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Abstract

Group tasks are often organized by a list: group members state their willingness to contribute by entering their names on a publicly visible, empty list. Alternatively, one could organize the group task by starting with a full list: every group member is already entered on the list and non-cooperators have to cross out their names. Indeed, strong behavioral differences are observed when comparing (otherwise identical) environments with empty and full lists in a laboratory experiment with repeated interaction. Cooperation in the empty list is high in early periods, but is decreasing. In the full list, cooperation starts low, but is actually increasing, surpassing cooperation in the empty list treatment in later periods. Two factors, diffusion of responsibility and unraveling of cooperation seem to drive the results.

JEL: C71, C73, C92

keywords: Cooperation; Institutions; Coordination; Framing; Experiment; Volunteer's Dilemma

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1 Introduction

Many cooperative group tasks – consider, for example the organization of an event – benefit from a high number of contributors. Often, these tasks are organized with the help of lists where people indicate their willingness to cooperate by entering their names on a publicly visible, initially empty, list. One could also think of just raising one's hand in a meeting to indicate the willingness to contribute to the common project. These situations are very common and experience suggests that the general level of cooperation in these settings is often unequal and possibly inefficient in the sense that only few people enter their names on the list and then carry the burden for the whole group.

In this paper, I discuss potential negative outcomes in the form of low and unequal levels of cooperation when lists are used to organize a cooperative group task. I then explore experimentally whether a change in how the list is framed can mitigate these problems. Instead of starting from an *empty list* and asking contributors to enter their names, I discuss the use of a *full list* where every group member is automatically entered on the list and members who are not willing to help have to cross out their name.

The full list sets a cooperative default compared to the empty list where the default is to defect.[1] Then, one key aspect of the full list is that free-riding becomes more salient. In particular, free-riding in the empty list follows from inaction while free-riding in the full list requires an active decision. Cox et al. (2017) show that negative outcomes following from an active act (commission) are perceived as more negative compared to when the same outcome follows from inaction (omission) (see also Cox et al., 2008, for an axiomatic approach.). Thus, the empty list provides plenty of opportunities for an individual to make excuses (to himself) or create narratives (Bruner, 1991; Falk and Tirole, 2016) as why she should not contribute to the event. For instance, it is easy just to 'forget' to subscribe to the list. Alternatively, one could just contemplate a bit too long until a deadline passes. This diffusion of responsibility (see, e.g., Darley et al., 1968; Darley and Latane, 1970; Fischer et al., 2011; Falk and Szech, 2017) might negatively influence cooperation in a setting with an initially empty list. Additionally, Tan et al. (2015) find higher cooperation in a public-goods game where subjects can gradually decrease contributions from a high level compared to a setting where they can gradually increase cooperation from a low level. These observations directly lead to the main hypothesis studied in this paper.

Hypothesis: *Cooperation rates are higher when using a full list compared to using an empty list.*

To test this hypothesis, I use a laboratory experiment in which I compare the two list settings in a modified Volunteer's Dilemma with cost-sharing (Diekmann, 1985; Weesie and Franzen, 1998) where full cooperation is efficient. Subjects in the experiment can

[1] Defaults have been shown to be effective, e.g., for organ donation (Johnson and Goldstein, 2003). However, organ donor lists are in general not publicly visible, in contrast to the lists I consider in this experiment. (see also Sell and Wilson, 1991, for a discussion of the effects of visibility on cooperation.)

observe at any time how many other group members are entered on the list and can decide in a limited time frame whether to enter the list or to cross out their names.

The results are surprising. In a one-shot setting and in early periods of a repeated game, cooperation in the empty list treatment is high while cooperation rates are low in the full-list treatment. However, in the empty list setting, cooperation rates are decreasing, while with a full list, cooperation rates are increasing over time surpassing cooperation rates in the empty list. Further analysis suggests that two effects drive the results. The setting in the empty list treatment gives room for diffusion of responsibility. Observing other cooperators makes subjects less likely to cooperate themselves. On the other hand, crossing ones name out of the list in the full list treatment leads to unraveling of cooperation where the other group members cross out their names as well.

2 Experimental Design

Subjects play a variant of the Volunteer's Dilemma with cost-sharing (Weesie and Franzen, 1998) in groups of four. Subjects can either cooperate or defect (instructions for subjects can be found in Appendix 4). If there is at least one cooperator, she creates a benefit of 130 ECU (experimental currency unit, exchange rate 40 ECU=1€) for all group members. Cooperators share total costs evenly and these costs are decreasing in the number of cooperators. The payoffs in ECU are given in Table 1.

Number of subjects on the list	0	1	2	3	4
Total costs	–	110	100	90	80
Payoff if on the list	–	20	80	100	110
Payoff if not on the list	0	130	130	130	–
Total payoffs	0	410	420	430	440

Table 1: Payoffs in the experimental currency unit

It is individually rational not to cooperate if at least one other group member cooperates. Total welfare is maximized when all group members cooperate.

