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### Keeping up appearances: Experiments on cooperation in social dilemmas

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# Appendices

## *Appendix A1: Instructions “Direct and indirect reciprocity”*

Welcome to this experiment on decision making. The experiment will last for approximately 90 minutes. During the session it is not allowed to talk or communicate with the other participants. If you have a question, please raise your hand and one of us will come to you to answer it. During this experiment you will make money. How much you earn depends of your decisions and the decisions of others. At the end of the experiment the amount you have earned, plus a show up fee of 7 euros, will be paid to you in cash. These payments are anonymous; you will be paid individually in the reception room. Please stay seated at the end of the experiment until your desk number is called. We will not inform any of the other participants about your earnings. It is impossible for us to associate your desk number with your identity. You start out with an amount of 3000 points; 300 points are worth 1 euro.

### **Experimental procedure**

1. Instructions
2. Quiz to verify if you understand the experiment
3. The experiment
4. Questionnaire
5. Payment

The experiment consists of at least 100 rounds. From round 100 upon, there is a chance of 90% that a new round starts. Every round, you will be paired with another participant in the room. Everybody stays anonymous; you will not be informed about the identity of the participant you are paired with.

The chance to be paired with a particular participant is for all participants the same in every round. Hence, the chance to be paired with the same participant twice in a row is very small.

Every round you will be assigned a role (A or B). You only have to make a decision when you are assigned role A. If you are assigned role B, you do not have to do anything.

### **Choices**

If you are assigned role A, you can choose between two alternatives. If you choose ‘yellow’, participant B, who is paired with you, receives 250 points. You lose 150 points. If you choose ‘blue’, the participant paired with you receives nothing, and you do not lose any points.

Summarized:

Yellow has cost 150 for participant A. Participant B receives 250 points.

Blue yields 0 for both participants.

### **Information**

Before you make your decision, you have the opportunity to request information on the decisions of participant B in earlier rounds. By clicking the boxes you obtain a summary of the actions of participant B in the past **6 rounds**. You can request two kinds of information.

1. Information about what participant B decided, in the role of A, when s/he was paired with **you**
2. Information about what participant B decided, in the role of A, when s/he was paired with **others**

This information is obtained by clicking the boxes. The information will be displayed on the screen like this:

1. Participant B decided in earlier rounds, when s/he was paired with **you** in role A: ... times yellow and ... times blue
2. Participant B decided in earlier rounds, when s/he was paired with **others** in role A: ... times yellow and ... times blue

Requesting information about participant B comes at a **cost**. This amounts to 5 points per requested information item. If you request both kinds of information, it costs 10 points. Only the participant clicking on the buttons obtains this information. The number of decisions of B you can see is 6 at maximum. If participant B has not been in the role of A, you will see a 0.

*--- The next paragraph is only shown in the Noise treatment ---*

The information about what player B decided when s/he was paired with **you** is **perfectly reliable**. Information about what participant B decided when s/he was paired with **others** is **not perfectly reliable**. In  $1/6^{\text{th}}$  of the cases, a 'blue' choice is displayed as 'yellow', or a 'yellow' choice is displayed as 'blue'. Thus, the information on what participant B did, when s/he was paired with others, is not completely reliable.

*--- End of Noise treatment paragraph ---*

When participant A has made his decision, both participants will be informed about their payoffs in this round. This is the end of the round. In the next round you will be paired with another randomly drawn participant. The roles of A and B are randomly assigned.

Please stay seated at the end of the experiment. We will call your desk number, so you can be paid in the reception room individually.



## ***Appendix A2: Instructions “Public goods and private aversions”***

Welcome to this experiment on decision making. Please read these instructions carefully. Every participant receives exactly the same instructions. The instructions are easy; if you follow them carefully, you can make quite some money. How much you earn depends on your decisions and those of the other participants in this experiment. At the end of the experiment, your earnings will be paid in euros.

During this experiment we will compute your earnings in ‘francs’ instead of euros. At the end of the experiment your earnings in francs will be exchanged to euros at the exchange rate of 1 franc = €0.03 euro.

Please note that it is not allowed to communicate with the other participants. Please raise your hand if you have a question; one of us will come to your desk to answer your question.

There will be two experiments today. The first will take approximately 10 minutes. Afterwards you will receive the instructions for the second experiment.

### **First experiment**

In the first experiment you will be asked to make one choice. The choice determines the allocation of a sum (in francs) to you and to a randomly chosen other participant.

Below you see the computer screen for the first experiment.

Cirkel

instructies

Kies een punt op de cirkel. Gebruik daarvoor uw muis. Gebruik de knoppen links- en rechtsonder voor meer precisie.

