

Supplementary Information of
“Measuring Higher-Order Rationality with Belief Control”

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A. Experimental Instructions for RH Order

Experimental Payment

At the end of the experiment, you will receive a show-up fee of NT\$200, plus the amount of NT\$ converted from the experimental standard currency (ESC) you receive throughout the experiment. The ESC you receive, which differs from person to person, is determined by your decision, other participants' decision, and chance. Each participant will be paid privately, and you are under no obligation to tell others how much you earned.

Note: The exchange rate between ESC and NT\$ is 1:4. (1 ESC = NT\$4.)

Part 1

Part 1 consists of two computerized tests. The first test includes three questions, and the second test includes eleven questions. Each question has only one correct answer. You will be informed of how many correct answers you get at the end of the experiment. In the first test, you will receive 3 ESC per correct answer. In the second test, you will receive 1 ESC per correct answer.

Your payment from Part 1 will be the total payoff (in ESC) you receive from the two tests. Your payment from Part 1 and the number of correct answers you get will be displayed on the screen at the end of the experiment.

Note: You may not write during the computerized tests. If the experimenter finds you using pens and papers, you will lose all your payment from Part 1.

The Experiment Starts

The experiment starts now. Please make your decision carefully.

Part 2

Part 2 consists of two stages. Each stage includes eight rounds. Each round involves four participants. At the end of the experiment, one round in Part 2 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 2—Stage 1

The first stage has eight rounds. Each round concerns a decision situation in which four participants in different roles are grouped. You and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoff in that round.

The Rules of the Decision Situation

In each round, all participants will choose among three alternatives. Your payoffs will depend on the combination of your choice and another participant's choice, as shown in the **payoff tables** below.

Member A's Payoffs				Member B's Payoffs				Member C's Payoffs				Member D's Payoffs																			
Member B's Choices				Member C's Choices				Member D's Choices				Member A's Choices																			
				d	e	f					g	h	i					j	k	l					a	b	c				
Member A's Choices	a	10	4	16	Member B's Choices	d	12	16	4	Member C's Choices	g	20	12	8	Member D's Choices	j	10	12	8	k	6	20	18	l	0	16	4	0			
	b	20	8	0		e	0	12	8		h	6	8	18		i	6	8	18	a	10	12	8	b	6	20	18	c	16	4	0
	c	4	18	12		f	4	4	20		i	0	16	4		l	0	16	4	0	a	16	4	0	b	16	4	0	c	16	4

The payoff tables consist of four tables. Each table corresponds to a different group member's possible payoffs, as explained below.

1. Member A

Member A's payoffs depend on the combination of **Member A's** choice and **Member B's** choice. Given the above payoff tables, if Member A chooses a and Member B chooses d, Member A will earn 10 ESC. If instead Member B chooses e, Member A will earn 4 ESC.

Member A's Payoffs						
Member B's Choices						
				d	e	f
Member A's Choices	a	10	4	16		
	b	20	8	0		
	c	4	18	12		

2. Member B

Member B's payoffs depend on the combination of **Member B's** choice and **Member C's** choice. Given the above payoff tables, if Member B chooses e and Member C chooses h, Member B will earn 12 ESC. If instead Member C chooses i, Member B will earn 8 ESC.

		Member B's Payoffs		
		Member C's Choices		
		g	h	i
Member B's Choices	d	12	16	4
	e	0	12	8
	f	4	4	20

3. Member C

Member C's payoffs depend on the combination of **Member C's** choice and **Member D's** choice. Given the above payoff tables, if Member C chooses h and Member D chooses k, Member C will earn 8 ESC. If instead Member D chooses j, Member C will earn 6 ESC.

		Member C's Payoffs		
		Member D's Choices		
		j	k	l
Member C's Choices	g	20	12	8
	h	6	8	18
	i	0	16	4

4. Member D

Member D's payoffs depend on the combination of **Member D's** choice and **Member A's** choice. Given the above payoff tables, if Member D chooses k and Member A chooses c, Member D will earn 18 ESC. If instead Member A chooses a, Member D will earn 6 ESC.

		Member D's Payoffs		
		Member A's Choices		
		a	b	c
Member D's Choices	j	10	12	8
	k	6	20	18
	l	16	4	0

The following table summarizes the alternatives that each member may choose from and whose choices a member's payoff may depend on.

Role	Member A	Member B	Member C	Member D
Alternatives	a, b, c	d, e, f	g, h, i	j, k, l
Payoff Determined by	A and B	B and C	C and D	D and A

The Appearance of Payoff Tables

As previously described, the payoff tables consist of four tables. Your payoffs will always be listed in the **leftmost** table on the screen. Your choice (g, h, or i in the example below) will determine the row of the leftmost table. Depending on your role, the choice of one of the other members (Member D in the example below) in your group, will determine the column of the leftmost table.

Your (Member C's) Payoffs				Member D's Payoffs				Member A's Payoffs				Member B's Payoffs							
Member D's Choices				Member A's Choices				Member B's Choices				Member C's Choices							
j k l				a b c				d e f				g h i							
Your (Member C's) Choices	g	12	16	4	Member D's Choices	j	10	12	8	Member A's Choices	a	10	4	16	Member B's Choices	d	20	12	8
	h	0	12	8		k	6	20	18		b	20	8	0		e	6	8	18
	i	4	4	20		l	16	4	0		c	4	18	12		f	0	16	4

Example: given the above payoff tables, you are assigned as Member C. The payoffs of Member C (you), D, A, and B are listed in the tables from left to right.

The payoffs of the other three members in your group will be listed in the other three tables in order, as summarized in the table below.

Your Role	Member A	Member B	Member C	Member D
Order of Payoff Tables	A/B/C/D	B/C/D/A	C/D/A/B	D/A/B/C

The Members Matched with You and Their Strategies

When you start each new round, you will be grouped with three other participants who are in different roles. The three other participants will be **computers** that are programmed to take the following strategy:

1. The computers aim to earn as much payoff as possible for themselves.
2. A computer believes that every participant will try to earn as much payoff as one can.
3. A computer believes that every participant believes “the computers aim to earn as much payoff as possible for themselves.”

Note:

1. A computer’s payoff (ESC) will **not** be converted into NT\$ to be paid to any human participants.
2. A computer will **not** randomly make a choice among the three alternatives.
3. A computer will **not** know your choice before it makes a choice.

Experiment Procedure

In each round, the payoff tables corresponding to that round will be displayed on the screen. After you have made your choice, you need to click on the button “Confirm.” The payoff tables may change from round to round, so you should always look at the payoffs carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Note that you will be informed of your payment, the round chosen for payment, what choice you made in that round, and the choices of your matched group-mates only at the end of the experiment. You will not learn any other information about the choices of other participants in the experiment.

At the beginning of the experiment of Part 2, you will be randomly assigned to be either Member A, B, C, or D. Once decided, your role remains the same **throughout Part 2**.

Understanding Questions

There are five understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are right rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 2—Stage 2

The second stage has eight rounds. Each round concerns a decision situation in which you and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoffs in that round.

The rule and procedure of this stage are the same as the previous stage, but your group members will use a different strategy, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be grouped with computers but **the choice data from human participants in the previous stage**. Specifically, the experimenter will randomly draw three human participants and adopt their choices in the previous stage as your group members' choices.

Note:

1. The human participants matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participants matched with you will **not** actually interact with you. Their choices have been confirmed in Stage 1.
3. The human participants matched with you will **not** be the previous you. They will be randomly drawn from the other human participants with equal probabilities.
4. The human participants matched with you confronted the **same** payoff tables as you did in Stage 1, but in **different** roles.
5. The human participants matched with you will be drawn **only** from the corresponding members' data.
(For example, if you are Member A, then the experimenter will randomly draw a human Member B, a human Member C, and a human Member D, using their choices in Stage 1 as your matched Member B, Member C, and Member D's choices.)

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

Understanding Questions

There are six understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are eight rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3

Part 3 consists of two stages. Each stage includes three rounds. Each round involves two participants. At the end of the experiment, one round in Part 3 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 3—Stage 1

The first stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make **guesses**. Together, your guess and the other participant's guess determine your payoffs in this round.

The Rules of the Decision Situation

In each round, you will choose one integer between 1 and 100, called your guess. The participant with whom you are matched will also make a guess, choosing one integer between 1 and 100. In addition, you and the participant with whom you are matched will be assigned a number p in each round. Your payoff will depend on your guess, the guess of the other participant with whom you are matched, and the number p . The payoff is calculated based on the following formula:

$$\text{Your payoff} = 0.2 \times (100 - | \text{Your guess} - \text{The guess of the other participant with whom you are matched} \times p |)$$

The Payoff Formula

In each round, we measure how close your guess is to “the guess of the other participant with whom you are matched $\times p$.” For example, if the other participant's guess was 80 and the $p = 4/5$, then we measure how close your guess is to $80 \times 4/5 = 64$. If you guessed 70 then the absolute difference between your guess and 64 was 6. We call this number (6) the **error** in your guess.

The error in the other participant's guess will also be calculated. In the above example, the other participant's error is equal to $80 - (70 \times 4/5) = 24$.

You will be paid based on how small your error is, and smaller errors mean larger payoffs. When payoffs are calculated, only the (absolute) error matters, not “the other participant's guess $\times p$ ” is greater or less than your guess.

If your error is some number E , then your payoff in ESC will be $0.2 \times (100 - E)$. In the above example your error was 6. Therefore, you would earn $0.2 \times (100 - 6) = 18.8$ ESC; the other participant's error was 24, so he would earn $0.2 \times (100 - 24) = 15.2$ ESC. The error ranges between 0 and 100, so your maximum payoff in one round is 20 ESC and your minimum payoff is 0 ESC.

The Members Matched with You and Their Strategies

When you start each new round, you will be matched with another participant. The other participant will be a **computer** that is programmed to take the following strategy:

1. The computer aims to earn as much payoff as possible for itself.
2. The computer believes that every participant will try to earn as much payoff as one can.
3. The computer believes that every participant believes “the computer aims to earn as much payoff as possible for itself.”

Note:

1. A computer’s payoff (ESC) will **not** be converted into NT\$ to be paid to any human participants.
2. A computer will **not** randomly guess an integer between 1 and 100.
3. A computer will **not** know your choice before it makes a choice.

Experiment Procedure

In each round, the number p corresponding to that round (and the payoff formula) will be displayed on the screen. After you have made your guess, you need to click on the button “Confirm.” The number p may change from round to round, so you should always look at the number p carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Note that you will be informed of your payment, the round chosen for payment, what choice you made in that round, and the choices of your matched group-mates only at the end of the experiment. You will not learn any other information about the choices of other participants in the experiment.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are three rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3—Stage 2

The second stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make guesses. Together, your guess and the other participant's guess determine your payoffs in this round.

The rule and procedure of this stage are the same as the previous stage, but your matched member will use a different strategy, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be matched with a computer but **the choice data from a human participant in the previous stage**. Specifically, the experimenter will randomly draw a human participant and adopt his/her guesses in the previous stage as your matched member's guesses.