Subjects in the experiment play a one-shot version of the game and, after a surprise restart, they play 10 periods in a repeated game setting with stranger rematching.[2] Two treatments were conducted in a between-subjects design. In the empty-list treatment (EMPTY) no subject is entered on the list and subjects have to decide if they want to put their designation on the list.[3] In the full-list treatment (FULL) all subjects are entered on the list and have to decide whether to cross out their designation from the list. The decision is binding and cannot be taken back.

In each period, subjects have 40 seconds to make their decisions. During this time, the list is updated in real time, which allows subjects to observe the decisions of other

[2]We used matching groups of 12 subjects.

[3]To preserve anonymity subjects received random designations each period ('Subject A' to 'Subject D').

group members and vice versa.[4]

To ensure that subjects understood the instructions, they had to answer control questions and could only continue with the experiment if they solved them correctly. The experiment was conducted using z-Tree (Fischbacher, 2007) and took place at the University of Bonn (BonnEconLab) in January and December 2013. In total, 192 subjects (60% female, avg. 22.4 years, mostly undergraduate students from economics, law, and natural sciences) were recruited using ORSEE (Greiner, 2004). Subjects received 2.50€ as a flat payment in addition to their earnings in ECU from the one-shot game with an exchange rate of 40 ECUs = 1€. In the second part of the experiment, one period was chosen randomly for payment. Subjects earned on average 6.78€.

3 Results

Figure 1 shows the average number of cooperators, for the one-shot game as well as the 10 periods of the repeated game.

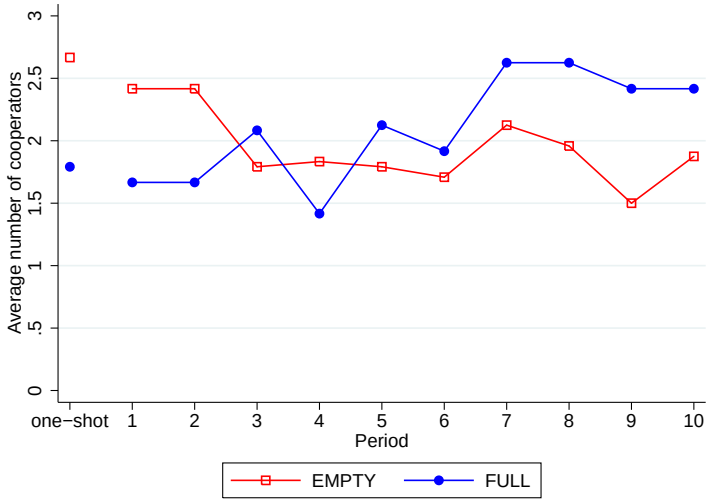

Figure 1: Average number of cooperators

In the one-shot part of the experiment, cooperation is higher in EMPTY than in FULL (EMPTY: 2.67, FULL: 1.79, rank-sum test $p = 0.0549$) leading to the first result.

Result 1: *In the one-shot part, the cooperation rate is higher in* EMPTY *compared to* FULL.

I will now turn to the repeated game. Overall there is no significant difference between average cooperation rates in EMPTY (1.94) compared to FULL (2.10, rank-sum test $p = 0.2814$) in the repeated game. However, the graph reveals an interesting dynamic. Over the course of the 10 periods, cooperation rates are increasing in FULL and decreasing in

[4]The decision time was extended by another 10 seconds every time a subject made a decision in the last 5 seconds of the decision time.

Table 2: Mixed effects logit regression estimating the propensity to cooperate.

	(1)	(2)	(3)	(4)
FULL	0.0103	0.0103	-0.245**	-0.201**
	(0.14)	(0.14)	(-3.07)	(-2.66)
Period		0.00240	-0.0196***	-0.0217***
		(0.83)	(-4.75)	(-5.37)
FULL × Period			0.0426***	0.0409***
			(7.45)	(7.27)
# other actors				-0.0824***
				(-5.17)
# other actors × FULL				-0.0485*
				(-2.26)
Observations	2112	2112	2112	2112

z statistics in parentheses

$^{+}$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Note Estimates show average marginal effects. Mixed effects logit regression with errors nested in individuals nested in matching groups. Dependent variable is the propensity to cooperate. FULL is a dummy taking "1" in the full list treatment. "# other actors" is the number of actions (cooperate in EMPTY or defect in FULL) that an individual observed either before his own action or, if she was inactive, the number of observed actions at the end of the round.

EMPTY. Using a mixed effects logit regression on the individual propensity to cooperate shows that this difference in the dynamic is significant (Column (3) in Table 2).

