## Supplementary Material

## A. Materials in Study 1 (in English)

## Instruction

Welcome to this experiment! Each participant has $¥ 40$ basic participation fee. The participants will be in pairs and complete eight games. The system will match another participant with you as a pair in random and anonymous form.

The pair cannot communicate with each other. You and your partner will make your choices between $A$ and $B$, respectively.

After the experiment, the system will randomly select one from the eight games, calculate each fee according to the choices of both sides, and then add or subtract to the basic participation fee:

Final payment=basic participation fee $\pm$ one game fee randomly
Taking the following game as an example:
The red number represents your own profit, and the blue number represents your partner’s profit. If both choose A, each would obtain ¥10.


If you choose A, your partner chooses B, you would obtain $-¥ 15$ and your partner would obtain $¥ 15$.


If you choose B, your partner chooses A, you would obtain $¥ 15$ and your partner would obtain $-¥ 15$.


If both choose B, each would obtain $-¥ 10$.


## Comprehension test of game rule

(If you fail to pass the items, your data will be regarded as invalid data!) 1.In the game, the game payment will depend on:
A. Your choice
B. Your partner's choice
C. The choices of both sides (you and your partner)
2.In the following game, if both choose A ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
3.In the following game, if you choose A and your partner chooses B,


Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
4.In the following game, if you choose B and your partner chooses $A$,

Other
A
B


Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
5.In the following game, if both choose B,


Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
6. How is the final payment calculated?
A. Basic participation fee $\pm$ one game's fee (the system would choose one from the eight games randomly)
B. Basic participation fee $\pm$ cumulative eight games' fee

Formal games (presenting at random)

Please make your choice :

- A $\quad$ B

Please make your choice :
- A B

Please make your choice
- A B
- A b B


Please make your choice :

- A B


Please make your choice :

- A • B


Please make your choice :

- A - B
make your choice
- A - B

Your gender:

- Male
- Female

Your age: $\qquad$ years old

## B. Materials in Study 2 (in English)

## Instruction

Welcome to this experiment! Each participant has $¥ 40$ basic fee to participate in the game.

There is only one question in the game, which needs to be completed in pairs. And the system will match another participant with you as a pair in random and anonymous form.

The pair cannot communicate with each other. You and your partner will make your choices between A and B, respectively.

After the experiment, the system will calculate each fee according to the choices of both sides, and then add or subtract to the basic participation fee.

Please read the game rules carefully. If you fail the game rules comprehension test, the questionnaire is considered invalid.

Taking the following game as an example:
The red number represents your own profit, and the blue number represents your partner’s profit. If both choose A, each would obtain $¥ X$.


If you choose A , your partner chooses B , you would obtain $¥ \mathrm{~W}$ and your partner would obtain ¥Z.


If you choose B, your partner chooses A, you would obtain $¥ \mathrm{Z}$ and your partner would obtain $¥ \mathrm{~W}$.


If both choose B, each would obtain ¥Y.


Note: In the official game, "+" means profit and "-" means loss.

## Comprehension test of the game rule

(If you fail to pass the items, your data will be regarded as invalid data!)
1.In this section, who has the right to allocate the amount of profit and loss?
A. Your choice
B. Your partner's choice
C. The choices of both sides (you and your partner)
2.In the following game, if both choose A ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
3.In the following game, if you choose A and your partner chooses B ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
4.In the following game, if you choose B and your partner chooses A,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
5.In the following game, if both choose B,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$

Click [Next page] to continue

Formal games (participants in each group only had to complete one question)

Gain-domain group:

|  |  | A |
| :---: | :---: | :---: |
| A | B |  |
|  | $+22,+22$ | $+14,+26$ |
| B | $+26,+14$ | $+18,+18$ |
|  |  |  |

Please make your choice:

- A
- B
- B

Your gender:

- Male
- Female

Your age: $\qquad$ years old

Loss-domain group:


Please make your choice:

- A


## C. Materials in Study 3 (in English)

## Instruction

Welcome! This experiment includes several sections, and each section includes several items.

The system will randomly match a participant with you in each section. Please complete the tasks according to the requirements of each section.

The one who fail to pass the comprehension test of game rule will be regarded as invalid data!

## Social Motives Section

In this section, each participant has $¥ 40$ basic participation fee. There are six games in this section. You need to complete the game in pairs with another participant. The system will randomly match one participant with you.

In the games, you will be faced with the issue of how to allocate the gains or losses. If you have the decision right to allocate the payment (or losses) between you and your partner, make choice from the four options: A, B, C, and D. The games will be played in anonymous form.