Note:

1. The human participant matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participant matched with you will **not** actually interact with you. His/Her guesses have been confirmed in Stage 1.
3. The human participant matched with you will **not** be the previous you. He/She will be randomly drawn from the other human participants with equal probabilities.
4. The human participant matched with you confronted the **same p** as you did in Stage 1.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

Understanding Questions

There are four understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

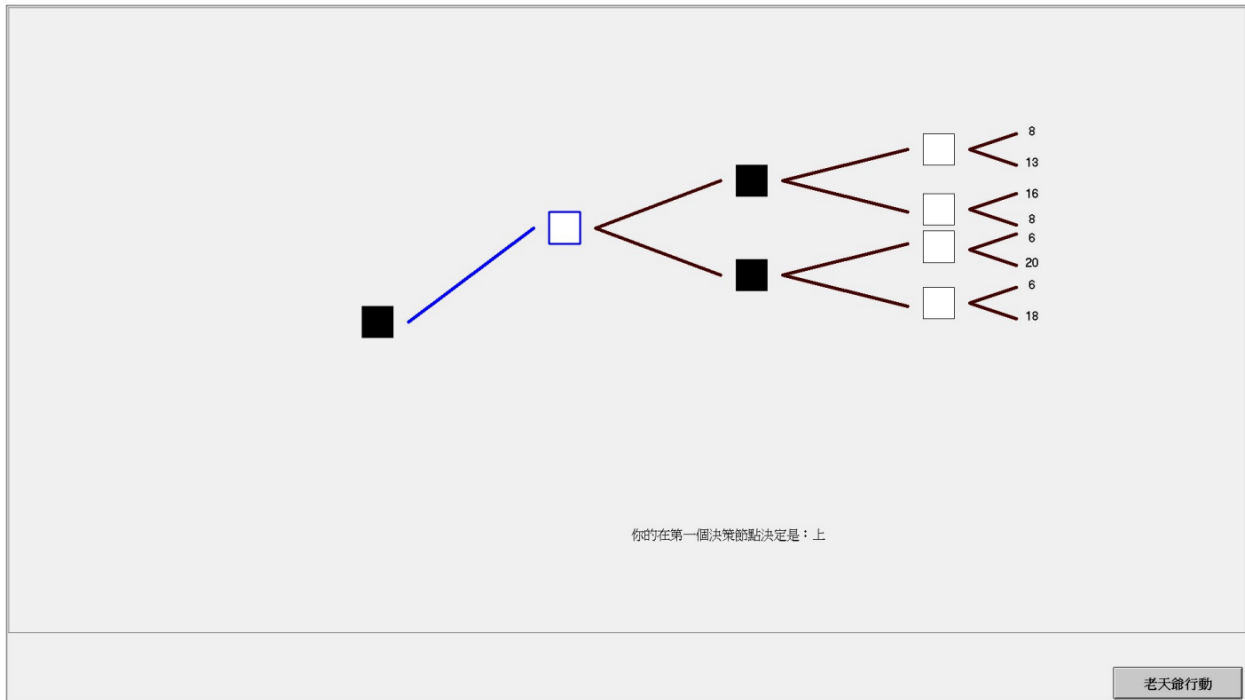
The experiment starts now. There are three rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Experiment Procedure

The tree diagram will be displayed on the screen (as shown in the screenshot above). You should carefully study the tree diagram and the various possible end (payoff) nodes. You will end up at one of these payoff nodes. You will then be invited to work through the tree, starting at the left-hand node (a decision node).

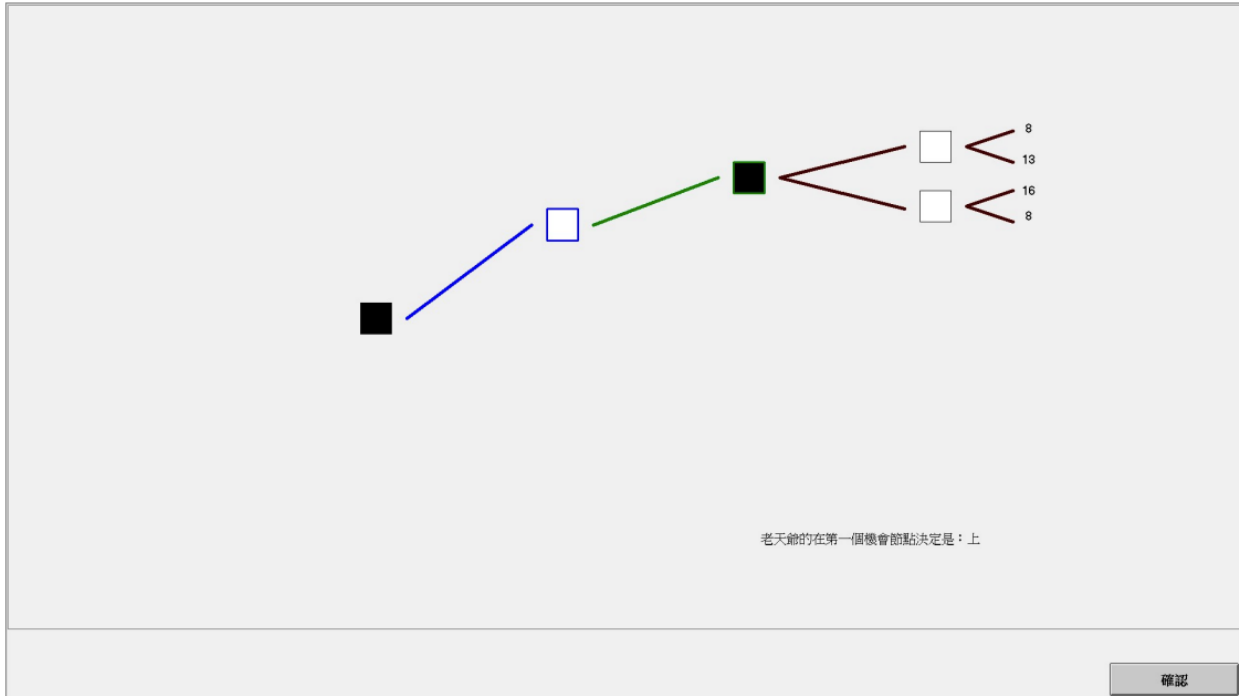
The Decision Node

At each decision node, please indicate whether you want to move Up or Down using the buttons at the bottom and then click on the button “Confirm.” Your decision will then be implemented, with the part of the tree that your decision has excluded being removed to indicate that that part is no longer available. As shown in the screenshot below, if you choose to move Up in the previous figure, then the bottom half of the tree diagram will be removed.



The Chance Node

At each chance node, please click on the button “Nature Move.” You will then be told the move by Nature, and it will be implemented, with the part of the tree that Nature’s move has excluded being removed to indicate that it is no longer available. As shown in the screenshot below, if Nature chooses to move Up, then the bottom half of the remaining tree diagram will be removed.



Payoff Calculation

The last node will be a chance node. After the final move by Nature, you will see that only one end (payoff) node remains available. This is the payoff you receive for Part 4.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions; the experimenter will come and answer them.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. Please make your decision carefully.

B. Experimental Instructions for HR Order

Experimental Payment

At the end of the experiment, you will receive a show-up fee of NT\$200, plus the amount of NT\$ converted from the experimental standard currency (ESC) you receive throughout the experiment. The ESC you receive, which differs from person to person, is determined by your decision, other participants' decision, and chance. Each participant will be paid privately, and you are under no obligation to tell others how much you earned.

Note: The exchange rate between ESC and NT\$ is 1:4. (1 ESC = NT\$4.)

Part 1

Part 1 consists of two computerized tests. The first test includes three questions, and the second test includes eleven questions. Each question has only one correct answer. You will be informed of how many correct answers you get at the end of the experiment. In the first test, you will receive 3 ESC per correct answer. In the second test, you will receive 1 ESC per correct answer.

Your payment from Part 1 will be the total payoff (in ESC) you receive from the two tests. Your payment from Part 1 and the number of correct answers you get will be displayed on the screen at the end of the experiment.

Note: You may not write during the computerized tests. If the experimenter finds you using pens and papers, you will lose all your payment from Part 1.

The Experiment Starts

The experiment starts now. Please make your decision carefully.

Part 2

Part 2 consists of two stages. Each stage includes eight rounds. Each round involves four participants. At the end of the experiment, one round in Part 2 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 2—Stage 1

The first stage has eight rounds. Each round concerns a decision situation in which four participants in different roles are grouped. You and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoff in that round.

The Rules of the Decision Situation

In each round, all participants will choose among three alternatives. Your payoffs will depend on the combination of your choice and another participant's choice, as shown in the **payoff tables** below.

Member A's Payoffs				Member B's Payoffs				Member C's Payoffs				Member D's Payoffs							
Member B's Choices				Member C's Choices				Member D's Choices				Member A's Choices							
				g h i								a b c							
								j k l											
Member A's Choices	d	e	f	Member B's Choices	g	h	i	Member C's Choices	j	k	l	Member D's Choices	a	b	c				
	a	10	4		16	d	12		16	4	g		20	12	8	j	10	12	8
	b	20	8		0	e	0		12	8	h		6	8	18	k	6	20	18
c	4	18	12	f	4	4	20	i	0	16	4	l	16	4	0				

The payoff tables consist of four tables. Each table corresponds to a different group member's possible payoffs, as explained below.

1. Member A

Member A's payoffs depend on the combination of **Member A's** choice and **Member B's** choice. Given the above payoff tables, if Member A chooses a and Member B chooses d, Member A will earn 10 ESC. If instead Member B chooses e, Member A will earn 4 ESC.

Member A's Payoffs				
Member B's Choices				
d e f				
Member A's Choices	a	10	4	16
	b	20	8	0
	c	4	18	12

2. Member B

Member B's payoffs depend on the combination of **Member B's** choice and **Member C's** choice. Given the above payoff tables, if Member B chooses e and Member C chooses h, Member B will earn 12 ESC. If instead Member C chooses i, Member B will earn 8 ESC.

		Member B's Payoffs		
		Member C's Choices		
		g	h	i
Member B's Choices	d	12	16	4
	e	0	12	8
	f	4	4	20

3. Member C

Member C's payoffs depend on the combination of **Member C's** choice and **Member D's** choice. Given the above payoff tables, if Member C chooses h and Member D chooses k, Member C will earn 8 ESC. If instead Member D chooses j, Member C will earn 6 ESC.

		Member C's Payoffs		
		Member D's Choices		
		j	k	l
Member C's Choices	g	20	12	8
	h	6	8	18
	i	0	16	4

4. Member D

Member D's payoffs depend on the combination of **Member D's** choice and **Member A's** choice. Given the above payoff tables, if Member D chooses k and Member A chooses c, Member D will earn 18 ESC. If instead Member A chooses a, Member D will earn 6 ESC.

		Member D's Payoffs		
		Member A's Choices		
		a	b	c
Member D's Choices	j	10	12	8
	k	6	20	18
	l	16	4	0

The following table summarizes the alternatives that each member may choose from and whose choices a member's payoff may depend on.

Role	Member A	Member B	Member C	Member D
Alternatives	a, b, c	d, e, f	g, h, i	j, k, l
Payoff Determined by	A and B	B and C	C and D	D and A

The Appearance of Payoff Tables

As previously described, the payoff tables consist of four tables. Your payoffs will always be listed in the **leftmost** table on the screen. Your choice (g, h, or i in the example below) will determine the row of the leftmost table. Depending on your role, the choice of one of the other members (Member D in the example below) in your group, will determine the column of the leftmost table.

