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De-biasing the Measurement of Conditional Cooperation

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Abstract

Fischbacher, Gächter and Fehr (2001) let subjects condition their contributions in a linear public goods game on the average contribution of their groupmates using the strategy method. About half of their subjects exhibit "conditional cooperation" (CC) in that they contribute more the more the groupmates are assumed to contribute. This finding has been extensively replicated. However, recent studies have found large fractions of conditional cooperators (CCs) even in placebo settings in which we would not expect to see any CC, suggesting that the measure of CC is upwardly-biased. We investigate whether mitigating subject confusion and experimenter demand can eliminate or at least reduce the bias. We introduce several design features to mitigate confusion. To mitigate experimenter demand, we provide participants with "exit options" that allow them to avoid conditioning their contributions on those of their groupmates. We evaluate the extent of the bias by the proportion of subjects classified as CCs in a mirror placebo setting involving a meaningless conditioning variable. When we mitigate confusion but not experimenter demand, more than a quarter of subjects end up classified as CCs in the placebo mirror. When we also mitigate experimenter demand, this proportion drops to a level indistinguishable from random behavior. In a standard setting, mitigating experimenter demand reduces the proportion of CCs by almost 40 percent. We therefore conclude that CC should be measured in the presence of the exit options in order to mitigate experimenter demand.

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1 Introduction

Many individuals cooperate in social dilemmas. For example, individuals often contribute to public goods even though such act is costly to themselves (Chen 2008; Chaudhuri 2011). Moreover, in their seminal experiment, Fischbacher, Gachter and Fehr (2001) (henceforth FGF) document that individuals tend to cooperate more when others do the same. Their approach uses a linear public good game with four players. After contributing unconditionally, the players also decide, using the strategy method, on their contributions conditional on the average unconditional contribution of the other three groupmates. FGF find that about half of the participants are *conditional cooperators* (henceforth CCs) in that their conditional contribution increases with the average unconditional contributions of the groupmates. This finding has been widely replicated in later studies (Thöni and Volk 2018).

What economic fundamentals could motivate *conditional cooperation* (henceforth CC)? Katuščák and Miklánek (2023) catalogue several potential explanations. CC could be driven by reciprocity to perceived intentions behind others' contributions (Rabin 1993; Dufwenberg and Kirchsteiger 2004; Falk and Fischbacher 2006) or their inferred "type" (Levine 1998; Rotemberg 2008; Gul and Pesendorfer 2016), conformity with others' contributions either due to a perceived social norm (Axelrod 1986; Bernheim 1994; Fehr and Fischbacher 2004) or due to an information-cascade-like behavior (Bikhchandani, Hirshleifer and Welch 1998), or aversion to advantageous payoff inequality (Fehr and Schmidt 1999; Bolton and Ockenfels 2000).

However, disturbingly, CC has also been found in studies in which none of these explanations apply. Using one approach, Ferraro and Vossler (2010), Burton-Chellew, El Mouden and West (2016) and Wang, Li, Wang, Niu and Wang (2024) document CC even when human players interact with computerized players that do not collect any payoffs.[1] Using another approach, Katuščák and Miklánek (2023) document that many subjects are classified as CCs even when the conditioning variable is meaningless. These findings suggest that factors such as confusion (Andreoni 1995; Houser and

[1] Wang et al. (2024) show that when subjects are properly trained through quiz questions with *ex post* provided correct answers (in contrast to Burton-Chellew et al. (2016)), the fraction of subjects classified as conditional cooperators drops significantly, but nevertheless remains substantial (15-25%).

Kurzban 2002; Cappelletti et al. 2011) and experimenter demand (Zizzo 2010) might play a role in the measurement of CC based on the FGF design. Because of these confounding factors, the FGF measure of CC appears to be upward-biased.

We investigate whether mitigating subject confusion and experimenter demand can eliminate or at least reduce the bias. We mitigate confusion through several measures. First, we reduce the number of group members from four to two. As a result, conditioning is based on the actual contribution of the one groupmate. In contrast, with four group members, the conditioning variable is the average unconditional contribution of the three groupmates, which conceals three potentially different individual contributions and opens a wide array of possible beliefs about these contributions given the value of the average. Second, we provide subjects with an explicit payoff matrix specifying the payoff to oneself and to the groupmate given any possible contribution combination of the two group members. Third, we use a pen and paper approach which, we believe, simplifies the understanding of the setup and makes the matching procedure and the meaning of the conditioning variable more illustrative. Fourth, we implement a comprehension quiz, which is individually reviewed by the experimenters, with further explanation provided to subjects in case of incorrect answers.

We mitigate experimenter demand by giving subjects, along with the usual option to specify their conditional contributions, also two "exit options" to contribute unconditionally: to contribute a specified fixed amount or to contribute a random amount from a specified interval. Hence subjects can condition their contribution on that of the groupmate if they wish to do so, but are also provided with simple ways to avoid this conditioning. The first exit option does not increase the choice set beyond what is feasible via specifying conditional contributions since a fixed unconditional contribution can always be specified via conditional contributions. The second exit option does increase the choice set, but, arguably, in a minimal way. On the other hand, the presence of the two exit options allows subjects to avoid conditioning their contributions and, hence, to also avoid providing an input that they might think the experimenter expects (such as an increasing profile of conditional contributions).

Following Katuščák and Miklánek (2023), we evaluate the extent of the potential upward bias in the FGF-based measure of CC by the proportion of subjects who are categorized as CCs in a mirror placebo setting that is identical to the original environment with the exception that the realization of the conditioning variable is determined by an independent random draw that is completely uninformative about the contribution of the groupmate. If subjects decided on their conditional contributions randomly with the uniform distribution, on average 5.4% of them would spuriously be classified as

CCs. Hence, if the proportion of subjects classified as CCs in the mirror placebo setting is below this threshold, we consider the bias to be absent. On the other hand, if it is higher, we consider the bias to be present.

We find that mitigating confusion alone does not eliminate CC in a placebo mirror of the standard conditional contribution setting. Despite all the clarifying measures, 28.6% of subjects are classified as CCs using the classification algorithm of Thöni and Volk (2018) in this placebo mirror. When we also mitigate experimenter demand by provision of the exit options, the proportion of CCs in the placebo mirror drops by 24 percentge points to 4.6%, indistinguishable from random behavior. This exit-option-induced drop in the proportion of CCs translates also into the standard conditional contribution setting. In that setting, 65% of subjects are classified as CCs when mitigating confusion alone. However, when we also mitigate experimenter demand, the proportion of CCs drops by 25.3 percentage points to 39.7%. Based on these findings, we conclude that CC should be measured in the presence of the exit options in order to mitigate experimenter demand.

