

Detailed Experimental Procedures and Items

We ran a total of six experimental sessions. In each session, around 30 (min: 30, max: 35) 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: A session consisted of the main task, two additional tasks, and a postexperimental questionnaire. The English translation of the general instructions is provided in section #1 below.

For the main task, there were a total of six conditions, using a 2 (Group Participation: mandatory or voluntary) \times 3 (Threshold Value: 2, 4, or 5) factorial within-subject design. All participants experienced all six conditions once. The order of the six conditions was (partially) randomized across participants. Specifically, each session was designated to begin with either the voluntary or the mandatory conditions (2 ways, 3 sessions each), and the order of threshold values within the voluntary/mandatory conditions [36 ($=3!^2$) ways] was randomly determined for each participant within the session. 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 had the individual option; the current threshold value). Below, we provide an English translation of example instruction sequences: The example session begins with a voluntary condition with the threshold of 2, progresses through voluntary conditions with threshold values 4 and 5, and then proceeds to the mandatory conditions with a progression of threshold values of 2, 4, and 5. For simplicity, we include only the instruction slides (see section #2) and comprehension quiz (see section #3) from Round 1, the slides from Round 2 (explaining the difference in the threshold; section #4), and the slides from Round 4 (explaining the difference in the group participation rule; section #5). Note that participants were unable to learn about the play of other participants during the experiment, as there was no feedback about other participants’ decisions or resultant payoffs until the end of the whole experimental session.

One additional task concerned participants’ other-regarding preferences: They were repeatedly asked to select their preferred allocation of a pile of money between themselves and a randomly selected other participant (independent of the main task). In the general instructions, the task was instructed to participants as the part 2-a (see the image in section #1). The set of items was adopted from He and Wu (38) with range adjustments. Below, we provide the complete set of items (see section #6).

The other additional task concerned participants’ risk aversion: They were presented with a number of raffles with variable probabilities and prize amounts and were asked to choose one for

themselves. In the general instructions, the task was instructed to participants as the part 2-b (see the image in section #1). The set of items was adopted from Holt and Laury (37). Below, we provide the complete set of items (see section #7).

#1: General Instructions

Overall Procedure:

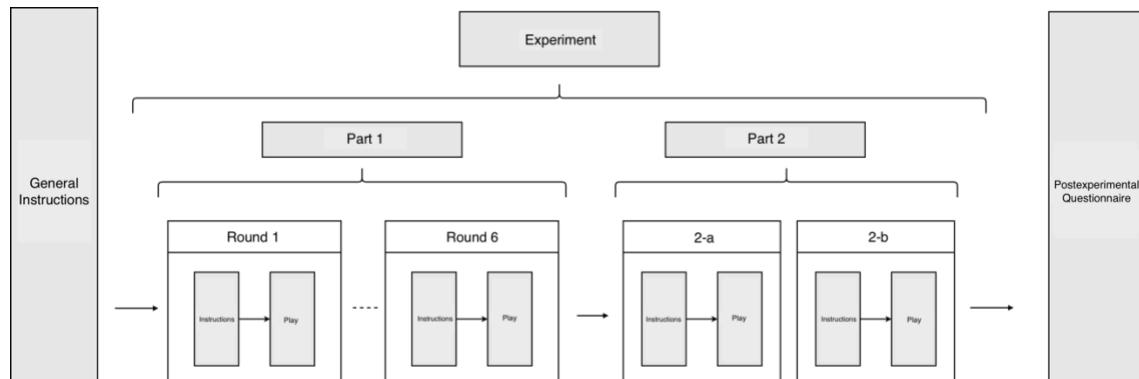
Thank you for your participation.

Here, we describe the overall procedure of this experiment.

The experiment is expected to be completed within 60 minutes.

The flow of the experiment and the approximate duration of each step are as follows:

1. General instructions (← in progress): about 15 minutes
2. Decision-making task (multiple rounds): about 30 minutes
3. Postexperimental questionnaire: about 15 minutes



- You are one of approximately 30 participants who are participating in this experiment simultaneously. Please stay on the screen until you have completed the whole experiment.
- If you have any questions along the way, please use the chat to ask us directly. However, please refrain from unnecessary conversations.
- You will receive payment for completing the entire experiment, including the postexperimental questionnaire. Please understand that we will be unable to pay those who leave the experiment before completion.
- The amount of payment will range between 1,200 JPY and 2,800 JPY.
 - All participants who have completed the experiment will receive 1,200 JPY, plus a bonus ranging from 0 to 1,600 JPY based on their performance in the decision-making task.
 - The detailed bonus calculation scheme will be provided later.
 - Payment will be made with an Amazon gift card at a later date.
- The experiment is composed of two parts, and detailed rules will be explained at the beginning of each part or round.

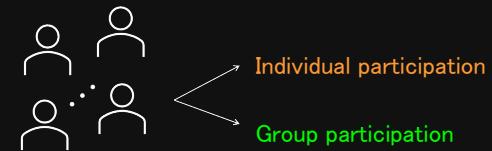
Instructions for the first round

1

Rules of the game

Each participant (including you) can choose to participate in the game either

(1) **Individually** or (2) **Collectively (in a group)**.



2

(1) If you choose **individual participation**

You are sure to earn 20 points (pt) in this round.



$$\text{\$} = 10 \text{ pt}$$

3

(2) If you choose **group participation**

- You will be assigned to a **group of five** whose members have all chosen group participation.



