wave, a full set of conditional preferences is elicited from the subjects by using Selten's strategy elicitation method [18]. In the partner treatments, we adopt the elicitation mechanism introduced for public good experiments by [14]. The mechanism consists of two tasks. In the direct response task, subjects indicate their *unconditional* decision with respect to the amount of money contributed to the public account. In the second task, subjects indicate their preferred choices *conditional* upon the other subject's contribution (N = 2) or the other group members' average contribution (N = 4) accordingly. This second task requires eleven choices to be made, one for each possible level of (average) contribution chosen by the other subject (other group members) in the direct response task. In each treatment (N = 2 and N = 4), one subject is randomly determined for whom the actual contribution level is taken from the conditional response task, while for the other subject (all other group members), the choice made in the direct response task is relevant to the payoff.

In the stranger treatments, there is no need for the direct response task. Therefore, the main participants only submit their set of conditional preferences with respect to the direct responses made

[2] Each subject is one independent observation in the partner treatment. In the stranger treatment, only the subject who participates in all waves is an observation.

by the freshly recruited subjects they are matched with in that particular wave. In any treatment, data collection is conducted with pencil and paper (see Appendices A1–A4).

In none of the treatments do the subjects learn the outcome of the experiment immediately after each wave. All information is only revealed after the end of the final wave. This procedure has many important advantages in regard to our research strategy. First of all, it rules out effects due to reputation building. Subjects also cannot learn the relevant moral norm through observation of other subjects' choices. Furthermore, subjects cannot update their beliefs based on the other subjects' behavior. This is a necessary pre-condition for exercising imperfect conditional preferences, which have shown to be a relevant factor in the context of public good experiments by [4]. In combination with employing the strategy elicitation method, withholding feedback until after the end of the last experiment also rules out several other effects that are discussed in the literature with respect to cooperation levels and group size. Punishment, for example, is not possible and the "bad apple" hypothesis (see, e.g., [19]) is rendered irrelevant, since bad apples do not become salient and preferences are stated conditionally anyway.

Withholding feedback requires withholding payment after each wave as well, since the amount of money paid out would otherwise serve as indirect feedback. For this reason, subjects are paid only after the end of the final wave. In doing so, we employed the following payment mechanism: subjects do not receive the sum of earnings from all waves but instead receive the earnings from a randomly determined wave, which is multiplied by four. This mechanism rules out portfolio choices and increases the validity of our findings because the mechanism provides an incentive for stable behavior to risk-averse subjects[3]. A side benefit of this payoff mechanism is the credible threat of all earnings being forfeited in the case of failure to show up for one of the experiments. This results in a very low number of no-shows, which in turn rules out possible selection biases.

To summarize, by employing the strategy method, withholding feedback and using a payment mechanism promoting stable behavior, we created an experimental design that strongly favored stability of cooperation over the four waves. Nevertheless, we expect contributions to decrease and our hypothesis is that the moral norm for prosocial behavior is stronger in *pairs* than in *groups* of four. We therefore expect more stable behavior in pairs than in groups.

3. Results

Figures 1–4 show the extent of conditional cooperation over the course of the four waves in all four treatments of our experiment. For our analysis we focus on the average of contributions that where made conditional upon the other subject's contribution. Figures 1–4 summarizes the average conditional cooperation in all 16 waves of our experiment. Figure 5 shows the average contributions in all treatments.

The results are very conclusive. Focusing on the behavioral dynamics, we observed a monotonous but statistically insignificant and economically negligible decline in prosocial behavior over time in the N = 2 partner treatment (see Row (f) in Table 2 for statistical significance with $\varnothing$ = x indicating an average contribution of the other subjects of x) as the average contribution dropped from EUR 3.60 in the first wave to EUR 3.00 in the fourth wave. In stark contrast, cooperative behavior in the N = 4 partner treatment declined substantially by 39 percent from the first wave to the last wave (from EUR 3.62 to EUR 2.21). The decline over time is statistically significant (Row (f) in Table 3) and is most pronounced from the first to the second wave (EUR 3.62 to EUR 2.71, Row (a) in Table 3). The later decline in the third and fourth waves is also insignificant (Rows (b,c) in Table 3). The results

[3] We tested this stabilizing effect with a series of four repeated dictator game experiments at intervals of one week, once using the payoff mechanism described above and once paying subjects immediately after each wave. Prosocial behavior was indeed significantly more stable when the payoff mechanism "one out of four" was used.

show that pairs achieve much more stable cooperation than groups in the partner treatment condition, indicating a stronger moral norm demanding stable cooperation in pairs than in groups.

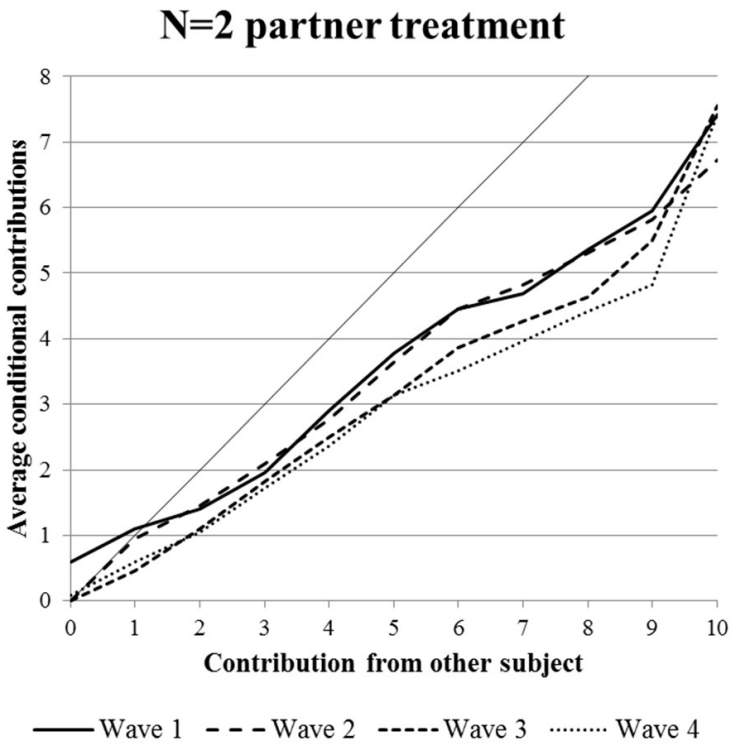

Figure 1. Results N = 2 partner treatment.

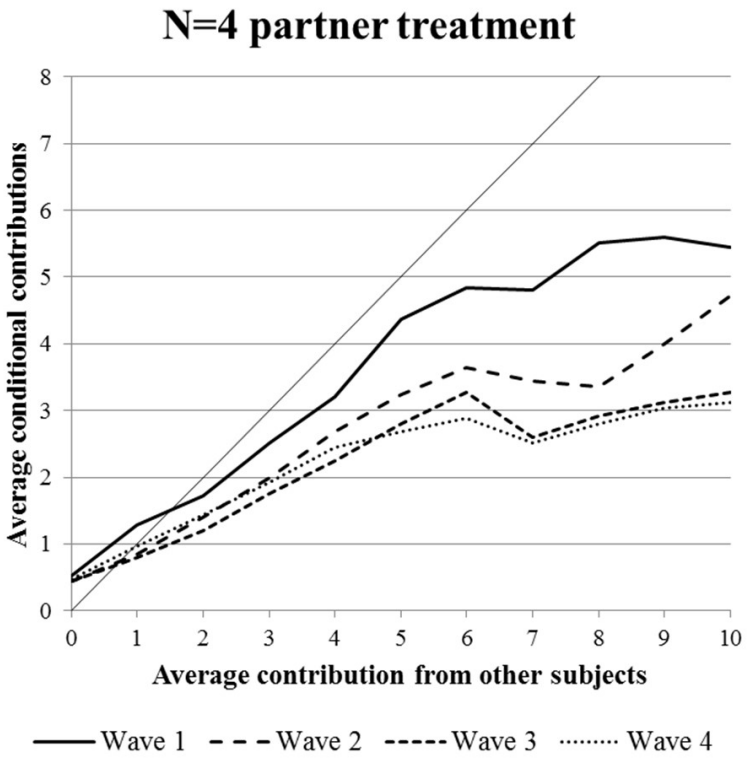

Figure 2. Results N = 4 partner treatment.

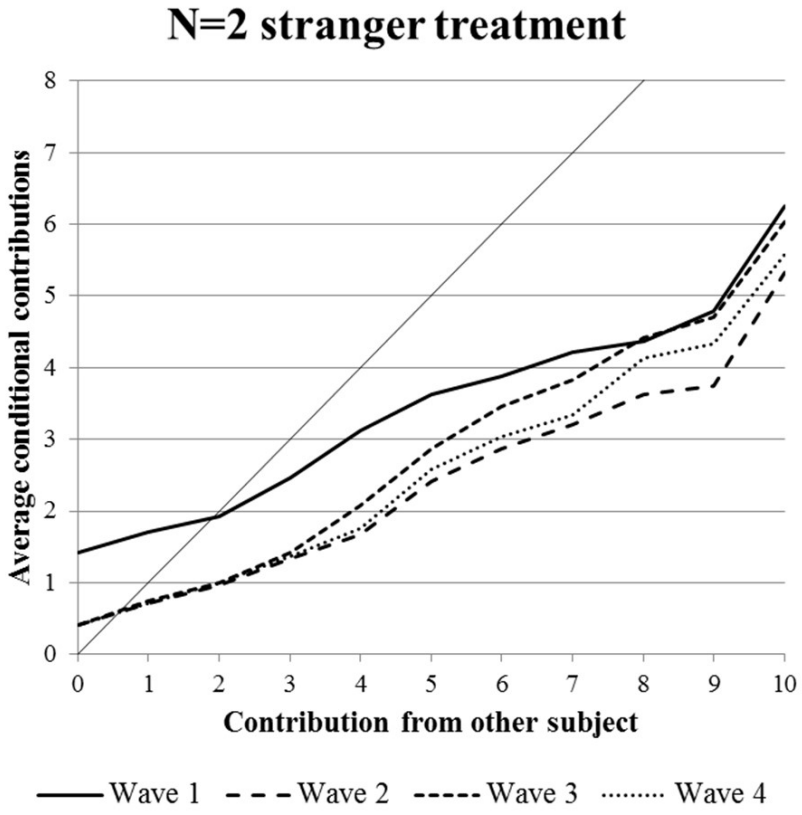

Figure 3. Results N = 2 stranger treatment.