After the experiment, the system will randomly select one from the six games, calculate each fee according to your choice, and then add or subtract to the basic participation fee:

Final payment=basic participation fee $\pm$ one game fee randomly
Taking the following game as an example:
The red number represents your own profit, and the blue number represents your partner’s profit. If you choose A , each would obtain $¥ 10$.
$\left.\begin{array}{|c|c|}\hline \text { A } & \text { B } \\ +10,+10\end{array}\right)-15,+15$.

If you choose B, you would obtain $-¥ 15$ and your partner would obtain $¥ 15$.

| $\begin{gathered} \mathrm{A} \\ +10,+10 \end{gathered}$ | $\begin{gathered} \text { B } \\ -15,+15 \end{gathered}$ |
| :---: | :---: |
| $\begin{gathered} \text { C } \\ +15,-15 \end{gathered}$ | D $-10,-10$ |

If you choose $C$, you would obtain $-¥ 15$ and your partner would obtain $¥ 15$.

| A | B |
| :---: | :---: |
| $+10,+10$ | $-15,+15$ |
| C | D |
| $+15,-15$ | $-10,-10$ |

If you choose D, each would obtain $-¥ 10$.

| A |  |
| :---: | :---: |
| $+10,+10$ | B |
| $-15,+15$ |  |
| C | D |
| $+15,-15$ | $-10,-10$ |

## Comprehension test of the game rule

(If you fail to pass the items, your data will be regarded as invalid data!)
1.In this section, who has the right to allocate the amount of profit and loss?
A. Yourself
B. Your partner
2.In the following game, if you choose A ,

| $\begin{gathered} \mathrm{A} \\ +12,+12 \end{gathered}$ | $\begin{gathered} \text { B } \\ -16,+16 \end{gathered}$ |
| :---: | :---: |
| $\begin{gathered} \mathrm{C} \\ +16,-16 \end{gathered}$ | $\begin{gathered} \mathrm{D} \\ -8,-8 \end{gathered}$ |

Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
3.In the following game, if you choose B,

| A | B |
| :---: | :---: |
| $+12,+12$ | $-16,+16$ |
| C | D |
| $+16,-16$ | $-8,-8$ |

Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
4.In the following game, if you choose C,

| A | B |
| :---: | :---: |
| $+12,+12$ | $-16,+16$ |
| C | D |
| $+16,-16$ | $-8,-8$ |

Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
5.In the following game, if you choose D,

| A | B |
| :---: | :---: |
| $+12,+12$ | $-16,+16$ |
| C | D |
| $+16,-16$ | $-8,-8$ |

Note: the red number represents your profit, and the blue number represents your partner's profit.
A. You would gain $¥ 16$, your partner would lose $¥ 16$
B. You would lose $¥ 16$, your partner would gain $¥ 16$
C. You would gain $¥ 12$, your partner would gain $¥ 12$
D. You would lose $¥ 8$, your partner would lose $¥ 8$
6.How is the payment in this section calculated?
A. Basic participation fee $\pm$ one game's fee (the system would choose one from the six games randomly)
B. Basic participation fee $\pm$ cumulative six games' fee

Formal games (presenting at random)

| $\begin{gathered} \mathrm{A} \\ +12,+12 \end{gathered}$ | $\begin{gathered} \mathrm{B} \\ +4,+16 \end{gathered}$ |
| :---: | :---: |
| $\begin{gathered} \text { C } \\ +16,+4 \end{gathered}$ | $\begin{gathered} \mathrm{D} \\ +8,+8 \end{gathered}$ |

Please make your choice :
$\begin{array}{ll}\bullet & \mathrm{A} \\ -\mathrm{C} & \text { - } \\ & \text { D }\end{array}$

| A |
| :---: | :---: |
| $+22,+22$ | | B |
| :---: |
| $+14,+26$ |
| C |
| $+26,+14$ | | D |
| :---: |
| $+18,+18$ |

Please make your choice :

- A
- B
- C

| A | B |
| :---: | :---: |
| $-18,-18$ | $-26,-14$ |
| C | D |
| $-14,-26$ | $-22,-22$ |

Please make your choice :
Please make your choice :
$\begin{array}{lll}- & \mathrm{A} & \text { - } \\ - & \text { - }\end{array}$

- A - B
- C - D

| A | B |
| :---: | :---: |
| $+32,+32$ | $+24,+36$ |
| C | D |
| $+36,+24$ | $+28,+28$ |

Please make your choice :

- A
- B
- C

| A | B |
| :---: | :---: |
| $-28,-28$ | $-36,-24$ |
| C | D |
| $-24,-36$ | $-32,-32$ |

Please make your choice :

- A
- B
- C
- D


## Belief Section

Firstly, we present the game rule of Study 1 to the participants (please see the materials in Study1). The task in this section is as follows:

In this section, the system will randomly match one participant with you. Your task is to indicate your beliefs of your partner's choice. Please indicate the option (A or B) which you think your partner would choose.