4

If you choose **group participation**,

- You will be assigned to a group of five whose members have all chosen group participation.
- Groups are randomly formed via a computer program. If the number of players choosing group participation is not a multiple of five, any remaining few players will be allocated to individual participation.



5

If you choose **group participation**,

- You will be assigned to a group of five whose members have all chosen group participation.
- Groups are randomly formed via a computer program. If the number of players choosing group participation is not a multiple of five, any remaining few players will be allocated to individual participation.
- In groups (of five members), players work on a **group project**, which we explain more in the next pages.



6

If you choose **group participation**,

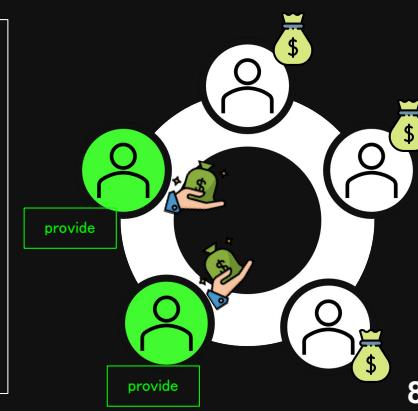
- In groups, players are first endowed with 10 pt (**initial endowment**).



7

If you choose **group participation**,

- In groups, players are first endowed with 10 pt (**initial endowment**).
- Each player has the option of **providing** the group project (GP) with their entire initial endowment or **not**.

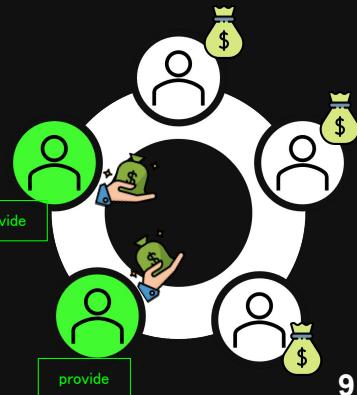


8

If you choose **group participation**,

- In groups, players are first endowed with 10 pt (initial endowment).
- Each player has the option of *providing* the group project (GP) with their entire initial endowment or *not*.
- Every player decides simultaneously, so it is impossible to change one's decision after observing other players' decisions.

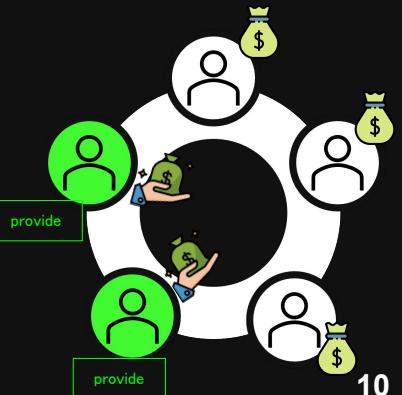
 =10 pt



If you choose **group participation**,

- In groups, players are first endowed with 10 pt (initial endowment).
- Each player has the option of *providing* the group project (GP) with their entire initial endowment or *not*.
- Every player decides simultaneously, so it is impossible to change one's decision after observing other players' decisions.
- Whether the GP succeeds depends on the number of players who provide their initial endowment.

 =10 pt



When the GP **succeeds**:

If 2 or more players among the 5 group members provide their initial endowment, the GP **succeeds**.

 =10 pt



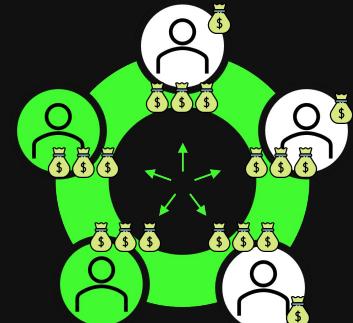
11

When the GP **succeeds**:

If ≥ 2 players provide their endowment, the GP succeeds.

 =10 pt

When the GP succeeds, an **extra 30 points** will be given to each of the five members.



12

When the GP **fails**:

If fewer than **2** players among the 5 group members provide their endowment, the GP **fails**.



13

When the GP **fails**:

If < 2 players provide their endowment, the GP fails.



When the GP fails, **no one will receive any additional points or get their provisions back**.



14

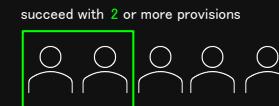
Summary of the rules with **group participation**



- Participants are assigned to groups of five members randomly.
- Each member simultaneously chooses whether or not to provide their own initial endowment for the group project (GP).
- A successful GP requires **2** or more of its members' provisions.
 - If the GP succeeds, all five members earn 30 extra points.
 - If the GP fails, no one receives extra points or gets their provisions back.
- In the next slides, we provide you with some examples.