Your (Member C's) Payoffs				Member D's Payoffs				Member A's Payoffs				Member B's Payoffs							
Member D's Choices				Member A's Choices				Member B's Choices				Member C's Choices							
j k l				a b c				d e f				g h i							
Your (Member C's) Choices	g	12	16	4	Member D's Choices	j	10	12	8	Member A's Choices	a	10	4	16	Member B's Choices	d	20	12	8
	h	0	12	8		k	6	20	18		b	20	8	0		e	6	8	18
	i	4	4	20		l	16	4	0		c	4	18	12		f	0	16	4

Example: given the above payoff tables, you are assigned as Member C. The payoffs of Member C (you), D, A, and B are listed in the tables from left to right.

The payoffs of the other three members in your group will be listed in the other three tables in order, as summarized in the table below.

Your Role	Member A	Member B	Member C	Member D
Order of Payoff Tables	A/B/C/D	B/C/D/A	C/D/A/B	D/A/B/C

The Members Matched with You and Their Strategies

When you start each new round, you will be grouped with three other participants who are in different roles. The three other participants will **be the choice data from human participants in past experiments**. Specifically, the experimenter will randomly draw three human participants from a previous experiment and adopt their choices from that experiment as your group members' choices.

Note:

1. The human participants matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participants matched with you will **not** actually interact with you. Their choices have been confirmed in the previous experiment.
3. The human participants matched with you will be randomly drawn from those participated in the previous experiment with equal probabilities.
4. The human participants matched with you confronted the **same** payoff tables in the previous experiment as you, but in **different** roles.
5. The human participants matched with you will be drawn **only** from the corresponding members' data.

(For example, if you are Member A, then the experimenter will randomly draw a human Member B, a human Member C, and a human Member D, using their choices in the previous experiment as your matched Member B, Member C, and Member D's choices.)

Experiment Procedure

In each round, the payoff tables corresponding to that round will be displayed on the screen. After you have made your choice, you need to click on the button “Confirm.” The payoff tables may change from round to round, so you should always look at the payoffs carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Note that you will be informed of your payment, the round chosen for payment, what choice you made in that round, and the choices of your matched group-mates only at the end of the experiment. You will not learn any other information about the choices of other participants in the experiment.

At the beginning of the experiment of Part 2, you will be randomly assigned to be either Member A, B, C, or D. Once decided, your role remains the same **throughout Part 2**.

Understanding Questions

There are five understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are right rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 2—Stage 2

The second stage has eight rounds. Each round concerns a decision situation in which you and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoffs in that round.

The rule and procedure of this stage are the same as the previous stage, but your group members will use a different strategy, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be grouped with the choice data from human participants in past experiments but **computers** that are programmed to take the following strategy:

1. The computers aim to earn as much payoff as possible for themselves.
2. A computer believes that every participant will try to earn as much payoff as one can.
3. A computer believes that every participant believes “the computers aim to earn as much payoff as possible for themselves.”

Note:

1. A computer's payoff (ESC) will **not** be converted into NT\$ to be paid to any human participants.
2. A computer will **not** randomly make a choice among the three alternatives.
3. A computer will **not** know your choice before it makes a choice.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions about the experiment; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are eight rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3

Part 3 consists of two stages. Each stage includes three rounds. Each round involves two participants. At the end of the experiment, one round in Part 3 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 3—Stage 1

The first stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make **guesses**. Together, your guess and the other participant's guess determine your payoffs in this round.

The Rules of the Decision Situation

In each round, you will choose one integer between 1 and 100, called your guess. The participant with whom you are matched will also make a guess, choosing one integer between 1 and 100. In addition, you and the participant with whom you are matched will be assigned a number p in each round. Your payoff will depend on your guess, the guess of the other participant with whom you are matched, and the number p . The payoff is calculated based on the following formula:

$$\text{Your payoff} = 0.2 \times (100 - | \text{Your guess} - \text{The guess of the other participant with whom you are matched} \times p |)$$

The Payoff Formula

In each round, we measure how close your guess is to “the guess of the other participant with whom you are matched $\times p$.” For example, if the other participant's guess was 80 and the $p = 4/5$, then we measure how close your guess is to $80 \times 4/5 = 64$. If you guessed 70 then the absolute difference between your guess and 64 was 6. We call this number (6) the **error** in your guess.

The error in the other participant's guess will also be calculated. In the above example, the other participant's error is equal to $80 - (70 \times 4/5) = 24$.

You will be paid based on how small your error is, and smaller errors mean larger payoffs. When payoffs are calculated, only the (absolute) error matters, not “the other participant's guess $\times p$ ” is greater or less than your guess.

If your error is some number E , then your payoff in ESC will be $0.2 \times (100 - E)$. In the above example your error was 6. Therefore, you would earn $0.2 \times (100 - 6) = 18.8$ ESC; the other participant's error was 24, so he would earn $0.2 \times (100 - 24) = 15.2$ ESC. The error ranges between 0 and 100, so your maximum payoff in one round is 20 ESC and your minimum payoff is 0 ESC.

The Members Matched with You and Their Strategies

When you start each new round, you will be matched with another participant. The other participant will be **the choice data from a human participant in past experiments**. Specifically, the experimenter will randomly draw a human participant from a previous experiment and adopt his/her guesses from that experiment as your group members' guesses.

Note:

1. The human participant matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participant matched with you will **not** actually interact with you. His/Her guesses have been confirmed in the previous experiment.
3. The human participant matched with you will be randomly drawn from those participated in the previous experiment with equal probabilities.
4. The human participant matched with you confronted the **same** p as you in the previous experiment.

Experiment Procedure

In each round, the number p corresponding to that round (and the payoff formula) will be displayed on the screen. After you have made your guess, you need to click on the button "Confirm." The number p may change from round to round, so you should always look at the number p carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Note that you will be informed of your payment, the round chosen for payment, what choice you made in that round, and the choices of your matched group-mates only at the end of the experiment. You will not learn any other information about the choices of other participants in the experiment.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment**. Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are three rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3—Stage 2

The second stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make guesses. Together, your guess and the other participant's guess determine your payoffs in this round.

The rule and procedure of this stage are the same as the previous stage, but your matched member will use a different strategy, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be matched with the choice data from a human participant in past experiments but a **computer** that is programmed to take the following strategy:

1. The computer aims to earn as much payoff as possible for itself.
2. The computer believes that every participant will try to earn as much payoff as one can.
3. The computer believes that every participant believes “the computer aims to earn as much payoff as possible for itself.”

Note:

1. A computer's payoff (ESC) will **not** be converted into NT\$ to be paid to any human participants.
2. A computer will **not** randomly guess an integer between 1 and 100.
3. A computer will **not** know your choice before it makes a choice.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions about the experiment; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are three rounds! Note: each round could be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

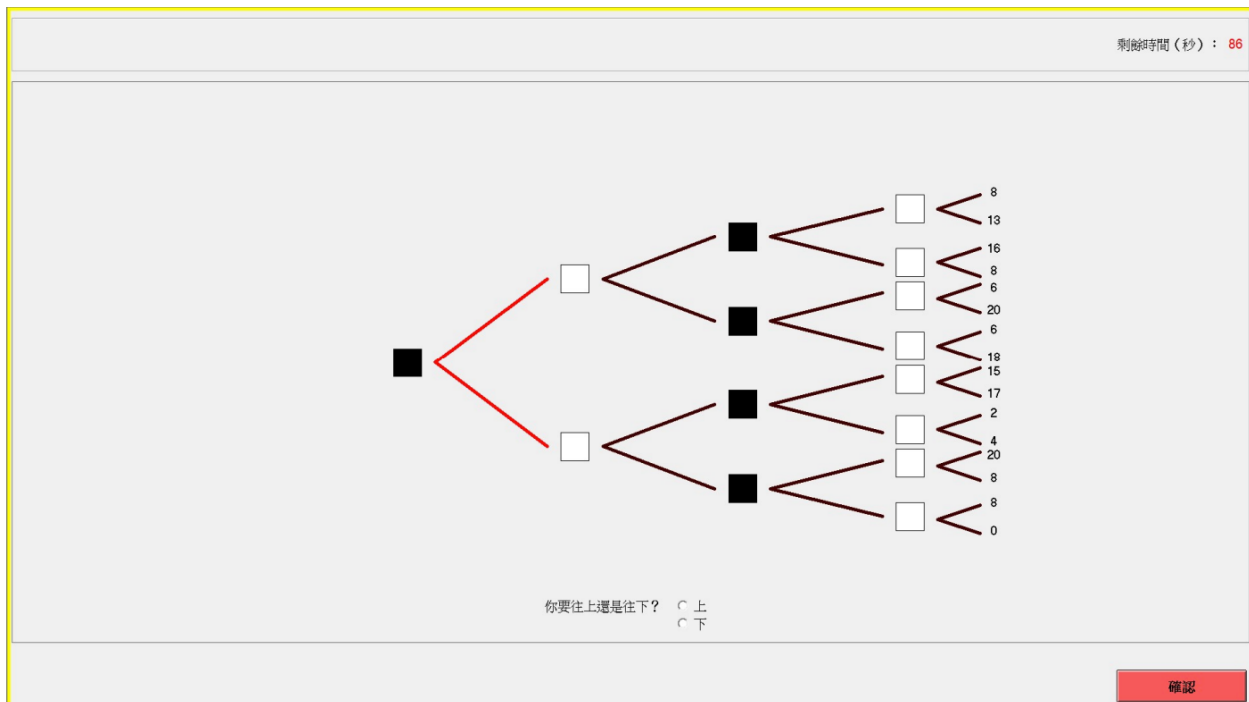
Part 4

This section concerns a **tree diagram**. This tree diagram is a short sequence of decisions to be taken by you, interlaced with moves taken by **Nature**. Nature is a random device, whose behavior will be explained below. Each sequence of decisions by you and moves by Nature leads to a payoff (ESC) for Part 4.

The Tree Diagram

The tree diagram is characterized by a sequence of **decision nodes (black squares)** and **chance nodes (white squares)**. At each node there are two subsequent paths to follow: Up and Down. At each decision node **you** will have to take a decision---in each case whether to go Up or Down. At each chance node **Nature** will determine whether Up or Down is chosen. Nature operates in a totally random way, so that Up and Down are equally likely and independent of any past moves either by you or Nature.

In total you will go through **two** decision nodes and **two** chance nodes in the following order: decision, chance, decision, chance. After the final chance node is played out by Nature you will arrive at an **end node**. As shown in the screenshot below, each end node has associated with it a payoff (ESC).