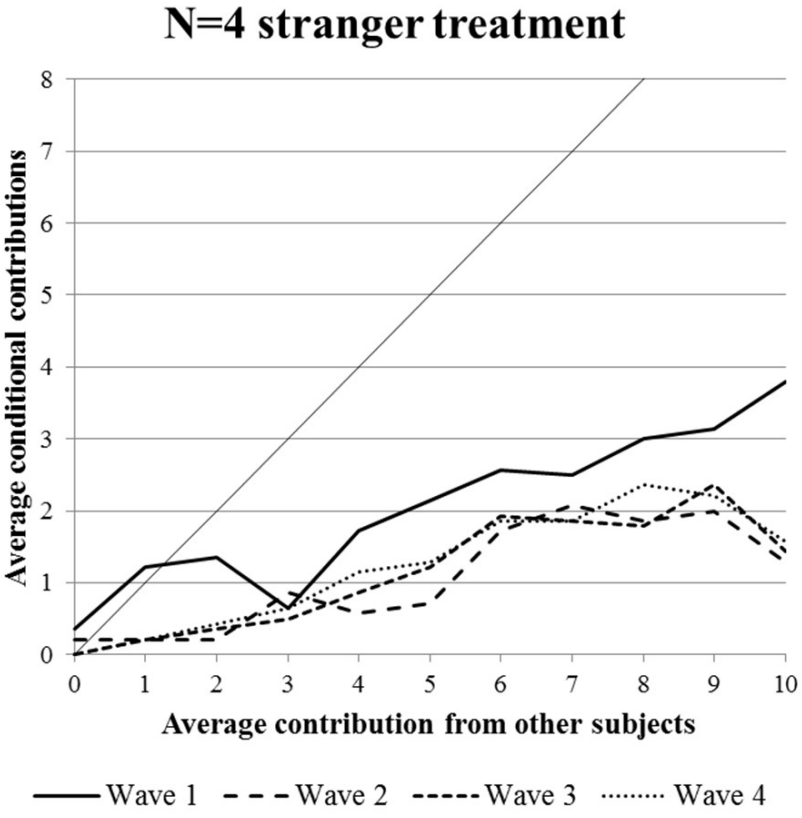

Figure 4. Results N = 4 stranger treatment.

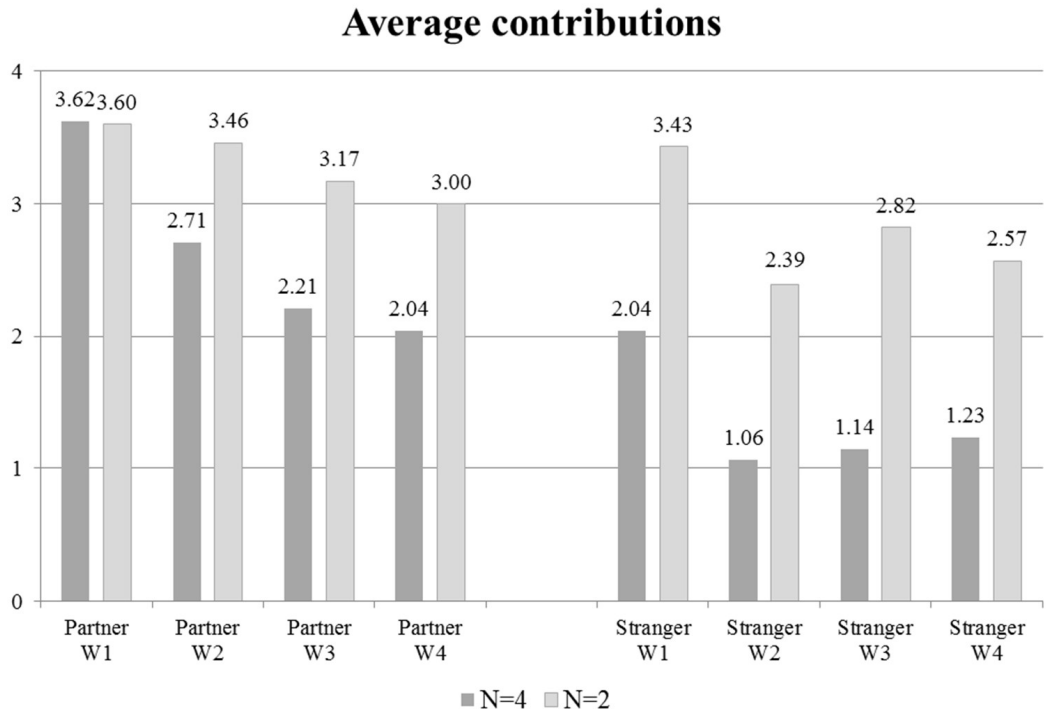

Figure 5. Average contributions in all treatments.

Table 2. Statistical significance in the N = 2 partner treatment (Wilcoxon signed-rank test).

	Treatment	ø = 0	ø = 1	ø = 2	ø = 3	ø = 4	ø = 5	ø = 6	ø = 7	ø = 8	ø = 9	ø = 10
(a)	W1 vs. W2	0.084 ↓	0.894	0.985	0.741	0.753	0.985	0.769	0.741	0.752	0.504	0.900
(b)	W2 vs. W3	1.000	0.099 ↓	0.259	0.171	0.095 ↓	0.052 ↓	0.015 ↓	0.046 ↓	0.026 ↓	0.123	0.900
(c)	W3 vs. W4	0.317	0.306	0.961	0.961	0.755	0.478	0.851	0.859	0.828	0.927	0.602
(d)	W1 vs. W3	0.084 ↓	0.091 ↓	0.805	0.898	0.714	0.476	0.426	0.663	0.448	0.917	0.721
(e)	W2 vs. W4	0.317	0.083 ↓	0.284	0.167	0.348	0.251	0.048 ↓	0.099 ↓	0.108	0.227	0.330
(f)	W1 vs. W4	0.528	0.579	0.791	0.844	0.475	0.638	0.402	0.454	0.329	0.541	0.491

↓ Statistically significant decline of prosocial behavior.

Table 3. Statistical significance in the N = 4 partner treatment (Wilcoxon signed-rank test).

	Treatment	ø = 0	ø = 1	ø = 2	ø = 3	ø = 4	ø = 5	ø = 6	ø = 7	ø = 8	ø = 9	ø = 10
(a)	W1 vs. W2	0.157	0.026 ↓	0.089 ↓	0.028 ↓	0.052 ↓	0.001 ↓	0.010 ↓	0.015 ↓	0.007 ↓	0.036 ↓	0.830
(b)	W2 vs. W3	1.000	0.564	0.207	0.432	0.233	0.141	0.204	0.070 ↓	0.596	0.368	0.078 ↓
(c)	W3 vs. W4	0.977	0.548	0.328	0.641	0.632	0.957	0.844	0.712	0.655	0.986	0.564
(d)	W1 vs. W3	0.157	0.008 ↓	0.016 ↓	0.009 ↓	0.003 ↓	0.000 ↓	0.004 ↓	0.001 ↓	0.003 ↓	0.005 ↓	0.144
(e)	W2 vs. W4	0.977	0.966	0.655	0.681	0.426	0.418	0.169	0.066 ↓	0.238	0.257	0.219
(f)	W1 vs. W4	0.580	0.069 ↓	0.075 ↓	0.015 ↓	0.017 ↓	0.003 ↓	0.002 ↓	0.002 ↓	0.003 ↓	0.016 ↓	0.139

↓ Statistically significant decline of prosocial behavior.

This conjecture is backed up by the behavioral dynamics in the stranger treatments. In both the pairs and the groups, contribution to the public account declined strongly and significantly from the first wave to the second wave (Row (a) in Table 4 and Row (a) in Table 5). However, it should also be noted that the decline was more pronounced in the N = 4 stranger treatment (48%) than in the N = 2 condition (30%). Neither the third nor fourth wave differed significantly from the second wave in the N = 2 or the N = 4 stranger treatments (Rows (b,e) in Table 4 and Rows (b,e) Table 5 respectively). This indicates that a lower willingness to cooperate also becomes a factor in pairs when there is a new partner in the next wave to cooperate with. Strictly speaking, however, pairs maintained a significantly higher level of cooperation than groups in which cooperation was extremely weak through waves two to four.

Table 4. Statistical significance in the N = 2 stranger treatment (Wilcoxon signed-rank test).

	Treatment	ø = 0	ø = 1	ø = 2	ø = 3	ø = 4	ø = 5	ø = 6	ø = 7	ø = 8	ø = 9	ø = 10
(a)	W1 vs. W2	0.083 ↓	0.044 ↓	0.056 ↓	0.055 ↓	0.024 ↓	0.013 ↓	0.059 ↓	0.040 ↓	0.111	0.083 ↓	0.401
(b)	W2 vs. W3	1.000	0.564	0.965	0.655	0.150	0.275	0.060 ↑	0.072 ↑	0.091 ↑	0.145	0.307
(c)	W3 vs. W4	1.000	0.564	1.000	0.564	0.096 ↓	0.099 ↓	0.032 ↓	0.031 ↓	0.096 ↓	0.026 ↓	0.046 ↓
(d)	W1 vs. W3	0.083 ↓	0.084 ↓	0.065 ↓	0.039 ↓	0.091 ↓	0.114	0.575	0.432	0.656	0.471	0.728
(e)	W2 vs. W4	1.000	1.000	0.581	0.581	0.581	0.680	0.563	0.779	0.290	0.410	0.598
(f)	W1 vs. W4	0.083 ↓	0.027 ↓	0.037 ↓	0.034 ↓	0.014 ↓	0.057 ↓	0.209	0.160	0.459	0.311	0.643

↓ Statistically significant decline of prosocial behavior, ↑ Statistically significant increase of prosocial behavior.

Table 5. Statistical significance in the N = 4 stranger treatment (Wilcoxon signed-rank test).

	Treatment	ø = 0	ø = 1	ø = 2	ø = 3	ø = 4	ø = 5	ø = 6	ø = 7	ø = 8	ø = 9	ø = 10
(a)	W1 vs. W2	0.604	0.026 ↓	0.026 ↓	0.959	0.009 ↓	0.123	0.155	0.133	0.070 ↓	0.181	0.491
(b)	W2 vs. W3	0.157	1.000	0.317	0.046 ↓	0.046 ↑	0.895	0.589	0.416	0.547	0.834	0.631
(c)	W3 vs. W4	1.000	1.000	0.564	0.545	0.622	0.672	0.786	0.277	0.323	0.414	1.000
(d)	W1 vs. W3	0.3173	0.026 ↓	0.026 ↓	0.046↓	0.368	0.450	0.303	0.103	0.087 ↓	0.408	0.200
(e)	W2 vs. W4	0.157	1.000	0.545	0.106	0.166	0.251	0.296	0.747	0.240	0.468	0.446
(f)	W1 vs. W4	0.317	0.026 ↓	0.026 ↓	0.213	0.600	0.508	0.453	0.587	0.719	0.139	0.050 ↓

↓ Statistically significant decline of prosocial behavior, ↑ Statistically significant increase of prosocial behavior.