De "ander" is willekeurig gekozen.

beslissing

**verdienste**

voor u:	77,3
voor de ander:	63,4

Bevestig

Every point at the circle defines a sum you receive (+) or lose (-) and a sum the other receives (+) or loses (-); losing means the sum will be deducted from this person's earnings. Your choice therefore influences whether you and/or the other person earn or lose money.

You can click on a point on the circle with the mouse pointer. An arrow indicates your choice. The corresponding amounts for you and for the other will be shown in the window on the right. In the above example you chose 77,3 francs for you and 63,4 for the other.

You can adjust your choice by clicking at another point on the circle, either with your mouse or with the buttons underneath the circle. If you are satisfied with your choice, please click the confirmation button.

Your earnings consist of the sum of what you allocated to yourself and what another participant allocated to you, by exactly the same procedure. Note that the participant to whom you allocate a sum will probably be another than the one who allocates a sum to you. Any of

these could be negative or positive. Only after the second experiment you will learn what the other allocated to you.

If you have any questions, please raise your hand. If not, please click on 'ready'. When everyone is ready with the instructions we will start with the first experiment.

### **The first part of the second experiment**

The first part of the second experiment consists of 10 rounds. At the start of a period, participants are divided in groups of 3. All group members are anonymous, which means you don't know who is in your group and others don't know whether you are in their group. Between the periods the constellation of your group changes- you will play with other participants every period.

At the end of the period the francs you have earned will be put on a savings account. The account and the period number are shown at the upper left of the screen.

In these instructions we will show numerical examples. These are chosen randomly. They do not give information about what you can expect during the experiment.

### **The project**

At the start of each period every participant receives 20 francs. Each participant may decide whether he or she wants to contribute to a group project. You can only choose between contributing all (20) francs or nothing. The other two group members decide at the same moment.

### **Earnings**

The contributions of the three group members to the group project will be added. The experimenters will increase the total sum with 50% and distribute the final sum evenly over all group members. The project earnings are thus for every group member  $\frac{1}{3}$  of 150 % of the



total contribution to the project. This means that every franc you (or someone else) contributed will result in an additional income of 0.5 franc for you and for every other group member.

Your earnings after the first decision in a period are the sum of

1. The number of francs you did not contribute (either 0 or 20)
2. Your income from the project ( $0.5 \times$  total contribution to the project)

These earnings are calculated the same way for every group member.

After everyone has reached a decision, all group members will learn whether the other group members have contributed, what the total contribution to the project is, and what the earnings of the group members are. This information will appear on a window in the center of the screen.

### **Second decision**

You now know whether the other group members have contributed to the project, and they know whether you did. Now you have the opportunity to lower the earnings of the other group members by allocating deduction points. You can decide for each of the two other group members separately whether you want to allocate a deduction point to them; one is the maximum.

What happens if you allocate a deduction point?

1. If you decide to allocate a deduction point to another group member, you lower their income with 3 francs. If you decide not to, their earnings remain unchanged.
2. Every deduction point you allocate to someone costs you 1 franc. If you decide not to allocate deduction points, it doesn't cost you anything.

The other group members simultaneously decide whether they want to allocate deduction points to anyone, including you. For every deduction point you receive, your earnings are lowered with 3 points. If you do not receive any reduction points, your earnings will remain unchanged.

The group members' contributions remain visible while you are deciding on deduction points.

### Total earnings in one period

Your earnings in one period consist of

- Your earnings after the first decision
- Lowered by the costs of the deduction points you allocated to others
- Lowered by the costs of the deduction points you received

These earnings are computed similarly for all group members. Your earnings from this period will be transferred to your 'savings account'.

The result of a period will be summarized as below:

Er zijn 1 aftrekpunt(en) aan u uitgedeeld door andere deelnemers. U verloor daardoor 3 franc(s).  
 Uw gemaakte kosten voor het uitdelen van aftrekpunten zijn 0.  
 Uw verdiensten uit de eerste fase waren 20.  
 Uw totale verdiensten uit deze ronde zijn 17 franc(s).

Verder

	U	deelnemer 1	deelnemer 2
bijdrage	ja	nee	ja
verdiensten	20	40	20
aftrekpunten door u		0	0
aftrekpunten door deelnemer 1	0		0
aftrekpunten door deelnemer 2	1	0	
verdiensite ronde	17	40	19

## **Second part of the second experiment**

The decisions in Part II of this experiment resemble the decisions in Part I. The difference between the parts is that groups are composed in a different way. The composition of groups is no longer random. From now on you can state a preference over your fellow group members.

Every group member will be allocated to either role A or role B in every period. 6 participants in role B and 3 in role A are pooled together, from which 3 groups of 3 can be composed. Every group consists of one A and 2 B's. Your role may change across periods.

If you are in role A, you can express a preference over the 6 B's with whom you could form a group. You will be asked to rank the participants B from 1 to 6. If you are undecided, you may give two B participants the same number. If you do not want to be in one group with a certain B participant, you can allocate a "-" to him or her.