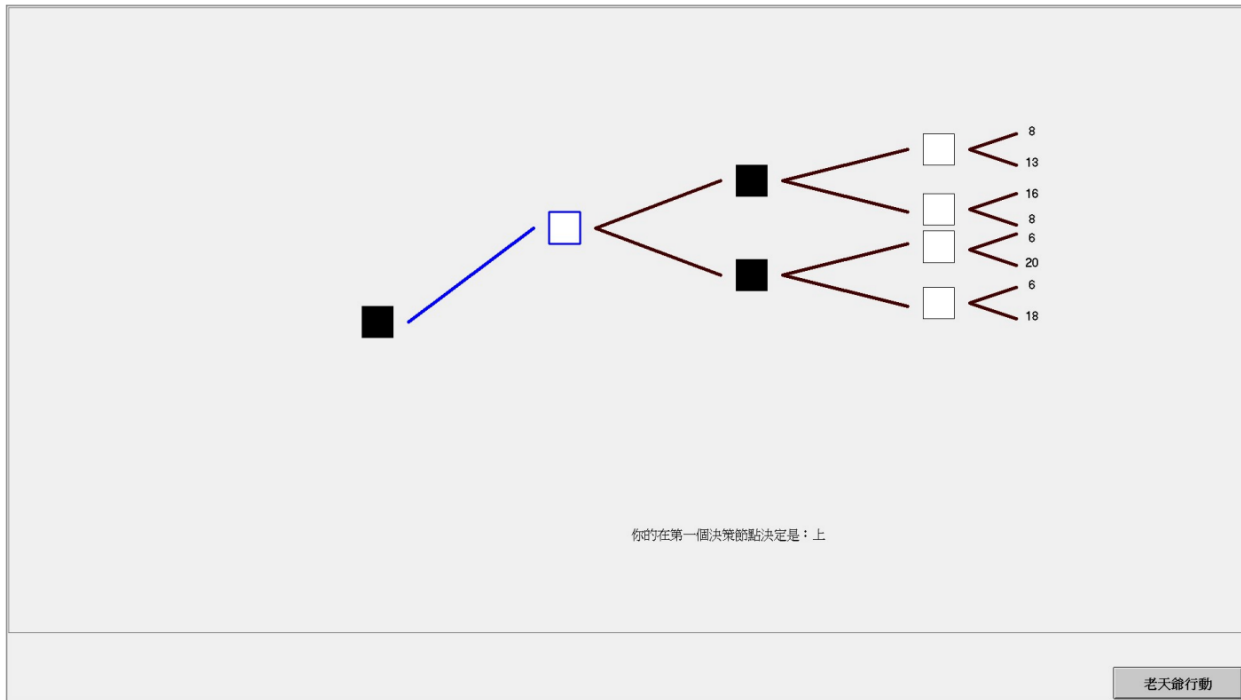


Experiment Procedure

The tree diagram will be displayed on the screen (as shown in the screenshot above). You should carefully study the tree diagram and the various possible end (payoff) nodes. You will end up at one of these payoff nodes. You will then be invited to work through the tree, starting at the left-hand node (a decision node).

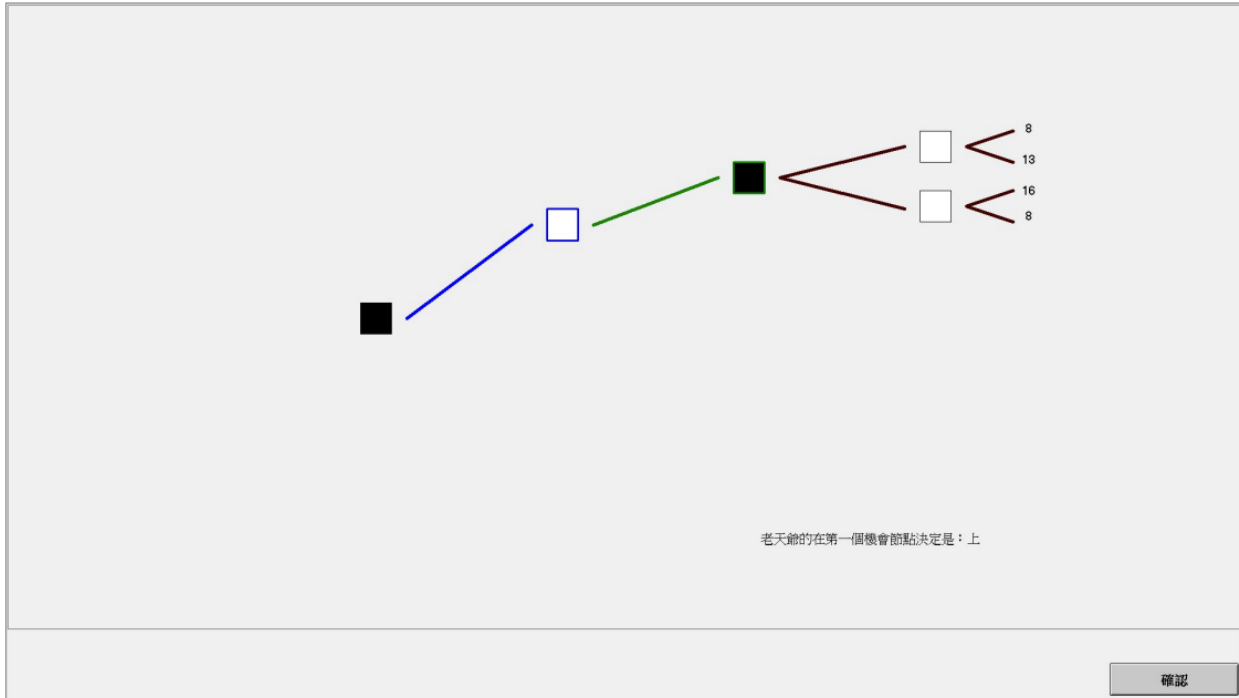
The Decision Node

At each decision node, please indicate whether you want to move Up or Down using the buttons at the bottom and then click on the button “Confirm.” Your decision will then be implemented, with the part of the tree that your decision has excluded being removed to indicate that that part is no longer available. As shown in the screenshot below, if you choose to move Up in the previous figure, then the bottom half of the tree diagram will be removed.



The Chance Node

At each chance node, please click on the button “Nature Move.” You will then be told the move by Nature, and it will be implemented, with the part of the tree that Nature’s move has excluded being removed to indicate that it is no longer available. As shown in the screenshot below, if Nature chooses to move Up, then the bottom half of the remaining tree diagram will be removed.



Payoff Calculation

The last node will be a chance node. After the final move by Nature, you will see that only one end (payoff) node remains available. This is the payoff you receive for Part 4.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. Please make your decision carefully.

C. Experimental Instructions for RH Order (Chinese)

實驗報酬

本實驗結束後，你將得到定額車馬費新台幣 200 元，以及你在實驗中獲得的「法幣」所兌換成之新台幣。

（「法幣」為本實驗的實驗貨幣單位。）你在實驗中能獲得的「法幣」會根據你所做的決策、別人的決策，以及隨機亂數決定，每個人都不同。每個人都會個別獨自領取報酬，你沒有義務告訴其他人你的報酬多寡。

請注意：本實驗中「法幣」與新台幣兌換匯率為 1:4。(法幣 1 元 = 新台幣 4 元)

第一部分

第一部分由兩個電腦化測驗組成，第一個測驗包含三題，第二個測驗包含十一題，每題都只有一個正確答案。你將會在實驗結束時得知你答對的題數。在第一個測驗中，每答對一題，你就會獲得 3 法幣；在第二個測驗中，每答對一題，你就會獲得 1 法幣。

你在兩個測驗中所獲得的法幣加總，即為你在第一部分的報酬。你在第一部分的報酬，以及答對的題數，將在實驗結束後顯示在你的螢幕上。

請注意：在電腦化測驗進行時，請不要使用紙筆做紀錄。如果實驗者發現你在測驗進行時使用紙筆，你將喪失本部分的所有報酬。

實驗正式開始

現在實驗正式開始！請慎重選擇、慎重決定。

第二部分

第二部分由兩個階段組成，每階段包含八個回合，每回合中有四名參與者。在實驗結束後，將「隨機抽取第二部分其中一個回合」的報酬實現，作為你在這一部分的實際報酬。每個回合都可能被抽中，因此，請你在每回合都認真做決定，彷彿它就會實現。

第二部分——第一階段

第一階段共有八回合。每回合包含一個決策情境。在每個決策情境中，四位不同成員身分的參與者將組成一組，而你和與你同組的其他參與者們，將各自獨立地在此情境下做出選擇。在每回合中，你的選擇以及其他同組參與者的選擇，將決定你在該回合的報酬。

決策情境規則

在每回合中，每位參與者分別需在三個選項中做出選擇，你的報酬將由你的選擇和另一名參與者的選擇所決定，如以下**報酬表**所示：

成員甲的報酬				成員乙的報酬			成員丙的報酬			成員丁的報酬									
成員乙的選擇				成員丙的選擇			成員丁的選擇			你（成員甲）的選擇									
d e f				g h i			j k l			a b c									
成員甲的選擇	a	10	4	16	成員乙的選擇	d	12	16	4	成員丙的選擇	g	20	12	8	成員丁的選擇	j	10	12	8
	b	20	8	0		e	0	12	8		h	6	8	18		k	6	20	18
	c	4	18	12		f	4	4	20		i	0	16	4		l	16	4	0

報酬表由四個表格組成，每個表格各自對應到同組內不同成員的可能報酬，具體說明如下：

1. 成員甲

成員甲的報酬由成員甲和成員乙的選擇決定。根據以上的報酬表，如果成員甲選擇 a、成員乙選擇 d，那麼成員甲的報酬為 10 法幣。但如果成員乙選擇 e，則成員甲的報酬為 4 法幣。

成員甲的報酬				
成員乙的選擇				
d e f				
成員甲的選擇	a	10	4	16
	b	20	8	0
	c	4	18	12

2. 成員乙

成員乙的報酬由成員乙和成員丙的選擇決定。根據以上的報酬表，如果成員乙選擇 e、成員丙選擇 h，則成員乙的報酬為 12 法幣。但如果成員丙選擇 i，則成員乙的報酬為 8 法幣。

		成員乙的報酬		
		成員丙的選擇		
		g	h	i
成員乙的選擇	d	12	16	4
	e	0	12	8
	f	4	4	20

3. 成員丙

成員丙的報酬由成員丙和成員丁的選擇決定。根據以上的報酬表，如果成員丙選擇 h、成員丁選擇 k，則成員丙的報酬為 8 法幣。但如果成員丁選擇 j，則成員丙的報酬為 6 法幣。

		成員丙的報酬		
		成員丁的選擇		
		j	k	l
成員丙的選擇	g	20	12	8
	h	6	8	18
	i	0	16	4

4. 成員丁

成員丁的報酬由成員丁和成員甲的選擇決定。根據以上的報酬表，如果成員丁選擇 k、成員甲選擇 c，則成員丁的報酬為 18 法幣。但如果成員甲選擇 a，則成員丁的報酬為 6 法幣。

		成員丁的報酬		
		你 (成員甲) 的選擇		
		a	b	c
成員丁的選擇	j	10	12	8
	k	6	20	18
	l	16	4	0

每個成員能選擇的選項，以及每個成員的報酬由誰決定，整理在以下表格：

成員身分	甲	乙	丙	丁
選項	a, b, c	d, e, f	g, h, i	j, k, l
報酬由誰決定	甲、乙	乙、丙	丙、丁	丁、甲

報酬表畫面

如同先前的說明，報酬表由四個表格組成。在實驗畫面中，你可能獲得的報酬將被列在報酬表中最左邊的表格。你的選擇（下圖範例中為 g, h, i）會影響最左邊的表格的橫列；根據你的成員身分，與你同組的另一名成員（下圖範例中為丁）的選擇會影響最左邊的表格的直行。