As mentioned before, comparisons across group size treatments and between stranger and partner treatments should be interpreted with caution. Focusing on our benchmark, which was the first wave of the partner experiments, we found that the extent of prosocial behavior was almost identical in both partner treatments (EUR 3.60 contributed to the public account is the average level for N = 2, EUR 3.62 is the average for N = 4, see Row (a) in Table 6). While cooperation levels in the first wave did not differ between the two N = 2 treatments (Row (c) in Table 6), we found that cooperation was significantly weaker in the stranger condition of the two N = 4 treatments (Row (d) in Table 6). When subjects in groups knew that they would be matched with freshly recruited new subjects in the next waves, the extent of prosocial behavior in the first wave was much smaller than in the partner treatment (EUR 3.62 in the partner treatment and EUR 2.04 in the stranger treatment).

Table 6. Statistical significance for pairwise comparisons of first wave behavior (Mann-Whitney U tests).

	Treatment	ø = 0	ø = 1	ø = 2	ø = 3	ø = 4	ø = 5	ø = 6	ø = 7	ø = 8	ø = 9	ø = 10
(a)	N = 2 partner vs. N = 4 partner	0.869	0.789	0.406	0.149	0.389	0.333	0.679	0.862	0.957	0.905	0.212
(b)	N = 2 stranger vs. N = 4 stranger	0.196	0.313	0.298	0.009	0.046	0.016	0.040	0.027	0.108	0.118	0.031
(c)	N = 2 partner vs. N = 2 stranger	0.686	0.560	0.536	0.332	0.536	0.775	0.599	0.780	0.425	0.328	0.455
(d)	N = 4 partner vs. N = 4 stranger	0.404	0.430	0.162	0.001	0.010	0.001	0.001	0.008	0.007	0.021	0.109

It is worthwhile noting that the low extent of cooperative behavior in the first wave of the N = 4 stranger treatment cannot be explained by the lack of opportunity for reputation building because attempts to trigger high cooperation through one's own substantial sacrifices are also ruled out in the N = 4 partner treatment by withholding feedback. It can be concluded that a lesser extent of bonding lowers the willingness to cooperate in the N = 4 stranger treatment. Contrarily, no such partner vs. stranger effect can be found in the N = 2 treatment, which indicates a strong bond in pairs regardless of group composition.

In the stranger treatment, we asked subjects state their unconditional contribution. This was necessary to find determine the payoff-relevant conditional contribution. Figure 6 shows the average unconditional contributions for pairs and groups in the partner treatment. Three results are worth noticing. First, unconditional contributions are between 4.28 and 7.86 and therefore

arguable high. This is significantly more than the average conditional contribution. This finding is in line with [14], who also find a higher unconditional contribution compared to the conditional contribution. Second, unconditional contributions are significantly higher in pairs compared to groups. Third, while unconditional contributions decrease in both treatments over time, they are more stable in pairs. The total decrease from Wave 1 to Wave 4 is 18.82% in pairs and 29.14% in groups.

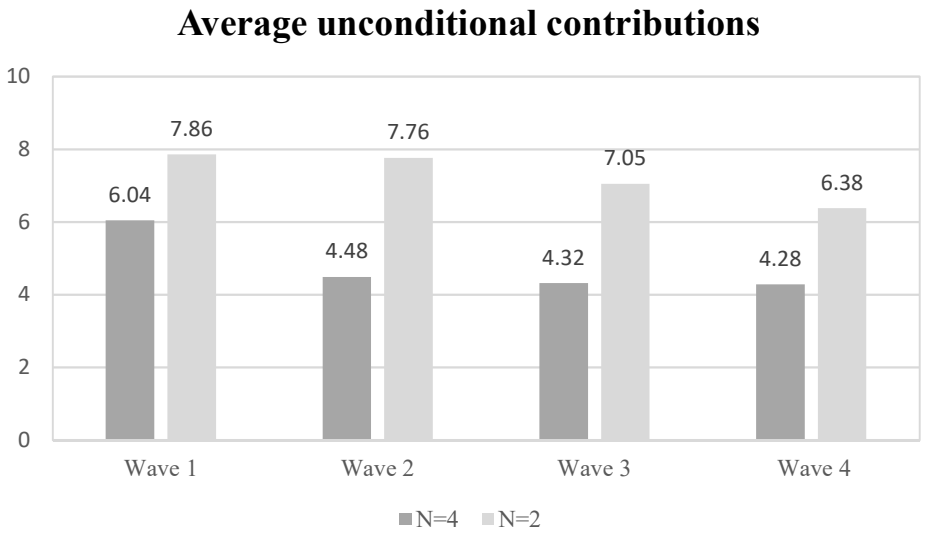

Figure 6. Average unconditional contributions.

Thus far, we can summarize our results:

1. Despite having designed the experiment in a way that promotes stable behavior, we generally find declining prosocial behavior in all treatments.
2. There is a strong norm demanding subjects to engage in cooperative behavior in the first wave. Under partner conditions, this norm is similar in groups and pairs. Under stranger conditions, this norm is stronger in pairs.
3. The norm mentioned in 2 apparently allows pairs a much more stable cooperation over time. This result is backed by both the partner and the stranger treatment in terms of conditional cooperation and for unconditional cooperation in the stranger treatment.

We shall note another observation backing up our findings up to this point. Examining the behavioral dynamics in Figures 1–4, we find that in the N = 4 treatments, contributions in six cases (waves two to four in both the stranger and the partner treatment) do not increase any further when the average contribution from the other group members is ≥EUR 6. Conditional responses to an average cooperation level ≥EUR 6 are constant at approximately EUR 3 in the partner treatment and approximately EUR 2 in the stranger condition. Contrarily, contribution in the pair treatments is also positively correlated with a high average contribution from the partner in each of the eight waves in the N = 2 treatments (Table 7).

Table 7. Correlation of average conditional contribution and contribution from other group member(s) when contribution from other group member(s) ≥6.

Treatment	Wave 1	Wave 2	Wave 3	Wave 4
N = 2 Stranger	0.909 **	0.912 **	0.961 ***	0.966 ***
N = 2 Partner	0.959 ***	0.985 ***	0.930 **	0.898 **
N = 4 Stranger	0.938 **	−0.467	−0.237	−0.116
N = 4 Partner	0.815 *	0.776	0.286	0.676

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

This allows the conclusion that members of a group of four are much more willing to engage in uncooperative behavior than partners in pairs do. Choosing low levels of contribution in cases of high contribution by others underlines a strong readiness to benefit from the other group members' sacrifices without contributing to the cause itself. This particular behavior is prevalent in those waves where we suspected a weak cooperation norm to be particularly relevant. We will come back to this point after presenting the norm elicitation experiment.

4. Norm Elicitation

The experimental results show very clearly that pairs are capable of more stable cooperation than groups. At the same time, however, they also show that the identical repetition of the experiments leads to a significant decline in cooperation—especially in groups. The question of the causes arises for both phenomena. Reference [5] observe that the gifts in modified dictator game experiments also decrease when the experiment is repeated. They offer two explanations which are not mutually exclusive. First, an experimenter demand effect, which weakens when the experiment is repeated, and second, moral self-licensing. This means that people take the fact that they have behaved socially as an opportunity to think more about themselves at the next opportunity.

Reference [20] show that moral self-licensing can be rationalized if one assumes that there is a substitutional relationship between social recognition and monetary payout and if the repetition of social actions leads to an increase in social recognition for these actions. The norm elicitation experiment, which will be described now, primarily has the task of checking whether the second condition for rational moral self-licensing is fulfilled. It also serves to investigate whether the behavior in groups and in pairs is fundamentally assessed differently or whether it is assessed in the same moral way. One possible difference could be that one does depend more on another in pairs than in groups. Therefore, the act to contribute the same amount as the other player is more important in pairs. This could possible reflect in a norm where the same social approval is attached to "matching the other persons contribution" in pairs and to give slightly less in groups.

4.1. Description of the Experiment

We use an incentivized coordination game to elicit behavioral norms. Reference [13] introduced this method. Subjects state their belief with respect to what the majority of the other participants felt about the social appropriateness of certain behaviors. The true norm serves as a focal point for this coordination game. Subjects whose stated belief matches that of the majority are financially rewarded.

Since we are interested in the behavioral norm for contributing to a public good conditional on the group size in the one-shot context and the repeated context, we invited two groups (A and B) of 50 subjects to take part in the elicitation experiments (between-subject design). All participants were recruited using hroot [17]. The subjects were separately seated at the same time in a large lecture hall with more than 500 seats so that all data could be collected in a single session.

Each treatment consisted of three parts. Written instructions (see Appendices C1–C4) were handed as soon as all subjects finished a prior part. Subjects received the identical description of the public good game as we described above. The treatment difference was the group size (N = 2 or N = 4) of the public good game. The instructions were numbered with an ID, which served as a means to run the norm elicitation process anonymously. The subjects picked up the instructions by themselves in such a way that the ID was not observable for the experimenter.

In the first task, subjects in treatment N = 2 were instructed to evaluate the social appropriateness of four different contributions (B = 2; B = 4; B = 6; B = 8) conditional on the contributions of another player (A = 2; A = 4; A = 6; A = 8). In treatment N = 4 the contribution was conditional on the average contributions of three other players. Subjects were able to choose from four evaluations: 'very desirable', 'somewhat desirable', 'somewhat undesirable' and 'very undesirable'.

After all the subjects had stated their belief about the assessments of the majority on a sheet of paper, one out of the twelve evaluations was randomly drawn to be payoff relevant and the results for

this particular evaluation were calculated on the spot. Of those subjects who marked the assessment, the majority had chosen to receive a payoff of EUR 10, whereas all other subjects received a show up fee of EUR 5 only.

In the second part of the elicitation experiment, the subjects were told that the same public good (N = 2 or N = 4) experiment was played four times with a timespan of one week between each repetition. All subjects were confronted with four sequences (6-6-4-0; 4-4-4-4; 8-8-2-0 and 8-6-2-0) of contributions of one particular player. Subjects were asked to evaluate the social appropriateness for each contribution within a sequence. Part two was incentivized as in part A, but with an additional payoff of 2 euros.

The third part was identical for both treatments. Subjects were asked if the contributions (same as in part A) deserved "more", "less" or "equally" social recognition if the group size was two or four.

4.2. Results

Following Krupka and Weber, all evaluations are assigned with a value: 'very desirable' = 1, 'somewhat desirable' = 0.33, 'somewhat undesirable' = −0.33 and 'very undesirable' = −1.

