

**Ten Little Treasures of Game Theory
and Ten Intuitive Contradictions:
Instructions and Data**

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The instructions for one shot games begin on the next page, and the data for the coordination and traveler's dilemma games follow. Summary data for other games are given in the paper, which can be downloaded by clicking on the title in the vita web page.

Instructions Appendix

Instructions for a Traveler's Dilemma (R = 5 treatment)

As before, in this part you will be paired with another person, using random draws of ping pong balls. You will make a single decision, and your earnings will be determined by your decision and the decision of the person with whom you are matched. Your earnings for this part will be added to those from other parts, and you will be paid in cash at the end of the experiment today. This part will be followed by another, quite different decision making experiment.

You and the person you are matched with will each have to choose an amount of money to claim, and your claim can be any number from 180 to 300 cents. If your claims are equal, then you each get what you claimed. But if your claims are different, you each get an amount that is equal to the minimum of the two claims. In addition, the person making the larger claim is penalized and must give back 5 cents, and the person making the lower claim is rewarded and will receive an additional 5 cents. To summarize,

your earnings = your claim	(if your claim equals the other claim)
your earnings = the other's claim - 5 cents	(if you have the higher claim)
your earnings = your claim + 5 cents	(if you have the lower claim)

At this time, do you have any questions about how the earnings are calculated? Please think this over and one of us will come by your desk to see if you have a question.

To be sure you understand the payoffs, please choose a hypothetical claim for you and the other person, and calculate what your earnings would be in this case. These hypothetical claims will not affect your earnings in any way, we just want to be sure that you understand the payoffs. We will come around and check your calculations. Please make one example in which your claim is higher than the other claim, one in which your claim is equal to the other claim, and one example in which your claim is lower. The claims in your examples must integer penny amounts that are greater than equal to 180 and less than or equal to 300.

1. Example in which your claim is higher than the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and add the reward or subtract the penalty, if claims are not equal)

2. Example in which your claim is equal to the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and add the reward or subtract the penalty, if claims are not equal)

3. Example in which your claim is lower than the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and add the reward or subtract the

penalty, if claims are not equal)

This experiment will only be done once, after which we will do another decision-making experiment.

Now please write your claim amount, any number of pennies between and including 180 and 300, in the blank below.

your claim: _____ (a penny amount between 180 and 300 cents)

other's claim: _____

minimum of the two claims: _____

your penalty or reward: _____ (+5 cents if you are low, - 5 cents if you are high)

your earnings on this part: _____

Instructions for a Matching Pennies Game (asymmetric, 320, treatment)

This is an experiment in which you will be matched with another person in the room using ping pong balls as before. Your earnings in pennies will depend on your decision and on that of the person with whom you are matched. The earnings from this part will be added to your earnings from other parts, and the total will be paid to you at the end of the session today. Half of you have been designated as type A, and half as type B. Your type is: _____. The type A participants will choose between decisions U and D, and the type B participants will choose between decisions L and R. The earnings in pennies are:

If type A chooses D and type B chooses L, A earns 40 cents and B earns 80 cents.

If type A chooses U and type B chooses R, A earns 40 cents and B earns 80 cents.

If type A chooses D and type B chooses R, A earns 80 cents and B earns 40 cents.

If type A chooses U and type B chooses L, A earns 320 cents and B earns 40 cents.

Each person should look at his or her type and then make a decision, which is recorded below. Then we will collect the decision sheets and use the ping pong balls to match each of you with another person. We will record the other person's decision in the blank below, and use the table above to calculate your earnings and return your own decision sheet to each of you. This process will only be done once, after which we will do a different experiment. Are there any questions?

your type: (copy from above): _____ your decision: _____

other person's decision: _____ your earnings for this part: _____

Instructions for Coordination Game with Outside Option (large outside option version)

This is an experiment in which you will be matched with another person in the room using the ping pong balls as before. Your earnings in pennies will depend on your decision and on that of the person with whom you are matched. The earnings from this part will be added to your earnings from other parts, and the total will be paid to you at the end of the session tonight. Half of you have been designated as type A, and half as type B. Your type is: _____. The type A participants will choose between decisions U and D, and the type B participants will choose between decisions L, M and R. The earnings in pennies are:

Your type: _____

If type A chooses U and type B chooses L, A earns 90 cents and B earns 90 cents.

If type A chooses U and type B chooses M, A earns 0 cents and B earns 0 cents.

If type A chooses U and type B chooses R, A earns 400 cents and B earns 40 cents.

If type A chooses D and type B chooses L, A earns 0 cents and B earns 0 cents.

If type A chooses D and type B chooses M, A earns 180 cents and B earns 180 cents.