你 (成員丙) 的報酬				成員丁的報酬				成員甲的報酬				成員乙的報酬							
成員丁的選擇				成員甲的選擇				成員乙的選擇				你 (成員丙) 的選擇							
j k l				a b c				d e f				g h i							
你 (成員丙) 的選擇	g	12	16	4	成員丁的選擇	j	10	12	8	成員甲的選擇	a	10	4	16	成員乙的選擇	d	20	12	8
	h	0	12	8		k	6	20	18		b	20	8	0		e	6	8	18
	i	4	4	20		l	16	4	0		c	4	18	12		f	0	16	4

範例：根據上面的報酬表，你被指定為成員丙。成員丙（你）、成員丁、成員甲、及成員乙的報酬由左至右被依序列在各個表格中。

其他三名同組成員的報酬，將被依序列在報酬表中其他三個表格內，如以下表格整理：

你的成員身分	甲	乙	丙	丁
報酬表的順序	甲/乙/丙/丁	乙/丙/丁/甲	丙/丁/甲/乙	丁/甲/乙/丙

與你配對的成員及其策略

每回合開始時，你將會與另外三位與你不同成員身分的參與者組成一組。另外三位參與者是電腦；電腦程式採取以下策略：

1. 電腦的目標是為自己賺取最多報酬（法幣）。
2. 電腦相信每位參與者都以自己賺取最多報酬為目標。
3. 電腦相信每位參與者都相信「電腦的目標是為自己賺取最多報酬」。

請注意：

1. 電腦的報酬（法幣）不會被兌換成新台幣給付給任何真人參與者。
2. 電腦不是從三個選項中隨機做出選擇。
3. 電腦做選擇時不會事先知道你的選擇。

實驗流程

每回合的螢幕上，將會顯示該回合的報酬表。當你做出你的選擇後，請按下「確認」鍵。每回合的報酬表都有可能不同，所以在每回合開始時，請仔細檢視報酬表的內容。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

請注意，只有在實驗結束後，你才會獲得以下資訊：被選中的回合、你在該回合中做的選擇、與你同一組的組員在該回合中做的選擇。在實驗進行中，你不會得到關於其他參與者所做的選擇的資訊。

在第二部分實驗一開始時，電腦會隨機決定你是成員甲、乙、丙、或是丁；決定之後，你的成員身分在整個第二部分都不會再變動。

練習問題

練習問題總共有五題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的解答有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有八回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第二部分——第二階段

第二階段共有八回合，每回合包含一個決策情境，而你和其他與你同組的參與者，將各自獨立地在此情境下做出**選擇**。在每回合中，你的選擇以及其他同組參與者的選擇，將決定你在該回合的報酬。

本階段的規則和流程與上階段完全相同，除了與你配對的成員使用的策略不同；具體說明如下：

與你配對的成員及其策略

本階段，與你同組的參與者將不再是電腦，而是上個階段中其他參與者的選擇資料。具體來說，實驗者將從剛才第一階段的資料中，隨機抽出三個真人參與者，並用他們的選擇做為其他三位成員的選擇。

請注意：

1. 與你同組的真人參與者**不會**因為你的選擇額外收到任何報酬，或是被收取任何費用。
2. 與你同組的真人參與者**不會**實際與你互動；他們已在第一階段確定了他們的選擇。
3. 與你同組的真人參與者**不會**是過去的你自己，會從其他真人參與者當中以相同機率抽出。
4. 與你同組的真人參與者在第一階段和你面對**相同**的報酬表，但是是**不同**的成員身分。
5. 與你同組的真人參與者**只會**從對應的成員資料中抽取。

(舉例來說，如果你是成員甲，那麼實驗者就會隨機抽出一位真人成員乙、一位真人成員丙、一位真人成員丁，並用他們在第一階段的選擇，分別做為與你配對的成員乙、成員丙、成員丁的選擇。)

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

練習問題

練習問題總共有六題，目的為確認你已理解本實驗。請注意，**練習問題的作答結果與你最後的現金報酬無關**。如果你對本實驗或練習問題的答案有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有八回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第三部分

第三部分由兩個階段組成，每階段包含三個回合，每回合中有兩名參與者。在實驗結束後，將「隨機抽取第三部分其中一個回合」的報酬實現，作為你在這一部分的實際報酬。每個回合都可能被抽中，因此，請你在每回合都認真做決定，彷彿它就會實現。

第三部分——第一階段

第一階段共有三回合。每回合包含一個決策情境，而你和與你配對的另一位參與者，將各自獨立地在此情境下做出**猜測**。在每回合中，你的猜測以及另一位參與者的猜測，將決定你在該回合的報酬。

決策情境規則

在每回合中，你需在 1 到 100 當中選取一個整數，做為你的猜測。與你配對的參與者也會在 1 到 100 之間的整數做出猜測。除此之外，在每回合中，你和與你配對的參與者會被指定一個**數字 ρ** 。你的報酬將由你的猜測、另一位與你配對的參與者的猜測、以及數字 ρ 所決定。報酬公式如下：

$$\text{你的報酬} = 0.2 \times (100 - |\text{你的猜測} - \text{另一位與你配對的參與者的猜測} \times \rho|)$$

報酬公式說明

在每回合中，我們會計算你的猜測有多靠近「另一位與你配對的參與者的猜測 ρ 」。舉例而言，如果另一位參與者的猜測是 80，而 $\rho = 4/5$ ，則我們會計算你的猜測有多靠近 $80 \times 4/5 = 64$ 。假如你的猜測是 70，則你的猜測與 64 的差距的絕對值為 6；這個數字（6）就是你的猜測的**誤差**。

另一位參與者的猜測的誤差也會被計算。在前面的例子裡，另一位參與者的誤差等於 $80 - (70 \times 4/5) = 24$ 。

你的報酬取決於你的誤差有多小，誤差越小則報酬越高。報酬多寡只跟誤差的（絕對值）大小有關，跟「另一位參與者的猜測 $\times \rho$ 」比你的猜測大或小無關。

如果你的誤差等於 E，則你的報酬（法幣）等於 $0.2 \times (100 - E)$ 。在前面的例子裡，你的誤差為 6，因此你會獲得 $0.2 \times (100 - 6) = 18.8$ 法幣；另一位參與者的誤差是 24，因此他會獲得 $0.2 \times (100 - 24) = 14.4$ 法幣。誤差的範圍在 0 到 100 之間，所以你在一個回合中的最高報酬是 20 法幣，最低報酬是 0 法幣。

與你配對的成員及其策略

每回合開始時，你將會與另一位成員配對。另一位成員是電腦；電腦程式採取以下策略：

1. 電腦的目標是為自己賺取最多報酬（法幣）。
2. 電腦相信每位參與者都以自己賺取最多報酬為目標。
3. 電腦相信每位參與者都相信「電腦的目標是為自己賺取最多報酬」。

請注意：

1. 電腦的報酬（法幣）不會被兌換成新台幣給付給任何真人參與者。
2. 電腦不是從 1 – 100 的整數中隨機做出猜測選一個數字。
3. 電腦做選擇時不會事先知道你的選擇。

實驗流程

每回合的螢幕上，將會顯示該回合的數字 p （以及報酬公式）。當你做出你的猜測後，請按下「確認」鍵。每回合的數字 p 都有可能不同，所以在每回合開始時，請仔細檢視數字 p 的大小。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

請注意，只有在實驗結束後，你才會獲得以下資訊：被選中的回合、你在該回合中做的選擇、與你同一組的組員在該回合中做的選擇。在實驗進行中，你不會得到關於其他參與者所做的選擇的資訊。

練習問題

練習問題總共有三題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗有任何疑問，請在此時舉手。實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有三回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第三部分——第二階段

第二階段共有三回合。每回合包含一個決策情境，而你和與你配對的另一位參與者，將各自獨立地在此情境下做出猜測。在每回合中，你的猜測以及另一位參與者的猜測，將決定你在該回合的報酬。

本階段的規則和流程與上階段完全相同，除了與你配對的成員使用的策略不同；具體說明如下：

與你配對的成員及其策略

本階段，與你同組的參與者將不再是電腦，而是上個階段其它參與者的猜測資料。具體來說，每回合開始時，實驗者將從剛才第一階段的資料中，考慮同樣的決策情境下，隨機抽出一個真人參與者，並用他的猜測選擇做為你同組成員的猜測選擇。

請注意：

1. 與你同組的真人參與者不會因為你的選擇額外收到任何報酬，或是被收取任何費用。
2. 與你同組的真人參與者不會實際與你互動；他已在第一階段確定了他的猜測。
3. 與你同組的真人參與者不會是過去的你自己，會從其他真人參與者當中以相同機率抽出。
4. 與你同組的真人參與者在第一階段和你面對相同的 ρ 。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

練習問題

練習問題總共有四題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的答案有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有三回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

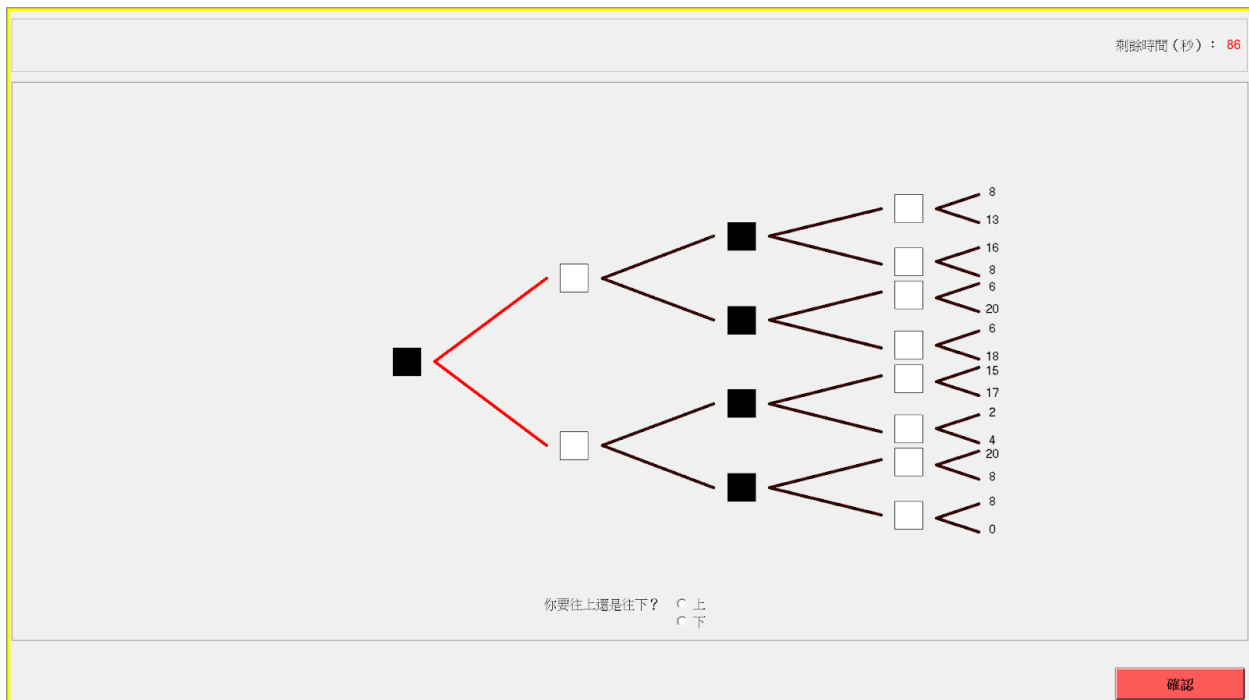
第四部分

本部分包含一個樹狀圖，樹狀圖由你的一系列決策及老天爺的行動交錯組成。「老天爺」是一個隨機機制，其機制規則將在底下說明。你的一系列決策及老天爺的行動將決定你在第四部分的報酬。