After the experiment, the system will randomly select one from the six games, compare your prediction with your partner’s real choice. You would get $¥ 2$ if your belief is accurate, otherwise get $¥ 0$.

## Comprehension test of the game rule

(If you fail to pass the items, your data will be regarded as invalid data!)
1.In this section, your task is
A. Indicate your beliefs of your partner's choice
B. Make your own choice
2.How is the payment in this section calculated?
A. The system would choose one from the six games. If your prediction is consistent with your partner’s real choice, you would get $¥ 2$; if not, you would get $¥ 0$.
B. If all of the predictions from the six games are accurate, you would get $¥ 2$; if not, you would get $¥ 0$.

Formal games (presenting at random)


Which option do you think your partner will choose? : - A

- B


Which option do you think your partner will choose? : - A • B


Which option do you think your partner will choose? :

- A
- B


Which option do you think your partner will choose? : - A B


Which option do you think your partner will choose? : - A • B


Which option do you think your partner will choose? : - A • B

## The responses to gain less and lose more

Firstly, we present the game rule of Experiment 1 to the participants (please see the materials in Experiment 1). The task in this section is as follows:
Please indicate how would you feel if the following cases happened:
(Take one gain-version game as an example)
Other


Note: the red number represents your profit, and the blue number represents your partner's profit.
(The order of the following four items were presented randomly)
1.how much worse do you feel if your choice caused you to gain less?

| Not at all |  |  |  |  |  | very |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

2.how guilty do you feel if your choice caused you to gain less?

```
Not at all
very
    1
```

(Take one loss-version game as an example)

|  | A | B |
| :---: | :---: | :---: |
| A | $-18,-18$ | $-26,-14$ |
| Self |  |  |
| B | $-14,-26$ | $-22,-22$ |

Note: the red number represents your profit, and the blue number represents your partner's profit.
(The order of the following four items were presented randomly)
1.how much worse do you feel if your choice caused you to lose more?

```
Not at all very
```

    \(\begin{array}{lllllll}1 & 2 & 3 & 4 & 5 & 6 & 7\end{array}\)
    2.how guilty do you feel if your choice caused you to lose more?

```
Not at all very
    \(\begin{array}{lllllll}1 & 2 & 3 & 4 & 5 & 6 & 7\end{array}\)
```


## The Index of Loss aversion Section

This section includes two choices, each choice includes two option (A and B). Please indicate the least acceptable X , making you willing to change the choice from A to B.

For example, in the following choice:
A. $50 \%$ loss $¥ 0,50 \%$ gain $¥ 0$
B. $50 \%$ loss $¥ 15,50 \%$ gain $¥ X$

If you mark the value of $X$ as 30 , that means: when $X \geq ¥ 30$, you are willing to choose $B$, when $X<¥ 30$, you are willing to choose $A$.

Please slide the scroll bar and mark that in your mind you will switch from "Choose A" to "choose B" when $X_{1}$ is at least:
A. 50\% loss 0 yuan, $50 \%$ gain 0 yuan
B. $50 \%$ loss 20 yuan, $50 \%$ gain $\mathrm{X}_{1}$ yuan


Please slide the scroll bar and mark that in your mind you will switch from "Choose A" to "choose B" when $X_{2}$ is at least:
A. $50 \%$ loss 20 yuan, $50 \%$ gain 50 yuan
B. $50 \%$ loss 50 yuan, $50 \%$ gain $X_{2}$ yuan

(The order of social motives section, belief section, loss aversion and taking aversion section were counterbalanced across the participants).

## Prisoner's Dilemma Section

The game rule is same to Study 1.
Formal games (presenting at random)


Please make your choice :

- A
- B

Please make your choice :

- A B


Please make your choice :

- A • B


Please make your choice :

- A B


Please make your choice :

- A
- B


Please make your choice :

- A
- B

Your gender:

- Male
- Female

Your age: $\qquad$ years old
D. Participant's response to loss more and gain less.

| item | $\mathrm{M}( \pm$ SD $)$ | T -test |
| :--- | :---: | :---: |
| feel worse for gain less | $5.22(1.40)$ | $t(236)=-0.15, p=0.879$ |
| feel worse for loss more | $5.24(1.53)$ |  |
| feel guilty for gain less | $4.93(1.62)$ | $t(236)=-0.49, p=0.626$ |
| feel guilty for loss more | $5.18(1.58)$ |  |

## E. Materials and results in supplementary study (in English)

(In the supplementary study, we compared the effect of domain on cooperation and the effect of frame on cooperation.)

