Appendices

Appendix A: Experimental Instructions, main experiment

The following is a translation of the original instructions (in Italian) provided to the *row-players* participants in the *eye-tracking group*. The role description was adapted in the instructions provided to the *column players*, and the eye-link procedure was omitted in the *non eye-tracking group*. The experimenter read the instructions aloud to the participant while he/she followed along on his/her own copy. Original instructions are available upon request.

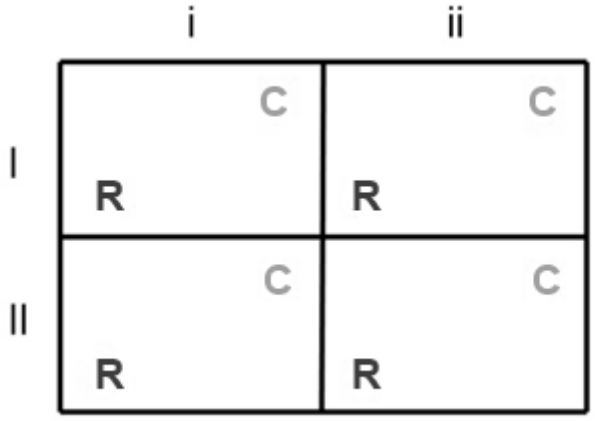
Instructions

Dear student, you are about to participate in an experiment in interactive decision making. Your privacy is guaranteed; results will be used and published anonymously. Your choices during the experiment will determine your gain, which you will receive at the end of the data collection, privately and in cash. Your earning will depend on both your choices and the choices of another participant that you will select randomly at the end of the data collection. All of your choices and earnings in the experiment will be confidential. You can earn between 1€ and 9€ in addition to a 5€ show-up fee.

The experimental structure

The experiment consist of 32 rounds, in each round you will face an interactive decision making situation. In each round you will have to choose one **between two options**: the word "*interactive*" indicates that the outcome of your decision will be determined by your choice and the choice of another randomly chosen participant.

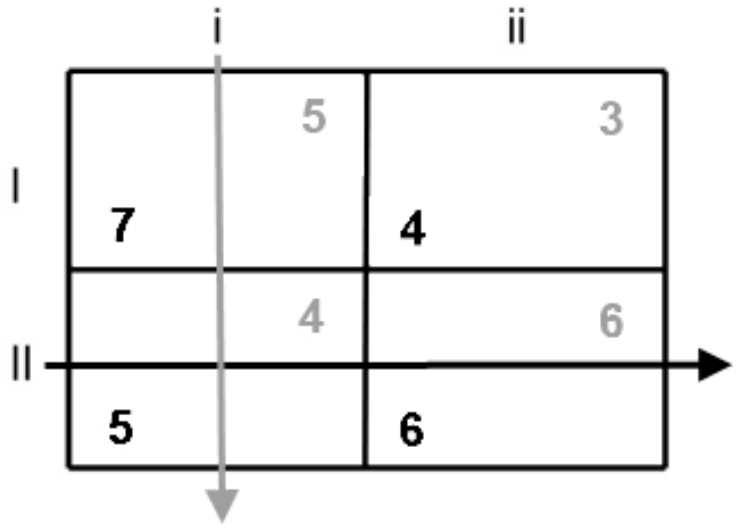
The structure of each interactive decision problem, henceforth **game**, will be represented by a matrix like the one shown below.



The letters will be substitutes by numbers, indicating an amount in Euros. Throughout the experiment, you and the participant with whom you will be paired will play the roles, respectively, of **ROW PLAYER** and **COLUMN PLAYER**. The available choices of the **ROW PLAYER** (for you) are represented by the **rows** of the matrix (the row on top "**I**", the row at the bottom "**II**"). The available choices of the **COLUMN PLAYER** are represented by the **columns** of the matrix (the column on the left "**i**", the column on the right "**ii**").

Each possible combination of choices of the row and column player (i.e., each possible combination of rows and columns of the matrix) identifies one cell in the matrix. Each cell reports two numerical values. These values indicate the earnings (in EUROS) of each participant associated with that combination of choices. Conventionally, the number on the bottom of the cell represents the earnings of the **ROW PLAYER** (your earning), while the number on the top represents the earnings of the **COLUMN PLAYER**.

