

Detailed experimental procedures and items of the additional experiment


We ran a total of six experimental sessions. In each session, around 30 (min: 28, max: 32) participants took part in the experiment from their own computers while connected via Zoom. At the beginning of each session, the experimenter presented the general instructions to all participants while they viewed them on their respective screens. The general instructions detailed the fee scheme and overall procedure of the experiment.

For the main task, we employed the threshold public goods game with a threshold of four. There were a total of three within-subject conditions, manipulating the probability of a loner being involved in the group assignment in three levels ($\rho = 0, 0.5$, or 1 ; see the main text for details). The order of the three conditions was randomized across participants. In each condition (presented to participants as a “round”), participants first read brief instructions about the rules of the round’s game and completed comprehension quizzes before proceeding to the actual play. In the first round of a session, we explained the general framework of the game (threshold public goods game) in detail, and in subsequent rounds, we only emphasized the differences from the previous rounds (e.g., whether players who chose the leave option may still get involved in a group or not). Below, we provide an English translation of example instruction sequences: The example sequence begins with $\rho = 0$ and proceeds to $\rho = 0.5$, and then $\rho = 1$. Below, we include the English translations of instruction slides from each round.

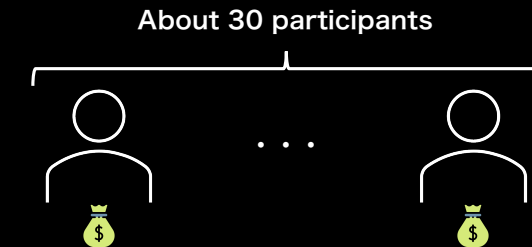
These slides will describe
the rules of the game for this round.

1

Game rules

 = 10 pts

The players (each participant, including you)
join the game with 10 pts as an endowment.



2

Game rules

In the game, there are mainly two options :

“group option” and “individual option”.

Group Option

Individual Option

3

Game rules

Based on the players' choices,
groups of five members are formed.

How these groups are formed will be explained later.

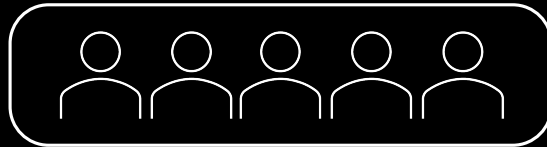
4

Rules in

Groups

In **groups**,
players will play "**Group Project Game**".

Groups of 5 members



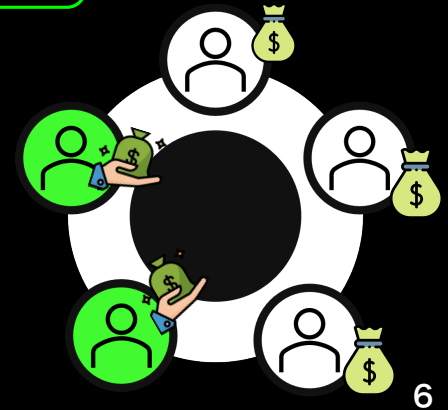
5

Rules in

Groups

Each player in a group decides whether to **provide** their initial endowment (10 pts) to the group project (GP).

The success or failure of the GP depends on the number of members who chose to provide their endowment.



Rules in

Groups

If at least **4** out of 5 members provided 10 pts, GP **succeeds**.



7

Rules in

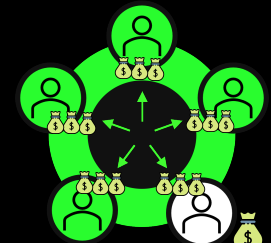
Groups

If at least **4** out of 5 members provided 10 pts, GP **succeeds**.



8

If GP succeeds,
all the five members will
equally receive additional 30 pts.



Rules in

Groups

If the number of providers did **not** reach 4, GP **fails**.



9

Rules in

Groups

If the number of providers did **not** reach 4, GP **fails**.



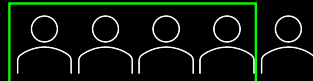
If GP fails, **no one** receives any gain, and the provided amounts are not returned.



10

Rules in

Groups



- Players simultaneously choose to either “provide” or “not provide” their own endowment to GP.
- For GP to succeed, at least **4** of five members must provide 10 pts.
 - If GP succeeds, all the five members earn 30 additional points.
 - If GP fails, no one earns anything, and the provided amounts are not returned.