樹狀圖

樹狀圖由一系列的決策節點（黑色方塊）及機會節點（白色方塊）所組成。在每個節點上，會分岔出兩條支線：「上」和「下」。在每個決策節點上，你需要做出一個決定：往上或往下；在每個機會節點上，老天爺會決定往上或往下。老天爺的決定是隨機的，往上或往下的機率各半；而且老天爺在某個機會節點往上或往下，跟你或老天爺先前的行動完全無關。

從決策節點開始，你將會經過兩個決策節點和兩個機會節點，依序為：決策節點、機會節點、決策節點、機會節點。當老天爺在最後的機會節點完成決定後，你將會抵達終點。如以下實驗畫面所示，每個終點都各自對應到一個報酬（法幣）。

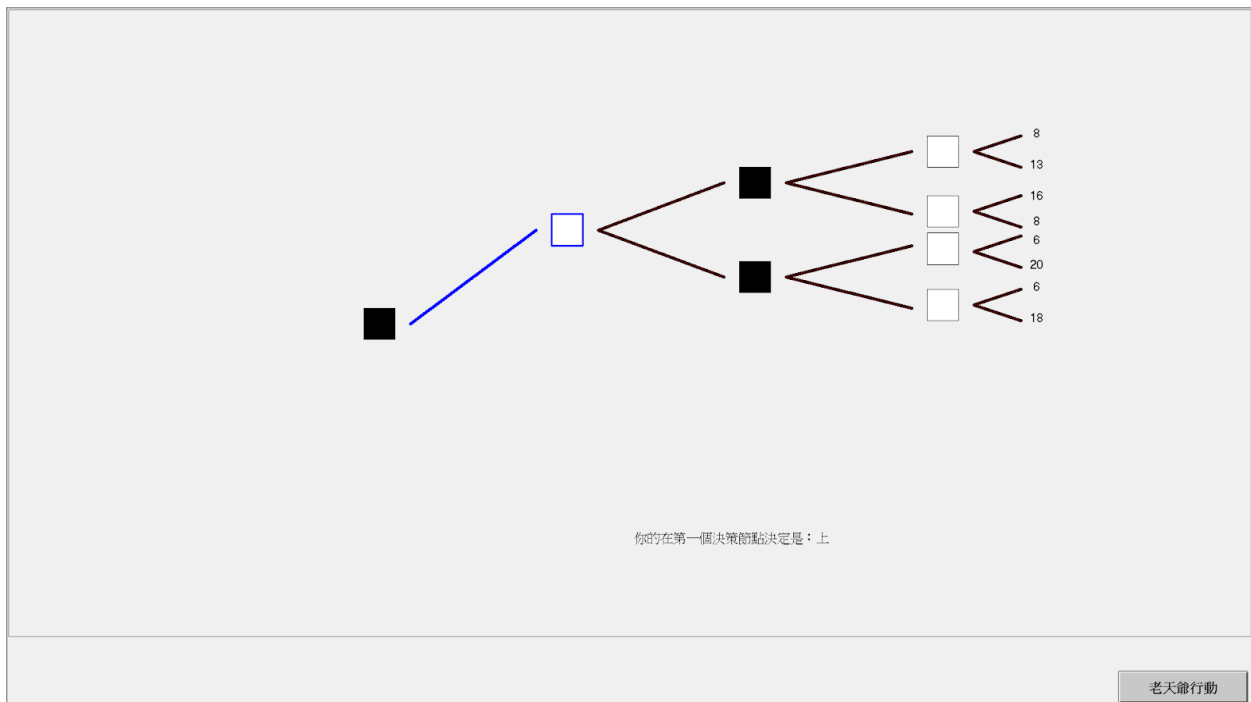


實驗流程

樹狀圖將會顯示在你的螢幕上（如以上實驗畫面所示）。請仔細檢視樹狀圖，以及每個可能的終點（對應的報酬）。你最終將會抵達其中一個終點。實驗開始時，你將從樹狀圖最左邊的節點（必定為一個決策節點）出發。

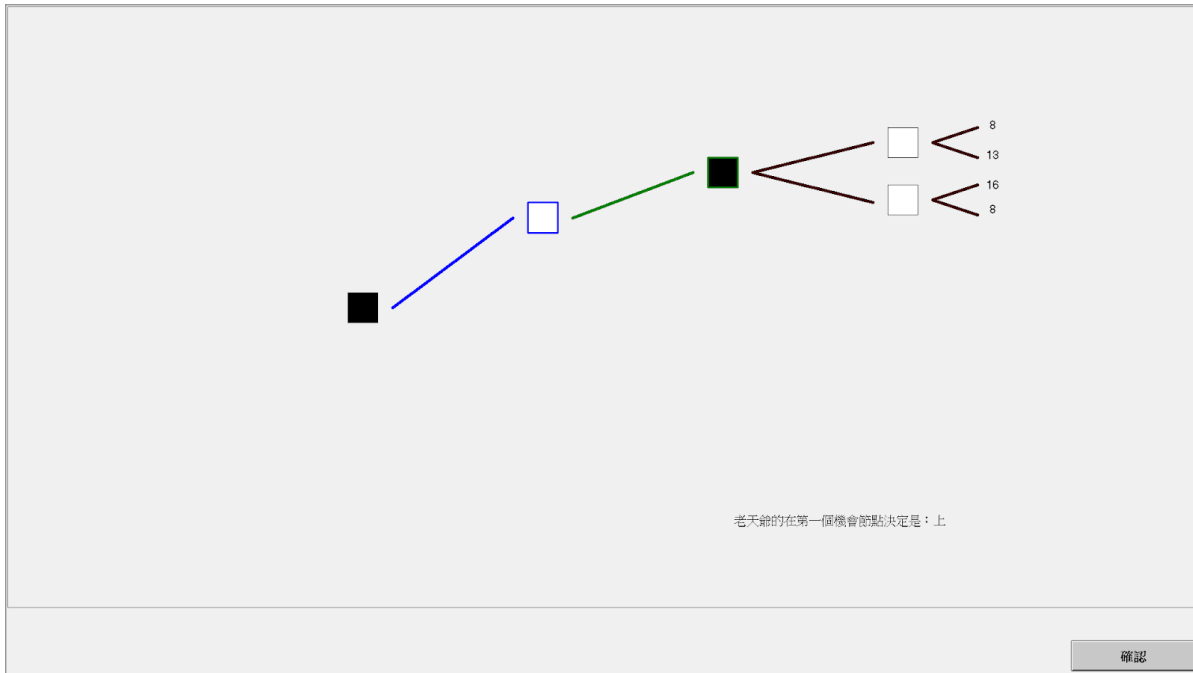
決策節點

在每個決策節點上，請利用下方的按鈕選擇你要往上還是往下。選擇完畢後，請按下「確認」鍵；你的決定將會被執行，而沒有被選到的支線、以及其後面相連的部分，將會消失，代表你不可能經過該部分。如以下實驗畫面所示，若你在前頁圖中選擇了往上，則下半部的樹狀圖皆會消失。



機會節點

在每個機會節點上，請按下右下方的「老天爺行動」鍵；你將會被告知老天爺的決定，而沒有被老天爺選到的支線、以及其後面相連的部分，將會消失，代表你不可能經過該部分。如以下實驗畫面所示，若老天爺選擇了往上，則下半部的樹狀圖皆會消失。



報酬結算

最後一個節點必定為機會節點，當老天爺完成該節點的決定之後，你會看到剩下一個終點（以及對應的報酬）。該報酬即為你在第四部分的報酬。

在每個決策節點上，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在本部分的報酬為 0。

練習問題

練習問題總共有三題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的答案有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始！請慎重選擇、慎重決定。

D. Experimental Instructions for HR Order (Chinese)

實驗報酬

本實驗結束後，你將得到定額車馬費新台幣 200 元，以及你在實驗中獲得的「法幣」所兌換成之新台幣。

（「法幣」為本實驗的實驗貨幣單位。）你在實驗中能獲得的「法幣」會根據你所做的決策、別人的決策，以及隨機亂數決定，每個人都不同。每個人都會個別獨自領取報酬，你沒有義務告訴其他人你的報酬多寡。

請注意：本實驗中「法幣」與新台幣兌換匯率為 1:4。(法幣 1 元 = 新台幣 4 元)

第一部分

第一部分由兩個電腦化測驗組成，第一個測驗包含三題，第二個測驗包含十一題，每題都只有一個正確答案。你將會在實驗結束時得知你答對的題數。在第一個測驗中，每答對一題，你就會獲得 3 法幣；在第二個測驗中，每答對一題，你就會獲得 1 法幣。

你在兩個測驗中所獲得的法幣加總，即為你在第一部分的報酬。你在第一部分的報酬，以及答對的題數，將在實驗結束後顯示在你的螢幕上。

請注意：在電腦化測驗進行時，請不要使用紙筆做紀錄。如果實驗者發現你在測驗進行時使用紙筆，你將喪失本部分的所有報酬。

實驗正式開始

現在實驗正式開始！請慎重選擇、慎重決定。

第二部分

第二部分由兩個階段組成，每階段包含八個回合，每回合中有四名參與者。在實驗結束後，將「隨機抽取第二部分其中一個回合」的報酬實現，作為你在這一部分的實際報酬。每個回合都可能被抽中，因此，請你在每回合都認真做決定，彷彿它就會實現。

第二部分——第一階段

第一階段共有八回合。每回合包含一個決策情境。在每個決策情境中，四位不同成員身分的參與者將組成一組，而你和與你同組的其他參與者們，將各自獨立地在此情境下做出選擇。在每回合中，你的選擇以及其他同組參與者的選擇，將決定你在該回合的報酬。

決策情境規則

在每回合中，每位參與者分別需在三個選項中做出選擇，你的報酬將由你的選擇和另一名參與者的選擇所決定，如以下**報酬表**所示：

		成員甲的報酬			成員乙的報酬			成員丙的報酬			成員丁的報酬								
		成員乙的選擇			成員丙的選擇			成員丁的選擇			你（成員甲）的選擇								
		d	e	f	d	g	h	i	j	k	l	a	b	c					
成員甲的選擇	a	10	4	16	成員乙的選擇	d	12	16	4	成員丙的選擇	g	20	12	8	成員丁的選擇	j	10	12	8
	b	20	8	0		e	0	12	8		h	6	8	18		k	6	20	18
	c	4	18	12		f	4	4	20		i	0	16	4		l	16	4	0

