PARTNERS OR STRANGERS? COOPERATION, MONETARY TRADE, AND THE CHOICE OF SCALE OF INTERACTION

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A Matching across supergames

The deterministic role alternation allows to match subjects across supergames so that, in the first five supergames of a session no two subjects could be paired in more than one supergame. Groups were created by dividing the session's subjects into four sets of six subjects each: , A, B, C, and D, where $A = \{s_1^A, \ldots, s_6^A\}$, $B = \{s_1^B, \ldots, s_6^B\}$, and so on. The sets A through D are fixed for the duration of the session.

First, we describe how to create up to three supergames in which subjects interact in groups of 12. The groups can be read in the table below.

	Pair this set...			
	A	B	C	D
...to this set in supergame I	B	A	D	C
...to this set in supergame II	C	D	A	B
...to this set in supergame III	D	C	B	A

In supergame 1, group 1 is composed of sets $\{A, B\}$, and group 2 of sets $\{C, D\}$, and so on. In all these three supergames, subjects in a set are always matched with subjects in a different set. All subjects in the same set have the same role, in each round. For example, in round 1 of supergame 1, all subjects

in sets A and C are producers, and subjects in set B and D are consumers. The roles alternate deterministically from round to round. This ensures that no two subjects can interact for more than one of these three supergames.

Next, we describe how to create up to four supergames in which subjects interact in fixed pairs. To exclude repeated interactions across supergames, we match subjects within their set. The pairs can be read in the table below (for the case of a generic set).

	Pair this subject...					
	s_1	s_2	s_3	s_4	s_5	s_6
...to this subject in supergame i	s_3	s_5	s_1	s_6	s_2	s_4
...to this subject in supergame ii	s_2	s_1	s_6	s_5	s_4	s_3
...to this subject in supergame iii	s_4	s_3	s_2	s_1	s_6	s_5
...to this subject in supergame iv	s_5	s_6	s_4	s_3	s_1	s_2

Clearly, if in the last supergame a large group of 24 people was formed, then subjects could meet counterparts they had interacted with in earlier supergames. This was clarified in the instructions.

B   Additional tables

Table B1: **Help imbalance and group size.**

Dependent variable:	Control		Tokens	
no help imbalance (yes=1)	marg. eff.	S.E	marg. eff.	S.E
Large group (dummy)	-0.402***	(0.034)	-0.315***	(0.032)
Cycles 3 and 4 (dummy)	0.120**	(0.056)	0.153***	(0.047)
Controls				
N	768		768	

Notes: Panel probit regression on the presence of a help imbalance, with standard errors robust for clustering at the session level. The regression includes controls for order effects, sex, and for the number of right answers and the response time in a comprehension test on the experimental instructions. Marginal effects are computed at the mean of the value of regressors (at zero for dummy variables). Data from rounds 1-16, Training Phase only.

Table B2: **Help imbalance across conditions.**

Dependent variable: no help imbalance (yes=1)	partnerships		Large groups	
	marg. eff.	S.E	marg. eff.	S.E
TOKENS condition (dummy)	0.049	(0.032)	0.135***	(0.036)
Cycles 3-4 (dummy)	0.215***	(0.051)	0.031	(0.028)
Controls				
N	768		768	

Notes: Panel probit regression on the presence of a help imbalance, with standard errors robust for clustering at the session level. The regression includes controls for order effects, sex, and for the number of right answers and the response time in a comprehension test on the experimental instructions. Marginal effects are computed at the mean of the value of regressors (at zero for dummy variables). Data from rounds 1-16, Training Phase only.

Table B3: **Full cooperation across conditions.**

Dependent variable: full cooperation (yes=1)	partnerships		Large groups	
	marg. eff.	S.E	marg. eff.	S.E
TOKENS condition (dummy)	-0.097*	(0.054)	-0.003	(0.018)
Cycles 3-4 (dummy)	0.373***	(0.053)	0.025	(0.017)
Controls				
N	768		768	

Notes: Panel probit regression on the experience of full cooperation, with standard errors robust for clustering at the session level. The regression includes controls for sex, and for the number of right answers and the response time in a comprehension test on the experimental instructions. Marginal effects are computed at the mean of the value of regressors (at zero for dummy variables). Data from rounds 1-16, Training Phase only.