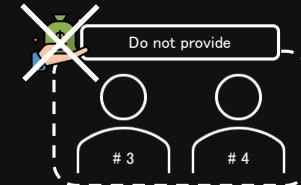
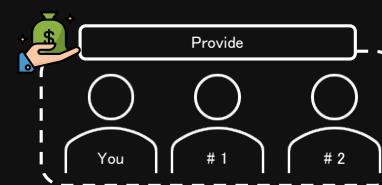
15

Example of group participation (1)

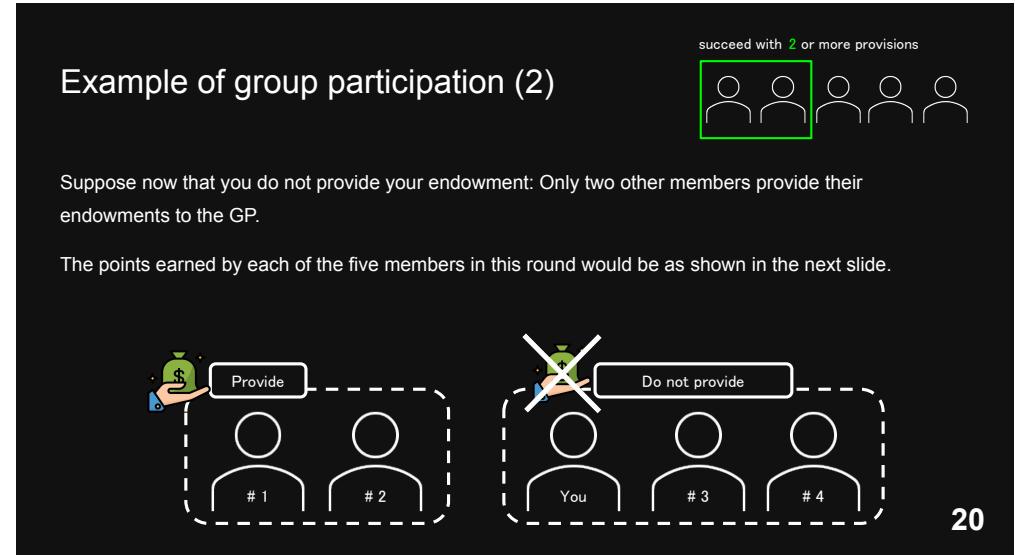