報酬表由四個表格組成，每個表格各自對應到同組內不同成員的可能報酬，具體說明如下：

1. 成員甲

成員甲的報酬由成員甲和成員乙的選擇決定。根據以上的報酬表，如果成員甲選擇 a、成員乙選擇 d，那麼成員甲的報酬為 10 法幣。但如果成員乙選擇 e，則成員甲的報酬為 4 法幣。

		成員甲的報酬		
		成員乙的選擇		
		d	e	f
成員甲的選擇	a	10	4	16
	b	20	8	0
	c	4	18	12

2. 成員乙

成員乙的報酬由成員乙和成員丙的選擇決定。根據以上的報酬表，如果成員乙選擇 e、成員丙選擇 h，則成員乙的報酬為 12 法幣。但如果成員丙選擇 i，則成員乙的報酬為 8 法幣。

		成員乙的報酬		
		成員丙的選擇		
		g	h	i
成員乙的選擇	d	12	16	4
	e	0	12	8
	f	4	4	20

3. 成員丙

成員丙的報酬由成員丙和成員丁的選擇決定。根據以上的報酬表，如果成員丙選擇 h、成員丁選擇 k，則成員丙的報酬為 8 法幣。但如果成員丁選擇 j，則成員丙的報酬為 6 法幣。

		成員丙的報酬		
		成員丁的選擇		
		j	k	l
成員丙的選擇	g	20	12	8
	h	6	8	18
	i	0	16	4

4. 成員丁

成員丁的報酬由成員丁和成員甲的選擇決定。根據以上的報酬表，如果成員丁選擇 k、成員甲選擇 c，則成員丁的報酬為 18 法幣。但如果成員甲選擇 a，則成員丁的報酬為 6 法幣。

		成員丁的報酬		
		你 (成員甲) 的選擇		
		a	b	c
成員丁的選擇	j	10	12	8
	k	6	20	18
	l	16	4	0

每個成員能選擇的選項，以及每個成員的報酬由誰決定，整理在以下表格：

成員身分	甲	乙	丙	丁
選項	a, b, c	d, e, f	g, h, i	j, k, l
報酬由誰決定	甲、乙	乙、丙	丙、丁	丁、甲

報酬表畫面

如同先前的說明，報酬表由四個表格組成。在實驗畫面中，你可能獲得的報酬將被列在報酬表中最左邊的表格。你的選擇（下圖範例中為 g, h, i）會影響最左邊的表格的橫列；根據你的成員身分，與你同組的另一名成員（下圖範例中為丁）的選擇會影響最左邊的表格的直行。

你 (成員丙) 的報酬				成員丁的報酬				成員甲的報酬				成員乙的報酬							
成員丁的選擇				成員甲的選擇				成員乙的選擇				你 (成員丙) 的選擇							
j k l				a b c				d e f				g h i							
你 (成員丙) 的選擇	g	12	16	4	成員丁的選擇	j	10	12	8	成員甲的選擇	a	10	4	16	成員乙的選擇	d	20	12	8
	h	0	12	8		k	6	20	18		b	20	8	0		e	6	8	18
	i	4	4	20		l	16	4	0		c	4	18	12		f	0	16	4

範例：根據上面的報酬表，你被指定為成員丙。成員丙（你）、成員丁、成員甲、及成員乙的報酬由左至右被依序列在各個表格中。

其他三名同組成員的報酬，將被依序列在報酬表中其他三個表格內，如以下表格整理：

你的成員身分	甲	乙	丙	丁
報酬表的順序	甲/乙/丙/丁	乙/丙/丁/甲	丙/丁/甲/乙	丁/甲/乙/丙

與你配對的成員及其策略

每回合開始時，你將會與另外三位與你不同成員身分的參與者組成一組。另外三位參與者是過去實驗中其他參與者的選擇資料。具體來說，實驗者將從過去相同實驗的資料中，隨機抽出三個真人參與者，並用他們的選擇做為其他三位成員的選擇。

請注意：

1. 與你同組的真人參與者不會因為你的選擇額外收到任何報酬，或是被收取任何費用。
2. 與你同組的真人參與者不會實際與你互動；他們已在過去實驗確定了他們的選擇。
3. 與你同組的真人參與者會從過去實驗的真人參與者當中以相同機率抽出。
4. 與你同組的真人參與者在過去實驗和你面對相同的報酬表，但是是不同的成員身分。
5. 與你同組的真人參與者只會從對應的成員資料中抽取。

(舉例來說，如果你是成員甲，那麼實驗者就會隨機抽出一位真人成員乙、一位真人成員丙、一位真人成員丁，並用他們在過去實驗的選擇，分別做為與你配對的成員乙、成員丙、成員丁的選擇。)

實驗流程

每回合的螢幕上，將會顯示該回合的報酬表。當你做出你的選擇後，請按下「確認」鍵。每回合的報酬表都有可能不同，所以在每回合開始時，請仔細檢視報酬表的內容。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

請注意，只有在實驗結束後，你才會獲得以下資訊：被選中的回合、你在該回合中做的選擇、與你同一組的組員在該回合中做的選擇。在實驗進行中，你不會得到關於其他參與者所做的選擇的資訊。

在第二部分實驗一開始時，電腦會隨機決定你是成員甲、乙、丙、或是丁；決定之後，你的成員身分在整個第二部分都不會再變動。

練習問題

練習問題總共有五題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的答案有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有八回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第二部分——第二階段

第二階段共有八回合，每回合包含一個決策情境，而你和其他與你同組的參與者，將各自獨立地在此情境下做出**選擇**。在每回合中，你的選擇以及其他同組參與者的選擇，將決定你在該回合的報酬。

本階段的規則和流程與上階段完全相同，除了與你配對的成員使用的策略不同；具體說明如下：

與你配對的成員及其策略

本階段，與你同組的參與者將不再是過去實驗中其他參與者的選擇資料，而是**電腦**；電腦程式採取以下策略：

1. 電腦的目標是為自己賺取最多報酬（法幣）。
2. 電腦相信每位參與者都以自己賺取最多報酬為目標。
3. 電腦相信每位參與者都相信「電腦的目標是為自己賺取最多報酬」。

請注意：

1. 電腦的報酬（法幣）**不會**被兌換成新台幣給付給任何真人參與者。
2. 電腦**不是**從三個選項中隨機做出選擇。
3. 電腦做選擇時**不會**事先知道你的選擇。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

如果你對本實驗有任何疑問，請在此時舉手。實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有八回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第三部分

第三部分由兩個階段組成，每階段包含三個回合，每回合中有兩名參與者。在實驗結束後，將「隨機抽取第三部分其中一個回合」的報酬實現，作為你在這一部分的實際報酬。每個回合都可能被抽中，因此，請你在每回合都認真做決定，彷彿它就會實現。

第三部分——第一階段

第一階段共有三回合。每回合包含一個決策情境，而你和與你配對的另一位參與者，將各自獨立地在此情境下做出**猜測**。在每回合中，你的猜測以及另一位參與者的猜測，將決定你在該回合的報酬。

決策情境規則

在每回合中，你需在 1 到 100 當中選取一個整數，做為你的猜測。與你配對的參與者也會在 1 到 100 之間的整數做出猜測。除此之外，在每回合中，你和與你配對的參與者會被指定一個數字 ρ 。你的報酬將由你的猜測、另一位與你配對的參與者的猜測、以及數字 ρ 所決定。報酬公式如下：

$$\text{你的報酬} = 0.2 \times (100 - |\text{你的猜測} - \text{另一位與你配對的參與者的猜測} \times \rho|)$$

報酬公式說明

在每回合中，我們會計算你的猜測有多靠近「另一位與你配對的參與者的猜測 ρ 」。舉例而言，如果另一位參與者的猜測是 80，而 $\rho = 4/5$ ，則我們會計算你的猜測有多靠近 $80 \times 4/5 = 64$ 。假如你的猜測是 70，則你的猜測與 64 的差距的絕對值為 6；這個數字（6）就是你的猜測的**誤差**。

另一位參與者的猜測的誤差也會被計算。在前面的例子裡，另一位參與者的誤差等於 $80 - (70 \times 4/5) = 24$ 。

你的報酬取決於你的誤差有多小，誤差越小則報酬越高。報酬多寡只跟誤差的（絕對值）大小有關，跟「另一位參與者的猜測 $\times \rho$ 」比你的猜測大或小無關。

如果你的誤差等於 E ，則你的報酬（法幣）等於 $0.2 \times (100 - E)$ 。在前面的例子裡，你的誤差為 6，因此你會獲得 $0.2 \times (100 - 6) = 18.8$ 法幣；另一位參與者的誤差是 24，因此他會獲得 $0.2 \times (100 - 24) = 14.4$ 法幣。誤差的範圍在 0 到 100 之間，所以你在一個回合中的最高報酬是 20 法幣，最低報酬是 0 法幣。

與你配對的成員及其策略

每回合開始時，你將會與另一位成員配對。另一位成員是過去實驗其他參與者的猜測資料。具體來說，實驗者將從過去相同實驗的資料中，隨機抽出一個真人參與者，並用他的猜測做為你同組成員的猜測。

請注意：

1. 與你同組的真人參與者不會因為你的選擇額外收到任何報酬，或是被收取任何費用。
2. 與你同組的真人參與者不會實際與你互動；他已在過去實驗確定了他的猜測。
3. 與你同組的真人參與者會從過去實驗的真人參與者當中以相同機率抽出。
4. 與你同組的真人參與者在過去實驗和你面對相同的 ρ 。

實驗流程

每回合的螢幕上，將會顯示該回合的數字 ρ （以及報酬公式）。當你做出你的猜測後，請按下「確認」鍵。每回合的數字 ρ 都有可能不同，所以在每回合開始時，請仔細檢視數字 ρ 的大小。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

請注意，只有在實驗結束後，你才會獲得以下資訊：被選中的回合、你在該回合中做的選擇、與你同一組的組員在該回合中做的選擇。在實驗進行中，你不會得到關於其他參與者所做的選擇的資訊。

練習問題

練習問題總共有三題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的答案有任何疑問，請在此時舉手。實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有三回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

第三部分——第二階段

第二階段共有三回合。每回合包含一個決策情境，而你和與你配對的另一位參與者，將各自獨立地在此情境下做出猜測。在每回合中，你的猜測以及另一位參與者的猜測，將決定你在該回合的報酬。

本階段的規則和流程與上階段完全相同，除了與你配對的成員使用的策略不同；具體說明如下：

與你配對的成員及其策略

本階段，與你同組的參與者將不再是過去實驗其他參與者的猜測資料，而是電腦；電腦程式採取以下策略：

1. 電腦的目標是為自己賺取最多報酬（法幣）。
2. 電腦相信每位參與者都以自己賺取最多報酬為目標。
3. 電腦相信每位參與者都相信「電腦的目標是為自己賺取最多報酬」。

請注意：

1. 電腦的報酬（法幣）不會被兌換成新台幣給付給任何真人參與者。
2. 電腦不是從 1 – 100 的整數中隨機選一個數字。
3. 電腦做選擇時不會事先知道你的選擇。

在每回合中，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在該回合的報酬為 0。

如果你對本實驗有任何疑問，請在此時舉手。實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始，一共有三回合！請注意，每一回合都有可能經由隨機過程、被選中來決定你參加本次實驗的報酬。因此請慎重選擇、慎重決定。