C   Instructions

We include copies of the instructions for CONTROL and TOKENS conditions, for the case where the Training Phase had group size ordering 2, 12, 2, 12. Instructions for the case where the Training Phase had group size ordering 12, 2, 12, 2 are identical with the obvious change in ordering.

Instructions for the Control condition

This is an experiment in decision-making. You will earn money based on the decisions you and others make in the experiment, and you will be paid in cash at the end of the experiment. Different participants may earn different amounts.

Overview of the experiment

The experiment is divided into **six blocks**. Each block is a separate section with **many periods**:
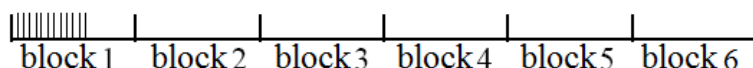
There are 24 participants. At the start of each **block**, a computer program will form groups. In each period of the block you will be paired with someone **in your group** to interact with him or her.

- In some blocks there will be **random pairings** inside two groups of 12 participants:
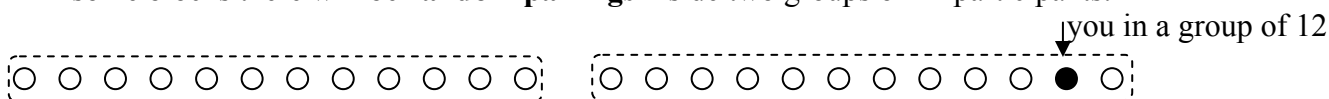
- In other blocks there will be **fixed pairings** because groups will have only 2 participants:

Groups change in each block so that **you cannot interact with anyone for more than one block**, except, possibly, block 6.

How do you earn money in a period?

You will earn points that depend on your choices and the choices of others **in your group**. Points will be converted into dollars at the end of the session in a manner that we explain later.

In each period you interact with another participant called your **"match."** If you are not in a fixed pair, then your match is **a random person** from your group. Your match will always remain anonymous.

In each pair, one person will be **red** and the other **blue**. The **red** person must choose to execute either outcome **Y** or **Z.** This choice determines the point **earnings** in the pair; the earnings also depend on whether you are in a fixed pair or not, as shown in the following tables:

In a **fixed pair**:

- if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points.
- if **Z** is the outcome: **red** earns **0** points and **blue** earns **15** points.

In a **random pair:**

- if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points.
- if **Z** is the outcome: **red** earns **0** points and **blue** earns **18** points.

What happens in each period?

Each **period** has the following timeline:

1. You see your color and you are paired with another participant.
2. You may be called to make a choice.
3. You observe the outcome.
4. The block may continue or may end.

We now discuss these points in detail.

1. Your color and your match

In each period, half of the persons in your group are **red** and the others **blue**. Your initial color is random and then your color alternates from period to period:

- If you are **blue**, then next period you will be **red**;
- If you are **red**, then next period you will be **blue**.

Your match has always a color different than yours. If there are **fixed pairs**, then your match remains the same in each period of the block. Otherwise, your match changes from period to period with a probability greater than 80% because your match can be **anyone from your group** who has a color different than yours. You will never know who you meet.

2. Your choices

- If you are **blue**, then you have no choice to make.

- If you are **red**, then you must select one of the following two options (see figure below):

  o **Execute Y**
  o **Execute Z**

Your ID: 24 Block: 2 Period: 9

YOUR ID

This period you are: RED

Your match is random
(you are in a group of 12)

EARNINGS TABLE

POSSIBLE OUTCOMES	EARNINGS
Y	BLUE gets 3 points You get 6 points
Z	BLUE gets 18 points You get 0 points

YOUR CHOICES

Please make a choice:
- Execute Y
- Execute Z

Submit

Results of previous periods in this block

Period	Your color	Outcome	Your earnings	Same outcome in all pairs?
3	RED	Y	6	Yes
4	BLUE	Y	3	Yes
5	RED	Y	6	No
6	BLUE	Z	18	No
7	RED	Y	6	No
8	BLUE	Y	3	No

PAST OUTCOMES

To make your choice, select the relevant option and click the "Submit" button**.** You can review results of **past periods of the block** by scrolling down the table at the bottom of the screen. Each line reports your color, the **outcome** Y or Z in your pair and your **earnings** in a past period**.** The last column reports whether the outcome was the same in all pairs of your group.