Figures 7 and 8 show the average social recognition of four consecutive decisions (across waves). They hardly distinguish between groups and pairs. A contribution of 0 is rated very negatively in pairs and groups. Even if high contributions were previously made, this does not change the social disregard for low cooperation. It is striking that a constant contribution of 4 leads to a slight decrease in recognition. If 6 is contributed in the first two waves, a contribution of 4 in the third wave is rated significantly worse than with constant output. Otherwise, the amount of social recognition depends solely on the amount of the contribution.

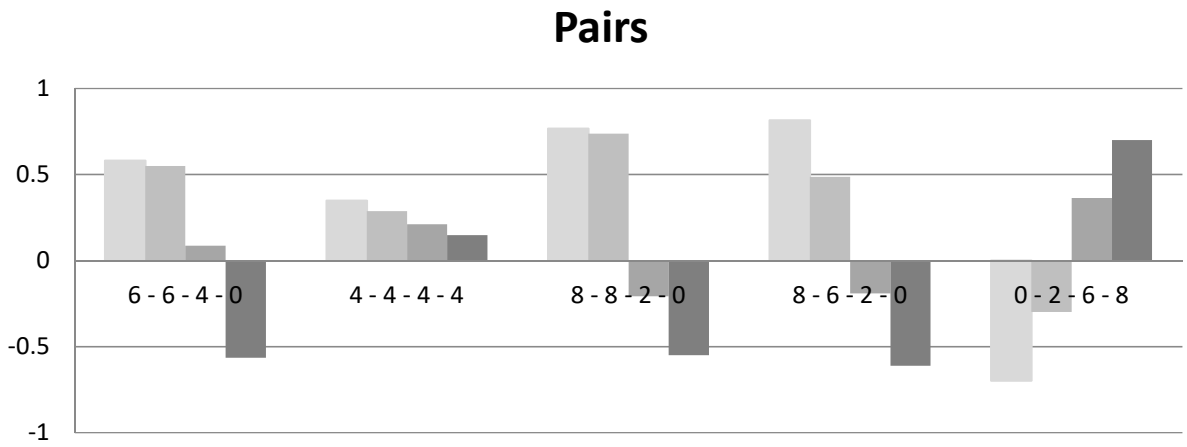

Figure 7. Average social recognition for each contribution in pairs (N = 2).

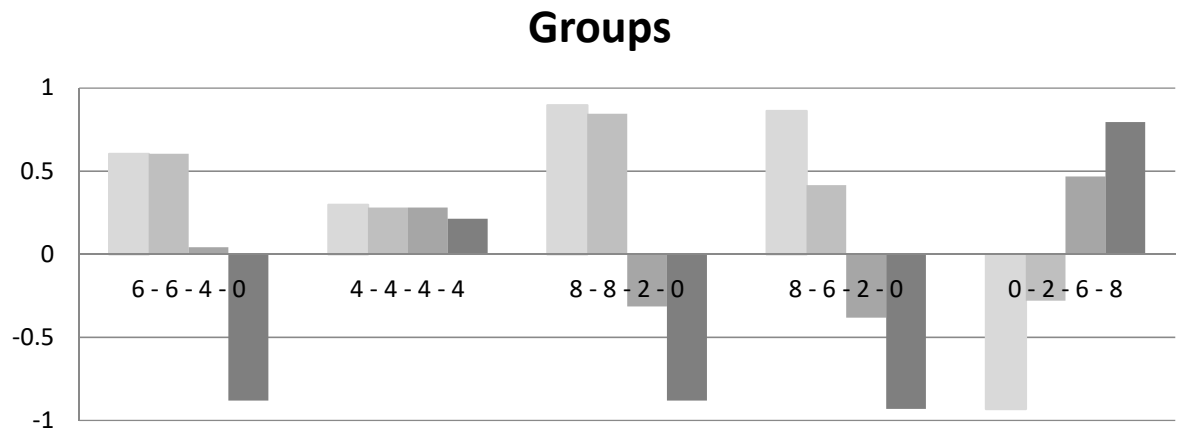

Figure 8. Average social recognition for each contribution in groups (N = 4).

Figures 7 and 8 clearly show that repeated cooperation does not lead to an increase in social recognition. This speaks against the interpretation that the decline in cooperation is due to a moral self-licensing effect. Conversely, this suggests that the second hypothesis of [5]), that a weakening experimenter demand effect is responsible for the decline, is becoming more likely.

Figures 9–12 show the average social assessments of contributions in groups and pairs conditional on the contributions of the other player or players. Contribution A denotes the given contribution of the "others". A very clear pattern can be seen in all four illustrations. The highest social recognition is achieved in pairs if the contributions are symmetrical. This result is significant (MW-Test: $p = 0.0544$ for A = 2; $p = 0.0999$ for A = 4; $p = 0.000$ for A = 6 and A = 8). Symmetrical behavior is obviously of central importance in pairs. This explains why the cooperation does not collapse in pairs even with high contributions of the other player (as in the groups). Even if the other player contributes beyond 6, the partner is still involved because this is the only way to maintain symmetry in the pair. For the groups, the contributions of the others seem to be less relevant. For example, social recognition at A = 4 and A = 6 is almost identically distributed. If the other group members cooperate very little (A = 2), contributions are socially recognized. However, recognition decreases significantly ($p = 0.004$) if one's own contribution goes far beyond the group average. If the rest of the group is very cooperative (A = 8), however, a contribution of at least 6 is required in order to receive social recognition. When asked directly (experimental part C) to compare the same contribution in a 2-player group and in a 4 player group, we find no significant difference.

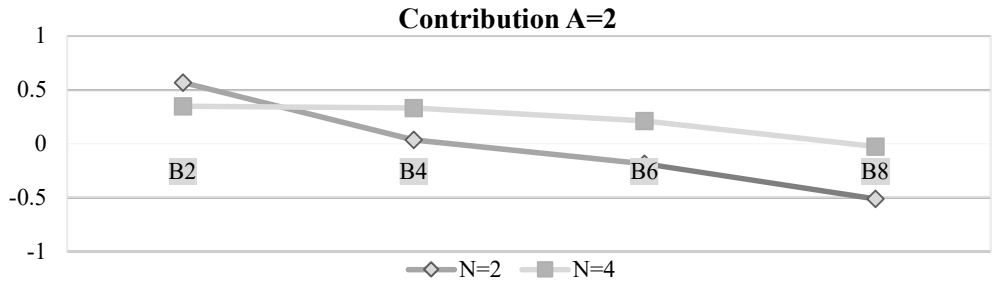

Figure 9. Average social recognition for A = 2.

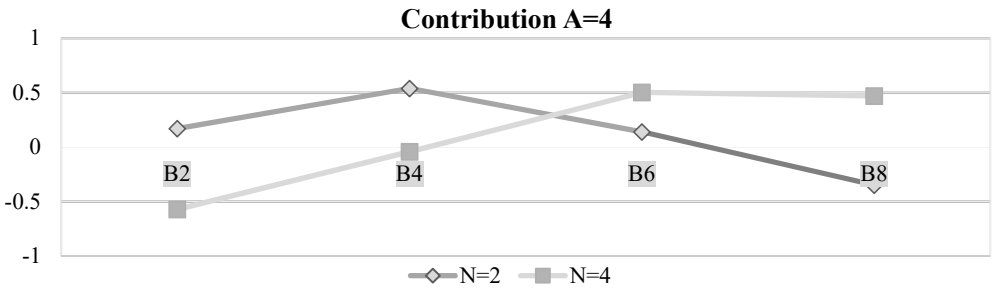

Figure 10. Average social recognition for A = 4.

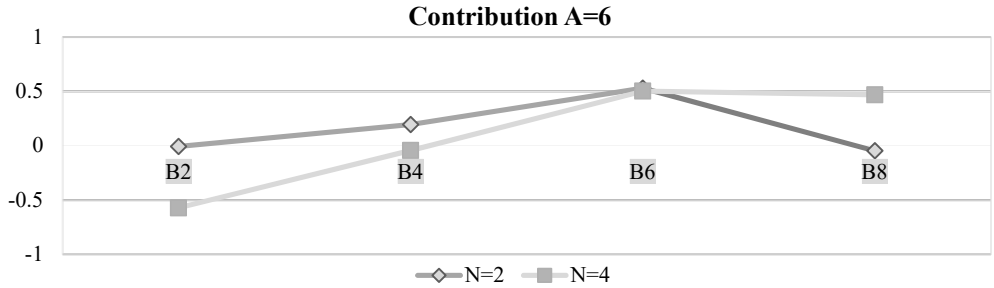

Figure 11. Average social recognition for A = 6.

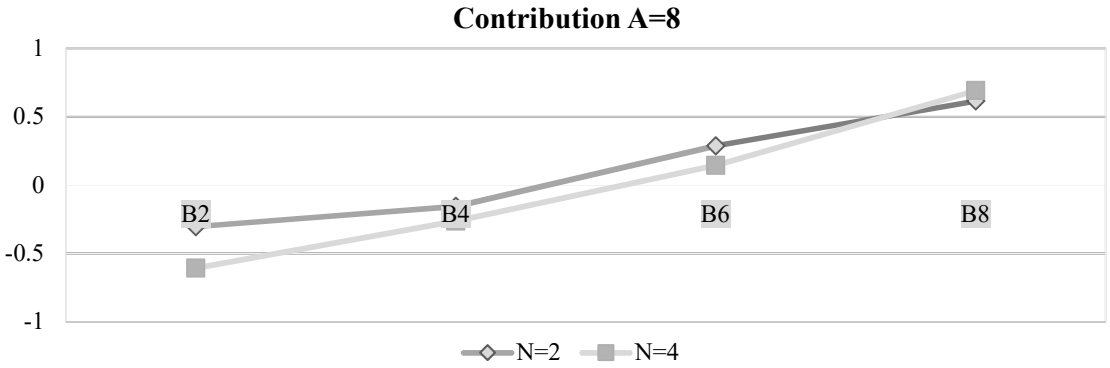

Figure 12. Average social recognition for A = 8.

5. Discussion

Two main conclusions can be taken from this study. First, the extent of prosocial behavior found in non-repeated experiments should be seen as the *upper bound* of cooperative behavior. The identical repetition of experimental sessions leads also in a public good experiment to a considerable decrease in social behavior. This is remarkable in that this observation has so far only been made for the dictator game experiment, in which there is no strategic interaction between the subjects. Obviously, repeating sessions also reduces social behavior in games with strategic interaction. Therefore, in real world situations where people are repeatedly put in similar cooperation dilemma contexts, we should expect to observe less cooperation as in non-repeated experiments.

Second, the mechanics of cooperation in pairs differ significantly from those in groups. The peculiar characteristics of two-person interactions highlighted in the introduction apparently promote stable cooperative behavior. Our results are in line with findings recently reported by [11] who also found that cooperation in their public good experiments was strongest for N = 2, followed by N = 4, and N = 3.

