Online Appendix for "Nash vs. Coarse Correlation"

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1 APPENDIX (FOR ONLINE PUBLICATION)

We first report below the full set of instructions including record sheet and the test only for our coarse correlated treatment. The instructions (and subsequently the record sheet and the questionnaire) for other treatments involving the game(s) differ in a natural way. Thus, for obvious reasons, these have been omitted here and are available upon request. We then provide just the instructions for our individual lottery treatment.

1.1 Instructions (Coarse Correlated Treatment)

All participants in a session (in the coarse correlated treatment) have the following identical instructions.

Welcome to this experiment and thank you for participating. Please read the following instructions carefully. From now on, please do not talk to any other participants until this session is finished. You will be given 15 minutes to read these instructions. Please read them carefully because the amount of money you earn will depend on how well you understand these instructions. After you have read these instructions, we will ask you to complete a brief questionnaire to ensure that you completely understand the instructions. If you have a question at any time, please feel free to ask the experimenter.

In this experiment, you will face a simple decision problem, in each of the successive 20 rounds. Before the first round begins, all the participants will be randomly divided into two equal-sized groups. One group is called Red and the other is called Blue. Your computer screen will tell you which group you are in; you will remain in the same group throughout this session.

In each round, you will be randomly matched with a person from the other group. You have an equal chance of being matched with any particular person from the other group. Both your identities will remain concealed throughout the session and you will have no direct contact with each other during the experiment. Your earnings for this experiment will depend on the choices you make as well as the choices made by the persons you are matched with.

SEQUENCE OF THE PLAY:

1. You are randomly allocated to a group: Red or Blue, with equal chance. You will remain in the same group for the whole session.

2. The session will have 20 identical rounds.

3. At the start of each round, you are randomly matched to another participant (your counterpart), who belongs to the other group.

4. The computer program asks you (and your counterpart) whether or not you accept the computer to make a choice for you (and your counterpart), using a specific device (explained later in detail).

5. You and your counterpart both decide (independently) whether to accept or not.

6. There are two possible situations for you:

a. If you accept, there is nothing else for you to do in this round.

b. If you do not accept, then you will make a choice (as explained below).

7. In the first 10 rounds, you will have 2.5 minutes per round to make a choice, and thereafter 1.5 minutes per round. If you do not choose within this time, the computer will automatically choose (at random) one of the three choices.

8. You find out the choice of your counterpart, as well as your earnings for that round.

9. You proceed to the second round and steps $3 - 7$ above are repeated.

10. The session ends after the 20th round.

CHOICES:

Both you and the person you are matched with will have three different choices available, depending on which group you belong to. Each participant in the Red group has three alternatives, A, B and C while each participant in the Blue group has three alternatives, X, Y and Z. Each of the choice combinations have corresponding points allocated for the Red and Blue participant and the points table below summarises all the possible combinations and points achievable.

Blue

		X	Y	Z
	A	3, 3	1, 1	4, 1
Red	B	1, 4	5, 2	0, 0
	C	1, 1	0, 0	2, 5

If you are in the Red group, your choice determines a row, and the choice of the person of the Blue group you are matched with determines a column of the points table above. If you are from the Blue group, this is reversed. Each box in the table contains two numbers. The first of these numbers represent the Red person's earnings (in points), and the second number represents the Blue person's earnings (in points). For example, suppose you are from the Red group and in some round you choose A while your counterpart from the Blue group chooses Z, then from that round you will earn 4 points and your counterpart will earn 1 point.

COMMITMENT:

The computer can choose an alternative for you and your counterpart and the computer is programmed in such a way that there are only three equally-likely choice combinations.

There is a $\frac{1}{3}$rd chance that the computer chooses A for the Red person and X for the Blue person.

There is a $\frac{1}{3}$rd chance that the computer chooses B for the Red person and Y for the Blue person.

There is a $\frac{1}{3}$rd chance that the computer chooses C for the Red person and Z for the Blue person.

The above mentioned three options can be the only possible combinations the computer chooses, and no other combination (of Red and Blue groups' choices), other than the above three mentioned, will be chosen. For example, it will never happen that the computer chooses A for the Red participant and Z for the Blue. This is summarised in the following Device:

		Blue		
		X	Y	Z
Red	A	$\frac{1}{3}$	0	0
	B	0	$\frac{1}{3}$	0
	C	0	0	$\frac{1}{3}$

At the start of each round, the computer program asks you and your counterpart the following question: 'Would you like the computer to choose for you according to the device?' It is entirely up to you, in any round, whether or not to accept the computer to make a choice for you. The choice you make is independent and without any communication with your counterpart in the other group. So, at the moment you decide whether or not to accept the computer to make your choice, you do not know what your counterpart's decision is. Depending on what you and your counterpart's response to the question, there are three possible scenarios, as discussed below in detail.

