

APPENDIX
NOT FOR PUBLICATION
BARGAINING WITH ASYMMETRIC DISPUTE COSTS

Embedded Ultimatum Game

1. Public Instructions
2. Player *A* Private Instructions
3. Player *A* Record Sheet
4. Player *A* Payoff and Earnings Summary
5. Player *B* Private Instructions
6. Player *B* Record Sheet
7. Player *B* Payoff and Earnings Summary
8. Overheads Displayed in each Room

INSTRUCTIONS

This experiment is a study of decision-making. If you make your decisions carefully, you may earn a considerable amount of money that will be paid to you in cash at the end of the experiment. A research grant has provided funding for this study.

Today's experiment will consist of several "rounds". In each round, participants will be randomly and anonymously paired. One player will be "Player A" and the other will be "Player B". Each participant keeps the same player role throughout the experiment. For example, someone who is a Player A in round 1 remains a Player A in all rounds.

During each round, Players A and B will determine a result which in turn determines each player's cash earnings. Each player will have a Record Sheet on which to record information.

Player A earnings. At the end of each round, Player A's **payoff** for the round is recorded on his or her Record Sheet. At the end of the experiment, Player A sums the payoffs from all rounds. This total is divided by 100, and result is Player A's earnings in U.S. dollars. Thus for Player A, earnings for the experiment are:

$$(\text{Sum of Player A's Payoffs from all rounds}) \div 100 = \text{U.S. dollar earnings.}$$

Note that a higher payoff in a given round **increases** Player A's earnings from the experiment.

Player B earnings. At the end of each round, Player B's **cost** for the round is recorded on his or her Record Sheet. At the end of the experiment, Player B sums the costs from all rounds. This sum is **subtracted from** a lump sum. This difference is divided by 100, and the result is Player B's earnings in U.S. dollars. Thus, for Player B, earnings for the experiment are:

$$(\text{Player B Lump Sum} - \text{sum of B's Costs from all rounds}) \div 100 = \text{U.S. dollar earnings.}$$

Note that a higher cost in a given round **decreases** Player B's earnings from the experiment.

Steps of a Round. In a moment, we'll go through some examples. First, we describe the steps in a round. A round consists of the following 6 steps.

1. Player A and Player B are randomly and anonymously paired.
2. A 6-sided die is rolled for each Player A. A roll of **1, 2, 3 or 4** is called **outcome L**. A roll of **5 or 6** is called **outcome H**. Note that outcome L has a $4/6 = 2/3$ or 67% chance of occurring and outcome H has a $2/6 = 1/3$ or 33% chance of occurring. Only Player A knows result of the die roll. Player B knows only that a roll of 1, 2, 3 or 4 results in outcome L and a roll of 5 or 6 results in outcome H.
3. While the die is being rolled for Player A, Player B decides on an offer to submit to Player A. This offer may be any number between (and including) 0 and 599.

We will now work through some examples. Please fill in the blanks as indicated. If you have any questions as we proceed, please raise your hand.

These examples are for illustrative purposes only. Any numbers that you see during the experiment may be very different from those in these examples.

Also, as we go through these examples, you will record information for both Player A and Player B. During the experiment, you will be either Player A or Player B, but not both. You will only record your own information.

Example 1. $F_A = 100$ and $F_B = 50$. Below, please enter 100 for F_A on Player A's Record Sheet, and 50 for F_B on Player B's Record Sheet.

The die will now be rolled. Recall that a 1, 2, 3 or 4 results in outcome L, and a 5 or 6 results in outcome H. (The experimenter rolls the die, a participant verifies, and the result is announced.) Below on line 1 of A's Record Sheet, please circle the relevant letter to indicate the outcome.

While the die is being rolled for A, Player B decides on an offer. In this example, the Random Number will be used as Player B's offer. Please enter this offer on line 1 of B's Record Sheet.

Player A is then informed of the offer. Please write B's offer on line 2 of A's Record Sheet.

Assume that Player A accepts Player B's offer. Please circle "Yes" on Line 3 of A's Record Sheet.

Player B is then informed of A's decision. Please circle "Yes" on line 2 of B's Record Sheet.

Recall that when Player A accepts Player B's offer,

$$\begin{aligned} \text{Player A's Payoff for the round} &= \text{Player B's offer} \\ \text{Player B's Cost for the round} &= \text{Player B's offer.} \end{aligned}$$

Please enter Player B's offer as the Payoff on line 4 of A's Record Sheet and as the Cost on line 3 of B's Record Sheet

Player A's Record Sheet		Player B's Record Sheet
Round <u>Example 1</u> $F_A =$ _____		Round <u>Example 1</u> $F_B =$ _____
1. Outcome L H		1. Offer to Player A _____
2. Player B's Offer _____		2. Accepted? Yes No
3. Accept? Yes No		3. Cost _____
4. Payoff _____		

Are there any questions about this example? If so, please raise your hand.