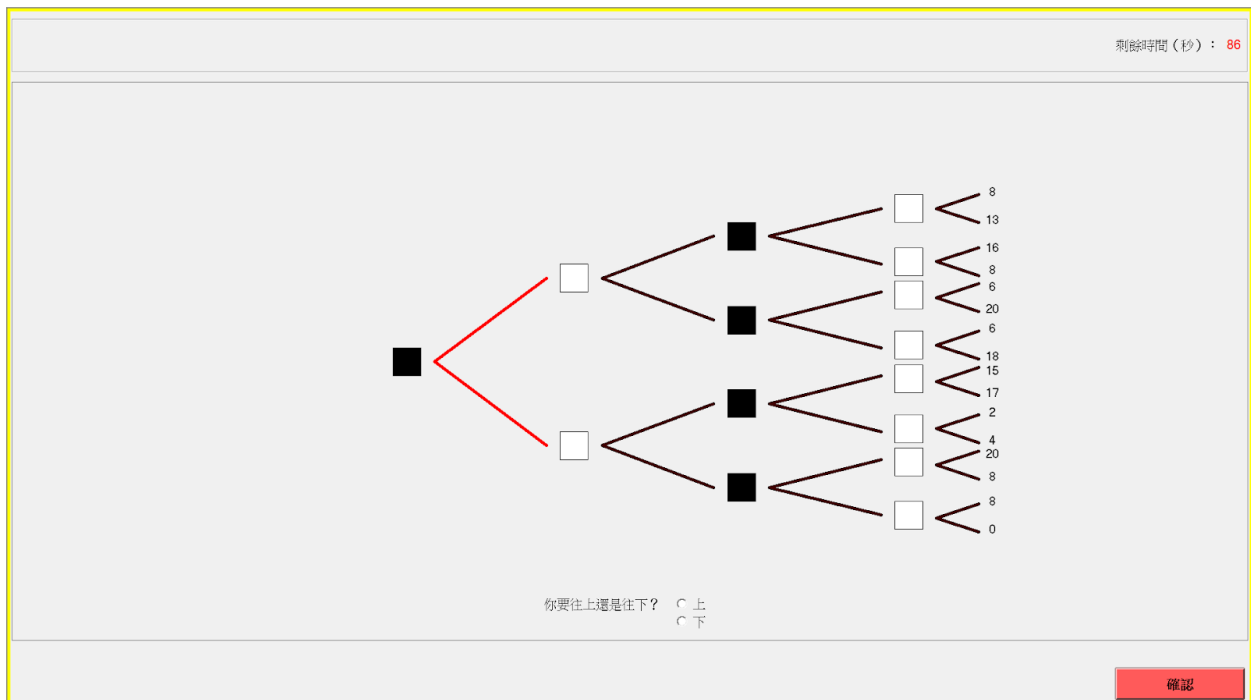
第四部分

本部分包含一個樹狀圖，樹狀圖由你的一系列決策及老天爺的行動交錯組成。「老天爺」是一個隨機機制，其機制規則將在底下說明。你的一系列決策及老天爺的行動將決定你在第四部分的報酬。

樹狀圖

樹狀圖由一系列的決策節點（黑色方塊）及機會節點（白色方塊）所組成。在每個節點上，會分岔出兩條支線：「上」和「下」。在每個決策節點上，你需要做出一個決定：往上或往下；在每個機會節點上，老天爺會決定往上或往下。老天爺的決定是隨機的，往上或往下的機率各半；而且老天爺在某個機會節點往上或往下，跟你或老天爺先前的行動完全無關。

從決策節點開始，你將會經過兩個決策節點和兩個機會節點，依序為：決策節點、機會節點、決策節點、機會節點。當老天爺在最後的機會節點完成決定後，你將會抵達終點。如以下實驗畫面所示，每個終點都各自對應到一個報酬（法幣）。

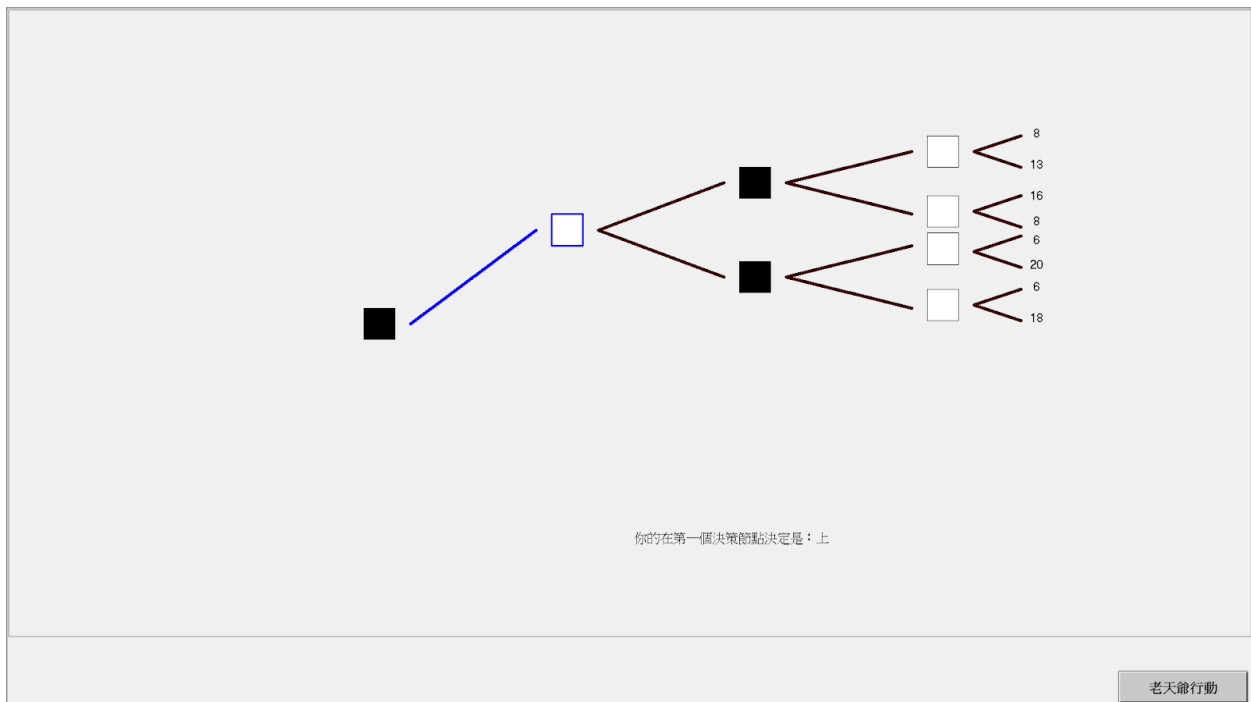


實驗流程

樹狀圖將會顯示在你的螢幕上（如以上實驗畫面所示）。請仔細檢視樹狀圖，以及每個可能的終點（對應的報酬）。你最終將會抵達其中一個終點。實驗開始時，你將從樹狀圖最左邊的節點（必定為一個決策節點）出發。

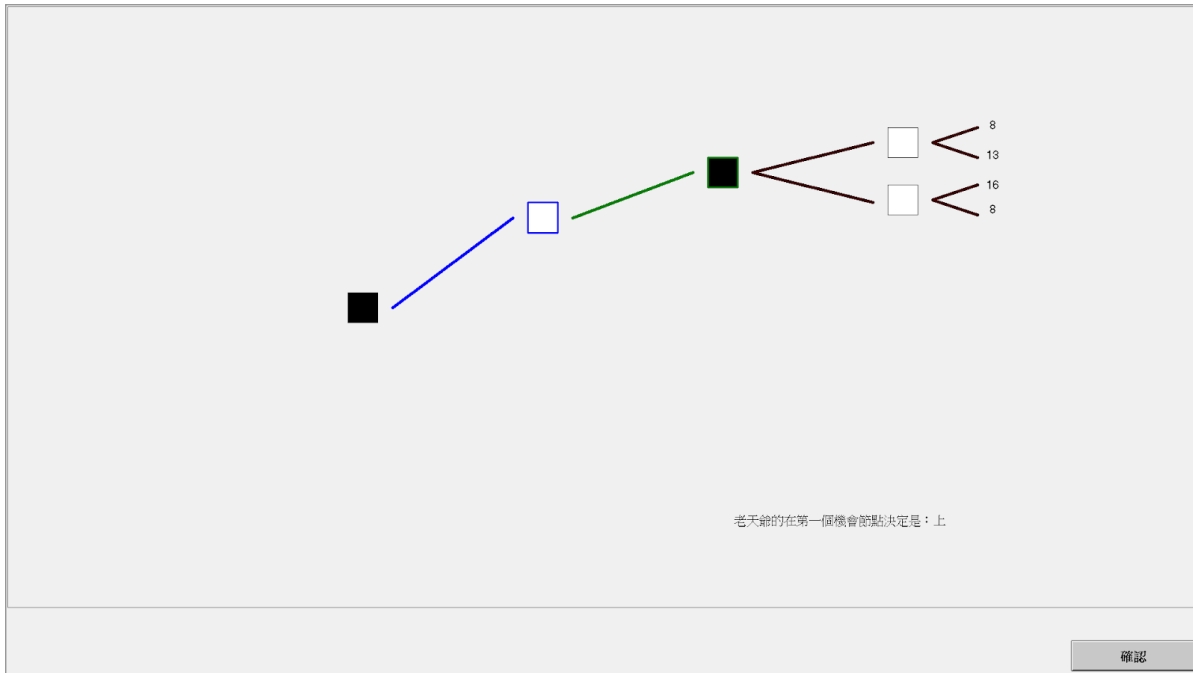
決策節點

在每個決策節點上，請利用下方的按鈕選擇你要往上還是往下。選擇完畢後，請按下「確認」鍵；你的決定將會被執行，而沒有被選到的支線、以及其後面相連的部分，將會消失，代表你不可能經過該部分。如以下實驗畫面所示，若你在前頁圖中選擇了往上，則下半部的樹狀圖皆會消失。



機會節點

在每個機會節點上，請按下右下方的「老天爺行動」鍵；你將會被告知老天爺的決定，而沒有被老天爺選到的支線、以及其後面相連的部分，將會消失，代表你不可能經過該部分。如以下實驗畫面所示，若老天爺選擇了往上，則下半部的樹狀圖皆會消失。



報酬結算

最後一個節點必定為機會節點，當老天爺完成該節點的決定之後，你會看到剩下一個終點（以及對應的報酬）。該報酬即為你在第四部分的報酬。

在每個決策節點上，你有 180 秒的時間可以做出選擇。在實驗畫面的右上角，會有一個倒數計時器，顯示這一回合你還剩下多少時間。如果你沒有在 180 秒內做出選擇，則你在本部分的報酬為 0。

如果你對本實驗有任何疑問，請在此時舉手。實驗者會過去為你解答。

練習問題

練習問題總共有三題，目的為確認你已理解本實驗。請注意，練習問題的作答結果與你最後的現金報酬無關。如果你對本實驗或練習問題的答案有任何疑問，請舉手，實驗者會過去為你解答。

實驗正式開始

現在實驗正式開始！請慎重選擇、慎重決定。