Instructions [CB Committee Treatment]

1. Overview

Welcome to this experiment in the economics of decision-making. Please read these instructions carefully as they explain how you earn money from the decisions you make in today's experiment. If you have a cell phone, please turn the ringer off.

At the start of today's session, you will be randomly assigned a role as a Player A or a Player B. Player As will be seated in different rooms from Player Bs. You will remain in the same role for the duration of the session.

Today's session consists of a number of "sequences". Each sequence consists of a number of "rounds". At the start of each new sequence the computer program will randomly form groups of 7 players. Each group will consist of 3 Player As and 4 Player Bs. Once you are assigned to a 7-member group, you will play all rounds of the sequence with the same 6 other members of your 7-member group. At the start of each new sequence, the computer program will again randomly assign players to 7-member groups, consisting of 3 Player As and 4 Player Bs. The identity of the players in your 7-member group is anonymous, except for the three player As who will meet in a separate room. Player As will not be informed of the identities of any player Bs in their group in any sequence played. Player Bs will not be informed of the identity of any other group member in any sequence played. Anonymity will be preserved, even after today's session is over.

2. The decisions to be made

Imagine there are two containers labeled Container 1 and Container 2. At the start of each round, Container 1 holds W_0 gallons of water while Container 2 is empty.

In each round, the four Player Bs in each group move first. Each Player B submits his or her forecast as to how many gallons of water there will be in Container 2 at the *end* of the round.

After all Player Bs have made their forecasts, the computer program calculates the average of the four Player B forecasts, which we denote by af. This average forecast is added to the amount of water in Container 1 so that the total amount of water in Container 1 is now $W_0 + af$.

Next, the three Player As in the group learn both W_0 and af and thereby the total amount of water in Container 1. Then, the three Player As must jointly decide on how much water, from 0 to 80 gallons they wish to move from Container 1 to Container 2. Denote the amount moved by M.

In addition, there is a random, uncontrolled flow of water, V, from Container 1 to Container 2 that the Player As do not know about when choosing M. Thus, the final amount of water in Container 2 is $M + V$.

2.1. Specific details

The initial water level in Container 1, W_0, is a random variable. For each round of a sequence, the computer program draws a value of W_0 randomly and independently from a **uniform distribution over the interval [120, 160].** This means that the minimum possible value of W_0 is 120 and the maximum

possible value of W_0 is 160. All numbers between 120 and 160 inclusive have an equal chance of being drawn, so the expected value of W_0 is 140.

In each round, the four Player Bs in each group move first. Each must submit their own forecast, f, of the final amount of water that will be in Container 2 at the end of the round. Recall that Container 2 is initially empty. Forecasts may range from 0 to 120 gallons of water inclusive in Container 2. Player Bs should type their forecast in the blue input box on their decision screen when prompted. Click the red Submit button when satisfied with your choice.

After all four Player Bs have entered their forecasts, the computer program calculates the *average value of the four forecasts*. Let us denote this average forecast by af. Then, af gallons of water are added to Container 1. Thus, the average forecast increases the amount of water in Container 1. The total amount of water in Container 1 is now $W_0 + af$.

Note that Player Bs do not precisely know the value of W_0 nor do they know af. They *do know* that W_0 is a uniform random draw from the interval [120, 160] and they do know their own forecast, f.

Next, the three Player As are privately informed of the value of af for the round. In addition, the three Player As learn this round's value of W_0 and are told the amount of water in Container 1, W_0+af.

After observing the values of af and W_0 and the total amount of water in Container 1, the three Player As in each group must *jointly* decide how much water to move from Container 1 to the empty Container 2. The three Player As can move up to 80 gallons of water inclusive from Container 1 to Container 2 in each round. Prior to making this decision, the three player As must discuss amongst themselves what to do and reach agreement on a single choice. Let us denote by M the amount of water the three Player As agree to *move* from Container 1 to Container 2. One of the three Player As should then type this choice for M in the blue input box on the decision screen when prompted. Click the red Submit button to confirm the choice.

In addition to M, there is a random, uncontrolled flow of water from Container 1 to Container 2. This uncontrolled flow of water is another random variable, denoted by V. The computer program draws the value of V randomly from a uniform distribution over the interval [0, 40], which means that the minimum possible value of V is 0 and the maximum possible value of V is 40. All numbers between 0 and 40 inclusive have an equal chance of being drawn, so the expected value of V is 20. The three Player As *do not know* V when deciding how much water to move, M; the uncontrolled flow, V, is determined only *after* Player A's choice of M has been made. It follows that:

The final amount of water in Container 1 is: $W_0 + af - M - V$.