Example 2. This example is identical to the previous one, except we'll assume that Player A does not accept Player B's offer.

Below, please enter 100 for F_A on A's Record Sheet and 50 for F_B on B's Record Sheet.

We'll use the same outcome of the die roll as in the previous example. Please circle the relevant letter to indicate the outcome. Note that in today's experiment, there will be a new die roll every round.

We'll use the Random Number again as B's offer. Please enter this offer on line 1 of B's Record Sheet.

Player A is then informed of the offer. Please write B's offer on line 2 of A's Record Sheet.

Assume that A does not accept B's offer. Please circle "No" on Line 3 of A's Record Sheet.

Player B is then informed of A's decision. Please circle "No" on line 2 of B's Record Sheet.

Recall that when Player A does not accept Player B's offer,

$$\begin{aligned} \text{Outcome L. (die roll is 1, 2, 3 or 4)} \quad \text{Player A's Payoff for the round} &= 200 - F_A \\ &\text{Player B's Cost for the round} = 200 + F_B \end{aligned}$$

$$\begin{aligned} \text{Outcome H. (die roll is 5 or 6)} \quad \text{Player A's Payoff for the round} &= 400 - F_A \\ &\text{Player B's Cost for the round} = 400 + F_B \end{aligned}$$

So in this example, Player A's **Payoff** for the round = _____ - _____ = _____.
Please enter this Payoff on line 4 of A's Record Sheet.

And in this example, Player B's **Cost** for the round = _____ + _____ = _____.
Please enter this Cost on line 3 of B's Record Sheet.

Player A's Record Sheet		Player B's Record Sheet
Round <u>Example 2</u> $F_A =$ _____		Round <u>Example 2</u> $F_B =$ _____
1. Outcome L H		1. Offer to Player A _____
2. Player B's Offer _____		2. Accepted? Yes No
3. Accept? Yes No		3. Cost _____
4. Payoff _____		

Are there any questions about this example? If so, please raise your hand.

Example 3: Earnings Calculations. We'll now do some earnings calculations, based on the examples above. Remember that these are only examples.

Player A. Recall that Player A's earnings from the experiment are:

(Sum of Player A's Payoffs from all rounds) \div 100 = U.S. dollar earnings.

Sum of Payoffs from both example rounds = $\frac{\quad}{\text{(Example1)}} + \frac{\quad}{\text{(Example 2)}} = \underline{\quad}$.

Sum of Payoffs = $\underline{\quad} \div 100 = \$ \underline{\quad}$

Player B. Recall that Player B's earnings from the experiment are:

(Player B Lump Sum - sum of B's Costs from all rounds) \div 100 = U.S. dollar earnings

Sum of Costs from both example rounds = $\frac{\quad}{\text{(Example1)}} + \frac{\quad}{\text{(Example 2)}} = \underline{\quad}$.

Assume that B's lump sum is 1100. Please complete the blanks below.

Player B Lump Sum = $\underline{\quad 1100 \quad}$

Sum of Costs from all rounds = $\underline{\quad}$

Player B Lump Sum – sum of Costs = $\underline{\quad} \div 100 = \$ \underline{\quad}$

Are there any questions about this example? If so, please raise your hand.

Closing Remarks

1. Remember that each round, a new random pairing of Player A and Player B is used. Neither participant will know the identity of the person with whom they are paired.
2. Anytime that a participant records information on his or her Record Sheet, an experimenter will also record the information on a separate sheet. There may be short pauses while the experimenters record and communicate decisions. Please sit quietly. The experimenters will make sure that there are no unnecessary delays.
3. Please do not talk with other participants, or look at other participants' Record Sheets. If anyone communicates in any way other than the manner described in these instructions, the experiment will be terminated.
4. You are encouraged to ask questions. If you are confused, it could affect your ability to earn money. Any time you have a question, please raise your hand. An experimenter will assist you.

Are there any questions?

Announcement for Player A Records Sheets, ID # _____

1. Everyone in this room is a Player A. The B players are seated in another room. The participants in the other room received the same instructions that you have received. The experiment will be conducted exactly as described by the instructions.
2. Each of you has been given a Payoff and Earnings Summary. Please take a moment to look at this Summary. The top portion reviews how your Payoff is computed each round. The lower portion will be used to compute your total earnings at the end of the experiment.
3. Each of you has been given several Record Sheets. More will be provided if necessary. Notice that your first Record Sheet shows Rounds 1, 2 and 3 in the left column and Rounds 4, 5 and 6 are in the right column. The same format is followed on all Record Sheets.
4. Each round, an overhead display will show the fees F_A and F_B for the round, and the Payoffs and Costs that apply for the round.
5. Each of you has been given two copies of a Consent Form. This protects your rights as a participant in this study. Please read, sign and date one copy. An experimenter will collect it from you. You make keep the second copy for your records, if you wish.
6. Any time you have a question, please raise your hand. An experimenter will assist you.