Scenario 1 – 'Both choose Yes':

If you and your counterpart both answer 'Yes' to this question, then the computer chooses one of the three possible alternatives at random as explained above and you both earn the points of the chosen combination, as described by the points table. For example, if you are from the Red group and you decide to accept the computer to choose for you and your counterpart in the Blue group also accepts, and the computer randomly chooses B for you (and therefore chooses Y for your Blue counterpart), then from the points table, you will receive 5 and your counterpart receives 2. Therefore by accepting the computer to make a choice for you, you will receive 2, 3 or 5 and thus on average you will receive $\frac{10}{3}$ $(= 2(\frac{1}{3}) + 3(\frac{1}{3}) + 5(\frac{1}{3}))$.

Scenario 2 – 'One chooses Yes and other chooses No':

Suppose you do not want the computer to make a choice for you and thus answer 'No' to this question, however your counterpart answers 'Yes', then you will have to choose among the three possible alternatives available for you, i.e., if you are from the Red group then you will have to choose between A, B and C and if you are from the Blue group you will have to choose between X, Y and Z. Once you have made your choice, you receive your points according to the points table, determined by your choice and the outcome of the computer's random choice for your counterpart. For example,

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if you are from the Red group and you answer No to the question and choose to play C, and your counterpart from the Blue group answers yes and the computer randomly chooses Z, then you will receive 2 points and your counterpart will receive 5 points. Note that any of the three (X, Y and Z) alternatives for your counterpart can be chosen by the computer and therefore by choosing alternative C you will receive 1, 0 or 2 and thus on average you will receive $1 \ (= 1(\frac{1}{3}) + 0(\frac{1}{3}) + 2(\frac{1}{3}))$.

Similarly, if you answer 'Yes' to this question, however your counterpart answers 'No', then you will not have to do anything more at this stage (the computer will make a choice for you) but your counterpart will be asked to choose among the three possible alternatives.

Scenario 3 – 'Both choose No':

If both of you answer 'No', then each of you will have to choose among the three possible alternatives, i.e., if you are from the Red group then you will have to choose between A, B and C and your counterpart from the Blue group will have to choose between X, Y and Z. Once you both have made your choices, you receive your points determined by the points table. For example, if you are from the Red group and you answer No and choose to play A, and your counterpart from the Blue group also answers No and chooses to play Z, then you will receive 4 points and your counterpart will receive 1 point.

THE COMPUTER SCREEN:

The main screen of each round looks like as follows. It will mention which group (Red or Blue) you belong to. On the top right corner the remaining time will be mentioned. In each round you will be asked the following question: Would you like the computer to choose for you according to the device? You will also see the points table and the Device, which will remain the same for all the rounds. Followed by these, you will have two options: Yes or No, to choose.

Shown here, to illustrate, is a screenshot where you belong to the Red group.

You belong to the Red group

Remaining Time:

0:56

Would you like the computer to choose for you according to the device?

		Your Counterpart's Choice			Device:			
		X	Y	Z		X	Y	Z
	A	3,3	1,1	4,1	A	1/3	0	0
Your Choice	B	1,4	5,2	0,0	B	0	1/3	0
	C	1,1	0,0	2,5	C	0	0	1/3

Yes   No   [OK]

Depending on what you choose there are two possibilities:

If you choose 'Yes', the round ends for you.

If you choose 'No', you will be given a choice to choose among your three available alternatives (as illustrated by the following screenshot).

This is round 1 out of 20

You belong to the Red group

Remaining Time:

0:54

		Your Counterpart's Choice		
		X	Y	Z
	A ○	3,3	1,1	4,1
Your Choice	B ○	1,4	5,2	0,0
	C ○	1,1	0,0	2,5

[OK]

To make a choice you simply have to select the appropriate button and then click OK. You may

then have to wait a few moments until all participants have made their choices, after which the on-screen results for you and your counterpart will appear in that round. On your desk is a Record sheet on which you are requested to keep a note of these results. After all the participants have read their results (15 seconds), the main screen for the next round will appear again, as shown above.

RECORD SHEETS:

You have been given a record sheet to keep a record of the results at the end of each round. During each round, you should write whether you (and your counterpart) committed (i.e. asked the computer to make a choice) or not, choice you (and your counterpart) made or the choice made by the computer for you (or your counterpart). Finally, please record the points you earned in each round.