For example: in the table below, if **YOU** choose the second row (II) and the **OTHER PLAYER** chooses the first column (i), then your earnings will be those in the cell at the intersection between the selected row and column. In this example **YOU** earn 5 EUROS and the **OTHER PLAYER** 4 EUROS.



Bear in mind that you cannot directly choose the cell of the matrix, but only one of the rows (the other participant with whom you will be matched will choose one column). Only the combination of both choices will select one and only one cell, corresponding to your earnings and to those of the other participant.

The choices that you and the other participant will make, and the corresponding results, will not be communicated to you at the end of each period, but only at the end of the whole data collection.

Information

In each of the 32 rounds, the screen will show the decisional matrix for that round, and you will be asked to make a decision knowing your gain will depend only on that choice and the choice of the person matched with you. Please remember that you cannot choose a single cell, but only the row that you prefer, given your considerations.

To help you with your choice, the payoffs of the row player (yours) are positioned in the bottom-left corner of each cell and will be in green, while the payoffs of the column player will be in the top-right corner of the cell and will be in red.

To select your choice you will have to press key 1 for row I (the row on the top of the matrix) and key 2 for row II (the row on the bottom of the matrix).

You will face 32 decisional matrices, corresponding to 32 different interactive situations. The matrices are divided in 4 blocks of 8 matrices each. After each block there will be a short procedure to verify the correct focus of the eye-link equipment.

There is no relation among your choices in the different games, each game is independent from the others. There is no time limit. We only ask you to try, if possible, to take no longer than one minute for each game.

Payments

Your earnings will be determined at the end of the data collection through the following procedure: Each matrix is identified by a code. Some tags will be placed in a box, each showing the code of one of the matrices. The experimenter will ask you to pick one of these tags from the box. You will be paid according to the earnings obtained in the matrix corresponding to the extracted code. In a second box 32 tags have been placed, corresponding to 32 subjects that have participated in the experiment as column player. You will have to draw one tag from this box too. Your earnings will be determined by your choice and the choice of the column player you have selected, in the matrix you have drawn. The earning of all other participants will be determined using the same procedure.

Since each of the 32 decisional matrices of the experiment has the same positive probability of being selected for payment, we ask you to devote the same attention to all of them.

Before the experiment starts, we will ask you to answer a simple anonymous questionnaire, in order to test whether instructions have been clearly understood or whether clarifications are needed. If there are incorrect answers, the relevant part of the instructions will be repeated. The experiment will start after the questionnaire phase is completed.

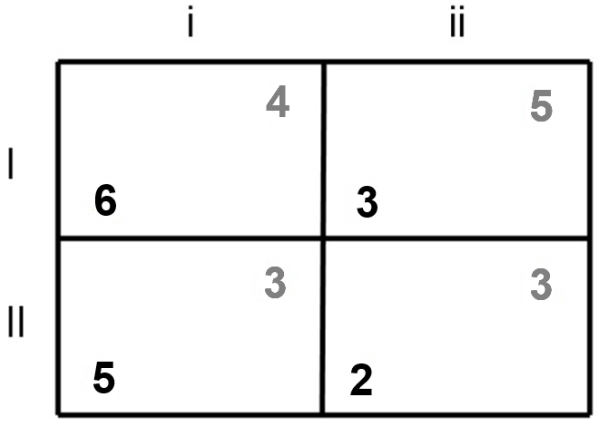
Thank you for your participation!

Appendix B: Questionnaire, main experiment

Dear Participant,

the following questionnaire has the sole purpose of verifying your understanding of the rules of this experiment. We ask you to answer the following questions. If you are uncertain about how to respond, please consult the instructions sheet or the experimenter. Your answers to these questions will not affect your earnings in the experiment.

Thank you for your cooperation!



<u>Suppose you are assigned the role of ROW PLAYER:</u>

- If the COLUMN PLAYER chooses the first column and you choose the first row, how many EUROs will you earn? ..... And how many will the other player earn? .....
- If you choose the second row, and COLUMN PLAYER chooses the first column, how many EUROs will that person earn? ..... And how many EUROs will you earn? .....

If the other player chooses the second column, your earnings will be:

If you choose the first row: .....

If you choose the second row: .....

<u>Suppose you are assigned the role of COLUMN PLAYER</u>:

- If the ROW PLAYER chooses the first row and you choose the second column, how many EUROs will you earn? ..... And how many will the other player earn? .....