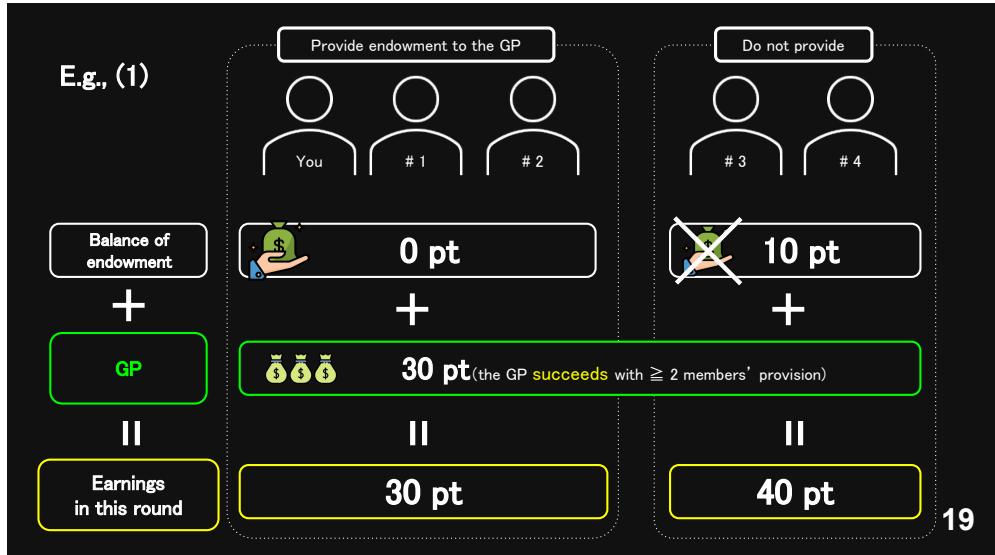
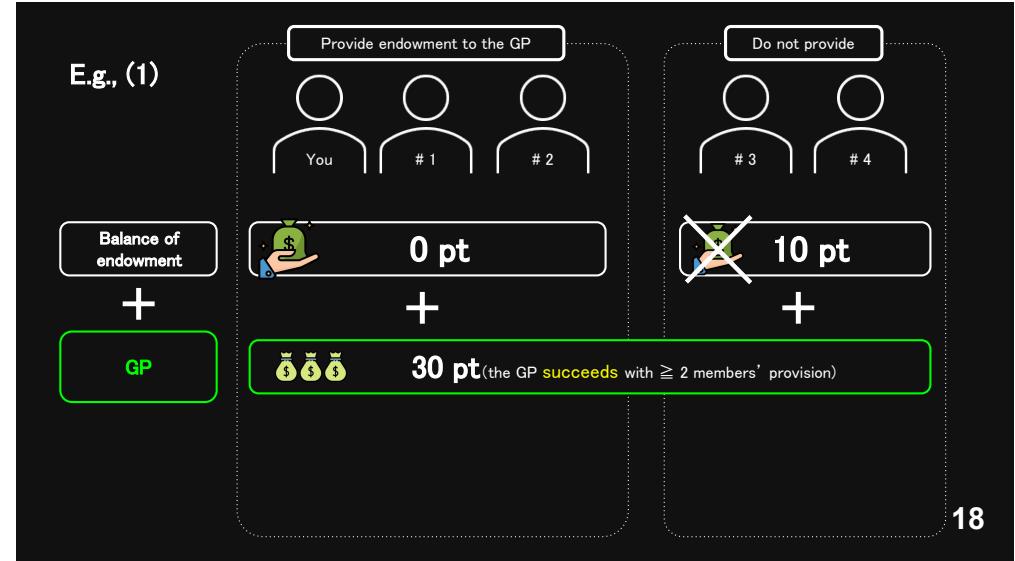
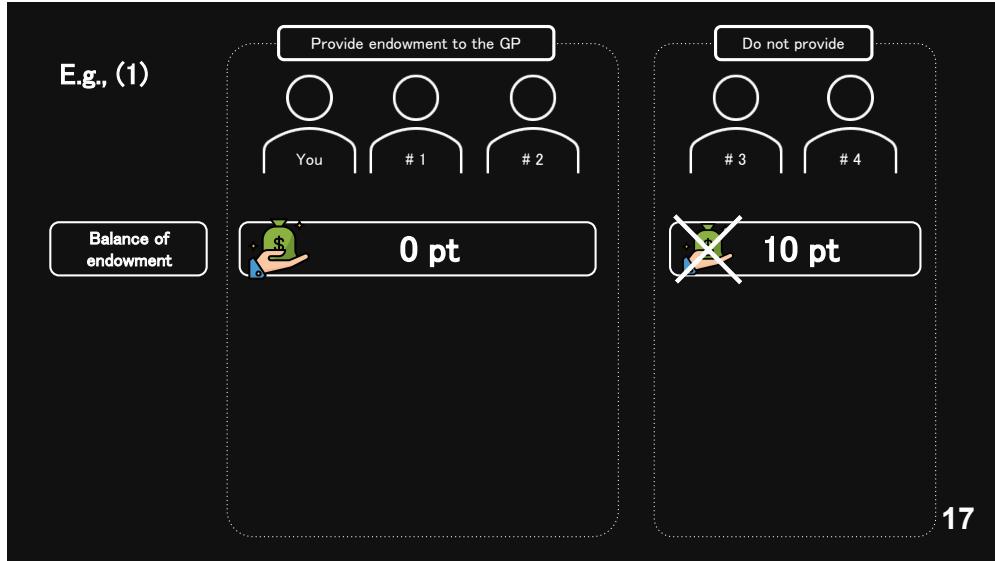


