

## Online Appendix

### Sample instructions – line network

#### Introduction

This is an experiment in the economics of decision-making in networks. A research foundation has provided funds for conducting this research. Your earnings will depend partly on your decisions and partly on the decisions of the other participants in the experiment. If you follow the instructions and make careful decisions, you may earn a considerable amount of money.

At this point, take a minute to write down the number of the computer you are using as appears on the top of the monitor. At the end of the experiment, you should use your computer number to claim your earnings. At this time, you will receive \$5 as participation fee (simply for showing up on time). Details of how you will make decisions will be provided below.

During the experiment your payoff will be denominated in experimental tokens that will be converted into dollars at the end of the experiment at the following rate:

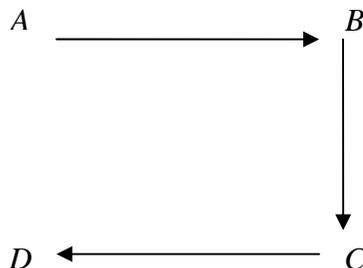
$$25 \text{ Tokens} = 1 \text{ Dollar}$$

#### Your Experimental Task

In this experiment, you will participate in 15 independent and identical (of the same form) periods each divided into two decision-stages. In each period, you will be assigned to a position in a four-person network. You will only be able to observe the choices of the other participants to whom you are connected in this network.

Before the first period, you will be randomly assigned to one of the network positions labeled *A*, *B*, *C*, or *D*. A fourth of the participants in the room will be designated as type-*A* participants, one fourth as type-*B* participants, one fourth as type-*C* participants and one fourth as type-*D* participants.

Your type depends solely upon chance and will remain constant in all periods throughout the experiment. When you are called to make your first decision you will be informed of your type on the left hand side of the dialog window (see attachment 1). The network is given to you in the window that appears just to the right of it and is illustrated in the scheme below.



A line segment between any two types represents that they are connected and the arrowhead points to the participant whose action can be observed. Note that in the network used in this experiment, type-*A* participants observe type-*B*, type-*B* observe type-*C* and type-*C* observe type-*D*. Type-*D* participants do not observe others.

Each period of the experiment consists of two stages. In the first stage of the period, you will decide how many tokens you want to allocate in each of two accounts. One account is a private account which only you benefit from, and the other is a public account of which the benefits are shared equally by all four participants in your group.

In the second stage of the period, you will observe the choices at the first stage of the participants to whom you are connected by the network. You can then decide whether and by how much to reduce their earnings from the first stage.

Next, we will describe in detail the process that will be repeated in all 15 periods.

### **Stage One**

Each period starts by having the computer randomly form four-person networks by selecting one participant of type-*A*, one of type-*B*, one of type-*C* and one of type-*D*. The networks formed in each period depend solely upon chance and are independent of the networks formed in any of the other periods.

That is, in any network each participant of type-*A* is equally likely to be chosen for that network, and similarly with participants of type-*B*, type-*C* and type-*D*. This is done by the computer. Hence, if there are 20 participants in the experiment the computer will randomly form five groups of four participants in each period.

At the beginning of each period each participant receives an endowment of 25 tokens. Your task is to decide how to use your endowment. You have to decide how many of the 25 tokens you want to allocate to a public account and how many to your private account. Your earning in the first stage will be determined by how many tokens you allocate to the private and public accounts and total number of tokens the other participants in your group allocate to the public account.

When you are ready to make your decision, all you need to do is just use the mouse to click on either the Private or Public input fields on the lower left hand corner of the dialog window (see attachment 1) and use the keyboard to fill the number (no decimals) of tokens between 0 and 25 that you wish to allocate to that account. Note that any of the 25 tokens not assigned to one account will automatically be allocated to the other. After that, confirm your decision by clicking on the Submit button. Once you have done this, your decision cannot be revised. This completes the first stage in the period.

Your earnings at the first stage are composed to two parts, and are determined as follows.

- (1) Your earnings from your private account are the tokens in your private account.
- (2) Your earnings from the public account are the total tokens allocated by all the participants in your group (including yourself) to the public account times 0.4.

Your earnings are given to you on the right hand side of the dialog window (see attachment 1).

Your total earnings in the first stage can therefore be summarized by

$$(\text{tokens in private account}) + 0.4 \times (\text{group total tokens in public account})$$

The earnings of each participant in your group from the public account are calculated in the same way. This means that each participant receives the same amount of tokens from the public account.

To clarify, suppose the total tokens allocated by all the participants in your group to the public account is 60. Then, each participant in the group receives  $0.4 \times 60 = 24$  tokens from the public account. So if you allocate 10 tokens to the public account your final payoff would be  $1 \times (25 - 10) + 0.4 \times 60 = 15 + 24 = 39$ . If the total tokens allocated by all the participants in your group to the public account is 20 then each participant in the group receives  $0.4 \times 20 = 8$  tokens from the public account. So if you allocate 10 tokens to the public account your final payoff would be  $1 \times (25 - 10) + 0.4 \times 20 = 15 + 8 = 23$ .