If type A chooses D and type B chooses R, A earns 0 cents and B earns 40 cents.

Each person should look at their type and then make a decision, which is recorded below. Then we will collect their decision sheets and use the ping pong balls to match each of you with another person. We will record the other person's decision in the blank below, and use the table above to calculate your earnings and return your own decision sheet to each of you. This process will only be done once, after which we will do a different experiment. Are there any questions?

your type: (copy from above): _____

your decision: _____

other person's decision: _____

your earnings for this part: _____

Instructions for the Kreps Coordination Game (positive payoffs version)

This is an experiment in which you will be matched with another person in the room using the ping pong balls as before. Your earnings in pennies will depend on your decision and on that of the person with whom you are matched. The earnings from this part will be added to your earnings from other parts (subtracted if they are negative), and the total will be paid to you at the end of the session today. Half of you have been designated as type A, and half as type B. Your type is: _____. The type A participants will choose between decisions U and

D, and the type B participants will choose between decisions H, I, J, or K. The earnings in pennies are:

Your type: _____

If type A chooses U and type B chooses H, A earns 500 cents and B earns 350 cents.

If type A chooses D and type B chooses H, A earns 300 cents and B earns 50 cents.

If type A chooses U and type B chooses I, A earns 300 cents and B earns 345 cents.

If type A chooses D and type B chooses I, A earns 310 cents and B earns 200 cents.

If type A chooses U and type B chooses J, A earns 310 cents and B earns 330 cents.

If type A chooses D and type B chooses J, A earns 330 cents and B earns 330 cents.

If type A chooses U and type B chooses K, A earns 320 cents and B earns 50 cents.

If type A chooses D and type B chooses K, A earns 350 cents and B earns 340 cents.

Each person should look at their type and then make a decision, which is recorded below. Then we will collect their decision sheets and use the ping pong balls to match each of you with another person. We will record the other person's decision in the blank below, and use the table above to calculate your earnings and return your own decision sheet to each of you. This process will only be done once, after which we will do a different experiment. Are there any questions?

your type: (copy from above): _____ your decision: _____

other person's decision: _____ your earnings for this part: _____

Instructions for Two-Stage Game (strong incentive version)

This is an experiment in which you will be matched with another person in the room using the ping pong balls as before. Your earnings in pennies will depend on your decision and on that of the person with whom you are matched. The earnings from this part will be added to your earnings from other parts, and the total will be paid to you at the end of the session today. Half of you have been designated as type A, and half as type B. Your type is: _____. The type A participants will choose between decisions Q or R, and the type B participants will choose between decisions S or T. The earnings in pennies are:

If type A chooses Q and type B chooses S, A earns 80 cents and B earns 50 cents.

If type A chooses Q and type B chooses T, A earns 80 cents and B earns 50 cents.

If type A chooses R and type B chooses S, A earns 20 cents and B earns 10 cents.

If type A chooses R and type B chooses T, A earns 90 cents and B earns 70 cents.

The participant designated as type A will choose first and mark their decision in the blank below. Then we will collect their decision sheets and use the ping pong balls to match each person of type A with a person of type B. We will write the type A person's decision on the decision sheet for the type B person who is matched with that type A. Then we will return the decision sheets to the type B people, so that they can see what the other person's decision is before making their own decision. When all type B people have made their decisions, we will collect their decision sheets and record the type B person's decision on the decision sheet of the type A person with whom they are matched. Then we will calculate the earnings, using the table above, and return your own decision sheet to each of you. This process will only be done once, after which we will do a different experiment. Are there any questions?

your decision: _____

(type B people, please wait until you see what the type A person has decided)

other person's decision: _____ your earnings for this part: _____

Instructions for Two-Stage Game (credible threat)

This is an experiment in which you will be matched with another person in the room using the ping pong balls as before. Your earnings in pennies will depend on your decision and on that of the person with whom you are matched. The earnings from this part will be added to your earnings from other parts, and the total will be paid to you at the end of the session tonight.

Half of you have been designated as type A, and half as type B. Your type is: _____. Each type A person will be matched with a type B and vice versa. The type A people will move first, and the type B people will not have to make a decision until they see what the type A that they are matched with has decided. Please do not make your decision until we describe the order in which decisions will be made in more detail. The type A participants will choose between decisions Q or R, and the type B participants will choose between decisions S or T. The earnings in pennies are:

If type A chooses Q and type B chooses S, A earns 70 cents and B earns 60 cents.

If type A chooses Q and type B chooses T, A earns 70 cents and B earns 60 cents.

If type A chooses R and type B chooses S, A earns 60 cents and B earns 10 cents.