11

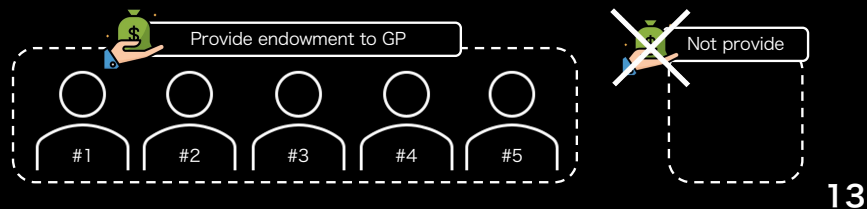
We will show you some examples in the next slides.

12

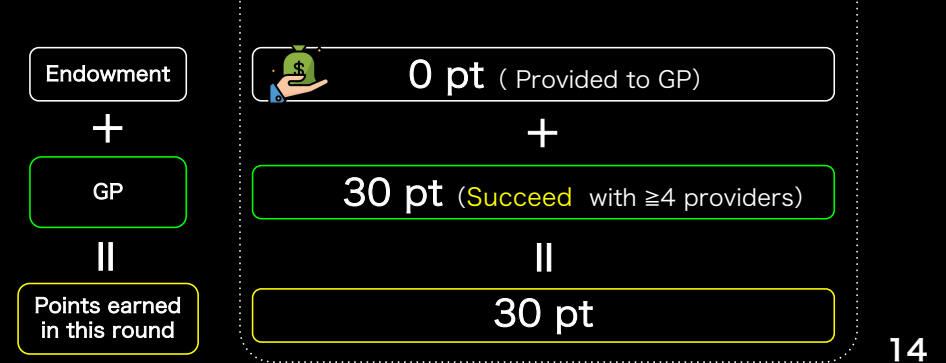
Example of a group (1)

Suppose that, in one group, **all five members have provided their initial points to GP**.

Each of the five members will receive the following points:



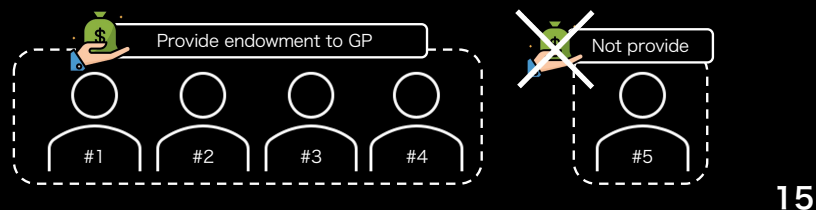
E.g., (1)



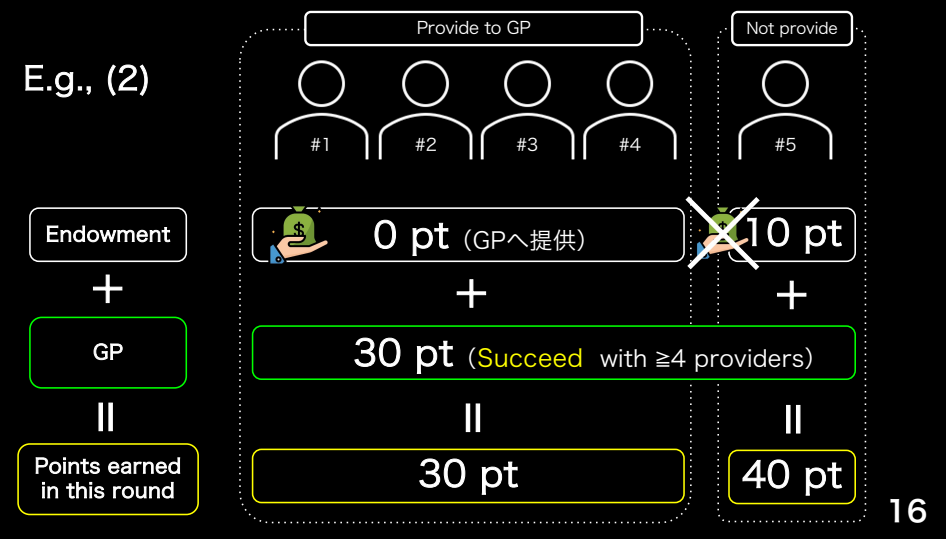
Example of a group (2)

Now, suppose that **only Member# 5 did not provide** the endowment, while the other four provided to GP as in Example 1.