PAYMENTS:

For showing up on time and completing the experiment, you will earn £3. In addition, at the end of the experimental session, we will randomly select two (out of 20) rounds. The total number of points you earn in these two rounds will be converted into cash at an exchange rate of £1 per point. For example, if out of the 20 rounds, we randomly select Round 5 and Round 18, and in those two rounds you have earned 2 and 5 points respectively, your final cash payment will be £10 in total including the show-up fee. You will be paid, individually and privately, your total earnings at that time. Please complete the receipt form which you will also find on your desk. We need these receipts for our own accounts.

QUESTIONNAIRE:

We will now pass around a questionnaire to make sure all the participants have understood all the instructions and how to read the points table. Please fill it out now. Do not put your name on the questionnaire. Raise your hand when finished, and the experimenter will collect it from you. If there are any mistakes in any of the questionnaires, we will go over the relevant part of the instructions once again. You may look again at the instructions while answering these questions.

Thank you for participating. We hope that you enjoyed the experiment, and that you will be willing to participate again in our future experiments.

1.2 Record Sheet (Coarse Correlated Treatment)

Subject Number:

I am a (circle one) RED BLUE player.

Round	Commit?	Counterpart commit?	Choice	Counterpart's choice	Points
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

1.3   Questionnaire (Coarse Correlated Treatment)

After reading the instructions you will be asked to complete this brief questionnaire, to ensure you have understood them, before starting the experiment itself.

You may look again at the instructions while answering these questions.

For questions $1 - 4$, write the answers in the corresponding boxes.

1. If you belong to the Blue group and you choose not to commit to the computer and choose X and your counterpart in the Red group also does not commit and choose B, how many points do you earn in that round?

2. If you belong to the Red group and you choose to commit to the computer and your counterpart in the Blue group also commits and then the computer chooses B for you, what will be the choice made by the computer for your counterpart in the Blue group?

3. If you belong to the Blue group and you choose to commit to the computer but your counterpart in the Red group does not commit and chooses A and then the computer chooses X for you, how many points do you earn in that round?

4. At the end of the experiment, if out of the 20 rounds, we randomly select Round 2 and Round 17, and in those two rounds you have earned 3 and 5 points respectively, what is your final cash payment in total (in £) for the experiment?

For questions $5 - 8$, circle either True or False.

5. If you are in the Blue group and you do not commit and instead choose Y, while your counterpart from the Red group commits and computer chooses A for him/her, then you will earn 1 point in that round. True or False.

6. If you are in the Red group and you do not commit and instead choose B, while your counterpart from the Blue group does not commit and chooses X, then your counterpart will earn 4 points in that round. True or False.

7. Your counterpart is the same person in each round. True or False.

8. In any publications arising from this experiment the participants will be completely anonymous. True or False.

Thank you for completing this questionnaire. Please leave this completed sheet face up on your desk.

The experimenter will come round to check that you have the correct answers. If any of your answers are incorrect then the experimenter will give you some explanatory feedback.

1.4   Instructions (Individual Lottery Treatment)

All participants in a session (in the individual lottery treatment) have the following identical instructions.

Welcome to this experiment and thank you for participating. Please read the following instructions carefully. From now on, please do not talk to any other participants until this session is finished. You will be given 10 minutes to read these instructions. Please read them carefully because the amount of money you earn will depend on how well you understand these instructions. After you have read these instructions, we will ask you to complete a brief questionnaire to ensure that you completely understand the instructions. If you have a question at any time, please feel free to ask the experimenter.

In this experiment, you will face a simple decision problem, in each of the successive 20 rounds. Before the first round begins, all the participants will be randomly divided into two equal-sized groups. One group is called Red and the other is called Blue. Your computer screen will tell you which group you are in; you will remain in the same group throughout this session.

In each round, you will be asked to choose between two options. Your earnings for this experiment will depend on the choices you make.

SEQUENCE OF THE PLAY:

1. You are randomly allocated to a group: Red or Blue, with equal chance. You will remain in the same group for the whole session.

2. The session will have 20 identical rounds.

3. You face two choices: Option A and Option B.

4. In the first 10 rounds, you will have 1.5 minutes per round to make a choice, and thereafter 1 minute per round. If you do not choose within this time, the computer will automatically choose (at random) one of the three choices.

5. You find out your earnings for that round.

6. You proceed to the second round and steps $3 - 5$ above are repeated.

7. The session ends after the 20th round.

CHOICES:

You will have two choices available: Option A and Option B. For both groups Option A remains the same: "£3 for sure". Depending on which group (Red or Blue) you belong to, your Option B will slightly vary. If you are in the Red group the Option B is: "Computer picks at random with equal chances £3, £5 or £2"; and if you are in the Blue group the Option B is: "Computer picks at random with equal chance £3, £2 or £5". Please note that the option you choose is not affected by any other participant's choice in the room.