## Domain Group:

Welcome to this experiment! Each participant has $¥ 30$ basic fee to participate in the game.

There is only one question in the game, which needs to be completed in pairs. And the system will match another participant with you as a pair in random and anonymous form.

The pair cannot communicate with each other. You and your partner will make your choices between A and B, respectively.

After the experiment, the system will calculate each fee according to the choices of both sides, and then add or subtract to the basic participation fee.

Please read the game rules carefully. If you fail the game rules comprehension test, the questionnaire is considered invalid.

Taking the following game as an example:
The red number represents your own profit, and the blue number represents your partner’s profit. If both choose A, each would obtain ¥X.


If you choose A, your partner chooses B, you would obtain ¥W and your partner would obtain $¥ Z$.


If you choose B, your partner chooses A, you would obtain $¥ \mathrm{Z}$ and your partner would obtain $¥ \mathrm{~W}$.


If both choose B, each would obtain $¥ Y$.


Note: In the official game, "+" means profit and "-" means loss.

## Comprehension test of the game rule

(If you fail to pass the items, your data will be regarded as invalid data!)
1.In this section, who has the right to allocate the amount of profit and loss?
A. Your choice
B. Your partner's choice
C. The choices of both sides (you and your partner)
2.In the following game, if both choose A ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
3.In the following game, if you choose A and your partner chooses B ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
4.In the following game, if you choose B and your partner chooses A,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
5.In the following game, if both choose B,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$

Formal games (participants in each group only had to complete one question)

Gain-domain group:


Please make your choice:

- $\begin{aligned} & \text { A } \\ & - \\ & B\end{aligned}$

Loss-domain group:


Your gender:

- Male
- Female

Your age: $\qquad$ years old

## Frame Group:

Welcome to this experiment! (Gain-frame group: Each participant has $¥ 0$ initial fee to participate in the game; Loss-frame group: Each participant has $¥ 30$ initial fee to participate in the game.)

There is only one question in the game, which needs to be completed in pairs. And the system will match another participant with you as a pair in random and anonymous form.

The pair cannot communicate with each other. You and your partner will make your choices between A and B, respectively.

After the experiment, the system will calculate each fee according to the choices of both sides, and then add or subtract to the basic participation fee.

Please read the game rules carefully. If you fail the game rules comprehension test, the questionnaire is considered invalid.

Taking the following game as an example:
The red number represents your own profit, and the blue number represents your partner’s profit. If both choose A, each would obtain $¥ X$.


If you choose A, your partner chooses B, you would obtain ¥W and your partner would obtain $¥ Z$.


If you choose B, your partner chooses A, you would obtain $¥ \mathrm{Z}$ and your partner would obtain $¥ \mathrm{~W}$.


If both choose B, each would obtain $¥ Y$.


Note: In the official game, "+" means profit and "-" means loss.

## Comprehension test of the game rule

(If you fail to pass the items, your data will be regarded as invalid data!)
1.In this section, who has the right to allocate the amount of profit and loss?
A. Your choice
B. Your partner's choice
C. The choices of both sides (you and your partner)
2.In the following game, if both choose A ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
3.In the following game, if you choose A and your partner chooses B ,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
4.In the following game, if you choose B and your partner chooses A,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$
5.In the following game, if both choose $B$,


Note: the red number represents your profit, and
the blue number represents your partner's profit.
A. You would gain $¥ W$, your partner would gain $¥ Z$
B. You would gain $¥ Z$, your partner would gain $¥ W$
C. You would gain $¥ X$, your partner would gain $¥ X$
D. You would gain $¥ Y$, your partner would gain $¥ Y$

Click [Next page] to continue

Formal games (participants in each group only had to complete one question)

Gain-frame group:


Please make your choice:

- B

Loss-frame group:


Please make your choice:

- $\begin{array}{r}\mathrm{A} \\ -\mathrm{B}\end{array}$

Your gender:

- Male
- Female

Your age: $\qquad$ years old

## Results

The results showed that the participants in the gain domain ( $\mathrm{M}=57.4 \%, 74 / 129$ ) were still more cooperative than those in the loss domain ( $\mathrm{M}=39.7 \%, 52 / 131$ ), $\mathrm{X}^{2}(1, N=$ 260) $=8.16, p=.004, \varphi=0.18$. However, there was no significantly difference in cooperation between the gain frame ( $\mathrm{M}=46.9 \%, 61 / 130$ ) and the loss frame $(\mathrm{M}=41.2 \%, 54 / 131), \chi^{2}(1, N=261)=0.86, p=.354, \varphi=0.06$.