The rest of the paper is organized as follows. Section 2 outlines our experimental design. Section 3 discusses our findings. Finally, Section 4 discusses interpretation of the findings and concludes.

2 Experimental design

Subjects play a linear public good game in groups of two. Each subject independently decides how many of their 10-token endowment they contribute to a "group project." Tokens not contributed to the group project are automatically put into a "private account." Each token in the private account generates a payoff of 20 CZK (Czech korunas, about 0.8 €) to the subject. Each token contributed to the group project generates a payoff of 15 CZK (0.6 €) to each group member. If the contribution of group member i ($\{-i\}$) to the group project is denoted by g_i (g_{-i}), the payoff of subject i is therefore $\pi_i = 20(10 - g_i) + 15 \times (g_i + g_{-i})$ CZK.

The experiment comprises two decision-making scenarios. Scenario 1 is an unconditional contribution scenario, which remains identical across all treatments. Scenario 2 is a conditional contribution scenario which differs across treatments (see below). In this scenario, within their group, subjects can end up in two roles labelled as "Member 1" and "Member 2". The actual role of each subject is based on a coin flip performed at the end of the experiment. Member 1's contribution in Scenario 2

equals their unconditional contribution in Scenario 1. On the other hand, Member 2's contribution is determined by their decision in Scenario 2. We elicit contribution decisions from each subject for the case they are selected to be Member 2. In all treatments, subjects can contribute to the group project based on the value of a conditioning variable called N. The meaning of this variable varies across treatments as described later. The underlying public good game remains the same as in Scenario 1. Subjects are informed that they will all be paid based on their earnings in one and only one of the two scenarios. The relevant scenario for payoff determination is drawn at the end of the experiment.

2.1 Procedure and logistics

The entire experiment is conducted in a "pen and paper" format instead of a more usual computerized format. In Scenario 2, we replace the "contribution table" of FGF with individual "contribution tickets" for eliciting subjects' contributions (see below). We implement these features with the aim to aid understanding of the setup and to make the matching procedure into groups, the meaning of the conditioning variable and the computation of payoffs more transparent.

At the beginning of the session, each subject receives a plastic box containing a one-page printout of the General Instructions (see Appendix A), two envelopes for submitting their decisions, one for each scenario, a pen, and their subject number. The General Instructions provide an overview of the experiment, information about participant matching, and an explicit statement that no feedback regarding any decisions or earnings will be provided until the end of the experiment. Following this, we publicly demonstrate the functioning of a random pairing device for the purpose of group formation using an Excel sheet projected on a screen. We generate the actual matching, which remains valid for the rest of the experiment, after several trial draws and subsequent anonymization of subject numbers on the screen. Following this, we distribute printed instructions and a quiz for Scenario 1, along with an earnings table. The table displays all potential combinations of contributions by both group members and the corresponding payoffs in CZK to each of them (see Appendix A). We monitor quiz answers for each subject and provide additional clarification in the case of incorrect answers or further questions. Once all subjects complete the quiz questions, we distribute decision tickets for Scenario 1 (see Appendix A). Subjects are instructed to fill out their unconditional contribution and place the ticket in the envelope designated by their subject number. We then collect the envelopes and Scenario 2 begins.

The procedure for Scenario 2 is similar to that of Scenario 1. We distribute printed instructions along with a quiz for Scenario 2 (see Appendix A). The earnings table is common for both scenarios, allowing subjects to refer to it as needed. Like in Scenario 1, we monitor quiz answers and provide additional clarification as needed. We then distribute decision tickets for Scenario 2 (see Appendix A). The composition of these tickets varies across treatments (see below). Filled-out decision tickets are collected in envelopes designated by the subjects' numbers.

Using a PowerPoint presentation and public coin flips, we determine: i) which scenario is payoff-relevant and ii) if Scenario 2 is payoff-relevant, we determine who the unconditional and conditional contributors are in each pair (left or right column in the matching spreadsheet). Following this, we distribute a demographic questionnaire. Meanwhile, we open the decision envelopes and calculate the payoffs. Experimental earnings are privately paid to subjects in cash at the end of the experiment.

2.2 Treatments

Scenario 1 is identical across all treatments. In Scenario 2, we use a 2×2 between-subject factorial design. Along the first dimension, we vary the meaning of the conditioning variable N. In the *Human* condition, N is equal to Member 1's contribution (which is given by the Member 1's Scenario 1 contribution). There are 11 potential realizations of N, ranging from 0 to 10 in integer amounts. To determine their contribution in the event that they are Member 2, each participant is requested to fill out 11 conditional contribution tickets, each for a different potential value of N. In the *Random* condition, N is equal to an integer independently drawn from the uniform distribution on $\{0, ..., 10\}$. To determine their contribution in the event that they are Member 2, each participant is asked to fill out 11 conditional contribution tickets, each for a different potential value of N. The *Random* condition is a placebo mirror of the *Human* condition in which the meaningful conditioning variable is replaced my a meaningless one, with other features of the economic environment being preserved.

Along the second dimension, we vary the set of options how to contribute in Scenario 2. In the *No Exit* condition, the only option is to fill out the 11 contribution tickets as described in the previous paragraph. This is analogous to the FGF design. In the *Exit* condition, each subject has three options for contributing, labeled as "Option 1", "Option 2", and "Option 3". Option 1 is identical to the *No Exit* condition. Option 2 allows a subject to contribute a fixed amount regardless of the value of N by stating this fixed contribution on a corresponding contribution ticket. Option 3 permits a subject

Table 1: Treatments

		Meaning of the conditioning variable N	
		Member 1's contribution *(Human)*	Randomly drawn number *(Random)*
Set of contribution options	Conditional on N *(No Exit)*	*Human - No Exit* (60 subjects)	*Random - No Exit* (70 subjects)
	Conditional on N Fixed Random *(Exit)*	*Human - Exit* (63 subjects)	*Random - Exit* (66 subjects)

to randomize their contribution by specifying the lower and upper boundaries for the randomization on a corresponding contribution ticket.[2] Each participant is asked to choose only one of these three options, fill out the corresponding contribution ticket(s), and place it (them) into an envelope.

Table 1 presents an overview the experimental design and lists labels for the four resulting treatments. Note that we mitigate confusion in all four treatments by using groups of two, presenting an earnings table, quizzing subjects on understanding of the game and using a paper-and-pencil approach for data collection. However, in the two *No Exit* treatments, subjects need to provide conditional contributions for each value of N, and are hence not free from a potential experimenter demand effect to provide an increasing pattern of conditional contributions. To the contrary, in the two *Exit* treatments, subjects can avoid such demand by taking one of the two exit options (Options 2 and 3). Hence we mitigate the experimenter demand in these two treatments.