In our analysis we focus on the conditional contributions, because unconditional contributions are harder to interpret because they depend on unobservable elements as beliefs and expectations. Nevertheless, our results suggest that these conclusions can be drawn for both, unconditional and conditional decisions. Both show a high pro social behavior in the first decision. However, the unconditional contribution is more than twice as high as the average conditional contribution. One reason for this could be, as [21] lined out, that leaders who make an unconditional contribution, expect conditional cooperators as followers. The same observation was made by [22]. Therefore, they can maximize their payoff by contributing a relatively high amount. Our results show that conditional cooperation is especially stable in pairs when compared to groups. If the leader in a sequential framework expects this relative stability of pairs, then her unconditional contribution will be relatively stable as well. This is out of self-interest because of the before mentioned reason. In the consequence, we find a more stable unconditional contribution pattern in pairs compared to groups.

From our norm elicitation experiment, we can learn that symmetric behavior is of particular importance in pairs. This finding corresponds to the fact that pairs are insofar a symmetric "group" as the weight of each member is the same as the weight of the rest of the group. The second important observation made in the norm elicitation experiment is that the repetition of a cooperative contribution does not lead to increased social recognition for it. However, this would be a condition for moral self-licensing being a rational reaction in repeated experiments and therefore decreasing social behavior.

We can only speculate on the underlying foundations of pairs being able to achieve and maintain such high levels of cooperation. One might reason, for example, that people who constantly experience and therefore learn the mutual benefits of anonymous two-person trade interactions typical for market-oriented economies internalize a behavioral norm demanding cooperation in other contexts as well. Irrespective of whether or not such an explanation is indeed true, our findings illustrate that

partners in pairs achieve cooperation quite successfully, which in turn supports the hypothesis that institutional arrangements based on two-person interactions allow for particularly stable cooperation. We can therefore expect that market interactions can be functional even in the absence of regulative interventions designed to enforce cooperation.

Author Contributions: M.S., F.T. and J.W. conceived, designed and performed the experiments; M.S. and F.T. analyzed the data; M.S., F.T. and J.W. contributed to the interpretation and discussion of the data analysis and results; J.W. wrote the paper.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A1. Instructions & Data Sheet N = 4 Partner Treatment

The following instructions are the English translation of the original German instructions. The original instructions are available from the corresponding author.

- You will now take part in an experiment within the context of experimental economics. In this experiment you can earn money that will be paid out to you in cash at the end of the experiment. The amount of money depends on your decisions and the decisions of other subjects.
- The experiment has a duration of **four weeks**. The peculiarities that result from this experimental setup are explained in detail in the following instructions. Please read them carefully. Thank you!
- You and three other subjects are part of the following decision situation. You will be interacting with the **exact same three other subjects** each week. The other subjects' identities will not be revealed to you at any point in time. Likewise, your identity will not be revealed to the other subjects. Thus, the interaction is always completely anonymous.

The Decision Situation of Today's Experiment

- The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other subjects.
- You and the other subjects each receive a monetary endowment of EUR 10.
- You and the other subjects each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account for all four subjects. In the first step you will be asked to indicate this amount directly. In the second step you will be asked to indicate your preferred choice of contribution subject to the level of average contribution by the other three subjects (please also note the instruction on the data sheet).
- For each EUR 1 contributed by any group member to the public account, **every** group member will **each** receive a payoff of EUR 0.40. Each EUR 1 contributed to the public account thus yields a payoff of 4 $\times$ 0.40 EUR = EUR 1.60 to the group in total. Each group member will receive the same share of EUR 0.40.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Each group member's individual payoff (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.40 $\times$ sum of all contributions to public account

- **A few numeric examples**
    - The other three subjects contribute on average EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account is therefore 3 $\times$ EUR 5 + 1 $\times$ EUR 3 = EUR 18.

- Your payoff: $10 - 3 + 0.40 \times 18$ = EUR 14.20
- Average payoff to other subjects: $10 - 5 + 0.40 \times 18$ = EUR 12.20

○ All subjects (including you) contribute EUR 10 each to the public account. Total contribution to the public account is therefore $4 \times$ EUR 10 = EUR 40.

- Payoff to each subject: $10 - 10 + 0.40 \times 40$ = EUR 16

○ All subjects (including you) contribute EUR 0 each to the public account. Total contribution to the public account is therefore EUR 0.

- Payoff to each subject: $10 - 0 + 0.40 \times 0$ = EUR 10

○ The other three subjects contribute EUR 10 each to the public account. You contribute EUR 0 to the public account. Total contribution to the public account is therefore $3 \times$ EUR 10 $+ 1 \times$ EUR 0 = EUR 30.

- Your payoff: $10 - 0 + 0.40 \times 30$ = EUR 22
- Payoff to other subjects: $10 - 10 + 0.40 \times 30$ = EUR 12

Payment Mechanism & Feedback

- You will receive **no information** on what the other subjects did until after the end of the four week experiment. The same applies to all other subjects.
- Likewise, you will not receive your payment until after the end of the experiment, i.e., you will only be paid when the final experiment is completed. The same applies to all other subjects.
- **At the end of the experiment you will not receive the sum of the earnings from all the individual weeks. Instead, an individual week will be randomly drawn to be payoff relevant. The payment from that week will be multiplied by four and paid out to you in cash.**
- It is important to us that you show up for all four experiments. If you fail to show up for any of the experiments, you forfeit all earnings.
- Example 1:

○ You took part in all four weeks of the experiment. Your earnings were EUR 10 in week 1, EUR 14 in week 2, EUR 18 in week 3 and EUR 22 in week 4. The draw determines that you will be paid the earnings from week 3 multiplied by four. Your total payment in this illustrative example is thus $4 \times$ EUR 18 = EUR 72.

- Example 2:

○ You took part in the first three weeks of the experiment, but you failed to show up in week 4. In this case, you forfeit all earnings. Your total payment in this illustrative example is thus EUR 0.

The subjects filled out the following data sheet. Each data sheet contained a serial number, which made it possible to track the individual behavior of each participant over the course of the experiment.

Step 1

Please indicate in this first step how much you wish to contribute to the public account: _____ EUR.

Step 2

Please now indicate your preferred choice of contribution to the public account subject to the average level of contribution to the public account by the other three subjects. In each case you can contribute any integer value ranging from EUR 0 to EUR 10 (0 and 10 included).

1. If the other three subjects contribute **EUR 0** on average, I contribute: _____.
2. If the other three subjects contribute **EUR 1** on average, I contribute: _____.
3. If the other three subjects contribute **EUR 2** on average, I contribute: _____.
4. If the other three subjects contribute **EUR 3** on average, I contribute: _____.
5. If the other three subjects contribute **EUR 4** on average, I contribute: _____.
6. If the other three subjects contribute **EUR 5** on average, I contribute: _____.
7. If the other three subjects contribute **EUR 6** on average, I contribute: _____.
8. If the other three subjects contribute **EUR 7** on average, I contribute: _____.
9. If the other three subjects contribute **EUR 8** on average, I contribute: _____.
10. If the other three subjects contribute **EUR 9** on average, I contribute: _____.
11. If the other three subjects contribute **EUR 10** on average, I contribute: _____.

Note regarding payoff calculation: For 3 out of 4 group members, actual contribution to the public account is taken from the response made in step 1. For the randomly determined fourth group member, contribution is taken from the responses made in step 2. In doing so, the average contribution by the other three subjects from the step 1 responses (rounded to integers) is calculated. The fourth group member's contribution is then taken from the according response made in step 2. Example: The other three subjects contributed EUR 2 on average. In this case, the fourth group member's contribution is taken from row 3 of the step 2 responses ("3. If the other three subjects contribute EUR 2 on average ... "). The total sum of contributions to the public account is then known and individual payoffs are calculated as explained in the instructions.

Please note: If we detect an inconsistency regarding your decisions in step 1 and step 2, you might be excluded from the experiment, in which case you also forfeit all earnings. Please make sure that your choices made in step 1 and step 2 do not contradict each other. Thank you!

Appendix A2. Instructions & Data Sheet N = 4 Stranger Treatment

The following instructions are the English translation of the original German instructions. The original instructions are available from the corresponding author.

- You will now take part in an experiment within the context of experimental economics. In this experiment, you can earn money that will be paid out to you in cash at the end of the experiment. The amount of money depends on your decisions and the decisions of other subjects.
- The experiment has a duration of **four weeks**. The peculiarities that result from this experimental setup are explained in detail in the following instructions. Please read them carefully. Thank you!
- You and three other subjects are part of the following decision situation. In each weak, you will be matched with three freshly recruited new subjects, who will only take part once in this experiment. Thus, you will be interacting with three freshly recruited new subjects in each weak. The other subjects' identities will not be revealed to you at any point in time. Likewise, your identity will not revealed to the other subjects. Thus, the interaction is always completely anonymous.

The Decision Situation of Today's Experiment

- The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other subjects.
- You and the other subjects each receive a monetary endowment of EUR 10.
- You and the other subjects each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of all four subjects. Each of the other subjects will indicate their choice directly. You on the other hand will be asked to indicate your preferred choice of contribution subject to the level of average contribution by the other three subjects (please also note the instructions on the data sheet).
- For each EUR 1 contributed by any group member to the public account, **every** group member will **each** receive a payoff of EUR 0.40. Each EUR 1 contributed to the public account thus yields a payoff of 4 × 0.40 EUR = EUR 1.60 to the group in total. Each group member will receive the same share of EUR 0.40.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Each group member's individual payoff (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.40 × sum of all contributions to public account

- **A few numeric examples**
  - The other three subjects contribute on average EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account thus is 3 × EUR 5 + 1 × EUR 3 = EUR 18.
    - Your payoff: 10 − 3 + 0.40 × 18 = EUR 14.20
    - Average payoff of other subjects: 10 − 5 + 0.40 × 18 = EUR 12.20
  - All subjects (including you) contribute EUR 10 each to the public account. Total contribution to the public account thus is 4 × EUR 10 = EUR 40.
    - All subject's payoff: 10 − 10 + 0.40 × 40 = EUR 16
  - All subjects (including you) contribute EUR 0 each to the public account. Total contribution to the public account thus is EUR 0.
    - All subject's payoff: 10 − 0 + 0.40 × 0 = EUR 10
  - The other three subjects contribute EUR 10 each to the public account. You contribute EUR 0 to the public account. Total contribution to the public account thus is 3 × EUR 10 + 1 × EUR 0 = EUR 30.
    - Your payoff: 10 − 0 + 0.40 × 30 = EUR 22
    - Payoff of other subjects: 10 − 10 + 0.40 × 30 = EUR 12

Payment Mechanism & Feedback

- You will receive **no information** on what the other subjects did until after the end of the four week long experiment.
- Likewise, you will not receive your payment until after the end of the experiment. Only after the end of the final experiment you will be paid.