- If the other player chooses the second row, your earnings will be:

If you choose the first column: .....

If you choose the second column: .....

- Your role (as ROW or COLUMN PLAYER) in the rounds of the experiment will change:

TRUE or FALSE

- The participant with whom you are paired will be determined randomly.

TRUE or FALSE

- After you have taken your decision on a matrix, you will be able to observe the choice of the participant with whom you are paired.

TRUE or FALSE

Appendix C: Experimental Instructions, experiment with trained subjects

The following is a translation of the original instructions (in Italian). The experimenter read the instructions aloud to the participant while he/she followed along on his/her own copy. Original instructions are available upon request.

Instructions

Dear participant, you are about to participate in an experiment on interactive decision making (decisions whose outcome depends on the actions of more agents).

Your decisions will determine your earning: an amount that you will receive privately by bank transfer. The maximum earning is 19.20 €, the minimum 5.00 €.

Your earning is linked to your comprehension of these instructions, therefore we ask you to pay attention during the description of the various experimental phases.

The experiment consists of four phases. The order in which you will face the phases is randomly generated; therefore, it is possible that you will face them in an order different from the one we are presenting to you below. The order in which you will face the phases does not affect the development of the experiment, nor your earning.

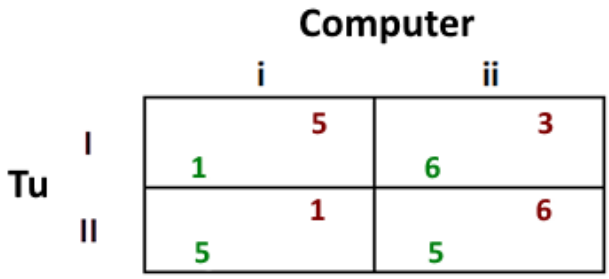
In each experimental phase you will be paired with a computer that will choose its actions following specific rules. We will now describe each of these rules in detail.

During the experiment, your task will be to choose one action following the instructions you will receive later on: you will have to adapt your choice according to the rule that the computer will use.

General structure of the game

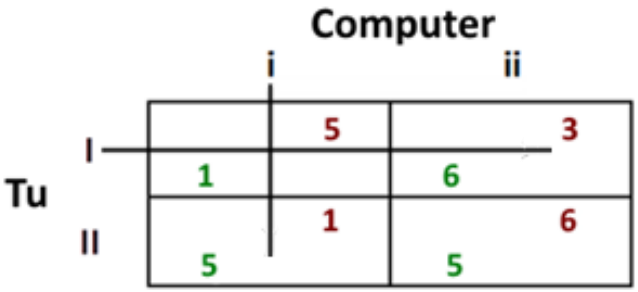
Each phase of the experiment consists of 32 rounds. In each round you will see on the screen a matrix like the one presented below. The matrix – henceforth called game – will always have two rows (I, II), and two columns (i, ii).

You will always be the row player and you will have to choose either row I or row II, while the computer will always be the column player and it will choose either column i or column ii. Your values will always be presented in green, while the values of your counterpart (the computer) will always be presented in red.



From each combination of choices of the **ROW PLAYER** and **COLUMN PLAYER** (i.e., for each combination of rows and columns) one cell of the matrix will be selected. Each cell contains two numerical values (one in green and one in red). These values correspond to a score for each player. In each cell, the number at the bottom and in green represents always the score for the ROW PLAYER (yours), while the number on top and in red represents always the score for the COLUMN PLAYER (the one of the computer).

For example, in the matrix below, if YOU choose row I and the computer chooses column i, your scores will be located in the cell at the intersection between the selected row and column. In this example the score is 1 for you and 5 for the other player.



Remember that you cannot choose directly a cell within the table, but only one of the rows (the computer will choose one of the columns). The combination of both choices will determine one and only one cell that will correspond to the game outcome.

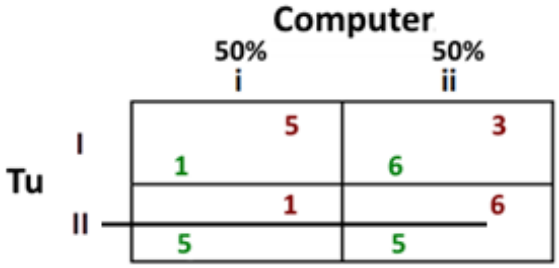
Phase 1

Your goal: best reply to a computer that chooses randomly

In each round of this experimental phase the computer will mimic the behavior of a player that chooses randomly. This means that it will choose column i with 50% probability and column ii also with 50% probability.