2.3 Subjects

We collect data from 264 subjects in 16 experimental sessions. However, we exclude 5 subjects from the dataset due to invalid decisions.[3] Therefore, the final dataset we use for analysis contains decisions from 259 subjects. Due to variation in experiment registration and show-up rates, the number of subjects per treatment ranges between 60 and 70 (see Table 1). All the sessions were conducted on the premises of the Prague University of Economics and Business in September and October 2023, taking

[2] If the lower boundary is not specified, it is automatically set to 0; if the upper boundary is not specified, it is automatically set to 10.

[3] (Some) contributions of these five subjects either exceed the range of 0 to 10 tokens or involve completion of decision tickets for multiple options in the *Exit* condition. Online appendix describes how we calculate payoffs in groups where these invalid decisions are deemed relevant.

Table 2: Subject type classification in Scenario 2

	Human No Exit	*Human Exit*	*Random No Exit*	*Random Exit*
Conditional cooperator	**65.0**	**39.7**	**28.6**	**4.6**
Free-rider	20.0	36.5	24.3	36.4
Unconditional cooperator	1.7	19.0	11.4	53.0
Triangle cooperator	8.3	1.6	10.0	3.0
Other type	5.0	3.2	25.7	3.0

Notes: Stata plugin *cctype* used for the classification (Thöni and Volk 2018).

place in lecture halls large enough to ensure sufficient privacy space between subjects. Subjects were recruited through the Online Recruitment System for Economic Experiments (Greiner 2015) from the subject database of the Laboratory of Experimental Economics at the same university. Our subjects primarily consist of students from the Prague University of Economics and Business, with over 71% reporting "Economics or Business" as their main field of study. We have an almost equally balanced gender ratio, with 47% of participants being female and 52% being male. The mean cash payoff is 243 CZK (median of 240 CZK) for approximately 1 hour of participation.[4]

3 Results

In Scenario 1, the mean (median) unconditional contribution across all four treatments is 4.68 (5) out of 10 tokens. This finding is consistent with the existing literature (e.g., Ledyard 1995; Kagel and Roth 2020).

Table 2 presents a classification of subjects into various conditional contribution types by treatment following the methodology initially introduced by FGF and subsequently refined by Thöni and Volk (2018). In the *Human-No-Exit* treatment, which is analogous to the typical way in which the FGF method is performed, 65.0% of subjects are classified as CCs, 20.0% as free-riders, 1.7% as unconditional cooperators, 8.3% as "triangular cooperators", and 5.0% as other types. The proportion of CCs is higher than in FGF and many of its replications (where it usually oscillates around 50%, see Thöni and Volk (2018)). This might be attributed to a relatively high marginal per capita return of 0.75 that we use in comparison to 0.4 typically used in the literature.

As mentioned in Section 1, we gauge the extent of the potential upward bias in the proportion of CCs

[4]For comparison, the hourly wage that students could earn at the time of the experiment in research assistant or manual jobs was typically around 150 CZK.

Table 3: Share of subjects choosing each contribution option (in %) in the *Exit* treatments in Scenario 2

Contribution option in Scenario 2	Treatment	
	Human Exit	*Random Exit*
Option 1: Conditional contribution	57.2	13.6
Option 2: Fixed contribution	34.9	62.1
Option 3: Random contribution	7.9	24.3

in the *Human-No-Exit* treatment by the proportion of subjects classified as CCs in the placebo mirror given by the *Random-No-Exit* treatment. Table 2 shows that, in this treatment, 28.6% of subjects are classified as CCs, even though the conditioning variable is meaningless. We interpret this finding to mean that a significant portion (perhaps as many as 28.6 percentage points) of the 65% of CCs in the *Human-No-Exit* treatment might exhibit CC not as an intended behaviour but rather as an artifact of the experimental design. This shows that mitigating confusion alone is not sufficient in eliminating spurious CC and the resulting upward bias in its measurement.

Along with mitigating confusion, the two *Exit* treatments mitigate the suspected experimenter demand as well by giving subjects a "way out" of having to specify conditional contributions. Table 3 displays the distribution of utilization of the three decision options in these two treatments. In the *Human-Exit* treatment, 57.2% of subjects choose Option 1 (conditional contributions), whereas 34.9% of subjects choose Option 2 (fixed contribution) and 7.9% choose Option 3 (random contribution). That is, 42.8% of subjects explicitly choose not to condition their Member 2 contribution on that of Member 1. Note that this is a larger proportion of subjects than the proportion of those classified as non-CCs in the *Human-No-Exit* treatment (35.0%). This is another piece of evidence suggesting that forcing subjects into explicit conditioning might artificially increase the share of subjects classified as CCs.

In contrast, in the *Random-Exit* treatment, only 13.6% of subjects choose Option 1 (conditional contribution), whereas 62.1% choose Option 2 (fixed contribution) and 24.3% choose Option 3 (random contribution). That is, 86.4% of subjects explicitly choose not to condition their Member 2 contribution on a meaningless conditioning variable. Note that this is a larger proportion of subjects than the proportion of those classified as non-CCs in the *Random-No-Exit* treatment (71.4%). Again, this is evidence that forcing subjects into explicit conditioning might artificially increase the share of subjects classified as CCs, even with a meaningless conditioning variable.

In order to obtain the classification into conditional contribution types for the two *Exit* treatments,

we use the procedure of Thöni and Volk (2018) to classify subjects who choose Option 1. We classify subjects who choose Option 2 as unconditional cooperators if their fixed contribution is positive and as free-riders if their fixed contribution is 0. We classify subjects who choose Option 3 as unconditional cooperators if the upper randomization boundary for their contribution is positive and as free-riders if this boundary is 0 (the latter never happens in our data). Table 2 displays the resulting type distributions. In the *Human-Exit* treatment, 39.7% of subjects are classified as CCs, 36.5% as free-riders, 19.0% as unconditional cooperators, 1.6% as "triangular cooperators" and 3.2% as other types. In the *Random-Exit* treatment, 4.6% of subjects are classified as CCs, which is statistically indistinguishable from the amount of CC resulting from randomly generated data.[5]

Comparing these findings with type classigications for the two *No Exit* treatments, notice a dramatic drop of 25.3 percentage points (z-test $p = 0.005$) in the proportion of CCs in comparison to the *Human-No-Exit* treatment and an analogous drop of 24.0 percentage points (z-test $p < 0.001$) in the proportion of CCs in comparison to the *Random-No-Exit* treatment. The fact that this drop is obtained in both the *Human* and *Random* condition and is of about the same size in percentage points signifies that providing the two exit options effectively mitigates the experimenter demand that overinflates the traditional measure of CC. In addition, the combination of our confusion and experimenter demand mitigation measures arguably eliminates the entire bias in the measurement of CC in our setting.