- The other subjects receive their payment at the end of today's experiment, since (unlike you) they only take part once in this experiment.
- **At the end of the experiment, you will not receive the sum of the earnings from all the individual weeks. Instead, an individual week will be randomly drawn to be payoff relevant. The payment from that week will be multiplied by four and paid out to you in cash.**
- **It is important to us that you show up for all four experiments. If you fail to show up for any of the experiments, you forfeit all earnings.**
- Example 1:

    ○ You took part in all four weeks of the experiment. Your earnings were EUR 10 in week 1, EUR 14 in week 2, EUR 18 in week 3 and EUR 22 in week 4. The draw determines that you will be paid the earnings from week 3 multiplied by four. Your total payment in this illustrative example is thus 4 × EUR 18 = EUR 72.

- Example 2:

    ○ You took part in the first three weeks of the experiment, but you failed to show up in week 4. In this case, you forfeit all earnings. Your total payment in this illustrative example is thus EUR 0.

The subjects filled out the following data sheet. Each data sheet contained a serial number, which made it possible to track individual behavior of each participant over the course of the experiment.

Please now indicate your preferred choice of contribution to the public account subject to the average level of contribution to the public account by the other three subjects. In each case you can contribute any integer value ranging from EUR 0 to EUR 10 (0 and 10 included).

1. If the other three subjects contribute **EUR 0** on average, I contribute: _____.
2. If the other three subjects contribute **EUR 1** on average, I contribute: _____.
3. If the other three subjects contribute **EUR 2** on average, I contribute: _____.
4. If the other three subjects contribute **EUR 3** on average, I contribute: _____.
5. If the other three subjects contribute **EUR 4** on average, I contribute: _____.
6. If the other three subjects contribute **EUR 5** on average, I contribute: _____.
7. If the other three subjects contribute **EUR 6** on average, I contribute: _____.
8. If the other three subjects contribute **EUR 7** on average, I contribute: _____.
9. If the other three subjects contribute **EUR 8** on average, I contribute: _____.
10. If the other three subjects contribute **EUR 9** on average, I contribute: _____.
11. If the other three subjects contribute **EUR 10** on average, I contribute: _____.

Note regarding payoff calculation: Unlike you, the other three subjects indicate their choice of contribution to the public account directly. The average contribution by the other three subjects (rounded to integers) is then calculated. Your contribution to the public account is then taken from the according response made in this data sheet.

Example: The other three subjects contributed EUR 2 on average. In this case, your response from row 3 is taken as your contribution ("3. If the other three subjects contribute EUR 2 on average . . . "). Total sum of contributions to the public account is then known and individual payoffs are calculated as explained in the instructions.

Please note: If we detect an inconsistency regarding your decisions in step 1 and step 2, you might be excluded from the experiment, in which case you also forfeit all earnings. Please make sure that your choices made in step 1 and step 2 do not contradict each other. Thank you!

Appendix A3. Instructions & Data Sheet N = 2 Partner Treatment

The following instructions are the English translation of the original German instructions. The original instructions are available from the corresponding author.

- You will now take part in an experiment within the context of experimental economics. In this experiment, you can earn money that will be paid out to you in cash at the end of the experiment. The amount of money depends on your decisions and the decisions of other subjects.
- The experiment has a duration of **four weeks**. The peculiarities that result from this experimental setup are explained in detail in the following instructions. Please read them carefully. Thank you!
- You and another subject are part of the following decision situation. You will be interacting with the **exact same other subject** in each week. The other subject's identity will not be revealed to you at any point in time. Likewise, your identity will not be revealed to the other subject. Thus, the interaction is always completely anonymous.

The Decision Situation of Today's Experiment

- The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other subject.
- You and the other subject each receive a monetary endowment of EUR 10.
- You and the other subject each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of both subjects. In a first step, you will be asked to indicate this amount directly. In a second step, you will be asked to indicate your preferred choice of contribution subject to the level of contribution by the other subject (please also note the instructions on the data sheet).
- For each EUR 1 contributed by you or the other subject to the public account, **you and the other subject** will **each** receive a payoff of EUR 0.80. Each EUR 1 contributed to the public account thus yields a payoff of 2 × 0.80 EUR = EUR 1.60 to you and the other subject in total. Each subject will receive the same share of EUR 0.80.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.80 × sum of all contributions to public account

- **A few numeric examples**
  - The other subject contributes EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account thus is EUR 5 + EUR 3 = EUR 8.
    - Your payoff: 10 − 3 + 0.80 × 8 = EUR 13.40
    - Others subject's payoff: 10 − 5 + 0.80 × 8 = EUR 11.40
  - Both you and the other subject contribute EUR 10 each to the public account. Total contribution to the public account thus is 2 × EUR 10 = EUR 20.
    - Your payoff and payoff of other subject: 10 − 10 + 0.80 × 20 = EUR 16
  - Both you and the other subject contribute EUR 0 each to the public account. Total contribution to the public account thus is EUR 0.
    - Your payoff and payoff of other subject: 10 − 0 + 0.80 × 0 = EUR 10
  - The other subject contributes EUR 10 to the public account. You contribute EUR 0 to the public account. Total contribution to the public account thus is EUR 10 + EUR 0 = EUR 10.

- Your payoff: $10 - 0 + 0.80 \times 10$ = EUR 18
- Others subject's payoff: $10 - 10 + 0.80 \times 10$ = EUR 8

Payment Mechanism & Feedback

- You will receive **no information** on what the other subjects did until after the end of the four week long experiment. The same applies to the other subject.
- Likewise, you will not receive your payment until after the end of the experiment. Only after the end of the final experiment you will be paid. The same applies to the other subject.
- **At the end of the experiment, you will not receive the sum of the earnings from all the individual weeks. Instead, an individual week will be randomly drawn to be payoff relevant. The payment from that week will be multiplied by four and paid out to you in cash.**
- **It is important to us that you show up for all four experiments. If you fail to show up for any of the experiments, you forfeit all earnings.**
- Example 1:
  - You took part in all four weeks of the experiment. Your earnings were EUR 10 in week 1, EUR 12 in week 2, EUR 14 in week 3 and EUR 16 in week 4. The draw determines that you will be paid the earnings from week 3 multiplied by four. Your total payment in this illustrative example is thus 4 × EUR 14 = EUR 56.
- Example 2:
  - You took part in the first three weeks of the experiment, but you failed to show up in week 4. In this case, you forfeit all earnings. Your total payment in this illustrative example is thus EUR 0.

The subjects filled out the following data sheet. Each data sheet contained a serial number, which made it possible to track individual behavior of each participant over the course of the experiment.

Step 1

Please indicate in this first step directly, how much you wish to contribute to the public account: _____ EUR.

Step 2

Please now indicate your preferred choice of contribution to the public account subject to the level of contribution to the public account by the other subject. In each case you can contribute any integer value ranging from EUR 0 to EUR 10 (0 and 10 included).

1. If the other subject contributes **EUR 0**, I contribute: _____.
2. If the other subject contributes **EUR 1**, I contribute: _____.
3. If the other subject contributes **EUR 2**, I contribute: _____.
4. If the other subject contributes **EUR 3**, I contribute: _____.
5. If the other subject contributes **EUR 4**, I contribute: _____.
6. If the other subject contributes **EUR 5**, I contribute: _____.
7. If the other subject contributes **EUR 6**, I contribute: _____.
8. If the other subject contributes **EUR 7**, I contribute: _____.
9. If the other subject contributes **EUR 8**, I contribute: _____.
10. If the other subject contributes **EUR 9**, I contribute: _____.
11. If the other subject contributes **EUR 10**, I contribute: _____.

Note regarding payoff calculation: For one subject, actual contribution to the public account is taken from the response made in step 1. For the other subject, contribution is taken from the responses made in step 2. It is randomly determined for which subject the responses made in step 1 are used for payoff calculation and for which subject the responses made in step 2 are used for payoff calculation.

Please note: If we detect an inconsistency regarding your decisions in step 1 and step 2, you might be excluded from the experiment, in which case you also forfeit all earnings. Please make sure that your choices made in step 1 and step 2 do not contradict each other. Thank you!

Appendix A4. Instructions & Data Sheet N = 2 Stranger Treatment

The following instructions are the English translation of the original German instructions. The original instructions are available from the corresponding author.

- You will now take part in an experiment within the context of experimental economics. In this experiment, you can earn money that will be paid out to you in cash at the end of the experiment. The amount of money depends on your decisions and the decisions of other subjects.
- The experiment has a duration of **four weeks**. The peculiarities that result from this experimental setup are explained in detail in the following instructions. Please read them carefully. Thank you!
- You and another subject are part of the following decision situation. In each weak, you will be interacting with a freshly recruited new subject in each week, who will only take part once in this experiment. Thus, you will be interacting with a different, new subject in each weak. The other subjects' identities will not be revealed to you at any point in time. Likewise, your identity will not be revealed to the other subjects. Thus, the interaction is always completely anonymous.

The Decision Situation of Today's Experiment

- The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other subject.
- You and the other subject each receive a monetary endowment of EUR 10.
- You and the other subject each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of both subjects. The others subject will indicate his or her choice directly. You on the other hand will be asked to indicate your preferred choice of contribution subject to the level of contribution by the other subject (please also note the instructions on the data sheet).
- For each EUR 1 contributed by you or the other subject to the public account, **you and the other subject** will **each** receive a payoff of EUR 0.80. Each EUR 1 contributed to the public account thus yields a payoff of 2 × 0.80 EUR = EUR 1.60 to you and the other subject in total. Each subject will receive the same share of EUR 0.80.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.80 × sum of all contributions to public account

- **A few numeric examples**
  - The other subject contributes EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account thus is EUR 5 + EUR 3 = EUR 8.
    - Your payoff: 10 − 3 + 0.80 × 8 = EUR 13.40
    - Others subject's payoff: 10 − 5 + 0.80 × 8 = EUR 11.40
  - Both you and the other subject contribute EUR 10 each to the public account. Total contribution to the public account thus is 2 × EUR 10 = EUR 20.

- Your payoff and payoff of other subject: $10 - 10 + 0.80 \times 20 = \text{EUR } 16$

○ Both you and the other subject contribute EUR 0 each to the public account. Total contribution to the public account thus is EUR 0.

- Your payoff and payoff of other subject: $10 - 0 + 0.80 \times 0 = \text{EUR } 10$

○ The other subject contributes EUR 10 to the public account. You contribute EUR 0 to the public account. Total contribution to the public account thus is EUR 10 + EUR 0 = EUR 10.