3. Outcome of choices

The results for the period will be displayed after everyone makes a choice (see figure below). You will see the **outcome** and the points you **earned**. You can write the results on your record sheet. Results from past periods will again be visible at the bottom of the screen.

Your ID: 24 Block: 2

OUTCOME IN YOUR PAIR

RESULTS OF PERIOD 20

This period you were: BLUE

The outcome was: Y

Your earnings are: 3 points

POSSIBLE OUTCOMES	EARNINGS
Y	RED gets 6 points You get 3 points
Z	RED gets 0 points You get 18 points

Random draw is: 12

CONTINUATION OR END OF THE BLOCK

The block will continue

Results of previous periods in this block

Period	Your color	Outcome	Your earnings	Same outcome in all pairs?
15	RED	Z	0	Yes
16	BLUE	Y	3	No
17	RED	Z	0	No
18	BLUE	Z	18	No
19	RED	Z	0	No
20	BLUE	Y	3	No

4. Ending of a block

Each block has many periods but their number is **unknown** because it is **random**. Hence:

- We never know for sure which period will be the last in a block.
- Some blocks may end up being longer and others shorter.

Each block will have at least 16 periods. From period 16 on, at the end of each period a computer selects with equal probability a number between 1 and 100. If the number selected is less than or equal to 75, then the block will continue. Otherwise, the block will end. This number is the same for every participant.

So: starting in period 16, the block has always a chance to continue. The results screen will inform you whether the block continues or not: you will see the randomly selected number.

Note: The number of past periods does not influence the chance that a block will end. In every period, **every number** between 1 and 100 has an equal chance of being selected. Hence, the chance that a block will end, say, after period 20, is 25%, which is identical to the chance that the block will end after period 16. As soon as a block ends, different groups are formed and a new block starts.

Will there be fixed pairs or random pairs?

In blocks 1 and 3 you will be in a fixed pair. In blocks 2 and 4 you will be randomly paired inside a group of 12 participants. **Recall**: participants that you meet in a block cannot be met in future blocks.

At the end of each of the first four blocks you will be asked to **express your preference** for your match to be either fixed, or randomly assigned from a group of 12 persons. Your preferences will **not** be revealed to others. A computer program will tally all the preferences expressed and in block 5 the program will either form fixed pairs or groups of 12 based on the most preferred option (or "flip a coin," in case of a tie).

Finally, before block 6 starts you will be asked to express a preference for your match to be either fixed, or randomly assigned from **one large group with all 24 participants** (in which case your match most likely changes every period). Once again, the computer program will implement the most preferred option.

Payments

When the session ends, **one** of the six blocks completed will be randomly selected. The points you have earned **in that block** will be converted into dollars: **1 point is worth 20 cents** ($0.20).

To choose the block we publicly roll a six-faced "virtual" die at http://www.bgfl.org/virtualdice.

The numbers on the die's faces identify the blocks. Each block is equally likely to be selected.

Final reminders

- The session is divided into six separate blocks; each block has many periods.

- In each period you meet an anonymous match. If pairs are fixed, your match is the same for the entire block. Otherwise, your match **changes** from period to period with more than 80% probability.

- If you are **red**, then you must choose between outcome Y and Z.

- The points you earn depend on the **outcome** in your pair, Y or Z, and whether pairs are fixed or not.

- Each block has an **uncertain** number of periods. Starting in period 16, there is **always** a 75% chance of an additional period, and a 25% chance of ending.

- In the last two blocks pairs are fixed or random depending on the majority of preferences.