4 Discussion and Conclusion

We revisit the established experimental method of FGF used to measure the extent of conditional cooperation (CC) in public good games. While this method has been widely adopted and its results replicated, emerging evidence (Ferraro and Vossler 2010; Burton-Chellew et al. 2016; Katuščák and Miklánek 2023; Wang et al. 2024) suggests that it might overstate the true prevalence of CC due to methodological artifacts such as confusion and experimenter demand. Our study addresses these concerns by introducing a novel experimental design that mitigates confusion and, in some treatments, also experimenter demand. We mitigate potential confusion by using groups with two participants, providing explicit information on monetary earnings for any vector of groupmate contributions,

[5]For the purpose of generating random data, we assign each contribution for every potential value of the conditioning variable a randomly and independently generated value between 0 and 10, with all values being equally likely. The mean share of conditional cooperation patterns, with the same number of subjects (259) and 1,000 repetitions, is 0.054 (SD = 0.014). Testing for the equality of the actual proportion of CCs in the *Random-Exit* treatment and the simulated proportion using a z-test results in a p-value of 0.759.

quizzing subjects on their understanding of the economic environment and using a paper-and-pencil data collection method. We mitigate experimenter demand by offering subjects "exit options" from the need to explicitly condition their contributions on those of their groupmates. We evaluate the extent to which these measures are successful in reducing or eliminating spurious CC by the proportion of subjects classified as CCs in a mirror placebo setting involving a meaningless conditioning variable.

We find that mitigating confusion but not experimenter demand results in a large amount of spurious CC. More than a quarter of subjects are classified as CCs in the mirror placebo setting. When we also mitigate experimenter demand, the proportion of subjects classified as CCs in the resulting mirror placebo setting drops to a level indistinguishable from random behavior. We therefore conclude that CC should be measured in the presence of the exit options in order to mitigate experimenter demand. Such methodological modification has a dramatic effect on the proportion of subjects classified as CCs in the standard (non-placebo) setting too. It reduces the measured proportion of CCs by over 25 percentage points from 65.0% to 39.7%, or almost 40 percent.

Unlike some of the literature critiquing the FGF method that claims that CC is entirely an experimental artifact (Burton-Chellew et al. 2016), we find that CC is a robust feature of human behaviour. In this respect, our findings align with those of FGF and its replications. However, our findings do suggest that substantial portion of CC as measured by the FGF method might be attributed to the structure of the experimental task rather than to social preferences typically invoked to explain such behavior. Our work implies that the spurious part of CC can be eliminated, or at least substantially reduced, by mitigating confusion and experimenter demand. In particular, we demonstrate that providing subjects with "exit options" that allow them to avoid explicit conditioning on contributions of their groupmate(s) is a very effective tool to counteract experimenter demand and, hence, to eliminate or at least reduce the upward bias in the traditional measure of CC.

A potential criticism of our conclusions is that the lower share of CCs in the *Exit* treatments in comparison to the *No Exit* treatments could simply be driven by the availability of additional contribution options that are less time- and cognitively-demanding than the baseline option. Simply put, filling out one contribution ticket takes less time and cognitive effort than filling out 11 contribution tickets. Also, it might be easier to understand earnings implications of a fixed or a random contribution in comparison to a set of conditional contributions. While we acknowledge this criticism, we note that at least the time cost is negligible given that the opportunity cost of time during an experimental ses-

sion is virtually zero. More importantly, if the preference for conditional cooperation is so weak that it is easily overridden by the presence of simpler contribution options, it becomes hard to interpret conditional cooperation displayed in the standard "no exit" frame as a robust or meaningful conscious preference for being conditionally cooperative.

Our findings underscore the importance of mitigating experimenter demand in measuring conditional cooperation, demonstrating that the inclusion of exit options significantly reduces spurious classifications. By offering a methodological refinement, this approach improves the precision of experimental research on social preferences and should be adopted in future studies.

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A Appendix: Instructions

GENERAL INSTRUCTIONS

OUTLINE OF THE EXPERIMENT

- The experiment consists of the following **parts**:

  1. **General Instructions**.
  2. **Two decision scenarios**. Instructions for these scenarios will be distributed later. In each scenario, after going through the instructions at your own pace, you will be asked to answer a few quiz questions. We will check your responses and correct and clarify any incorrect responses. After that, you will make your decisions.
  3. A **questionnaire**, in which you will be asked a few questions about your demographic and academic background.
  4. **Payment** of your earnings.

LOGISTICS

- Your box contains two envelopes labelled "Scenario 1" and "Scenario 2". These envelopes will be used for submitting your decisions. Please do not manipulate with them until instructed to do so.
- During the experiment, **please do not communicate with other participants**. Please **turn off the ringer on your mobile phone** at this moment. If you have a question during the experiment, please raise your hand and an experimenter will assist you.
- There are no time restrictions for making your decisions during the experiment. You are free to progress at your own pace as you see fit. However, if progressing slowly, you may be asked by an experimenter to make your decision(s) more quickly. Note that you might at times need to wait until other participants make their decisions.
- Your earnings and earnings of the other participants in this experiment are expressed in **Czech korunas (CZK)**.
- Individual decisions and earnings will be kept confidential.
- Your participation is voluntary, and you can withdraw from the experiment at any time. However, please note that you will only receive your earnings if you complete all the parts of the experiment.
- You will not be given any feedback about your earnings in Scenario 1 at the end of Scenario 1. You will learn your earnings at the end of the experiment.

PARTICIPANT MATCHING, SCENARIOS AND PAYMENT SCHEME

- Throughout the experiment, you will be **matched to one other participant**. With this participant, you will form **a group of two participants**. This group will remain fixed throughout both scenarios. Who the other member of your group is will be determined by a random draw at the beginning of the experiment. Nobody will be informed about the number or identity of his/her matched participant.
- You and every other participant will be paid their earnings **in one and only one of the two scenarios**. Which scenario it is will be determined by a random draw at the end of the experiment.

INSTRUCTIONS FOR SCENARIO 1

SETUP

- You are in a group of **2 participants**. You and the other group member each start with 10 tokens. You can contribute any amount of these 10 tokens to a **group project**. Each token you do not contribute to the group project is automatically put into your **private account**. The other group member makes an analogous decision between the group project and his/her own private account.