Result 2: *In early periods of the repeated game, cooperation is lower in* FULL *compared to* EMPTY*, but is increasing, surpassing cooperation in* EMPTY *in later periods.*

Unraveling of Cooperation and Diffusion of Responsibility

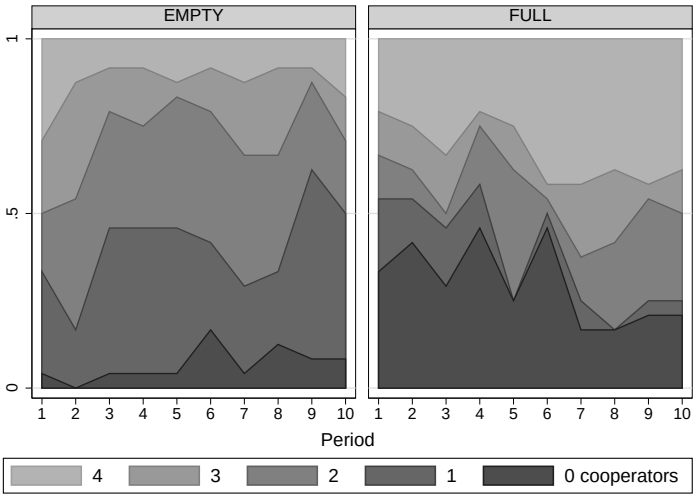

Figure 2: Distribution of the number of cooperators in all periods (repeated game).

In EMPTY, the most frequent group outcome is a single cooperator (32% of all group observations), while this is the least frequent outcome in FULL (9%). In contrast, the most frequent outcome in FULL is full cooperation, i.e., four cooperators (32%), while this occurs in only 14% of groups in EMPTY. As a direct consequence payoffs in the full list are more equal between group members.

Result 3: *The distribution of group outcomes differs between treatments, leading to more equal outcomes in the full list treatment.*

Interestingly, there is a large share of groups with no cooperators at all in FULL (30%). Recall that subjects can observe if other subjects enter the list (EMPTY) or drop out of the list (FULL). This suggests an unraveling effect. In groups where one subjects drops out of the list, it is very likely that the other subjects also drop out of the list. To test this mechanisms we include the number of other actors, i.e., the number of other defectors or cooperators observed by a subject in the regression (column (4) in Table 2). This analysis confirms the unraveling effect. Observing others drop out of the list reduces the probability to stay on the list (row 4 and row 5). This is telling since the last remaining cooperator on the list actively forgoes profits if she drops out.

Additionally, subjects in EMPTY who observe other cooperators are less likely to cooperate themselves (row 4 in column (4) of Table 2), i.e., they refrain from taking over

parts of the costs.

These two effects can explain the development of cooperation rates over time (Figure 2). In FULL, cooperation unravels after subjects drop out, leading to 0 profits for all subjects. Over time, subjects become aware of this and remain on the list, leading to more outcomes with full cooperation. In the empty list, subjects regularly encounter free-riders, which might reduce their willingness to cooperate in following periods.

4 Conclusion

The form of a list influences behavior drastically. If the list is full initially and decision makers have to cross out their names, higher cooperation rates can be obtained. Importantly, this result does not seem to be immediate, but develops over time. In the one-shot game and the early periods of the repeated game, cooperation rates are actually higher in EMPTY compared to FULL. However, cooperation rates are decreasing in EMPTY and increasing in FULL over time.

The dynamic seems to be driven by diffusion of responsibility in the empty-list treatment with more and more subjects standing aside, letting others cooperate alone leading to lower cooperation rates over time. And by direct unraveling of cooperation in the full-list treatment. Here, defecting triggers other subjects to defect as well. The last remaining cooperator hardly ever stays on the list, but prefers to defect also. Over time, this seems to lead to an increase in outcomes where all group members cooperate. At the same time, cooperation in the empty-list treatment seems to follow a typical path of relatively high cooperation in early periods but decreasing cooperation over time, with mainly a single cooperator in later periods.

The results have a clear implication for the field. They seem to confirm the anecdotal observation that the type of list that is commonly used and which is initially empty leads to low and unequal willingness to cooperate. The full list setting is a simple, nearly costless method to increase cooperation in the long term. However, the results suggest that an organizer of a task who is simply interested in finding at least one cooperator or only expects to have few occasions where she needs a list should choose an empty list. On the other hand, if the organizer is more interested in setting up a more long-term institution, the full list might lead to more equal outcomes and higher participation over time.

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Appendix

Instructions

The original instructions in German are available from the author upon request. Below is the English translation of the instructions used in treatment EMPTY. Differences in the instructions in treatment FULL are marked by square brackets "[...]".