- You **cannot** interact with anyone for more than one block except, possibly, in the last block.
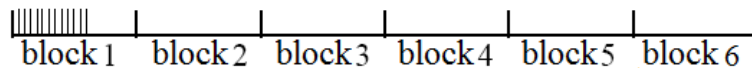
Before we start the experiment, you will be asked to answer ten questions designed to verify your understanding of the instructions. You will receive $0.25 for each question you answer correctly. If you have a question at any time, then please raise your hand and someone will come to answer it.

Instructions for the Tokens condition

This is an experiment in decision-making. You will earn money based on the decisions you and others make in the experiment, and you will be paid in cash at the end of the experiment. Different participants may earn different amounts.
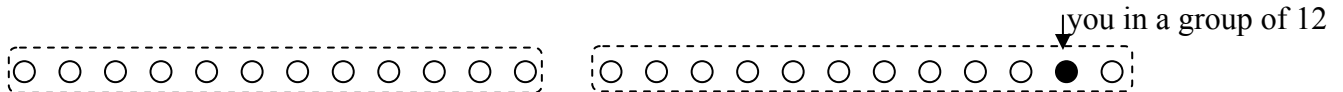
Overview of the experiment

The experiment is divided into **six blocks**. Each block is a separate section with **many periods**:

There are 24 participants. At the start of each **block**, a computer program will form groups. In each period of the block you will be paired with someone **in your group** to interact with him or her.

- In some blocks there will be **random pairings** inside two groups of 12 participants:

you in a group of 12

- In other blocks there will be **fixed pairings** because groups will have only 2 participants:

you in a fixed pair

Groups change in each block so that **you cannot interact with anyone for more than one block**, except, possibly, block 6.

How do you earn money in a period?

You will earn points that depend on your choices and the choices of others **in your group**. Points will be converted into dollars at the end of the session in a manner that we explain later.

In each period you interact with another participant called your **"match."** If you are not in a fixed pair, then your match is **a random person** from your group. Your match will always remain anonymous.

In each pair, one person will be **red** and the other **blue**. The **red** person must choose to execute either outcome **Y** or **Z.** This choice determines the point **earnings** in the pair; the earnings also depend on whether you are in a fixed pair or not, as shown in the following tables:

In a **fixed pair**:

- o if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points.
- o if **Z** is the outcome: **red** earns **0** points and **blue** earns **15** points.

In a **random pair:**

- o if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points.
- o if **Z** is the outcome: **red** earns **0** points and **blue** earns **18** points.

Tickets

In the first period of each block everyone who is **blue** will receive **1 ticket.** Tickets:

- do not yield points or dollars

- cannot be carried over to the next block

- cannot be redeemed for points or dollars

- can be exchanged with your match as explained below.

What happens in each period?

Each **period** has the following timeline:
1. You see your color and you are paired with another participant.
2. You may be called to make a choice.
3. You observe the outcome.
4. The block may continue or may end.

We now discuss these points in detail.

1. Your color and your match

In each period, half of the persons in your group are **red** and the others **blue**. Your initial color is random and then your color alternates from period to period:
- If you are **blue**, then next period you will be **red**;
- If you are **red**, then next period you will be **blue**.

Your match has always a color different than yours. If there are **fixed pairs**, then your match remains the same in each period of the block. Otherwise, your match changes from period to period with a probability greater than 80% because your match can be **anyone from your group** who has a color different than yours. You will never know who you meet.

2. Your choices

- If you are **blue,** in general you must choose one of three options (see figure below):

  o *Keep your ticket(s)*
  o *Give a ticket to red*
  o *Give a ticket to red only if Z is the outcome.*
     This option **guarantees** that your ticket goes to **red only if red does not** choose outcome **Y**.

Note: If you are **blue** and **do not** have a ticket, then you have **no choice** to make.