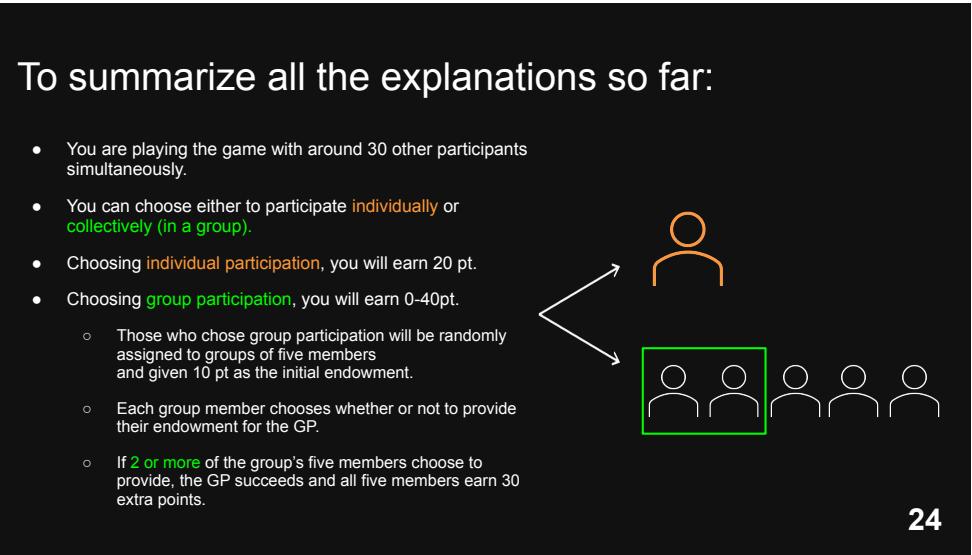
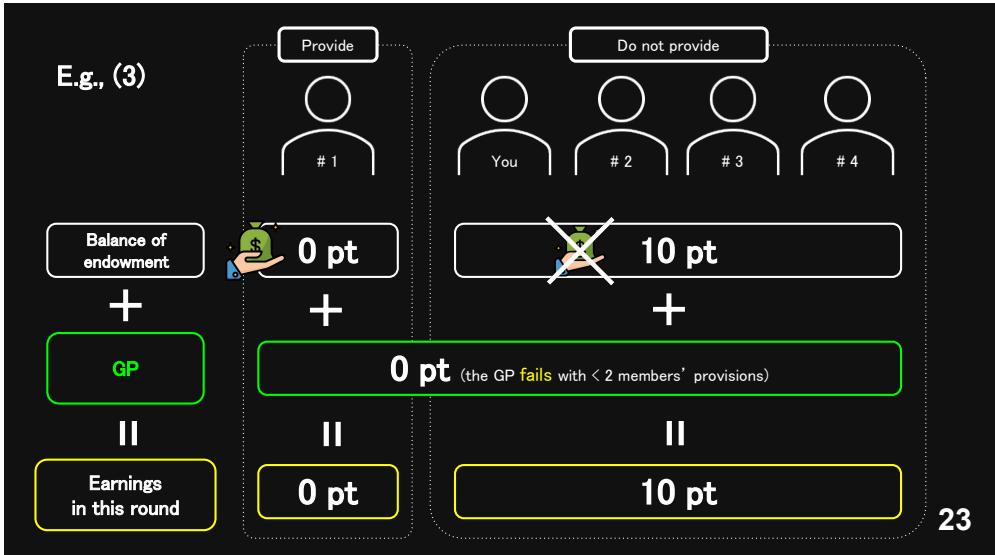
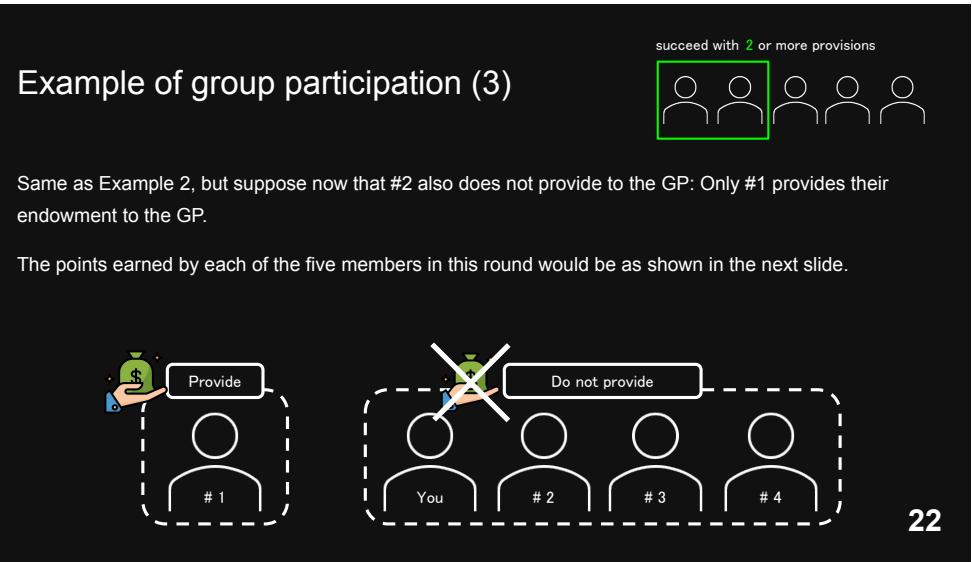
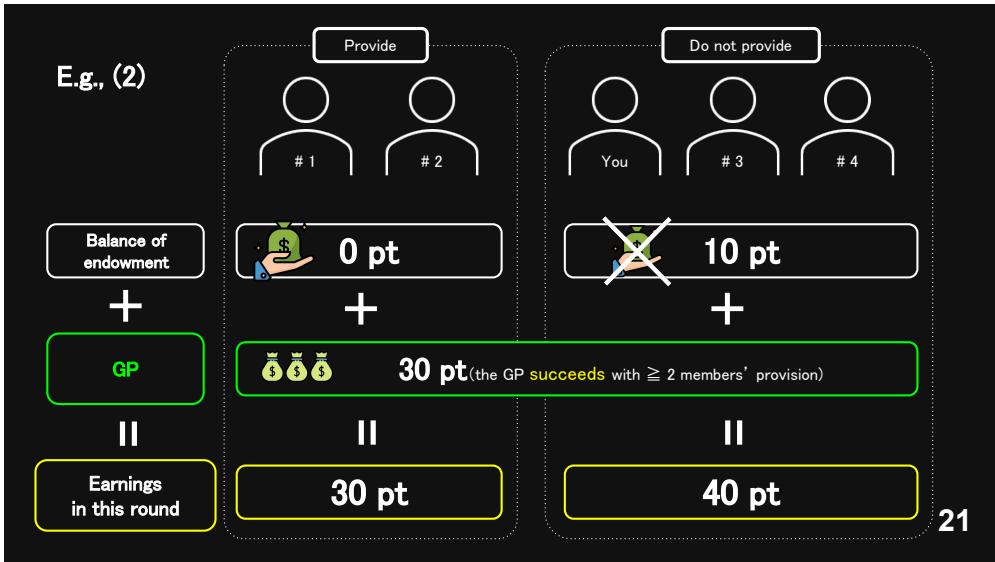
Suppose you and two other members provide the endowment to the GP.