YOUR EARNINGS FROM YOUR PRIVATE ACCOUNT

- **You earn 20 CZK for each token put into your private account.**

YOUR EARNINGS FROM THE GROUP PROJECT

- **You and the other group member earn equally from the sum of the two contributions to the group project** as follows:

  Earnings from the group project in CZK *= 15 × sum of the contributions to the group project*

- If, for example, the sum of contributions is 16 tokens, then each of you earns 15×16 = 240 CZK from the group project. If the sum of contributions is 4 tokens, then each of you earns 15×4 = 60 CZK from the group project.

YOUR TOTAL EARNINGS

- Your total earnings from Scenario 1 are given by the **sum of your earnings from your private account and your earnings from the group project.**

EARNINGS OF THE OTHER GROUP MEMBER

- Earnings of the other group member from Scenario 1 are computed in an analogous way based on his/her own private account and the sum of contributions to the group project.

EARNINGS TABLE

- An "**Earnings Table**" that you were given together with these instructions lists each group member's total earnings from Scenario 1 depending on how much you and the other group member contribute to the group project.

OTHER THINGS TO KNOW

- The numbers used in the examples above have been selected **for illustration only**. They do not indicate how anyone decides or should decide.
- When deciding on your contribution, you do not know the contribution of the other group member.
- There will be **no feedback** about anyone's decisions or earnings at the end of Scenario 1.
- Instructions for **Scenario 2** will be distributed after Scenario 1 is completed.

Please turn the sheet around.

Now **please answer the quiz questions** on the sheet given to you together with these instructions. After you answer the questions and have your answers checked by an experimenter, come back to these instructions.

Once everyone's quiz questions have been checked, you will be given a decision ticket for Scenario 1.

Write down the number of tokens you want to contribute to the group project on the ticket. Then put the ticket into the envelope labeled "Scenario 1". (Don't seal it)

Any number you write down must be a whole number (no decimals or fractions) between 0 and 10.

Please wait until an experimenter collects the envelopes with participants' decisions. We will then continue with instructions for Scenario 2.

EARNINGS TABLE (in CZK)

Your and the *other group member's* earnings for each combination of **your** and the *other group member's* contributions to the group project.

Contribution of the other group member to the group project

Your contribution to the group project	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
0	**200** , *200*	**215** , *195*	**230** , *190*	**245** , *185*	**260** , *180*	**275** , *175*	**290** , *170*	**305** , *165*	**320** , *160*	**335** , *155*	**350** , *150*
1	**195** , *215*	**210** , *210*	**225** , *205*	**240** , *200*	**255** , *195*	**270** , *190*	**285** , *185*	**300** , *180*	**315** , *175*	**330** , *170*	**345** , *165*
2	**190** , *230*	**205** , *225*	**220** , *220*	**235** , *215*	**250** , *210*	**265** , *205*	**280** , *200*	**295** , *195*	**310** , *190*	**325** , *185*	**340** , *180*
3	**185** , *245*	**200** , *240*	**215** , *235*	**230** , *230*	**245** , *225*	**260** , *220*	**275** , *215*	**290** , *210*	**305** , *205*	**320** , *200*	**335** , *195*
4	**180** , *260*	**195** , *255*	**210** , *250*	**225** , *245*	**240** , *240*	**255** , *235*	**270** , *230*	**285** , *225*	**300** , *220*	**315** , *215*	**330** , *210*
5	**175** , *275*	**190** , *270*	**205** , *265*	**220** , *260*	**235** , *255*	**250** , *250*	**265** , *245*	**280** , *240*	**295** , *235*	**310** , *230*	**325** , *225*
6	**170** , *290*	**185** , *285*	**200** , *280*	**215** , *275*	**230** , *270*	**245** , *265*	**260** , *260*	**275** , *255*	**290** , *250*	**305** , *245*	**320** , *240*
7	**165** , *305*	**180** , *300*	**195** , *295*	**210** , *290*	**225** , *285*	**240** , *280*	**255** , *275*	**270** , *270*	**285** , *265*	**300** , *260*	**315** , *255*
8	**160** , *320*	**175** , *315*	**190** , *310*	**205** , *305*	**220** , *300*	**235** , *295*	**250** , *290*	**265** , *285*	**280** , *280*	**295** , *275*	**310** , *270*
9	**155** , *335*	**170** , *330*	**185** , *325*	**200** , *320*	**215** , *315*	**230** , *310*	**245** , *305*	**260** , *300*	**275** , *295*	**290** , *290*	**305** , *285*
10	**150** , *350*	**165** , *345*	**180** , *340*	**195** , *335*	**210** , *330*	**225** , *325*	**240** , *320*	**255** , *315*	**270** , *310*	**285** , *305*	**300** , *300*

”Human - No Exit” Scenario 2 instructions

INSTRUCTIONS FOR SCENARIO 2

- Scenario 2 is similar to Scenario 1 with the exception of how contributions of the two group members to the group project are determined.
- Based on a coin flip performed at the end of the experiment, one of the two group members will be selected as **Member 1**, while the other one will be selected as **Member 2**.
- The contribution of **Member 1** in Scenario 2 is equal to his/her contribution in Scenario 1.
- **Member 2** decides on his/her contribution in Scenario 2 conditionally on the contribution of Member 1 as described below.
- At the time of making decisions, none of the group members knows the decisions of the other group member in Scenario 1 or Scenario 2 or whether he/she is Member 1 or Member 2.
- Please decide on your contribution **for the case you are Member 2** by using **11 decision tickets** that will be given to you after the instruction stage.
- On each ticket, write down **how many tokens you want to contribute conditionally on Member 1 contributing N tokens**, where the value of N is specified on each ticket. For example, on the ticket with “N = 8”, write down how many tokens you want to contribute conditionally on Member 1 contributing 8 tokens. Or, on the ticket with “N = 4”, write down how many tokens you want to contribute conditionally on Member 1 contributing 4 tokens. **Fill out all 11 tickets!** Your actual contribution is then given by the number you wrote on the ticket on which the value of N is equal to the number of tokens contributed by Member 1.
- Your decisions will be used to determine your contribution and earnings of both group members in Scenario 2 if the coin flip determines you are **Member 2**. If the coin flip determines you are **Member 1**, your decisions in Scenario 2 will not be used.
- Given the contributions of the two Members, their earnings are then calculated in the same way as in Scenario 1 (you can refer to the **Earnings Table** you were given in Scenario 1).

Please turn the sheet around.

”Human - No Exit” Scenario 2 instructions

Now **please answer the quiz questions** on the sheet given to you together with these instructions. After you answer the questions and have your answers checked by an experimenter, come back to these instructions.

Once everyone’s quiz questions have been checked, you will be given decision tickets for Scenario 2.