Suppose you prioritize the 6 B participants as below:

B1	2
B2	1
B3	-
B4	2
B5	3
B6	4

This means you prefer to be with B2 in a group, and you are indifferent between B1 and B4. If necessary you would form a group with B5 and/or B6; you do not want to be in a group with B3.

### **Information for participant A**

Information about the B-participants will be shown on the screen to facilitate your choice. This information concerns their contribution, the deduction points they allocated and their earnings. If there is no information available, a "-" will be shown. The information for the previous round is given immediately, but if you want you can browse through earlier periods

by means of the arrows on the left. Note that you can only go back to the first period of Part 2; no information is given about part I.

The information window is shown below.

Kies ronde		bijdrage	aftrekpunten uitgedeeld	verdiensden	voorkeur
◀	▶	nee	0	27	◀ ▶
	1	ja	0	30	◀ ▶
		ja	2	8	◀ ▶
		ja	1	26	◀ ▶

Once the groups have formed, you will be shown the same information at the moment you have to decide about your contribution.

At the deduction points stage, however, the only available information is about behavior in this period. You can no longer match a participant to the information shown before. The only thing you see is what was shown in part 1: information on contribution and earnings in this periods.

### Information for participant B

A participant in role B can express his or her preference for a group composition in another way. He or she can indicate for every a participant whether he/she wants to be in a group with the A participant, if this person would agree.

As a B participant you will be shown information for every A participant about contribution, deduction points and the earnings in previous periods. If no information is available, “-” will be displayed.

Kies ronde		bijdrage	aftrekpunten uitgedeeld	verdiensden	voorkeur
◀	▶	nee	0	40	<input type="radio"/> ja <input type="radio"/> nee
	2	nee	2	35	<input type="radio"/> ja <input type="radio"/> nee

After the groups have been formed, you will receive the similar information when you have to decide about your contribution. B participants, like the A participants, can see only information about contributions in the previous period while deciding to allocate deduction points.

### **Group formation**

Participants A and B will be matched according to their preferences by the following procedure.

When all participants have made their decisions, one A participant will be chosen randomly. This person will be matched to B participants according to his or her preferences, but only if the B participants agree to be in a group with this person. If such a match does not exist, the A participant will not be allocated to a group. Then a second A participant will be randomly chosen and matched to B participants through the same process. After the procedure has been applied to all A participants, it ends; B participants that have not been ‘matched’ will not be allocated to a group. The group stage will then proceed exactly as in part I.

If you are not allocated to a group, you will receive the 20 francs at the beginning of the period, but you will not receive any income from the group project and you cannot make a decision about contribution or deduction points.

Please raise your hand if you have any questions.

## ***Appendix A3: Instructions “Group competition and punishment”***

### **Introduction**

Welcome to this experiment on decision making. In this experiment you will earn money. The amount depends on your choices and on the choices of other participants present here.

The experiment is organized by the ‘Institute for Biodiversity and Ecosystem Dynamics (IBED)’ of the Science Department of the University of Amsterdam, in collaboration with the ‘Center for Research in Experimental Economics and political Decision-making (CREED)’ from the Department for Economics and Business. The results of the experiment will be used only for scientific purposes.

The next 1.5 hours are organized as follows:

1. Instructions for this experiment. Please read them carefully, it is of utter importance for this research project that you understand what will happen.
2. Practice questions. If you can answer these questions properly, the researchers can be convinced that you understand the experiment correctly.
3. A short questionnaire
4. The experiment itself
5. A questionnaire at the end
6. Payment. After the experiment, everyone will be paid individually and anonymously. The participants will be called to the reception room to be paid.

### **Instructions for the experiment**

All participants receive the same instructions. The experiment consists of 30 periods. In every period you will be asked to make a decision of the same kind.

At the beginning of the experiment, all participants will be divided into groups of three. The group members are anonymous. The composition of your group does not change- you will remain in your group with the same participants during the entire experiment. The same applies to the other groups.

Earnings are denoted in fiches. At the beginning of the experiment, everyone will receive an initial endowment of fiches. The experiment consists of 30 periods and every period consists of two stages. In every stage, you and the other group members make a decision. After every period, your earnings will be transferred to your saving account. The total number of fiches at your saving account after 30 periods will be changed into euros.

1 fiche = 3 eurocent.

During the experiment you are not allowed to communicate with the other participants in any way. If you have a question, please raise your hand. One of us will come to your table and answer your question.

Please find an explanation of the stages of the experiment below.

#### Stage 1- contributions to the group project

At the beginning of every period, every participant receives 20 fiches. Each period you may decide how many of your fiches you want to contribute to the project and how many you want to keep. The other two members of your group simultaneously make the same decision.