If type A chooses R and type B chooses T, A earns 90 cents and B earns 50 cents.

The participant designated as type A will choose first and mark their decision in the blank below. Then we will collect their decision sheets and use the ping pong balls to match each person of type A with a person of type B. We will write the type A person's decision on the decision sheet for the type B person who is matched with that type A. Then we will return the decision sheets to the type B people, so that they can see what the other person's decision is before

making their own decision. When all type B people have made their decisions, we will collect their decision sheets and record the type B person's decision on the decision sheet of the type A person with whom they are matched. Then we will calculate the earnings, using the table above, and return your own decision sheet to each of you. This process will only be done once, after which we will do a different experiment. Are there any questions?

your decision: _____
(type B people, please wait until you see what the type A person has decided)

other person's decision: _____

your earnings for this part: _____

Instructions for a First-Price Auction (with independent private prize values of \$0, \$2, \$5)

As before, in this part you will be paired with another participant, using random draws of ping pong balls. You will make a single decision, and this part will be followed by a different decision experiment.

This will be an auction in which you will make a monetary bid for a prize that will be awarded to the highest bidder. Your prize value will be determined by a throw of a 6-sided die. A throw of 1, or 2 will determine a prize value of \$0, a throw of 3 or 4 will determine a prize of \$2, and a throw of 5 or 6 will determine a prize value of \$5. We will begin by coming to each of your desks to throw the die to determine the value of the prize for each of you. The value of the prize to you will be equally likely to be \$0, \$2, or \$5, which you will know before you make your bid, but you will not know the value of the prize to the person you are matched with. All you know is that the value to them is equally likely to be \$0, \$2, or \$5. (The random difference in values is like having an antique to be auctioned that may be worth more to one person than to another.)

After each person finds out their own prize value, you will choose a bid in an integer dollar amount, which is recorded below. Then we will collect these sheets and use draws of numbered ping pong balls to match you with another bidder. The prize goes to the higher bidder. There are likely to be some ties, since every bid must be in integer dollar amounts (\$0, \$1, ...), and in the event of a tie we will decide who wins with the flip of a coin (heads and the person with the higher ID number wins, tails and the person with the lower ID number wins). If you are the high bidder (or win the flip in the event of a tie), you earn the difference between your own prize value and your bid, and if you are the low bidder, you earn nothing in this auction.

earnings = your own prize value - your bid (if you are the high bidder or win the flip in case of a tie)

earnings = 0 (if you are the low bidder or lose the flip in case of a tie)

Your earnings will be added to those for other parts. (If you bid above your prize value and win the auction, your earnings will be negative and will be subtracted from your earnings for other parts to determine your total earnings.) Now we will come to your desks to throw the die to determine each of your prize values, and please write the value in the blank below as soon as the die is thrown.

your own prize value \$_____ (in dollars)

your bid \$_____ (any integer dollar amount)

other's bid \$_____ your earnings \$_____

Instructions for a Signaling Game (separating equilibrium)

This will be a game that you only play once, with another person in the room. You will be matched with draws of numbered ping pong balls, as before. What you earn from this game will be added to your other earnings and paid to you in cash after we have finished today. Above you see your role in the game, either "sender" or "responder." The sender will begin by choosing between two possibilities, I or S. Then this choice will be communicated to the responder. After learning the sender's choice, the responder must choose among three decisions: C, D, and E. Next, the decision of the responder will be communicated to the sender. Given these decisions, the earnings in pennies will be determined by one of the following two tables:

TABLE A (selected with probability 1/2)

Sender's Decision	Responder's Decision	Sender's Earnings	Responder's Earnings
I	C	300	300
I	D	0	0
I	E	500	350
S	C	450	900
S	D	150	150
S	E	1000	300

TABLE B (selected with probability 1/2)

Sender's Decision	Responder's Decision	Sender's Earnings	Responder's Earnings
I	C	500	500
I	D	300	450
I	E	300	0
S	C	450	0
S	D	0	300
S	E	0	150

Note that the earnings will depend on two decisions made and on the table of earnings being used. The table of earnings, A or B, will be chosen by a throw of a 6-sided die; a 1, 2, or 3 yields table A and a 4, 5, or 6 yields B.

The sender will observe the die throw, and therefore will know the table employed before making his/her decision. On the other hand, the responder will not know which table is being employed until after his/her decision is made.

Each period begins with the throw of a 6-sided die that determines the table of earnings that will be employed during this period. Once the sender has observed the die throw, he/she will make his/her decision and record it. Afterwards, the responder will be informed of the decision made by the sender, and the responder in turn will make a decision, without knowing the result of the die throw. Finally, the decision of the responder will be shown to the sender and the responder will be told which earnings table was being used. With this information, each person will be able to use the appropriate earnings table to determine his/her earnings.