The points earned by each of the five members in this round would be as shown in the next slides.



16





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

From the next page, we will explain how a round proceeds.

25

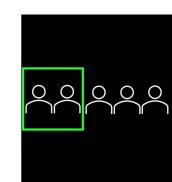
How a round proceeds:

Each participant, including you, choose to participate in the game either

individually or collectively (in groups).



Individual participation



Group participation

26

How a round proceeds:

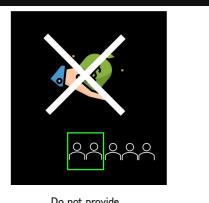
In addition to making your own choice,
you will be asked to estimate about the choices other
participants will make.

How a round proceeds:

Next, players who have chosen group participation are allocated to groups of five members, and each decides whether to provide their initial endowment for the GP.



Provide



Do not provide

27

28

How a round proceeds (4):

Prior to choosing your own actions, you will be asked to estimate other participants' actions: How many of the 30 other participants would choose the following, respectively?



Please answer such that the total number of participants equals to 30, and also indicate your confidence.

29

Screenshot when estimating other participants' choices:

(1) **Provide your estimates of other participants' choices.**
Answers should add up to 30.

Individual participation: _____

Provide endowment in a group: _____

Not provide endowment in a group: _____

Current total: _____

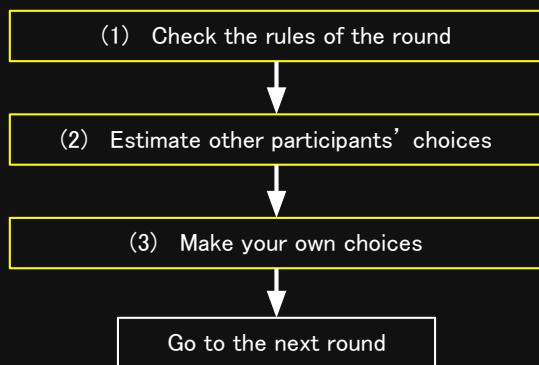
(2) **How confident are you about your estimate?**
Adjust the slider from 0 to 100 % to indicate your confidence.

Not at all confident Fully confident

Current answer: %

30

To sum up, a round proceeds as follows:



31

That is all about the procedures within each round.

Finally, we will explain
how monetary bonus will be determined.

32

How your bonus will be determined:

- After every participant has completed the whole experiment, we will inform you of the results of your choices and estimations.

33

How your bonus will be determined:

- After every participant has completed the whole experiment, we will inform you of the results of your choices and estimations.
- Bonus rewards from Part 1 (this part) will range from **0 to 800 JPY**, depending on the outcome of the game.
- Your monetary bonus will be greater if
 - (1) **you earned more points**, and
 - (2) **made more accurate estimations** about the choices of other participants.

34

How your bonus will be determined:

- After every participant has completed the whole experiment, we will inform you of the results of your choices and estimations.
- Bonus rewards from Part 1 (this part) will range from 0 to 800 JPY, depending on the outcome of the game.
- Your monetary bonus will be greater if
 - (1) you earned more points, and
 - (2) made more accurate estimations about the choices of other participants.
- There will be multiple rounds in this part of the experiment. Your bonus will be determined randomly by either your points or your estimation accuracy in one randomly selected round.
- For your reference, the following slides describe the detailed formula.

35

(*) Detailed formula to calculate your bonus

- The bonus based on Part 1 ranges from 0 to 800 JPY and is calculated as follows.

36

(*) Detailed formula to calculate your bonus

- The bonus based on Part 1 ranges from 0 to 800 JPY and is calculated as follows.
- Your bonus will be based on either your points or the estimation accuracy in one randomly selected round.

37

(*) Detailed formula to calculate your bonus

- The bonus based on Part 1 ranges from 0 to 800 JPY and is calculated as follows.
- Your bonus will be based on either your points or the estimation accuracy in one randomly selected round.
- If the bonus is based on your points:
Your bonus is the amount of points you earned in that round (0-40 pt.) multiplied by 20 JPY. Thus, the reward will increase in proportion to the points.
- If the bonus is based on your estimation accuracy:
Your bonus is equal to the difference between the estimation and actual choices (e.g., if your estimation about the number of participants choosing each action was (10, 20, 0), and the result was (10, 10, 10), then the difference is 20 ($=|10-10|+|20-10|+|0-10|$)) multiplied by a factor of 80/6 and then subtracted from 800. The bonus is higher the more accurate your estimate is.
- The bonus will range from 0 JPY to 800 JPY, whether the points or the estimation accuracy was chosen.

38

This is the end of all the explanations for this round.

You will find nice summaries on p. 24 and p. 31.
Please review them if necessary.

If you check the box stating “I have read all the explanations” below the slides, the “Next” button will appear.

Please proceed to answer the comprehension quizzes whenever you feel ready.

39

#3: Comprehension quiz for the first round (voluntary participation with threshold of 2)

Question 1:

Is this sentence correct? “You have the option of playing this round’s game either individually or collectively (in groups).”

Question 2:

If you choose individual participation, how many points will you earn in this round?

Question 3:

How many group members out of five, including you, must provide their initial endowment for the [group project] GP for it to succeed?

Question 4:

Suppose you chose group participation and provided the GP with your endowment.

Is it possible for the GP to succeed, and if so, how many points will you earn in this round?

If not possible, answer -1; if possible, answer the points to be earned.

Question 5:

Suppose you chose group participation and did not provide the GP with your endowment.

Is it possible for the GP to succeed, and if so, how many points will you earn in this round?

If not possible, answer -1; if possible, answer the points to be earned.

Question 6:

Suppose you chose group participation and did not provide the GP with your endowment.

Is it possible for the GP to fail, and if so, how many points will you earn in this round?

If not possible, answer -1; if possible, answer the points to be earned.

Question 7:

Suppose you chose group participation and provided the GP with your endowment.

Is it possible for the GP to fail, and if so how many points will you earn in this round?

If not possible, answer -1; if possible, answer the points to be earned.

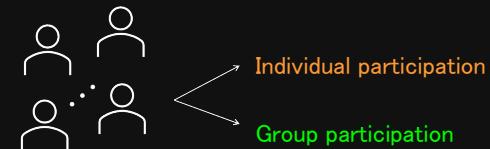
Instructions about the rules of this round

1

Rules of the game

Again, each participant (including you) can choose to participate in the game either

- (1) Individually or (2) Collectively (in a group).



2

Rules of the game

However, if you choose to participate in a group,
the condition for a successful group project (GP)

differs from that in the previous round.

We explain it in a more detail in the following slides.

3

If you choose individual participation

As was the case in the previous round, you can be sure to earn 20 points (pt).