#### Consequences of your decision

All contributions to the group project are then summed. The experimenters will increase the total amount with 1/8 and divide this amount evenly over all group members. The income from the project is thus for every group member 1/3 of 112,5 percent of the total contribution to the project. This means that every fiche that you (or someone else) invest in the project will yield 0.375 fiches, both for yourself and for the other members in your group.

Once everyone has made their decision, you will learn what the other group members' contributions were, how much has been contributed in total, and the sum of the group member's earnings.

Your earnings at stage 1 are thus:

1. The number of fiches you did not contribute ( $20 - \text{your contribution}$ )
2. Your income from the project ( $0.375 \times \text{total contributions to the project}$ )

These earnings are calculated similarly for every participant.

*(Only in treatments with punishment- BaseP, ObsP, CompP)*

### **Stage 2: the second decision**

You now know how much each of the two other members has contributed to the project. Similarly, the two other members know what you have contributed. During stage 2, you have the opportunity to decrease the earnings of each other member by awarding points to them. You can award at most 10 points to every group member. Every member takes at the same moment a similar decision with regard to the other group members. This means they can decide to attribute points to you, too.

What happens if you award points?

- For every point that you give to someone, their earnings diminish by 3 fiches. You don't have to award points. In the case you do not award points, the other's earnings remain unchanged.
- Every point that you give to someone, lowers your income with 1 fiche. If you do not award any points, you do not incur any costs.

Similarly, every point that is awarded to you will lower your earnings with 3 fiches. If there are no points awarded to you, your earnings do not change.

Note that only the results affecting you will be displayed after this period, e.g., how many points have been awarded to you.

Your earnings after Stage 2 are now composed of

Earnings from stage 1

Minus the costs of awarded points to others, if any ( $1 \times \text{total number of points you awarded}$ )

Minus the fiches that were deducted because of points received from others ( $3 \times \text{total number of points received}$ )



*(Only in treatments with encounters- Obs, ObsP, Comp, CompP)*

### **Stage 3 – encounter with another group**

At the end of each period, there is a chance that you and the other group members ‘encounter’ another group of 3. The chance that this happens is 20% in every period; on average you can expect to encounter another group every 5<sup>th</sup> period. The encounters are determined randomly by the computer. Note that the actual number of periods between encounters is not necessarily the average, since the encounters are randomly determined by the computer program. Every period the chance to encounter another group is 20%.

If you and the other group members encounter another group of three, everyone in your group receives information about the total earnings of the other group in this period. The members of the other group also get to know what the total earnings of the members in your group have been. No one else receives this information. You will always encounter the same other group.

*(ONLY in treatments with competition- Comp, CompP)*

The encounter with another group has the following consequences: The group with the highest total earnings will receive fiches from the group with the lowest total earnings. The number of fiches that is exchanged is 3 x the difference in total earnings. These fiches will be distributed evenly among the 3 members of the group with the highest total earnings. You will receive the difference in total earnings if you are a member of the group with the highest total earnings, but you will lose the difference in total earnings if you are a member of the group with the lowest earnings.

At the end of a period in which you have encountered a group are the sum of

1. your earnings from stage 1
2. your costs from stage 2 (if any)
3. your share in the earnings resulting from the difference in this period between your group and the other group (positive or negative)

Your earnings at the end of a period in which you do not encounter another group is thus the sum of

1. Your earnings from Stage 1
2. Your costs from Stage 2 (if any)

The earnings are computed similarly for every group member. Your earnings will be added to your savings.

It is in principle possible that you have negative earnings at the end of a period. This negative amount will be subtracted from your saving account.

Please raise your hand if you have any questions.



## *Appendix B: Decision to include*

<b>Model</b>	<b>I</b>	<b>II</b>
<b>Treatment</b>	<b>Baseline</b>	<b>Punishment</b>
<b>Contribution i (t-1)</b>	-2.64(0.58)***	-0.66 (0.54)
<b>Contribution j (t-1)</b>	-0.95 (2.53)	1.59 (1.45)
<b>Punishment points i (t-1)</b>		0.30 (0.54)
<b>Punishment points j (t-1)</b>		1.08 (1.49)
<b>Period</b>	4.83 (1.80)***	0.02 (0.06)
<b>Inclusive value</b>	-9.56 (3.53)***	-1.16 (1.00)
<b>Constant</b>	2.65(0.63)***	0.95(0.40)*
<b># observations (groups)</b>	957(4)	862 (6)
<b>R<sup>2</sup></b>	0.59	0.36

*Notes.* The table presents the results of two binomial logit regressions, used to explain the inclusion of  $j$  (a responder) by  $i$  (a proposer). Formally, it gives the  $\beta$ -coefficients of a vector of independent variables relating to  $i$  and  $j$  in  $t$  as described in the first column of the table. A (white noise) matching-group-specific error corrects for the dependencies within matching groups.