Record Sheet for Player A, ID # _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Offer _____
3. Accept? Yes No
4. Payoff _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Offer _____
3. Accept? Yes No
4. Payoff _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Player B's Offer _____
3. Accept? Yes No
4. Payoff _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Player B's Offer _____
3. Accept? Yes No
4. Payoff _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Player B's Offer _____
3. Accept? Yes No
4. Payoff _____

Round _____ $F_A =$ _____
1. Outcome L H
2. Player B's Offer _____
3. Accept? Yes No
4. Payoff _____

Payoff and Earnings Summary. Player A, ID # _____

1. Review of Payoff each round.

Your Payoff each round is computed as follows. In both cases, note that a higher payoff in a given round **increases** your earnings from the experiment:

- a. If you accept Player B's offer (if "Yes" is circled on line 3 of your Record Sheet), then:

$$\text{Your Payoff for the round} = \text{Player B's offer}$$

$$\text{Player B's Cost for the round} = \text{Player B's offer}$$

Thus, the number on line 4 is the same as the number on line 2 (i.e., line 4 = line 2).

- b. If you do not accept Player B's offer (if "No" is circled on line 3 of your Record Sheet), then your Payoff is determined by the die roll and the fee F_A that apply for the round:

$$\begin{array}{lll} \text{Outcome L. (die roll is 1, 2, 3 or 4)} & \text{your Payoff for the round} & = 200 - F_A \\ & \text{Player B's Cost for the round} & = 200 + F_B \end{array}$$

$$\begin{array}{lll} \text{Outcome H. (die roll is 5 or 6)} & \text{your Payoff for the round} & = 400 - F_A \\ & \text{Player B's Cost for the round} & = 400 + F_B \end{array}$$

2. Computation of Total Earnings from the Experiment

The table below will aid you in computing your total earnings from participation in this experiment.

- a. At the end of the experiment, add together the Payoffs from all the rounds (shown on line 4 for each round on your Record Sheet). Be sure to include all of your Record Sheets.
- b. Your earnings from participation in this experiment are:

$$(\text{Sum of Payoffs from all rounds}) \div 100 = \text{U.S. \$\$ earnings}$$

Sum of Payoffs from all rounds = _____

Sum of Payoffs = _____ \div 100 = \$ _____

Announcement for Player B Records Sheets, ID # _____

1. Everyone in this room is a Player B. The A players are seated in another room. The participants in the other room received the same instructions that you have received. The experiment will be conducted exactly as described by the instructions.
2. Each of you has been given a Cost and Earnings Summary. Please take a moment to look at this Summary. The top portion reviews how your Cost is computed each round. The lower portion will be used to compute your total earnings at the end of the experiment. Note that your Player B Lump Sum has been entered on line 2b.
3. Each of you has been given several Record Sheets. More will be provided if necessary. Notice that your first Record Sheet shows Rounds 1, 2 and 3 in the left column and Rounds 4, 5 and 6 are in the right column. The same format is followed on all Record Sheets.
4. Each round, an overhead display will show the fees F_A and F_B for the round, and the Payoffs and Costs that apply for the round.
5. Each of you has been given two copies of a Consent Form. This protects your rights as a participant in this study. Please read, sign and date one copy. An experimenter will collect it from you. You make keep the second copy for your records, if you wish.
6. Any time you have a question, please raise your hand. An experimenter will assist you.

This overhead is displayed in both rooms.

For this round

The fees are $F_A = 75$ $F_B = 75$

When A accepts B's offer: **Your Payoff** = **Player B's offer**
Player B's Cost = **Player B's offer**

When A does not accept B's offer:

Outcome L. (1, 2, 3, 4) **Your Payoff** = **200 - 75 = 125**
Player B's Cost = **200 + 75 = 275**

Outcome H. (5 or 6) **Your Payoff** = **400 - 75 = 325**
Player B's Cost = **400 + 75 = 475**

This overhead is displayed in both rooms.

For this round

The fees are $F_A = 25$ $F_B = 125$

When A accepts B's offer: **Your Payoff** = **Player B's offer**
Player B's Cost = **Player B's offer**

When A does not accept B's offer:

Outcome L. (1, 2, 3, 4) **Your Payoff** = **200 - 25 = 175**
Player B's Cost = **200 + 125 = 325**

Outcome H. (5 or 6) **Your Payoff** = **400 - 25 = 375**
Player B's Cost = **400 + 125 = 525**

This overhead is displayed in both rooms.

For this round

The fees are $F_A = 125$ $F_B = 25$

When A accepts B's offer: **Your Payoff** = **Player B's offer**
Player B's Cost = **Player B's offer**

When A does not accept B's offer:

Outcome L. (1, 2, 3, 4) **Your Payoff** = **200 - 125 = 75**
Player B's Cost = **200 + 25 = 225**

Outcome H. (5 or 6) **Your Payoff** = **400 - 125 = 275**
Player B's Cost = **400 + 25 = 425**