General information for participants

You are participating in a study on economic decision-making. If you read the following explanations carefully, you can earn a substantial amount of money. It is therefore very important that you read these explanations carefully and understand them.

During the study no communication of any kind is allowed. If you have any questions, please indicate it and raise your hand. We will come to you and answer your question in private. Breaking this rule will lead to exclusion from the study and all payments.

The study consists of exactly two parts. You will now receive information for the first part. You will receive information on the second part before the start of the second part.

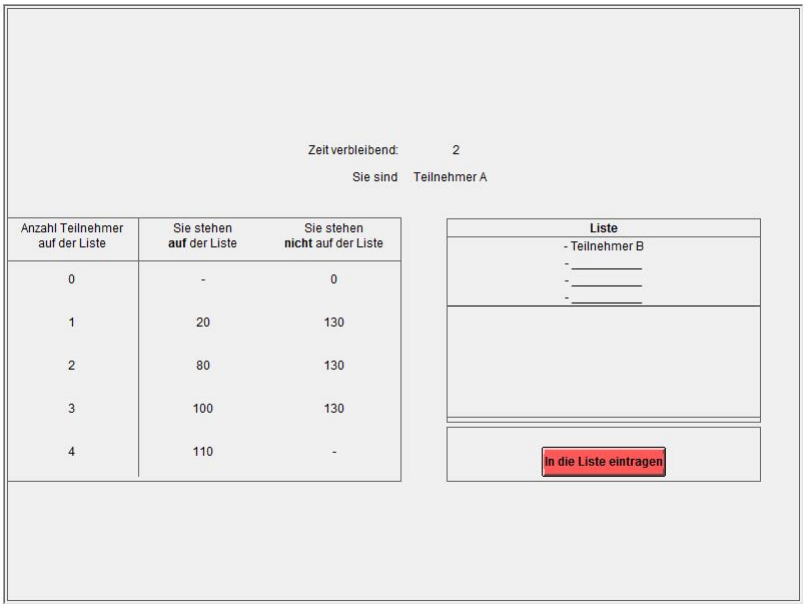
The amount of money you will earn depends on your decisions as well as the decisions of other participants. During the study we do not speak of € but of Taler, whereas in the first part: 1 €= 40 Taler.

After the study follows a short questionnaire. For the participation in this questionnaire you will receive 2.50 €.

Information about the first part of the study

In the first part, you interact with three other randomly determined participants. You and the participants in your group will be randomly designated as Participant A, B, C or D. All participants in your group have the same possible decisions.

For your group there is a list in which you and the other group members names can be entered. *At the beginning, no subject has entered his name on the list.* You have to decide whether to put your designation on the list. [*At the beginning, all subjects are entered on the list.* You have to decide whether to remove your designation from the list.] The decision is binding and cannot be taken back. You have 40 seconds for your decision. During this time every group member can see the list at any time. As soon as one group member decides to put his designation on the list, his name (Participant A, B, C or D) appears on the list; i.e. during the 40 seconds one can observe whether a participant has put his name on the list. [As soon as one group member decides to remove his designation from the list, his name (Participant A, B, C or D) disappears from the list; i.e. during the 40 seconds one can observe whether a participant has removed his name from the list.]



You make your decision by pressing the button "Put on the list" ["Remove from the list"]. *If you do not make any decision within the 40 seconds, you are not [you are] on the list.*

Please note: Should any decision be made in the last 5 seconds before the end of the decisiontime, the decisiontime will be extended by 10 seconds. This also holds when the decisiontime was extended before.

Your payment depends on your decision and on the decision of the other participants of your group. The payment is determined by the number of participants on the list **after the end of the decisiontime**.

If no participant is entered on the list, each group member receives **0 Taler**. If at least one participant is entered on the list, each group member gets **130 Taler**. Participants, which are entered on the list, have to carry costs which are deducted of the 130 Taler. How high these costs are depends on the number of participants entered on the list:

Number of participants on the list	1	2	3	4
Costs for each participant on the list	110	50	30	20
Total costs	110	100	90	80

Therefore, the payment for the participants is calculated as follows:

- If **no one** is entered on the list, every group member receives **0 Taler**.
- If **one** participant is entered on the list, he receives 130-110=**20 Taler** and the other group members receive **130 Taler**.
- If **two** participants are entered on the list, they receive 130-50=**80 Taler** and the other group members receive **130 Taler**.
- If **three** participants are entered on the list, they receive 130-30=**100 Taler** and the other group member receives **130 Taler**.
- If all **four** participants are entered on the list, they each receive 130-20=**110 Taler**.

Following the first part you will receive information for the next part. Do you have any questions? If yes, please indicate this by raising your hand.

[The instructions for the second part were shown on the computer screen and stated simply that the same setting will be played in 10 repeated rounds with stranger-matching. It was also stated that one period would be randomly selected for payment.]