The final amount of water in Container 2 is $M + V$.

Participants' payoffs depend on the final amounts of water in Containers 1 and 2 as described in the next section.

2.2. Payoffs for the round

If you are a Player A, you get the *same* payoff as the other two Player As in your group. Your payoff in points for each round depends on the final amounts of water in both Containers 1 and 2 and is determined according to the formula:

$$\text{Player A Points} = 6000 - 2\,(\text{Final Container 1 amount} - 120)^2 - (\text{Final Container 2 amount} - 40)^2$$

For your convenience, a non-exhaustive table of values for Player A's payoff in points is given in Table A as a function of the final water levels in Containers 1 and 2. Notice that Player A's maximize their payoff when the final amount of water in Containers 1 and 2 are as close as possible to 120 and 40, respectively, and that deviations in the final Container 1 water amount from 120 are 2 times more costly than are deviations in the final Container 2 water amount from 40.

If you are a Player B, only the final amount of water in Container 2 matters for your payoff in points. Specifically, your payoff in points for each round is given by the formula:

$$\text{Player B Points} = 4000 - (\boldsymbol{f} - \text{Final Container 2 amount})^2$$

Recall that ***f*** denotes a Player B's *own* forecast for the round and *not* the average forecast, ***af***. For your convenience, a non-exhaustive table of values for Player B's payoffs in points is given in Table B as a function of the difference, ***f*** – Final Container 2 amount. Notice that Player B's maximize their payoff when ***f*** = Final Container 2 water amount.

2.3. Feedback and record keeping at the end of each round.

At the end of each round, the three Player As will be reminded of $\boldsymbol{W_0}$, ***af*** and their choice of ***M***. Player As will then learn of the value of the uncontrolled water flow from Container 1 to Container 2, ***V,*** and the final amount of water in Container 1 ($\boldsymbol{W_0 + af - M - V}$) and in Container 2 ($\boldsymbol{M + V}$). Finally, Player As will be told their own payoff in points for the round and their cumulative point total for the sequence.

At the end of each round, Player Bs will be reminded of their forecast, ***f,*** and learn the average forecast, ***af***, by all Player Bs in their group. Player Bs will then learn the value of $\boldsymbol{W_0}$ (initial water in Container 1), and the sum, $\boldsymbol{W_0 + af}$, which is the amount of water in Container 1 *before* Player A's choice of ***M***. Player Bs will *not* learn the amount of water the Player As in his or her group chose to move from Container 1 to Container 2, ***M,*** nor will they learn the value of the uncontrolled water flow from Container 1 to Container 2, ***V***, but they will learn the final amount of water in Container 1 ($\boldsymbol{W_0 + af - M - V}$) and the final amount of water in Container 2 ($\boldsymbol{M + V}$). Finally, Player Bs will be told the difference between their forecast ***f,*** and the final amount of water in Container 2, their own payoff in points for the round and their cumulative point total for the sequence.

Following revelation of this information, the round is over. Please record the results of the round on your record sheet under the appropriate headings. When you are done recording this information press the Continue button. The sequence may or may not continue with a new round, depending on the random number drawn. If a sequence continues, the procedures will be the same as above. Following the first round of a sequence, all players will see at the bottom of their screens, a history of past final amounts of water in Containers 1 and 2 for the five-person group they were in along with their own payoff in points for each round and their cumulative payoff in points from all rounds played in a given sequence.

3. When does a sequence of rounds continue and when does it end?

At the end of each round, the computer program will randomly draw a number (an integer) between 1 and 6, inclusive. All numbers, 1,2,3,4, 5 and 6 have an equal chance of being drawn; it is like rolling a six-sided die. The number drawn will be displayed on your computer screen. If the number chosen is 1,2,3,4 or 5, the sequence will continue with a new round. If a 6 is chosen, the sequence will end. Thus, there is a 5 in 6 (83.33 percent) chance that a sequence will continue from one round to the next and a 1 in 6 (16.67 percent) chance that the current round will be the last round of the sequence.

If a sequence ends, then, depending on the time available, a new sequence may then begin. At the start of each new sequence you would be randomly formed into new 7-member groups, consisting of three Player As and 4 Player Bs. The players in your group would again remain fixed for the duration of the new sequence.