Each of the five members will receive the following points:



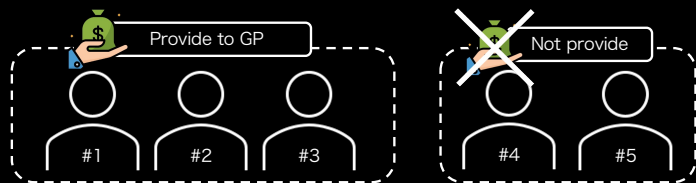
E.g., (2)



Example of a **group** (3)

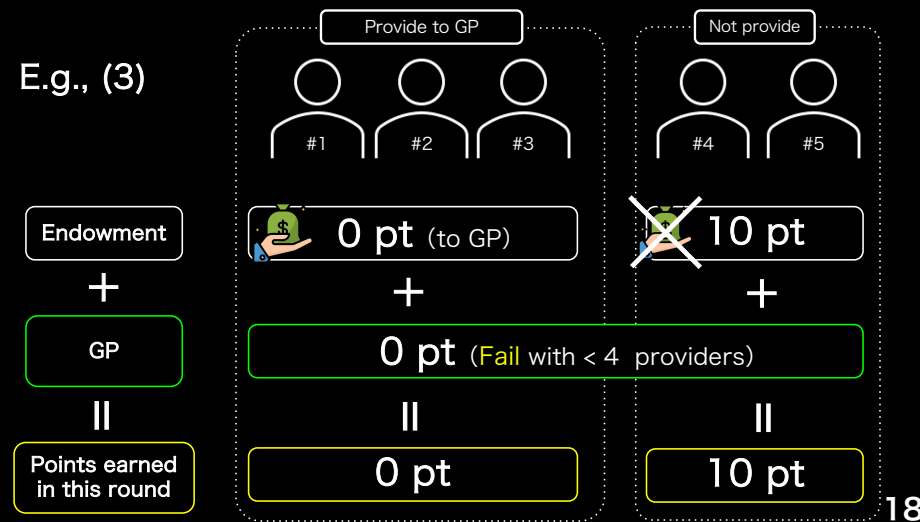
Same as Example 2, but now assume that **Member 4 also did not provide to GP.**

Each of the five members will receive the following points:



17

E.g., (3)



18

Rules in **Individual Option**

Players can choose the **Individual Option** instead of the Group Option.

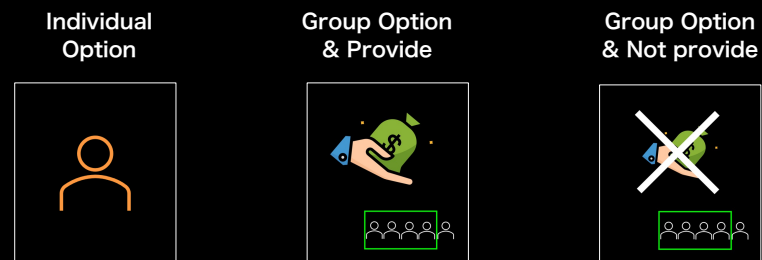
If they choose the individual option, they will earn an additional **10 pts** (plus their endowment) **regardless of other players' decisions.**



19

Game rules

In summary, players have **3** options in total.



20

Next, we will explain the relationship between
 how groups of five are formed
 and the individual option.

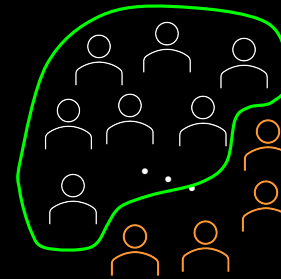
21

How groups are formed

and

Individual option

About 30 participants



All players **except** those who chose the individual option (orange) will be randomly assigned to groups of 5 players each.



Groups of five

22

How groups are formed

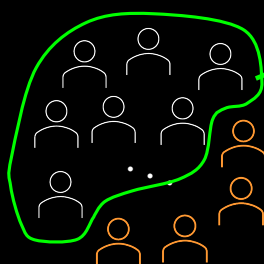
and

Individual option

- Those who choose the individual option always get 20 pts, regardless of the choices of others.
- Those who chose the group option are randomly divided into groups of 5 and get 0 - 40 pts depending on the GP result.