The best way to reply when facing a counterpart behaving in this way is to choose the row with the highest average score.

In the example presented above the highest average score is obtained in row II. Row II has an average score of 5 ((5+5)/2), while row I has an average score of 3.5 ((1+6)/2).



In this phase you will play 32 rounds. Each time you will choose the option with **the highest average score** you will earn 15 cents; if your answer is wrong your earning (for that round) will be 0 cents.

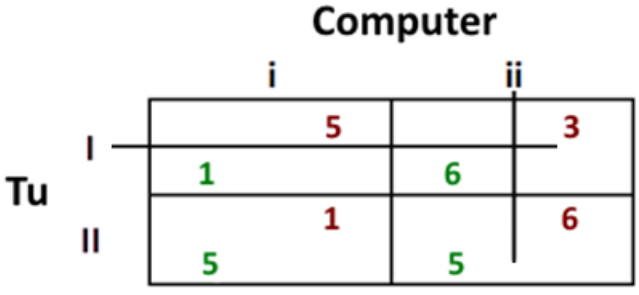
In this experimental phase, your earning will vary from a minimum of 0 cents to a maximum of 4.80 euros, depending on how many times you will choose **the row with the highest average score**.

Phase 2

Your goal: best reply to a computer that chooses the column with the highest average score.

In each round of this experimental phase, the computer will mimic the behavior of a player that chooses the column with the highest average score.

The best way to reply when facing a counterpart behaving in this way is first to locate what the computer will choose, then reply choosing the option (either row I or row II), which provides the highest score. In the example presented above the computer will choose column ii since it has the highest average score (column ii: (3+6)/2 = 4.5; column i: (5+1)/2 = 3). To reply correctly, you will have to choose row I, which provides you a score of 6, higher than what you will obtain choosing row II (5).



In this phase you will play 32 rounds. Each time you will choose **the row that will produce the highest score (knowing that the computer will choose the option with the highest average score)** you will earn 15 cents.

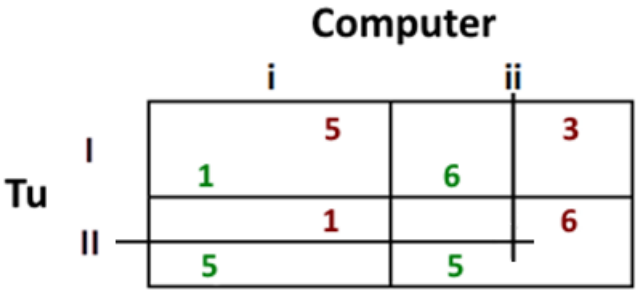
In this experimental phase, your earning will vary from a minimum of 0 cents to a maximum of 4.80 euros, depending on how many times you will choose **the row that produces the highest score**.

Phase 3

Your goal: coordinate on the option that maximizes the joint score.

In each round of this experimental phase, the computer will mimic the behavior of a cooperative player that aims to coordinate with you in order to maximize the joint score. The computer will choose the column in which the cell with the highest joint score lies. Your goal is to behave cooperatively as well, choosing the row in which the cell with the highest joint score lies.

In the example above the highest joint score is obtained in the bottom-right cell (6+5 = 11). The computer will choose column ii and you will have to choose row II.



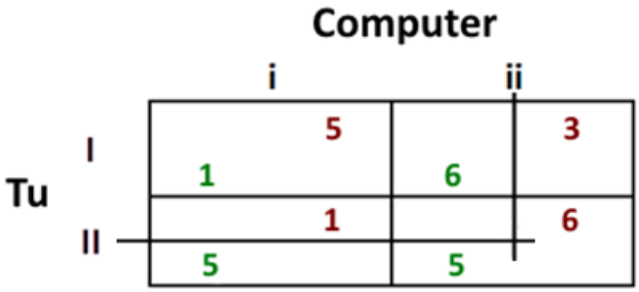
In this phase you will play 32 rounds. Each time you will choose **the row in which the cell with the highest joint score lies** you will earn 15 cents. In this experimental phase, your earning will vary from a minimum of 0 cents to a maximum of 4.80 euros, depending on how many times you will choose **the row in which the cell with the highest joint score lies**.