- Your payoff: $10 - 0 + 0.80 \times 10 = \text{EUR } 18$
- Others subject's payoff: $10 - 10 + 0.80 \times 10 = \text{EUR } 8$

Payment Mechanism & Feedback

- You will receive **no information** on what the other subjects did until after the end of the four week long experiment. The same applies to the other subject.
- Likewise, you will not receive your payment until after the end of the experiment. Only after the end of the final experiment you will be paid. The same applies to the other subject.
- The other subject receives his or her payment at the end of today's experiment, since (unlike you) he or she only takes part once in this experiment.
- **At the end of the experiment, you will not receive the sum of the earnings from all the individual weeks. Instead, an individual week will be randomly drawn to be payoff relevant. The payment from that week will be multiplied by four and paid out to you in cash.**
- **It is important to us that you show up for all four experiments. If you fail to show up for any of the experiments, you forfeit all earnings.**
- Example 1:

○ You took part in all four weeks of the experiment. Your earnings were EUR 10 in week 1, EUR 12 in week 2, EUR 14 in week 3 and EUR 16 in week 4. The draw determines that you will be paid the earnings from week 3 multiplied by four. Your total payment in this illustrative example is thus $4 \times \text{EUR } 14 = \text{EUR } 56$.

- Example 2:

○ You took part in the first three weeks of the experiment, but you failed to show up in week 4. In this case, you forfeit all earnings. Your total payment in this illustrative example is thus EUR 0.

The subjects filled out the following data sheet. Each data sheet contained a serial number, which made it possible to track individual behavior of each participant over the course of the experiment.

Please now indicate your preferred choice of contribution to the public account subject to the level of contribution to the public account by the other subject. In each case you can contribute any integer value ranging from EUR 0 to EUR 10 (0 and 10 included).

1. If the other subject contributes **EUR 0**, I contribute: _____.
2. If the other subject contributes **EUR 1**, I contribute: _____.
3. If the other subject contributes **EUR 2**, I contribute: _____.
4. If the other subject contributes **EUR 3**, I contribute: _____.
5. If the other subject contributes **EUR 4**, I contribute: _____.
6. If the other subject contributes **EUR 5**, I contribute: _____.
7. If the other subject contributes **EUR 6**, I contribute: _____.
8. If the other subject contributes **EUR 7**, I contribute: _____.

9. If the other subject contributes **EUR 8**, I contribute: _____.
10. If the other subject contributes **EUR 9**, I contribute: _____.
11. If the other subject contributes **EUR 10**, I contribute: _____.

Note regarding payoff calculation: Unlike you, the other subject indicates his or her choice of contribution to the public account directly. Your contribution to the public account is then taken from the according response made in this data sheet.

Example: The other subjects contributed EUR 2. In this case, your response from row 3 is taken as your contribution ("3. If the other subject contributes EUR 2 . . . "). Total sum of contributions to the public account is then known and individual payoffs are calculated as explained in the instructions.

Appendix B1. Control Questions N = 4 Treatments

The following control questions are the English translation of the original German control questions. The original control questions are available from the corresponding author.

1. Each member of your group is given an endowment of EUR 10. Suppose that nobody (including you) contributes to the public account. What is your payoff? EUR _____ What is the payoff of all other group members? EUR _____
2. Each member of your group is given an endowment of EUR 10. Suppose that everybody (including you) contributes EUR 10 to the public account. What is your payoff? EUR _____ What is the payoff of all other group members? EUR _____
3. Each member of your group is given an endowment of EUR 10. Suppose that each of the other group members contributes EUR 10 to the public account, whereas you contribute EUR 0. What is your payoff? EUR _____ What is the payoff of all other group members? EUR _____
4. Each member of your group is given an endowment of EUR 10. Suppose that each of the other group members contributes EUR 0 to the public account, whereas you contribute EUR 10. What is your payoff? EUR _____ What is the payoff of all other group members? EUR _____
5. Each member of your group is given an endowment of EUR 10. Suppose that the other group members contribute EUR 10 in total to the public account. What is your payoff if you contribute EUR 0? EUR _____ What is your payoff if you contribute EUR 5? EUR _____ What is your payoff if you contribute EUR 10? EUR _____

Appendix B2. Control Questions N = 2 Treatments

The following control questions are the English translation of the original German control questions. The original control questions are available from the corresponding author.

1. You and the other subject are given an endowment of EUR 10. Suppose that neither you nor the other subject contributes to the public account. What is your payoff? EUR _____ What is the payoff of the other subject? EUR _____
2. You and the other subject are given an endowment of EUR 10. Suppose both you and the other subject each contribute EUR 10 to the public account. What is your payoff? EUR _____ What is the payoff of the other subject? EUR _____
3. You and the other subject are given an endowment of EUR 10. Suppose that the other subject contributes EUR 10 to the public account, whereas you contribute EUR 0. What is your payoff? EUR _____ What is the payoff of the other subject? EUR _____
4. You and the other subject are given an endowment of EUR 10. Suppose that the other subject contributes EUR 0 to the public account, whereas you contribute EUR 10. What is your payoff? EUR _____ What is the payoff of the other subject? EUR _____

5. You and the other subject are given an endowment of EUR 10. Suppose that the other group members contribute EUR 5 to the public account. What is your payoff if you contribute EUR 0? EUR _____ What is your payoff if you contribute EUR 5? EUR _____ What is your payoff if you contribute EUR 10? EUR _____

Appendix C1. Elicitation Experiment N = 2

The following control questions are the English translation of the original German control questions. The original control questions are available from the corresponding author.

Page 1: Instructions (ID: 1)

Please read these instructions carefully. If you have any questions, please raise your hand and wait for an experimenter to come to your seat.

You will receive a show-up fee of EUR 5 for participating in this experiment. You might receive an additional monetary compensation depending on the decisions that you and other participants make in the context of this experiment.

Note: Please do not communicate with other subjects during this experiment verbally or in any other way. Subjects not obeying this rule will be excluded from the experiment and will not receive a payment. Thank you!

50 subjects will be taking part in this experiment. All of them are sitting in this lecture hall at the same time. Your task is to indicate what you estimate or believe the majority of the other subjects think is a "socially appropriate" or "socially desirable" behavior in a certain decision situation. If your estimation is identical with the estimation of the majority of other subjects, you will receive an additional EUR 5 on top of the show-up fee, thus EUR 10 in total. If not, you will only receive the show-up fee that every participant will be paid in any case.

The situation in question is given by an experiment that other subjects took part in or will take part in at a different point in time in Magdeburg. You'll find the description of this experiment on the next page. Questions you might have will be answered at your seat. Please raise your hand if you have any.

On the third page you will find the actual questions you are asked to answer. To answer the questions, just mark one of the given response options. This is not about what **you** personally think is the appropriate behavior but what the majority of the other subjects think.

Procedure of this experiment:

1. Please read the description of the base game on page 2 carefully.
2. Answer the question on page 3 (data sheet).
3. Separate page 3 from these instructions, fold it once and hand it to an experimenter when asked to do so.
4. The data sheets will be evaluated immediately after collection.
5. You will find an ID on each page in the top right corner. After the evaluation of the data sheets, we will list all IDs and the corresponding payment. Please line up at the payment desk when asked to do so.

Page 2: Description of the Base Game (ID:1)

The following box includes instructions of an experiment that other subjects took part in or will take part in at a different point in time in Magdeburg. Please read these instructions carefully. Although you will not take part in the experiment described in these instructions, it is important that you are familiar with them.

The Decision Situation of Today's Experiment

- The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other subject.
- You and the other subject each receive a monetary endowment of EUR 10.
- You and the other subject each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of both subjects. In a first step, you will be asked to indicate this amount directly. In a second step, you will be asked to indicate your preferred choice of contribution subject to the level of contribution by the other subject (please also note the instructions on the data sheet).
- For each EUR 1 contributed by you or the other subject to the public account, **you and the other subject** will **each** receive a payoff of EUR 0.80. Each EUR 1 contributed to the public account thus yields a payoff of 2 × 0.80 EUR = EUR 1.60 to you and the other subject in total. Each subject will receive the same share of EUR 0.80.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.80 × sum of all contributions to public account

- **A few numeric examples**
  - The other subject contributes EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account thus is EUR 5 + EUR 3 = EUR 8.
    - Your payoff: 10 − 3 + 0.80 × 8 = EUR 13.40
    - Others subject's payoff: 10 − 5 + 0.80 × 8 = EUR 11.40
  - Both you and the other subject contribute EUR 10 each to the public account. Total contribution to the public account thus is 2 × EUR 10 = EUR 20.
    - Your payoff and payoff of other subject: 10 − 10 + 0.80 × 20 = EUR 16
  - Both you and the other subject contribute EUR 0 each to the public account. Total contribution to the public account thus is EUR 0.
    - Your payoff and payoff of other subject: 10 − 0 + 0.80 × 0 = EUR 10
  - The other subject contributes EUR 10 to the public account. You contribute EUR 0 to the public account. Total contribution to the public account thus is EUR 10 + EUR 0 = EUR 10.
    - Your payoff: 10 − 0 + 0.80 × 10 = EUR 18
    - Others subject's payoff: 10 − 10 + 0.80 × 10 = EUR 8

Page 3: Data Sheet (ID:1)

- The experiment described on page 2 is conducted in a laboratory.
- The following table consists of different possibilities on how a player could behave in the two experiments. In the first column you find the contributions of the other player and in the second column you find your own contributions. You are asked to indicate for each possibility, what you believe a majority of your co-participants thinks of the "appropriateness" or "social desirability" of the behavior in the second experiment. Options range between "very desirable/very appropriate" to "somewhat desirable/somewhat appropriate" to "somewhat undesirable/inappropriate" to "very undesirable/very inappropriate".

- **Note:** Only <u>one</u> of the 16 possibilities is chosen for evaluation. You will receive the additional EUR 5 if you match the choice made by the majority of participants in the randomly drawn row.

Amount Given by the Other Player	Amount Given by the Yourself	Very Desirable/Very Appropriate	Somewhat Desirable/Somewhat Appropriate	Somewhat Undesirable/Somewhat Inappropriate	Very Undesirable/Very Inappropriate
2 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
4 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
6 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
8 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				

Please make ONE mark in each ROW!

Appendix C2. Elicitation Experiment N = 4

The following control questions are the English translation of the original German control questions. The original control questions are available from the corresponding author.

Appendix C2.1. Page 1: Instructions (ID: 1)

Please read these instructions carefully. If you have any questions, please raise your hand and wait for an experimenter to come to your seat.

You will receive a show-up fee of EUR 5 for participating in this experiment. You might receive an additional monetary compensation depending on the decisions that you and other participants make in the context of this experiment.