Note that for each token you allocate to your private account you earn one token. If instead you allocate this token to the public account the total allocation in the public account would rise by one token. The earnings of all participants in your group including yourself from the public account would rise by  $0.4 \times 1 = 0.4$  tokens each. Thus, the total earnings of the participants in your group from the public account would rise by 1.6 tokens. Note that you also earn 0.4 tokens for each token allocated to the public account by any of the other participants in your group.

## **Stage Two**

When everyone in your group has made a decision in the first stage, you will observe the choices of the participants to whom you are connected by the network. For example, if you are a type-A participant, you will be informed what allocation the type-B participant has chosen.

Note that you will observe how many tokens each participant with whom you are connected by the network allocated in stage one to both his or her private account and public account. This information is given to you in the large window that appears at the top of the dialog window (see attachment 2).

Each of the other participants will also observe the choices of the participants to whom he or she is connected by the network. In addition, all participants will be informed about the total number of tokens allocated by all the participants in your group (including yourself) to the public account. This information is given to you right below the large window that appears at the top of the dialog window (see attachment 2).

At this stage, you have to decide if and by how much you wish to reduce the earnings from the first period of each of the other participants with whom you are connected by the network. Note that each of the other participants also have to decide if and by how much he or she wishes to reduce the earnings from the first period of each of the other participants with whom he or she is connected by the network.

When you are ready to make your decision, use the mouse to choose the type of participant in the stage two window (see attachment 2) and use the keyboard to fill the number of tokens (no decimals) you wish to reduce from that participant's earnings into the input-text box that appears to the right of the participant's type. After that, confirm your decision by clicking on the Set button.

You must decide by how much you wish to reduce the earnings of each of the other participants with whom you are connected by the network by filling a number of tokens for each of them. If you do not wish to reduce the earnings of another participant you must enter 0.

Reducing the earnings of other participants is costly. The cost of reducing one token from any of the other participants is 1/2 tokens. Each participant can spend as much as his or her accumulated earnings in tokens from the first stage towards reducing the earnings of the other participants with whom he or she is connected by the network.

Throughout, you will be informed on the bottom of the program dialog window (see attachment 2) how many tokens you currently have. That is, the number of tokens you earned in the first stage minus the cost in tokens of the reductions of other participants' earnings you already set.

After you have entered the amount that you wish to reduce the earnings of each of the other participants with whom you are connected by the network, confirm your decisions by clicking on the Submit button (see attachment 2). Once you have done this, your decisions cannot be revised. This completes the second stage in this period.

When a period ends, the computer will inform all participants of their total earnings, earnings from private account, earnings from public account, total tokens spent on reducing others' earnings, and total tokens reduced by other participants (see attachment 3). After letting you observe the results, the next period will start by having the computer randomly forming new groups of participants in networks.

### **Earnings**

Your earnings at each period are determined as follows. Your total net earning in tokens for the period is given by the maximum of either zero or the earnings from stage one minus the number of your tokens reduced by other participants minus your cost of reducing the earning of other participants.

Put differently, your earnings in each period will be calculated in tokens as follows: (earnings from stage one) - (reductions directed towards you) - (your expenditure on reductions directed at other participants) if this sum is positive and zero if it is negative. Thus, the earnings from the first stage can be reduced at the second stage to zero but total earnings for the period cannot be negative.

At the end of period 1 we will continue and repeat the exact same experiment for another 14 periods (15 periods in total). However, before each period the computer will randomly assign you to a new group of four participants. You will remain the same type of subjects for the entire 15 periods, however, so if you were assigned to be a B type in period 1 you will remain a B type for all 15 periods.

The process will be repeated until all the 15 independent and identical periods are completed. At the end of the last period, you will be informed the session has. Your final earnings will be the sum of your earnings over the 15 periods.

### **Rules**

Please do not talk with anyone during the experiment. We ask everyone to remain silent until the end of the last period and then wait for further instructions.

Your participation in the experiment and any information about your earnings will be kept strictly confidential. Your payments receipt and participant form are the only places in which your name and social security number are recorded.

If there are no further questions, you are ready to start. An instructor will approach your desk and activate your program.

## Attachment 1

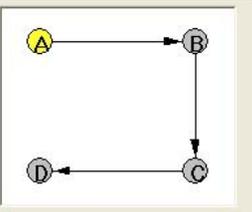
**ExpClient** ✖

Server Host:  Server Port:

Client ID:

Network

You are a type-  participant



```
graph TD; A((A)) --> B((B)); B --> C((C)); C --> D((D)); D --> A
```

Particip...	Private	Public	Tokens	Cost

Stage 1

Period:

Tokens:

Private:

Public:

Earnings

Current Period:

Total:

**Please make your decision at the first stage**

## Attachment 2

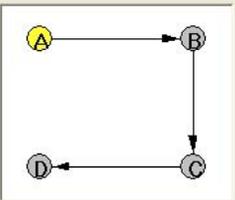
**ExpClient**

Server Host:  Server Port:

Client ID:

Network

You are a type-  participant



Particip...	Private	Public	Tokens	Cost
A	5	20		
B	5	20		
C				
D				

Total Public Contributions:

Participant  reduce by  tokens

Cost of reducing tokens:

Stage 1

Period:

Tokens:

Private:

Public:

Earnings

Current Period:

Total

**Please make your decisions at the second stage**

Attachment 3