On each ticket, **for the case you are Member 2**, write down the number of tokens you want to contribute to the group project conditionally on Member 1 contributing N tokens. **Please fill out all 11 tickets.** Then put all 11 tickets into the envelope labeled “Scenario 2”. (Don’t seal it)

Any number you write down must be a whole number (no decimals or fractions) between 0 and 10.

Please wait until an experimenter collects the envelopes with participants’ decisions. We will then continue with the Demographic Questionnaire.

”Human - Exit” Scenario 2 instructions

INSTRUCTIONS FOR SCENARIO 2

- Scenario 2 is similar to Scenario 1 with the exception of how contributions of the two group members to the group project are determined.
- Based on a coin flip performed at the end of the experiment, one of the two group members will be selected as **Member 1**, while the other one will be selected as **Member 2**.
- The contribution of **Member 1** in Scenario 2 is equal to his/her contribution in Scenario 1.
- **Member 2** decides on his/her contribution in Scenario 2. He/she has three options how to contribute:

  Option 1: make his/her contribution conditional on the contribution of Member 1

  Option 2: contribute a fixed amount regardless of the contribution of Member 1

  Option 3: let the computer choose his/her contribution randomly from a pre-specified range
- At the time of making decisions, none of the group members knows the decisions of the other group member in Scenario 1 or Scenario 2 or whether he/she is Member 1 or Member 2.
- Please decide on your contribution **for the case you are Member 2** by using the **decision tickets** that will be given to you after the instruction stage.
- **Option 1**: Use **11 tickets** titled “**My conditional contribution when N = …**”. On each ticket, write down **how many tokens you want to contribute conditionally on Member 1 contributing N tokens**, where the value of N is specified on each ticket. For example, on the ticket with “N = 8”, write down how many tokens you want to contribute conditionally on Member 1 contributing 8 tokens. Or, on the ticket with “N = 4”, write down how many tokens you want to contribute conditionally on Member 1 contributing 4 tokens. **Fill out all 11 tickets!** Your actual contribution is then given by the number you wrote on the ticket on which the value of N is equal to the number of tokens contributed by Member 1.
- **Option 2**: Use the ticket titled “**My fixed contribution:**”. On this ticket, write down the number of tokens you want to contribute. This will be your contribution no matter the contribution of Member 1.
- **Option 3**: Use the ticket titled “**Randomize my contribution between:**”. On this ticket, you can but do not have to write down a minimum and a maximum of the range from which the computer will randomly choose your contribution. If you do not write down the minimum, it will be set to 0. If you do not write down the maximum, it will be set to 10. Each whole number starting with the minimum and ending with the maximum has an equal chance to be chosen as your contribution.
- **Use only one of the three options!**
- Your decisions will be used to determine your contribution and earnings of both group members in Scenario 2 if the coin flip determines you are **Member 2**. If the coin flip determines you are **Member 1**, your decisions in Scenario 2 will not be used.
- Given the contributions of the two Members, their earnings are calculated in the same way as in Scenario 1 (you can refer to the **Earnings Table** you were given in Scenario 1).

Please turn the sheet around.

”Human - Exit” Scenario 2 instructions

Now **please answer the quiz questions** on the sheet given to you together with these instructions. After you answer the questions and have your answers checked by an experimenter, come back to these instructions.

Once everyone’s quiz questions have been checked, you will be given decision tickets for Scenario 2.

Pick only one of the three options of how you want to contribute **for the case you are Member 2**. Do not fill out the tickets intended for the other two options. Place the unused tickets into your box.

For option 1: Use **only** the tickets titled “**My conditional contribution when N = …:**”. On each ticket, write down the number of tokens you want to contribute to the group project conditionally on Member 1 contributing N tokens. **Please fill out all 11 tickets.** Then put all 11 tickets into the envelope labeled “Scenario 2”. (Don’t seal it)

For option 2: Use **only** the ticket titled “**My fixed contribution:**”. Write down the number of tokens you want to contribute to the group project on the ticket. Then put the ticket into the envelope labeled “Scenario 2”. (Don’t seal it)

For option 3: Use **only** the ticket titled “**Randomize my contribution between:**”. Optionally write down the minimum and the maximum of the range from which the computer will randomly draw your contribution to the group project. You can write down both, or only one, or neither. Then put the ticket into the envelope labeled “Scenario 2”. (Don’t seal it)

Any number that you write down for any of the three options must be a whole number (no decimals or fractions) between 0 and 10.

Please wait until an experimenter collects the envelopes with participants’ decisions. We will then continue with the Demographic Questionnaire.

”Random - No Exit” Scenario 2 instructions

INSTRUCTIONS FOR SCENARIO 2

- Scenario 2 is similar to Scenario 1 with the exception of how contributions of the two group members to the group project are determined.
- Separately and independently for each participant, the computer has drawn one of the numbers 0, 1, ..., 10, each with an equal chance. Call the number drawn for you **N**. You do not know the value of **N**.
- Based on a coin flip performed at the end of the experiment, one of the two group members will be selected as **Member 1**, while the other one will be selected as **Member 2**.
- The contribution of **Member 1** in Scenario 2 is equal to his/her contribution in Scenario 1.
- **Member 2** decides on his/her contribution in Scenario 2 conditionally on **N** as described below.
- At the time of making decisions, none of the group members knows the decisions of the other group member in Scenario 1 or Scenario 2 or whether he/she is Member 1 or Member 2 or **N**.
- Please decide on your contribution **for the case you are Member 2** by using **11 decision tickets** that will be given to you after the instruction stage.
- On each ticket, write down **how many tokens you want to contribute conditionally on N**, where the value of N is specified on each ticket. For example, on the ticket with “N = 8”, write down how many tokens you want to contribute conditionally on the drawn value of **N** being equal to 8. Or, on the ticket with “N = 4”, write down how many tokens you want to contribute conditionally on the drawn value of **N** being equal to 4. **Fill out all 11 tickets!** Your actual contribution is then given by the number you wrote on the ticket on which the value of N is equal to the drawn value of **N**.
- Your decisions will be used to determine your contribution and earnings of both group members in Scenario 2 if the coin flip determines you are **Member 2**. If the coin flip determines you are **Member 1**, your decisions in Scenario 2 will not be used.
- Given the contributions of the two Members, their earnings are then calculated in the same way as in Scenario 1 (you can refer to the **Earnings Table** you were given in Scenario 1).

Please turn the sheet around.

”Random - No Exit” Scenario 2 instructions

Now **please answer the quiz questions** on the sheet given to you together with these instructions. After you answer the questions and have your answers checked by an experimenter, come back to these instructions.