The points you earn depends on the option you choose in each round, as described below.

Scenario 1 – 'Choose Option A'

If you choose Option A, then you choose '£3 for sure', and therefore earn 3 points, irrespective of which group you belong.

Scenario 2 – 'Choose Option B'

If you choose Option B, then the computer chooses one of the three possible amounts at random and you will earn the amount chosen by the computer for that round. If you are in the Red group, the computer chooses £3, £5 or £2 with a chance of $\frac{1}{3}$rd each. If you are in the Blue group, the computer chooses £3, £2 or £5 with a chance of $\frac{1}{3}$rd each. Please note that in a particular round, the computer can choose only one of these three amounts, and the amount it chooses is the point you receive for that round. For example, if you are in the Red group and you choose Option B, i.e., accept the computer to make a choice for you, and the computer chooses £5, then the points you receive in that round is 5. Please note that the computer could have chosen £3, £5 or £2 with a chance of $\frac{1}{3}$rd each, and therefore on average you will receive $£\frac{10}{3}$ $(= £3(\frac{1}{3}) + £5(\frac{1}{3}) + £2(\frac{1}{3}))$. Please note that the average point you may receive is the same for Red and Blue group.

THE COMPUTER SCREEN:

The main screen of each round looks like as follows. It will mention which group (Red or Blue) you belong to. On the top right corner the remaining time will be mentioned. In each round you will be faced with two options: Option A and Option B. You will see the two options (Option A and Option B), and this will remain the same for all the rounds.

Shown here, to illustrate, is a screenshot where you belong to the Red group.

To make a choice you simply have to select the appropriate button and then click OK, after which the on-screen results for you will appear in that round (as shown in the screenshot below).
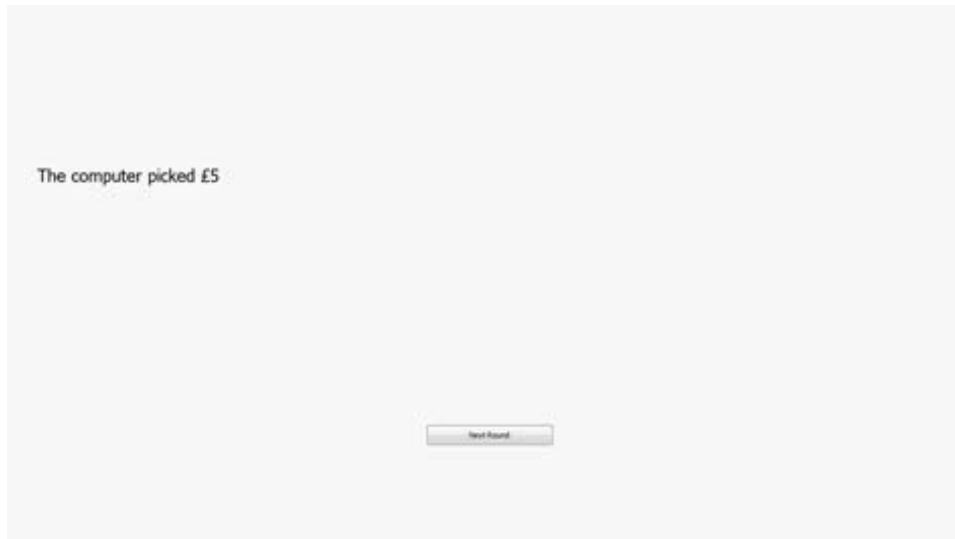
The computer picked £5

On your desk is a Record sheet on which you are requested to keep a note of these results. After you note down the results, click Next Round and the main screen for the next round will appear again, as shown in the first screenshot.

RECORD SHEETS:

You have been given a record sheet to keep a record of the results at the end of each round. During each round, you should write whether you chose Option A or Option B; the choice made by computer in case you chose Option B. Finally, please record the points you earned in each round.

PAYMENTS:

For showing up on time and completing the experiment, you will earn £3. In addition, at the end of the experimental session, we will randomly select two (out of 20) rounds. The total number of points you earn in these two rounds will be converted into cash at an exchange rate of £1 per point. For example, if out of the 20 rounds, we randomly select Round 5 and Round 18, and in those two rounds you have earned 2 and 5 points respectively, your final cash payment will be £10 in total including the show-up fee. You will be paid, individually and privately, your total earnings at that time. Please complete the receipt form which you will also find on your desk. We need these receipts for our own accounts.

QUESTIONNAIRE:

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