Phase 4

Your goal: choose the row that maximizes the difference between your score and the score of the computer (on average), knowing that the computer will choose the column that guarantees the highest average score.

In each round of this experimental phase, the computer will mimic the behavior of a player that chooses randomly. This means that it will choose column i with 50% probability and column ii also with 50% probability.

According to the rules of this phase, the best way to reply is to locate the row that maximizes the difference between your score and the score obtained by the computer. In the example above the right row is row II, since it has an average score difference of 1.5 ([5-1]+[5-6]/2), while row I has an average score difference of -0.5 ([(1-5)+(6+3)]/2).



In this phase you will play 32 rounds. Each time you will choose **the row which determines the highest average score difference** you will earn 15 cents. In this experimental phase, your earning will vary from a minimum of 0 cents to a maximum of 4.80 euros, depending on how many times you will choose **the row which determines the highest average score difference**.

Appendix D: Questionnaire, experiment with trained subjects

The following questionnaire has the sole purpose of verifying your understanding of the rules of this experiment. Your answers will not affect your future earnings.
To answer the questions you are allowed to look at the instruction. If you are uncertain about how to respond, please ask the experimenter.
Thank you for your cooperation!

- During the experiment you will play as:
  ROW PLAYER COLUMN PLAYER

- In each round you will have to choose a:
  ROW COLUMN CELL

- Your earning will be calculated depending on:
  YOUR SCORE number of CORRECT ANSWERS

- If facing this game:

	i	Ii
I	4 3	6 1
II	2 2	7 4

  - The right choice during the Phase 1 would be:
    I II
  - The right choice during the Phase 2 would be:
    I II
  - The right choice during the Phase 3 would be:
    I II
  - The right choice during the Phase 4 would be:
    I II

Appendix E: Experimental details about the experiment with trained subjects

Participants were 32 undergraduate students from the University of Trento (21 females, mean age 22.4). Participants were instructed to choose according with four different decision rules, defined as follow: (1) *L1-rule* in which participants were asked to choose the option with the highest average payoff. (2) *L2-rule,* in which participants were asked to best respond to a player who chooses the option with the highest average payoff. (3) C*ooperative-rule,* in which participants were asked to coordinate their actions with those of the counterpart on the outcome that maximize the join payoff. (4) *Competitive-rule,* in which they were asked to choose the option that maximizes the difference between their own payoff and the payoff of the counterpart, assuming that the counterpart was choosing randomly.

Participants were asked to apply each of the four rules to the 32 games described in the first experiment (see Figure 1 in the article), for a total of 128 trials per subject. They were informed they would receive 15 cents for each choice aligned with the selected rule, 0 cents otherwise.

Before the experiments started, a copy of the instructions - which describe a 2 by 2 strategic situation and the four decision rules - was given to the participants and read aloud by the experimenter. Then, one at a time, the decision rules were randomly selected and explained to the participants. Participants were also required to pass a comprehension questionnaire before starting the experiment.

After the eye-tracker was calibrated, one decision rule was randomly selected. Participants underwent two practice games and then played the 32 trials. At the end of the session, a new decision rule was selected and the procedure repeated. The same procedure was applied for all four decision rules.

Participants earned between 0 and 19.20 Euros (average 18.20 Euros) plus a show-up fee.

Appendix F: Relationship between attention and the spatial location of the payoffs.

The level of attention toward each AOI was influenced by the spatial location of the payoffs in the screen. A Wilcoxon paired test shows that participants devoted more attention (the average fixation time is higher) to the payoffs of Row 1/Column 1 (AOIs: 1, 2, 5, 7; see Figure 2 in the article) than to those of Row 2/Column 2 (AOIs: 3, 4, 6, 8; Wilcoxon paired test, $V = 2108$, $p = .001$). The same analysis showed that the average fixation time is higher in the AOIs located closer to the center of the screen (AOIs 2 and 7) than those located closer to the border of the game matrix (AOIs: 1, 3, 4, 5, 6, and 8; Wilcoxon paired test, $V = 1073$, $p = .004$).

However, equilibrium and focal cells were both evenly distributed within the four cells of the matrix (top-left, top-right, bottom-left, bottom-right), among games. Therefore, the tendency to fixate more the payoffs located closer to the center of the screen, should have not affected our results.