(*) If the number of players who chose the group option is not a multiple of 5, the remaining players do not join the group and gets the constant 20 pts as is the individual option.

About 30 participants



Groups

People **except** those who chose the individual option (orange) are assigned to the group.

23

That is all for the rules of the game in this round.

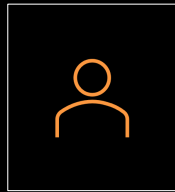
In coming slides, we will explain
 how the round proceeds.

24

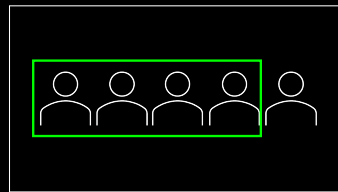
How to proceed with the round (1)

Each player, including you, will first choose either **individual** or **group** option simultaneously.

Individual option



Group option

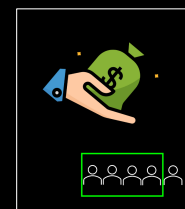


25

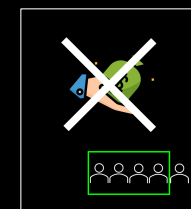
How to proceed with the round (2)

Next, those who choose the group option can either **provide their endowment (10 pts) to the GP or not.**

Provide to GP



Not provide



26

How to proceed with the round (3)

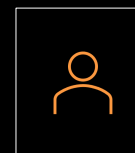
In addition, before making your own choices, you will be asked to predict **the choices that others are going to make.**

27

How to proceed with the round (4)

Please predict how many of the 30 other participants do you think will choose

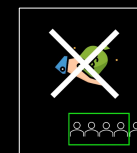
Individual option



Group option
& provide to GP



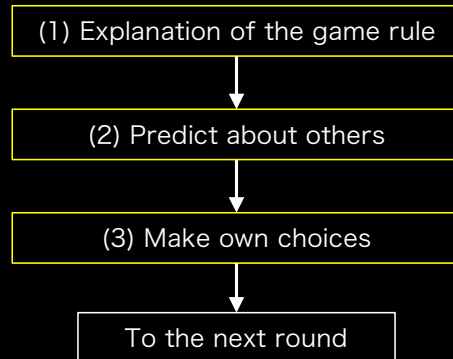
Group option
& not provide



, respectively? **Please make sure the total is 30.**

28

In summary, the round proceeds as follows:



29

The results of the rounds will be notified
at the end of the whole experiment.

30

This is the end of the explanation of
how to proceed with the round.

Finally, we will explain how your bonus is calculated.

31

Calculation of bonus rewards

- After all rounds and post-questionnaires have been completed, you will be informed of the points you have earned and the accuracy of your predictions.
- Bonus rewards will range from 0 to 800 JPY, depending on the result of the game (the points you earned and the accuracy of your predictions).
- Your bonus will be higher if you (1) earned more points and (2) if you predicted more accurately.
- There will be several rounds in the experiment. The bonus will be calculated based on either the points or prediction accuracy in one randomly selected round.
- For your reference, the detailed formula is described on the following page.

32

Detailed calculation formula of bonus rewards

- The bonus reward can range from 0 to 800 JPY and are calculated according to the following procedure.
- Randomly select "points" or "prediction accuracy" of one round as the target.
- If "points" is selected: The bonus reward is the amount of points earned in that round (0 to 40 pts) multiplied by 20. The reward increases in proportion to the points.
- If "prediction accuracy" is selected: The bonus reward is equal to:
800 minus the difference between the predicted and the actual numbers (e.g. if the predicted number is (10, 20, 0) and the actual number is (10, 10, 10), then $e = |10-10| + |20-10| + |0-10| = 20$) multiplied by 80/6. The reward is inversely proportional to the prediction error.
- The minimum bonus reward is 0 JPY and the maximum is 800 JPY, regardless of whether the target is "points" or "prediction accuracy".

33

This is the end of the instructions for this round.
A summary can be found on pages 11, 19 ~ 23.
Please review them if necessary.