Once everyone’s quiz questions have been checked, you will be given decision tickets for Scenario 2.

On each ticket, **for the case you are Member 2**, write down the number of tokens you want to contribute to the group project conditionally on **N**. **Please fill out all 11 tickets.** Then put all 11 tickets into the envelope labeled “Scenario 2”. (Don’t seal it)

Any number you write down must be a whole number (no decimals or fractions) between 0 and 10.

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”Random - Exit” Scenario 2 instructions

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- Based on a coin flip performed at the end of the experiment, one of the two group members will be selected as **Member 1**, while the other one will be selected as **Member 2**.
- The contribution of **Member 1** in Scenario 2 is equal to his/her contribution in Scenario 1.
- **Member 2** decides on his/her contribution in Scenario 2. He/she has three options how to contribute:

  Option 1: make his/her contribution conditional on **N**

  Option 2: contribute a fixed amount regardless of **N**

  Option 3: let the computer choose his/her contribution randomly from a pre-specified range
- At the time of making decisions, none of the group members knows the decisions of the other group member in Scenario 1 or Scenario 2 or whether he/she is Member 1 or Member 2 or **N**.
- Please decide on your contribution **for the case you are Member 2** by using the **decision tickets** that will be given to you after the instruction stage.
- **Option 1**: Use **11 tickets** titled “**My conditional contribution when N = …**”. On each ticket, write down **how many tokens you want to contribute conditionally on N**, where the value of N is specified on each ticket. For example, on the ticket with “N = 8”, write down how many tokens you want to contribute conditionally on the drawn value of **N** being equal to 8. Or, on the ticket with “N = 4”, write down how many tokens you want to contribute conditionally on the drawn value of **N** being equal to 4. **Fill out all 11 tickets!** Your actual contribution is then given by the number you wrote on the ticket on which the value of N is equal to the drawn value of **N**.
- **Option 2**: Use the ticket titled “**My fixed contribution:**”. On this ticket, write down the number of tokens you want to contribute. This will be your contribution no matter what the value of **N** is.
- **Option 3**: Use the ticket titled “**Randomize my contribution between:**”. On this ticket, you can but do not have to write down a minimum and a maximum of the range from which the computer will randomly choose your contribution. If you do not write down the minimum, it will be set to 0. If you do not write down the maximum, it will be set to 10. Each whole number starting with the minimum and ending with the maximum has an equal chance to be chosen as your contribution.
- **Use only one of the three options!**
- Your decisions will be used to determine your contribution and earnings of both group members in Scenario 2 if the coin flip determines you are **Member 2**. If the coin flip determines you are **Member 1**, your decisions in Scenario 2 will not be used.
- Given the contributions of the two Members, their earnings are calculated in the same way as in Scenario 1 (you can refer to the **Earnings Table** you were given in Scenario 1).

Please turn the sheet around.

”Random - Exit” Scenario 2 instructions

Now **please answer the quiz questions** on the sheet given to you together with these instructions. After you answer the questions and have your answers checked by an experimenter, come back to these instructions.

Once everyone’s quiz questions have been checked, you will be given decision tickets for Scenario 2.

Pick only one of the three options of how you want to contribute **for the case you are Member 2**. Do not fill out the tickets intended for the other two options. Place the unused tickets into your box.

For option 1: Use **only** the tickets titled “**My conditional contribution when N = …:**”. On each ticket, write down the number of tokens you want to contribute to the group project conditionally on **N**. **Please fill out all 11 tickets.** Then put all 11 tickets into the envelope labeled “Scenario 2”. (Don’t seal it)

For option 2: Use **only** the ticket titled “**My fixed contribution:**”. Write down the number of tokens you want to contribute to the group project on the ticket. Then put the ticket into the envelope labeled “Scenario 2”. (Don’t seal it)

For option 3: Use **only** the ticket titled “**Randomize my contribution between:**”. Optionally write down the minimum and the maximum of the range from which the computer will randomly draw your contribution to the group project. You can write down both, or only one, or neither. Then put the ticket into the envelope labeled “Scenario 2”. (Don’t seal it)

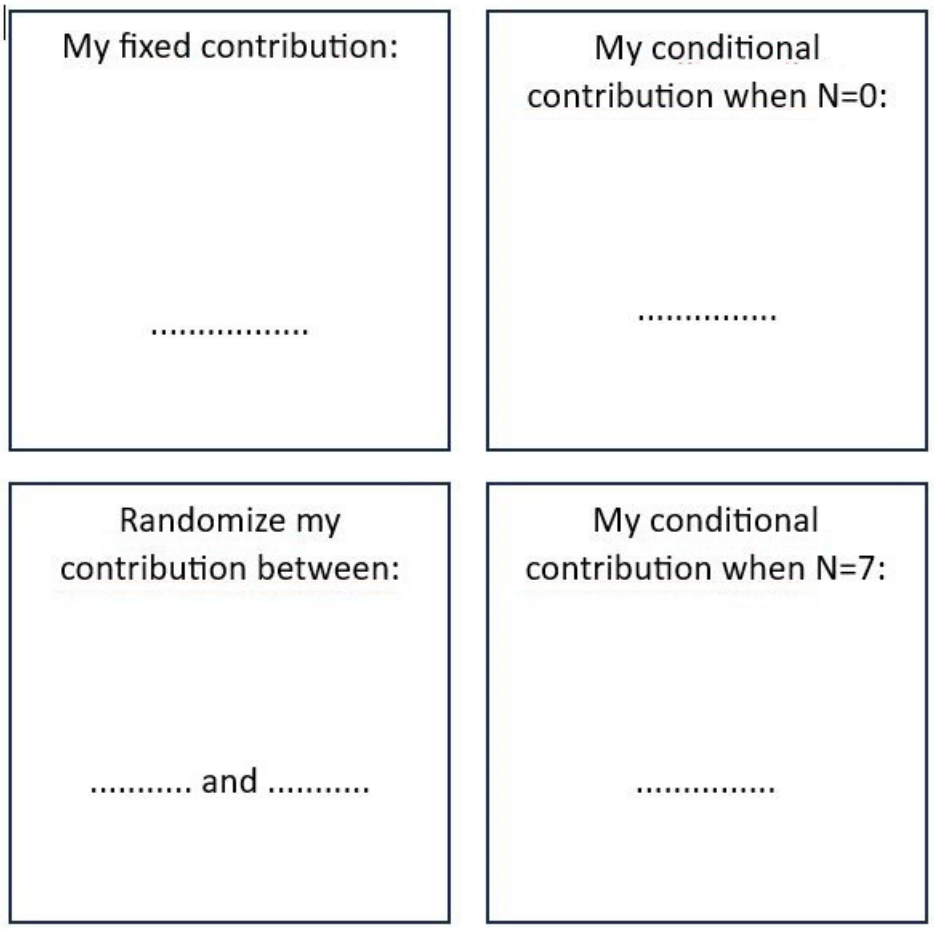
Any number that you write down for any of the three options must be a whole number (no decimals or fractions) between 0 and 10.