YOUR ID

EARNINGS TABLE

YOUR CHOICES

This period you are: BLUE

Your match is random
(you are in a group of 12)

You have 1 tickets

You have met a RED who has 1 or more tickets

POSSIBLE OUTCOMES	EARNINGS
Y	RED gets 6 points You get 3 points
Z	RED gets 0 points You get 18 points

Please make a choice:

○ Keep your tickets(s)
○ Give a ticket to RED
○ Give a ticket to RED only if Z is the outcome

Submit

Results of previous periods in this block

Period	Your color	Outcome	Ticket Transfer	Your earnings	Same outcome in all pairs?
1	RED	Z	NO	0	Yes
2	BLUE	Y	NO	3	Yes
3	RED	Z	YES	0	No

PAST OUTCOMES

To make your choice, select the relevant option and click the "Submit" button**.** You can review results of **past periods of the block** by scrolling down the table at the bottom of the screen. Each line reports your color, the **outcome** Y or Z in your pair, if there was a ticket transfer in your pair, and your **earnings** in a past period**.** The last column reports whether the outcome was the same in all pairs of your group.

- If you are **red,** in general you must choose one of three options (see figure below):
  - *Execute Y*
  - *Execute Z*
  - *Execute Z only if blue gives me a ticket.*
    Choosing this last option **guarantees** that:
    ▪ If **blue** chooses any option involving "*Give a ticket,*" then the outcome is **Z** and you receive a ticket from **blue**.
    ▪ Otherwise, the outcome is **Y** and you do not receive a ticket.

Note: If your **blue** match does not have a ticket, then you **do not** have the third option.

3

YOUR CHOICES

This period you are: RED

Your match is random
(you are in a group of 12)

You have 0 tickets

You have met a BLUE who has 1 or more tickets

POSSIBLE OUTCOMES	EARNINGS
Y	BLUE gets 3 points You get 6 points
Z	BLUE gets 18 points You get 0 points

Please make a choice:
- Execute Y
- Execute Z
- Execute Z only if BLUE gives me a ticket

Submit

Results of previous periods in this block

Period	Your color	Outcome	Ticket Transfer	Your earnings	Same outcome in all pairs?
1	BLUE	Z	YES	18	Yes

3. Outcome of choices

The results for the period will be displayed after everyone makes a choice (see figure below). You will see the **outcome**, if a ticket was transferred, and the points you **earned**. You can write the results on your record sheet. Results from past periods will again be visible at the bottom of the screen.

OUTCOME IN YOUR PAIR

RESULTS OF PERIOD 20

This period you were: BLUE

The outcome was: Z
Your earnings are: 18 points

You started with: 1 tickets
You now have: 0 tickets

POSSIBLE OUTCOMES	EARNINGS
Y	RED gets 6 points You get 3 points
Z	RED gets 0 points You get 18 points

CONTINUATION OR END OF THE BLOCK

Random draw is: 41

The block will continue

Results of previous periods in this block

Period	Your color	Outcome	Ticket Transfer	Your earnings	Same outcome in all pairs?
16	BLUE	Y	NO	3	No
17	RED	Z	NO	0	No
18	BLUE	Y	NO	3	Yes
19	RED	Y	YES	6	Yes
20	BLUE	Z	YES	18	No

4

<u>4. Ending of a block</u>

Each block has many periods but their number is **unknown** because it is **random**. Hence:

- We never know for sure which period will be the last in a block.
- Some blocks may end up being longer and others shorter.

Each block will have at least 16 periods. From period 16 on, at the end of each period a computer selects with equal probability a number between 1 and 100. If the number selected is less than or equal to 75, then the block will continue. Otherwise, the block will end. This number is the same for every participant.

So: starting in period 16, the block has always a chance to continue. The results screen will inform you whether the block continues or not: you will see the randomly selected number.

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- The session is divided into six separate blocks; each block has many periods.

- In each period you meet an anonymous match. If pairs are fixed, your match is the same for the entire block. Otherwise, your match **changes** from period to period with more than 80% probability.

- If you are **red**, then you must choose between outcome Y and Z.

- The points you earn depend on the **outcome** in your pair, Y or Z, and whether pairs are fixed or not.

- Tickets **neither** yield points or dollars, **nor** will be redeemed for points or dollars.

- Each block has an **uncertain** number of periods. Starting in period 16, there is **always** a 75% chance of an additional period, and a 25% chance of ending.

- In the last two blocks pairs are fixed or random depending on the majority of preferences.

- You **cannot** interact with anyone for more than one block except, possibly, in the last block.

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