When you are ready, please proceed to the next page and answer the confirmation test.

34

New Round Instructions

1

The rules in this round are largely the same as in the previous round.

We will explain the points that remain the same first, and then **emphasize the points that are different**.

Same!

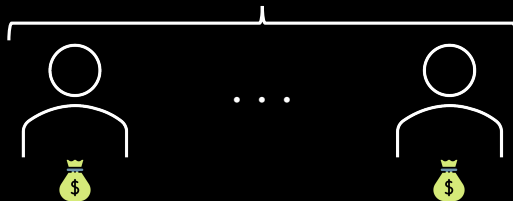
NEW!

2

Game rules

Again, in this round, players join the game with 10 pts as an initial endowment.

About 30 total participants



\$ = 10 pts

3

Game rules

Again, in this round, there are mainly two options :

“group option” and **“individual option”**.

Group Option

Individual Option

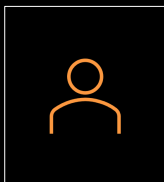
4

Game rules

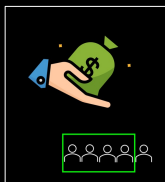
Same!

Again, in this round, players have 3 options in total.

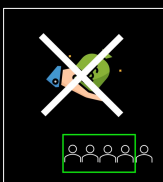
Individual
Option



Group Option
& Provide



Group Option
& Not provide

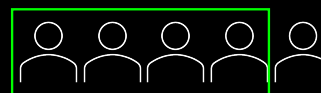


5

Game rules

Same!

Again, in this round, players can earn
0 to 40 points for choosing the **group option**,
And 20 points for choosing the **individual option**.



Group option

You must also decide whether to provide your
initial 10 pts to the GP.

If **>=4 members choose to provide**,
all group members will earn an additional 30
pts. Thus, the earnings can range from 0 to
40 pts.



Individual option

You can earn an **additional 10
pts (20 pts including the initial
point)** regardless of other
players' decisions.

6

Game rules

NEW!

In this round, the relationship between **how groups of
five are formed** and **the individual option** changes.

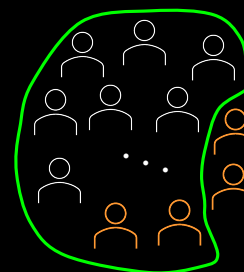
Of the (about) 30 total participants in the experiment,
all of those who chose the group option,
and **half of those who chose the individual option**,
are randomly assigned to groups of five.

7

Game rules

NEW!

About 30 participants



Groups of five

Half of those who chose
the individual option
(orange) are assigned to
groups.

8

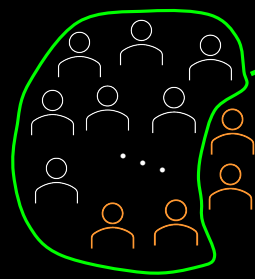
Game rules

NEW!

For example, if 26 players choose the group option and 4 players choose the individual option, a group of five players will be randomly formed from 26 players (the 26 players with the group option and the 2 [half of the 4 players; if the number is odd, it is randomly rounded up or down] players with the individual option).

*) If the number of players to be assigned to groups is not a multiple of 5, the remaining players will not be assigned to a group and will earn 20 pts, the same amount as the individual option.

About 30 participants



Groups of five

Half of those who chose the individual option (orange) are assigned to groups.

9

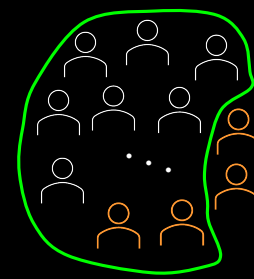
Game rules

NEW!

Those who choose the individual option (even if assigned to a group) will always earn 20 (10+10) pts.

Those who choose the group option will earn 0 ~ 40 pts depending on the GP result.

About 30 participants



Groups of five

Half of those who chose the individual option (orange) are assigned to groups.

10

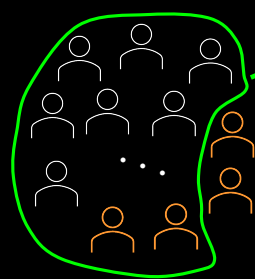
ゲームのルール

NEW!

Since those who choose the individual option will not participate in the GP even if they are assigned to a group, the maximum number of people in a group who can contribute to the GP can be less than four.