Any questions?

Now we will go to the desk of each sender and throw the 6 sided die to determine which earnings table will be used. After seeing which earnings table is relevant, the sender will make a choice, I or S.

Now we will collect all sheets and use draws of ping pong balls to match each sender with a responder, and we will write the sender's choice, I or S, on the responder's sheet, but not the payoff table.

Now we return the sheets to the responders who will then choose a response, C, D, or E.

Finally we tell the sender the response, and we tell the responder the earnings table used.

sender's choice: _____

earnings table used: _____

responder's choice: _____

your earnings: _____

Instructions for a Coordination Game (cost = 0.1)

As before, in this part you will be paired with another person, using random draws of ping pong balls. You will make a single decision, and your earnings will be determined by your decision and the decision of the person with whom you are matched. Your earnings for this part will be added to those from other parts, and you will be paid in cash at the end of the experiment today. This part will be followed by another, quite different decision making experiment.

You and the person you are matched with will each have to choose an amount of money to "claim", and your claim can be any number from 110 to 170 cents. If your claims are equal, then you each earn the amount that you claimed. But if your claims are different, you each get an amount that is equal to the minimum of the two claims. In addition, claims are costly to process, and you must pay an amount that equals 10% of your claim, regardless of whether your claim is less than, equal to, or greater than the other's claim. To summarize,

your earnings = your claim - .1*(your claim) (if your claim equals the other claim)

your earnings = the other's claim - .1*(your claim) (if you have the higher claim)

your earnings = your claim - .1*(your claim) (if you have the lower claim)

To be sure you understand the payoffs, please choose a hypothetical claim for you and the other person, and calculate what your earnings would be in this case. These hypothetical claims will not affect your earnings in any way, we just want to be sure that you understand the payoffs. We will come around and check your calculations. Please make one example in which your claim is higher than the other claim, one in which your claim is equal to the other claim, and one example in which your claim is lower. REMEMBER, BOTH CLAIMS MUST BE

INTEGER PENNY AMOUNTS THAT ARE GREATER THAN OR EQUAL TO 110 PENNIES AND LESS THAN OR EQUAL TO 170 PENNIES.

1. Example in which your claim is higher than the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and subtract the cost of the claim, which is .1 times your claim)

2. Example in which your claim is equal to the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and subtract the cost of the claim, which is .1 times your claim)

3. Example in which your claim is lower than the other claim:

Suppose that you claim _____ and the other claims _____, then the minimum claim is _____, and you will earn: _____ (take the minimum and subtract the cost of the claim, which is .1 times your claim)

This experiment will only be done once, after which we will do another decision-making experiment.

Now please write your claim amount, any number of pennies between and including 110 and 170, in the blank below.

your claim: _____ (a penny amount between 110 and 170 cents)

other's claim: _____

minimum of the two claims: _____

cost of your claim: _____ (.1 times your claim)

your earnings on this part: _____ (minimum of the two claims - cost of your claim)

Data Appendix

Table II. Claim Data for One-Shot Traveler's Dilemma Games

Cohort	Five Cohorts with the Low Penalty/Reward Parameter ($R = 5$)									
1	300	180	250	300	300	299	300	300	294	180
2	200	299	180	300	250	295	280	300	300	300
3	300	300	300	298	200	275	300	300	300	299
4	300	299	194	300	299	235	297	300	300	299
5	299	300	300	299	299	180	300	300	300	300
Cohort	Five Cohorts with the High Penalty/Reward Parameter ($R = 180$)									
1	198	299	180	180	250	180	180	180	180	299
2	180	180	300	180	180	180	180	180	300	180
3	180	180	300	180	180	200	180	280	180	180
4	180	298	180	180	180	180	180	180	180	180
5	180	180	180	180	181	180	290	180	180	180

Table III. Effort Choice Data for One-Shot Coordination Games

Cohort	Five Cohorts with the Low Effort-Cost Parameter ($c = 0.1$)									
1	170	170	170	170	140	170	120	164	110	170
2	150	110	170	170	170	170	140	170	170	142
3	170	170	170	170	170	160	130	170	170	155
4	170	150	170	170	170	170	150	170	160	170
5	120	110	170	110	150	170	140	140	170	140
Cohort	Five Cohorts with the High Effort-Cost Parameter ($c = 0.9$)									
1	110	130	110	110	140	110	110	130	110	110
2	160	140	110	170	170	110	170	110	130	110
3	110	120	140	170	170	110	120	150	124	130
4	122	120	170	110	110	170	120	110	150	110
5	150	110	125	130	150	120	110	160	120	130