Note: Please do not communicate with other subjects during this experiment verbally or in any other way. Subjects not obeying this rule will be excluded from the experiment and will not receive a payment. Thank you!

50 subjects will be taking part in this experiment. All of them are sitting in this lecture hall at the same time. Your task is to indicate what you estimate or believe the majority of the other subjects think is a "socially appropriate" or "socially desirable" behavior in a certain decision situation. If your estimation is identical with the estimation of the majority of other subjects, you will receive an additional EUR 5 on top of the show-up fee, thus EUR 10 in total. If not, you will only receive the show-up fee that every participant will be paid in any case.

The situation in question is given by an experiment that other subjects took part in or will take part in at a different point in time in Magdeburg. You'll find the description of this experiment on the next page. Questions you might have will be answered at your seat. Please raise your hand if you have any.

On the third page you will find the actual questions you are asked to answer. To answer the questions, just mark one of the given response options. This is not about what **you** personally think is the appropriate behavior but what the majority of the other subjects think.

Procedure of this experiment:

6 Please read the description of the base game on page 2 carefully.
7 Answer the question on page 3 (data sheet).
8 Separate page 3 from these instructions, fold it once and hand it to an experimenter when asked to do so.
9 The data sheets will be evaluated immediately after collection.
10 You will find an ID on each page in the top right corner. After the evaluation of the data sheets, we will list all IDs and the corresponding payment. Please line up at the payment desk when asked to do so.

Appendix C2.2. Page 2: Description of the Base Game (ID: 1)

The following box includes instructions of an experiment that other subjects took part in or will take part in at a different point in time in Magdeburg. Please read these instructions carefully. Although you will not take part in the experiment described in these instructions, it is important that you are familiar with them.

The Decision Situation of Today's Experiment

The decision situation is **completely symmetrical**, so the exact same information and choices are available to you and the other three subjects.

- You and the other three subjects each receive a monetary endowment of EUR 10.
- You and the other subjects each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of all four subjects. In a first step, you will be asked to indicate this amount directly. In a second step, you will be asked to indicate your preferred choice of contribution subject to the level of contribution by the other subjects (please also note the instructions on the data sheet).
- For each EUR 1 contributed by you or the other subject to the public account, **you and the other subjects** will **each** receive a payoff of EUR 0.40. Each EUR 1 contributed to the public account thus yields a payoff of 4×0.40 EUR = EUR 1.60 to you and the other subjects in total. Each subject will receive the same share of EUR 0.40.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.40 × sum of all contributions to public account

- A few numeric examples
  - The other subjects contribute EUR 5 to the public account. You contribute EUR 3 to the public account. Total contribution to the public account thus is EUR 5 + EUR 3 = EUR 18.
    - Your payoff: $10 - 3 + 0.40 \times 8$ = EUR 14.20
    - Others subject's payoff: $10 - 5 + 0.40 \times 18$ = EUR 12.20
  - Both you and the other subject contribute EUR 10 each to the public account. Total contribution to the public account thus is $4 \times$ EUR 10 = EUR 40.
    - Your payoff and payoff of other subject: $10 - 10 + 0.40 \times 40$ = EUR 16

○ Both you and the other subject contribute EUR 0 each to the public account. Total contribution to the public account thus is EUR 0.

■ Your payoff and payoff of other subject: $10 - 0 + 0.40 \times 0$ = EUR 10

○ The other subject contributes EUR 10 to the public account. You contribute EUR 0 to the public account. Total contribution to the public account thus is 3 × EUR 10 + 1 × EUR = EUR 30.

■ Your payoff: $10 - 0 + 0.40 \times 30$ = EUR 22

■ Others subject's payoff: $10 - 10 + 0.40 \times 30$ = EUR 12

Appendix C2.3. Page 3: Data Sheet (ID:1)

- The experiment described on page 2 is conducted in a laboratory.
- The following table consists of different possibilities on how a player could behave in the two experiments. In the first column you find the average contribution of the other players and in the second column you find your own contributions. You are asked to indicate for each possibility, what you believe a majority of your co-participants thinks of the "appropriateness" or "social desirability" of the behavior in the second experiment. Options range between "very desirable/very appropriate" to "somewhat desirable/somewhat appropriate" to "somewhat undesirable/inappropriate" to "very undesirable/very inappropriate".
- **Note:** Only one of the 16 possibilities is chosen for evaluation. You will receive the additional EUR 5 if you match the choice made by the majority of participants in the randomly drawn row.

Average Amount Given by the Other Players	Amount Given by the Yourself	Very Desirable/Very Appropriate	Somewhat Desirable/Somewhat Appropriate	Somewhat Undesirable/Somewhat Inappropriate	Very Undesirable/Very Inappropriate
2 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
4 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
6 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				
8 EUR	2 EUR				
	4 EUR				
	6 EUR				
	8 EUR				

Please make ONE mark in each ROW!

Appendix C3. Elicitation Sequence

Page 4: Additional Sheet I ID (Copy from Page 1/2)

Now you have the opportunity to earn 2 extra Euros. Therefore, answer the all questions at the bottom of this page. One of the 20 questions is chosen for evaluation. You will receive the additional EUR 2 if you match the choice made by the majority of participants in the randomly drawn row.

Background: The same players played the game described on page 2 four times. The time span between two repetitions was 1 week. No player got information about the behavior of other

players. Subjects were paid after the fourth game. Every player had to decide 4 times how much he contributes to the public account. We call these 4 decisions a sequence.

Each of the following tables consists of your own sequence. You find the sequence in the cell up left. The first number is the contribution in week 1, the second number the contribution in week 2 and so on. You are asked to indicate for each contribution within a sequence, what you believe a majority of your co-participants thinks of the "appropriateness" or "social desirability" of the behavior in the second experiment. Options range between "very desirable/very appropriate" to "some-what desirable/somewhat appropriate" to "somewhat undesirable/inappropriate" to "very undesirable/very inappropriate".

Sequence: 6 6 4 0	**Very Desirable/Very Appropriate**	**Somewhat Desirable/Somewhat Appropriate**	**Somewhat Undesirable/Somewhat Inappropriate**	**Very Undesirable/Very Inappropriate**
Contribution week 1.				
Woche: 6				
Contribution week 2				
Contribution week 3				
Contribution week 4				

Sequence: 4 4 4 4	**Very Desirable/Very Appropriate**	**Somewhat Desirable/Somewhat Appropriate**	**Somewhat Undesirable/Somewhat Inappropriate**	**Very Undesirable/Very Inappropriate**
Contribution week 1.				
Woche: 6				
Contribution week 2				
Contribution week 3				
Contribution week 4				

Sequence: 8 8 2 0	**Very Desirable/Very Appropriate**	**Somewhat Desirable/Somewhat Appropriate**	**Somewhat Undesirable/Somewhat Inappropriate**	**Very Undesirable/Very Inappropriate**
Contribution week 1.				
Woche: 6				
Contribution week 2				
Contribution week 3				
Contribution week 4				

Sequence: 8 6 2 0	**Very Desirable/Very Appropriate**	**Somewhat Desirable/Somewhat Appropriate**	**Somewhat Undesirable/Somewhat Inappropriate**	**Very Undesirable/Very Inappropriate**
Contribution week 1.				
Woche: 6				
Contribution week 2				
Contribution week 3				
Contribution week 4				

Sequence: 0 2 6 8	**Very Desirable/Very Appropriate**	**Somewhat Desirable/Somewhat Appropriate**	**Somewhat Undesirable/Somewhat Inappropriate**	**Very Undesirable/Very Inappropriate**
Contribution week 1. Woche: 6				
Contribution week 2				
Contribution week 3				
Contribution week 4				

Please make ONE mark in each ROW!

Appendix C4. Elicitation Direct

Appendix C4.1. Page 5: Additional Sheet II ID (Copy from Page 1/2)

Now you have the opportunity to earn 2 extra Euros. Therefore, answer all the questions at the bottom of this page. One of the 16 questions is chosen for evaluation. You will receive the additional EUR 2 if you match the choice made by the majority of participants in the randomly drawn row.

Background: There are two groups: group A and group B. Players from group A play the base game, which is described on page 2. Players from group B play a very similar game with 4 subjects. The following box explains the main information.

The Decision Situation of Today's Experiment (Group A)

- You play with one other subject.
- You and the other subject each receive a monetary endowment of EUR 10.
- You and the other subject each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of both subjects.
- For each EUR 1 contributed by you or the other subject to the public account, **you and the other subject** will **each** receive a payoff of EUR 0.80. Each EUR 1 contributed to the public account thus yields a payoff of 2 × 0.80 EUR = EUR 1.60 to you and the other subject in total. Each subject will receive the same share of EUR 0.80.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.
- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.80 × sum of all contributions to public account

The Decision Situation of Today's Experiment (Group B)

- You play with three other subjects.
- You and the other subjects each receive a monetary endowment of EUR 10.
- You and the other subjects each decide individually on how much of this endowment (integer values only) you wish to contribute to a public account of both subjects.
- For each EUR 1 contributed by you or the other subjects to the public account, **you and the other subject** will **each** receive a payoff of EUR 0.40. Each EUR 1 contributed to the public account thus yields a payoff of 4 × 0.40 EUR = EUR 1.60 to you and the other subjects in total. Each subject will receive the same share of EUR 0.40.
- For each EUR 1 **not** contributed to the public account, you will receive EUR 1 at the end of the experiment.

- Individual payoff for you and the other subject (in EUR) is thus calculated as follows:

10 − contribution to public account + 0.40 × sum of all contributions to public account

The following table consists of 4 different possibilities on how the other players could behave in the experiments (Group A = 2 players) or how the other players behaved on average (group B = 4 players). In the second column you find possible contributions for players of Group A and in the third column you find possible contributions for players in group B. You are asked to indicate for each possibility, what you believe a majority of your co-participants thinks of the "social desirability" of the two behaviors.

Average Contribution of Other Players	Contribution 2-Player Group (A)	Contribution 2-Player Group (B)	The Behavior of the Player from 2-Player Group Is Socially More Desirable	The Behavior of Both Players Is Equally Desirable	The Behavior of the Player from 4-Player Group Is Socially More Desirable
2 EUR	2 EUR	2 EUR			
	4 EUR	4 EUR			
	6 EUR	6 EUR			
	8 EUR	8 EUR			
4 EUR	2 EUR	2 EUR			
	4 EUR	4 EUR			
	6 EUR	6 EUR			
	8 EUR	8 EUR			
6 EUR	2 EUR	2 EUR			
	4 EUR	4 EUR			
	6 EUR	6 EUR			
	8 EUR	8 EUR			
8 EUR	2 EUR	2 EUR			
	4 EUR	4 EUR			
	6 EUR	6 EUR			
	8 EUR	8 EUR			

Please make ONE mark in each ROW!

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