In these cases, the number of providers required for a successful GP (=4) remains the same.

About 30 participants



Groups of five

Half of those who chose the individual option (orange) are assigned to groups.

11

The round proceeds in the same way as the previous round.

(1) Explanation of the game rule

(2) Predict about others

(3) Make own choices

To the next round

12

This is the end of the instructions for this round.
A summary can be found on pages 7 ~ 11.
Please review them if necessary.

When you are ready, please proceed to the next page and answer the
confirmation test.

New Round Instructions

1

The rules in this round are largely the same as in the previous round.

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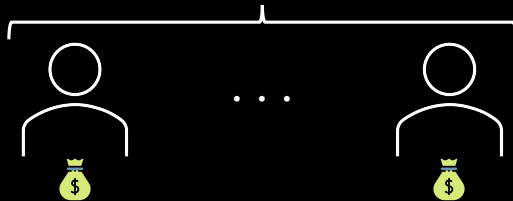
NEW!

2

Game rules

Again, in this round, players join the game with 10 pts as an initial endowment.

About 30 total participants



\$ = 10 pts

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Again, in this round, there are mainly two options :

“group option” and **“individual option”**.

Group Option

Individual Option

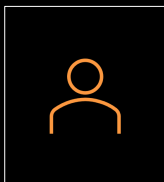
4

Game rules

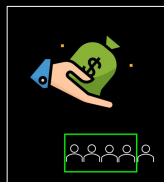
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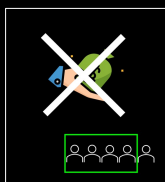
Individual Option



Group Option & Provide



Group Option & Not provide

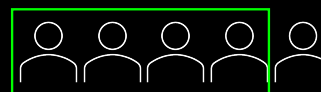


5

Game rules

Same!

Again, in this round, players can earn 0 to 40 points for choosing the **group option**, And 20 points for choosing the **individual option**.



Group option

You must also decide whether to provide your initial 10 pts to the GP.

If **≥ 4 members choose to provide**, all group members will earn an additional 30 pts. Thus, the earnings can range from 0 to 40 pts.



Individual option

You can earn an **additional 10 pts (20 pts including the initial point)** regardless of other players' decisions.

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Game rules

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In this round, the relationship between **how groups of five are formed** and **the individual option** changes.

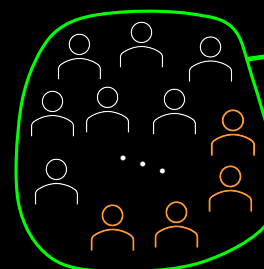
All of the (about) 30 total participants in the experiment, **including those who chose the individual option**, are randomly assigned to groups of five.

7

Game rules

NEW!

About 30 participants



Groups of five

Everyone, including those who chose the individual option (orange) will be randomly assigned to groups of five.

8

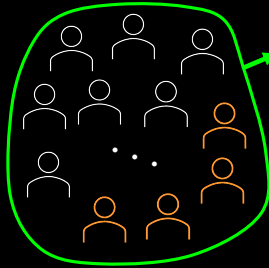
Game rules

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About 30 participants



Groups of five

Everyone, including those who chose the individual option (orange) will be randomly assigned to groups of five.

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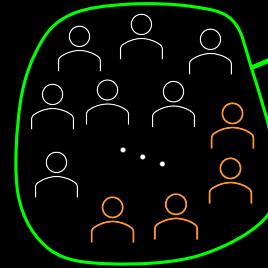
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About 30 participants

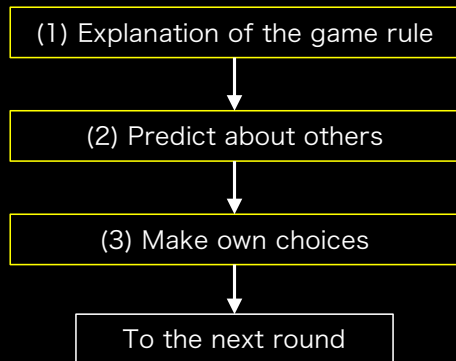


Groups of five

Everyone, including those who chose the individual option (orange) will be randomly assigned to groups of five.

10

The round proceeds in the same way as the previous round.



11

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12