= 10 pt

4

If you choose **group participation**

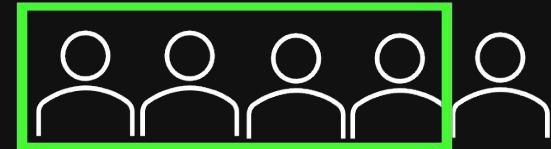


As was the case in the previous round,

- Those who choose to participate in a group are randomly assigned to a group of five members.
- Each player is given 10 initial pt and simultaneously chooses whether to provide their 10 pt to the GP.

5

If you choose **group participation**

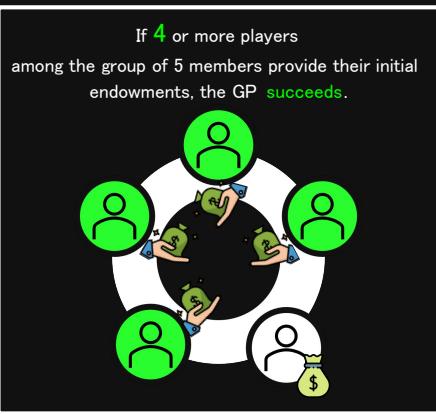


- Unlike in the previous round, the GP requires at least **4** of 5 members' provisions to succeed.

6

When the GP **succeeds**:

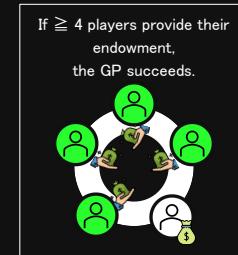
= 10pt



7

When the GP **succeeds**:

= 10pt



8

When the GP **fails**:

If fewer than **4** players among the 5 group members provide their endowment, the GP **fails**.



9

When the GP **fails**:

If < 4 players provide their endowment, the GP fails.



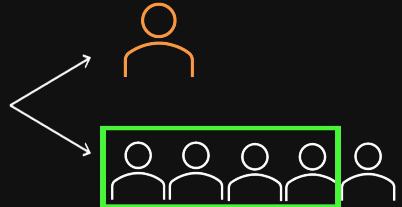
When the GP fails, **no one will receive any additional points or get their provided points back**.



10

To summarize all the explanations so far:

- You are playing the game with around 30 other participants simultaneously.
- You can choose to participate either **individually** or **collectively (in a group)**.
- Choosing **individual participation**, you will earn 20 pt.
- Choosing **group participation**, you will earn 0–40pt.
 - Those who choose group participation will be randomly assigned to groups of five members, and given 10 pt as the initial endowment.
 - Each group member chooses whether to provide their endowment for the GP.
 - If **4 or more** of the group's five members choose to provide, the GP succeeds and all five members earn 30 extra points.

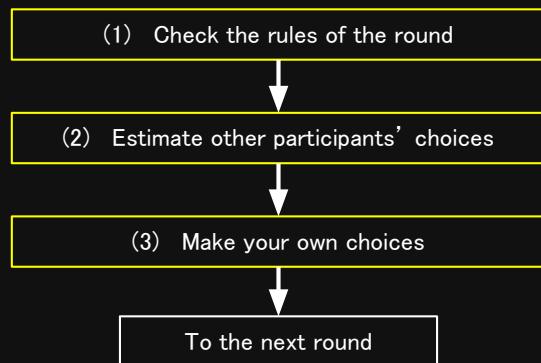


11

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

12

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



13

This is the end of all the explanations for this round.

You will find a nice summary on p. 11.
Please review it if necessary.

If you check the box stating “I have read all the explanations” below the slides, the “Next” button will appear.

Please proceed whenever you feel ready.

14

Instructions about the rules of this round

1

Rules of the game

In this round, players cannot choose to participate individually: All players participate in the game with group participation.



2

Rules of the game

- All players are randomly (via computer program) assigned to groups of five members each.



3

Rules of the game

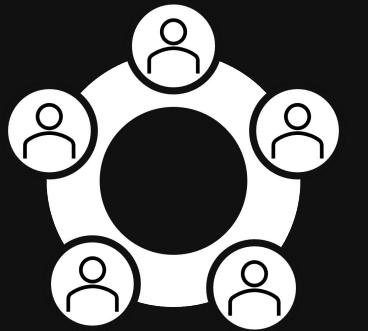
- All players are randomly (via computer program) assigned to groups of five members each.
- If the number of participants is not a multiple of 5, the few remaining players will receive a fixed amount of 20 points (pt).



4

Rules of the game

- All players are randomly (via computer program) assigned to groups of five members each.
- If the number of participants is not a multiple of 5, the few remaining players will receive a fixed amount of 20 points (pt).
- In groups, players work on a **group project (GP)**. The GP proceeds almost identically to in the previous rounds.

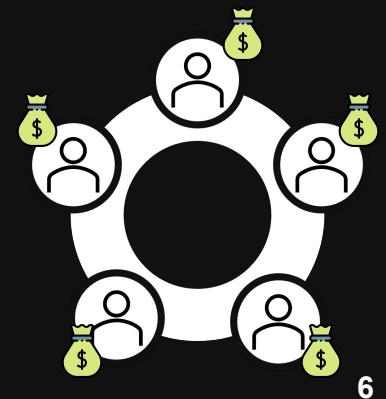


5

Group project

- In groups, players are first endowed with 10 pt (initial endowment).