Please wait until an experimenter collects the envelopes with participants’ decisions. We will then continue with the Demographic Questionnaire.

Decision Tickets

Scenario 1

Scenario 2



Quiz questions, Scenario 1

QUIZ QUESTIONS FOR SCENARIO 1

Please circle the correct answer for each of the following four quiz questions. These questions are meant to assure your understanding of the instructions for Scenario 1. When done answering, please **raise your hand**. An experimenter will privately check your answers and, perhaps, provide an explanation in case of an incorrect answer.

(1) If you look at a particular cell (row-column combination) of the Earnings Table, then
   (a) the first (**bolded**) number is your earnings, and the second (*italicized*) number is earnings of the other group member
   (b) the first (**bolded**) number is earnings of the other group member, and the second (*italicized*) number is your earnings

(2) Assuming the contribution of the other group member remains unchanged, **if you contribute more**
   (a) earnings of both group members increase
   (b) earnings of both group members decrease
   (c) your earnings increase, while the other group member's earnings decrease
   (d) your earnings decrease, while the other group member's earnings increase

(3) Assuming your contribution remains unchanged, **if the other group member contributes more**
   (a) earnings of both group members increase
   (b) earnings of both group members decrease
   (c) your earnings increase, while the other group member's earnings decrease
   (d) your earnings decrease, while the other group member's earnings increase

(4) Assuming the contribution of the remaining group member remains unchanged, **if one of the group members contributes more**
   (a) **the sum of earnings** of both group members increases
   (b) **the sum of earnings** of both group members decreases
   (c) **the sum of earnings** of both group members remains unchanged
   (d) it is impossible to say for sure whether **the sum of earnings** of both group members increases, decreases, or remains unchanged

Quiz questions, Scenario 2, No Exit

QUIZ QUESTIONS FOR SCENARIO 2

Please circle the correct answer for each of the following four quiz questions. These questions are meant to assure your understanding of the instructions for Scenario 2. When done answering, please **raise your hand**. An experimenter will privately check your answers and, perhaps, provide an explanation in case of an incorrect answer.

(1) The contribution of **Member 1** is:

(a) made equal to his/her contribution in Scenario 1
(b) determined by how he/she fills out his/her tickets in Scenario 2
(c) made equal to a randomly-drawn number unrelated to any of his/her decisions

(2) As **Member 2**, your contribution is:

(a) made equal to your Scenario 1 contribution
(b) unrelated to any of your decisions
(c) determined by how you fill out your ticket(s) in Scenario 2

(3) The value of **N** on the 11 decision tickets:

(a) represents potential values of a random number drawn by the computer at the beginning of Scenario 2
(b) represents potential values of contributions of Member 1
(c) represents potential values of the participant number assigned to the other member of your group

(4) As **Member 2**:

(a) you can make your contribution dependent on the contribution of Member 1
(b) you cannot make your contribution dependent on the contribution of Member 1

Quiz questions, Scenario 2, Exit

QUIZ QUESTIONS FOR SCENARIO 2

Please circle the correct answer for each of the following six quiz questions. These questions are meant to assure your understanding of the instructions for Scenario 2. When done answering, please **raise your hand**. An experimenter will privately check your answers and, perhaps, provide an explanation in case of an incorrect answer.

(1) The contribution of **Member 1** is:
- (a) made equal to his/her contribution in Scenario 1
- (b) determined by how he/she fills out his/her tickets in Scenario 2
- (c) made equal to a randomly-drawn number unrelated to any of his/her decisions

(2) As **Member 2**, your contribution is:
- (a) made equal to your Scenario 1 contribution
- (b) unrelated to any of your decisions
- (c) determined by how you fill out your ticket(s) in Scenario 2

(3) The value of **N** on the 11 decision tickets for option 1:
- (a) represents potential values of a random number drawn by the computer at the beginning of Scenario 2
- (b) represents potential values of contributions of Member 1
- (c) represents potential values of the participant number assigned to the other member of your group

(4) If, as **Member 2**, you use option 1, then:
- (a) you can make your contribution dependent on the contribution of Member 1
- (b) you cannot make your contribution dependent on the contribution of Member 1

(5) If, as **Member 2**, you use option 2, then:
- (a) you can make your contribution dependent on the contribution of Member 1
- (b) you cannot make your contribution dependent on the contribution of Member 1

(6) If, as **Member 2**, you use option 3, then:
- (a) you can make your contribution dependent on the contribution of Member 1
- (b) you cannot make your contribution dependent on the contribution of Member 1

Abstrakt

Fischbacher, Gächter a Fehr (2001) umožnili účastníkům v lineární hře na veřejné statky podmínit své příspěvky průměrným příspěvkem ostatních členů skupiny pomocí tzv. strategické metody. Přibližně polovina účastníků vykazovala „podmíněnou spolupráci“ (CC), tedy přispívala více, pokud byli ostatní členové skupiny předpokládáni jako štědřejší. Tento výsledek byl mnohokrát replikován. Novější studie však zjistily vysoký podíl podmíněných spolupracovníků i v placebo podmínkách, kde by se takové chování neočekávalo, což naznačuje, že měření CC je nadhodnocené. Zkoumáme, zda lze toto zkreslení odstranit nebo alespoň snížit zmírněním zmatení účastníků a tzv. experimentátorova efektu. Zavádíme několik prvků designu pro snížení zmatení. Pro omezení experimentátorova efektu poskytujeme účastníkům „únikové možnosti“, které jim umožňují vyhnout se podmiňování svých příspěvků příspěvky ostatních. Míru zkreslení hodnotíme podle podílu účastníků klasifikovaných jako CC v analogickém placebo treatmentu s bezvýznamnou podmíněnou proměnnou. Pokud zmírníme zmatení, ale ne experimentátorův efekt, více než čtvrtina účastníků je v placebo treatmentu klasifikována jako CC. Pokud zmírníme i experimentátorův efekt, tento podíl klesá na úroveň statisticky nerozeznatelnou od náhodného chování. Ve standardním nastavení snižuje zmírnění experimentátorova efektu podíl CC téměř o 40%. Docházíme tedy k závěru, že CC by měla být měřena za přítomnosti únikových možností, aby se omezil experimentátorův efekt.

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