If, by chance, the final sequence has not ended by the three-hour time period for which you have been recruited, we will schedule a continuation of that final sequence for another time in which everyone here can attend. You would be paid based on your cumulative point total for one randomly selected sequence that finished in today's session and you would receive a further payment following completion of the final sequence in a continuation sequence, as discussed below.

4. Earnings

If, as we expect, today's session ends within the 3-hour time period for which you have been recruited, then your payoff will depend on the total number of points you earned in a maximum of two of the sequences that were played in today's session. Specifically, if only one sequence was played, then your point total for today's session will equal your point total from that sequence. If two or more sequences have been played, then your point total for today's session will be the sum of your cumulative point totals from *two* sequences. If more than two sequences were played, then one sequence chosen for payment will be the sequence in which you earned the highest payoff. The other sequence will be randomly chosen from among all sequences played in today's session. Your session point total from the chosen sequence(s) will be converted into dollars at the rate of 2000 points =$1.00 (or 20 points = 1 cent). Clearly, the more points you earn the higher is your dollar payoff. Since you don't know in advance which sequence(s) will determine your final payoff, you will want to do your best in every sequence. If, as mentioned above, the final sequence does not end within the 3-hour time period for today's session, then you would be paid for one randomly chosen sequence that did end during today's session (provided that event occurred) and following completion of the final sequence in the later, continuation session, you would also be paid for the sequence in which you earned the highest payoff.

In addition to your dollar earnings from the two sequences chosen for payment, you begin each sequence with 7000 points ($3.50). The 7,000 initial endowment of points will show up in your cumulative point total for each sequence. Since we will pick two sequences for payment, these two initial point balances of 7,000 points (14,000 points total) comprise your $7.00 show-up payment for your participation in today's session. If only one sequence is played in today's session then we will add another 7000 points to your cumulative point total for that one sequence. Note that your initial or cumulative point total in each sequence will be reduced if you earn negative points in any round, so you will want to carefully review Tables A and B.

5. Questions

Now is the time for questions. If you have a question about any aspect of these instructions, please raise your hand and an experimenter will come to you and answer your question in private.

6. Quiz

Before the start of the experiment we ask you to answer the following quiz questions in the spaces provided. The numbers in these quiz questions are merely illustrative; the actual numbers in the session may be quite different. In answering these questions, please feel free to consult the Instructions and Tables A and B. After all participants have completed this quiz we will come around to check your answers.

1. Suppose the three Player As observe that $W_0 = 130$ and $af = 60$ so that the new level of water in Container 1 is 190. The three Player As agree to choose $M = 70$. Suppose it turns out that $V = 25$. What is the final amount of water in Container 2 in this case? _____ What is the final amount of water in Container 1?_____ What is the three Player As' payoff in points for the round? _____ If a Player B forecast $f = 75$, what would be that individual Player B's payoff for the round? _____

2. Same situation as in question 1, except that the Player As choose $M = 40$ instead of $M = 70$. What is the final amount of water in Container 2 in this case? _____ What is the final amount of water in Container 1?_____ What is the three Player As' payoff in points for the round? _____ If a Player B forecast $f = 75$, what would be that individual Player B's payoff for the round? _____

3. Suppose the Player As observe that $W_0 = 150$ and $af = 30$ so the new level of water in Container 1 is 180. The three Player As agree to choose $M = 30$. Suppose it turns out that $V = 15$. What is the final amount of water in Container 2 in this case? _____ What is the final amount of water in Container 1?_____ What is the three Player As' payoff in points for the round? _____ If a Player B forecast $f = 35$, what would be that individual Player B's payoff for the round? _____

4. Same situation as in question 3, except that Player A chooses $M = 10$ instead of $M = 30$. What is the final amount of water in Container 2 in this case? _____ What is the final amount of water in Container 1?_____ What is the three Player As' payoff in points for the round? _____ If a Player B forecast $f = 35$, what would be that individual Player B's payoff for the round? _____

5. Suppose it is round 2 of a sequence. What is the chance that the sequence will continue with round 3? _____. Would your answer change if we replaced round 2 with round 12 and round 3 with round 13? Circle one: yes / no.

6. True or false? You will remain in the same role as a Player A or Player B in all rounds of all sequences. Circle one: True / False.

7. True or false? Player As can perfectly determine the final amount of water in Container 2. Circle one: True / False

8. True or false? Both Player types A and B learn the final amounts of water in Containers 1 and 2. Circle one: True / False

9. True or false? You will be paid based on the points you earned in a maximum of two sequences. Circle one: True / False.