= 10 pt

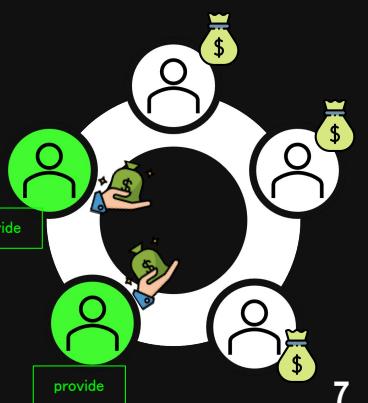


6

Group project

- In groups, players are first endowed with 10 pt (initial endowment).
- Each player has the option of *providing* the GP with their entire initial endowment or *not*.

= 10 pt

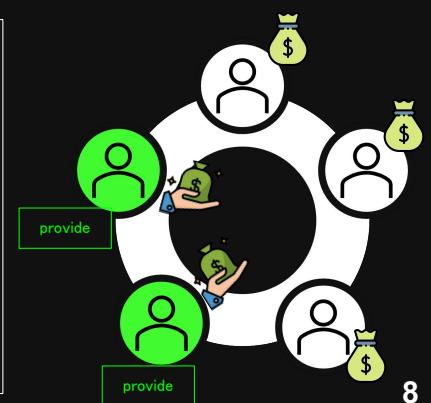


7

Group project

- In groups, players are first endowed with 10 pt (initial endowment).
- Each player has the option of *providing* the GP with their entire initial endowment or *not*.
- Every player decides simultaneously, so it is impossible to change one's decision after observing other players' decisions.

= 10 pt

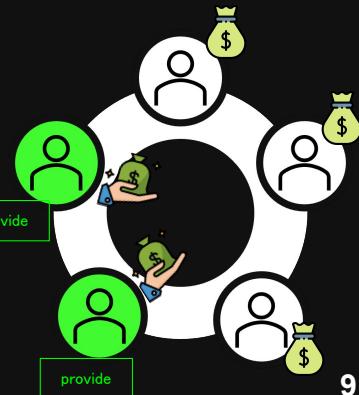


8

Group project

- In groups, players are first endowed with 10 pt (initial endowment).
- Each player has the option of *providing* the GP with their entire initial endowment or *not*.
- Every player decides simultaneously, so it is impossible to change one's decision after observing other players' decisions.
- Whether the GP succeeds depends on **the number of players who provide their initial endowment for the GP**.

 = 10 pt



9

When the GP **succeeds**:

 = 10 pt

If **2** or more players among the 5 group members provide their initial endowments, the GP **succeeds**.



10

When the GP **succeeds**:

 = 10 pt

When the GP succeeds, an **extra 30 points** will be given to each of the five members.



11

When the GP **fails**:

If **fewer than 2** players among the 5 group members provide their endowment, the GP **fails**.



12

When the GP **fails**:

If < 2 players provide their endowment,
the GP fails.



When the GP fails, **no one will receive
any additional points
or get their provided points back.**



13

To summarize all the explanations so far:

- You are playing the game with around 30 other participants simultaneously.
- All players are randomly assigned to groups of five members each.
- In groups,
 - Each player is first endowed with 10 pt.
 - Each member chooses whether to provide the endowment for the GP.
 - If **2 or more** of the 5 members choose to provide their endowment, the GP succeeds and all five members earn 30 extra points.



14

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

15

How a round proceeds:

All players, including you, are assigned to a group of five members and decide **whether to provide** their initial endowment for the GP.



16

How a round proceeds:

Prior to choosing your own actions, you will be asked to estimate other participants' actions: How many of the 30 other participants would choose the following, respectively?

Provide endowment
for the GP



Do not provide endowment
for the GP



Please answer such that the total number of participants equals 30, and also indicate your confidence.

17

The round proceeds in the same manner as the previous rounds.

(1) Check the rules of the round



(2) Estimate other participants' choices



(3) Make your own choices



Go to the next round

18

This is the end of all the explanations for this round.

You will find a nice summary on p. 14.
Please review it if necessary.

If you check the box stating "I have read all the explanations" below the slides, the "Next" button will appear.

Please proceed whenever you feel ready.

19

#6: Complete list of items for the additional task to measure participants' other-regarding preferences

index	Option A		Option B		index	Option A		Option B	
	You	Your peer	You	Your peer		You	Your peer	You	Your peer
0	450	450	300	780	0	844	216	760	120
1	435	450	300	780	1	832	216	760	120
2	420	450	300	780	2	820	216	760	120
3	405	450	300	780	3	808	216	760	120
4	390	450	300	780	4	796	216	760	120
5	375	450	300	780	5	784	216	760	120
6	360	450	300	780	6	772	216	760	120
7	345	450	300	780	7	760	216	760	120
8	330	450	300	780	8	748	216	760	120
9	315	450	300	780	9	736	216	760	120
10	300	450	300	780	10	724	216	760	120
11	285	450	300	780	11	712	216	760	120
12	270	450	300	780	12	700	216	760	120
13	255	450	300	780	13	688	216	760	120
14	240	450	300	780	14	676	216	760	120
15	225	450	300	780	15	664	216	760	120
16	210	450	300	780	16	652	216	760	120
17	195	450	300	780	17	640	216	760	120
18	180	450	300	780	18	628	216	760	120
19	165	450	300	780	19	616	216	760	120
20	150	450	300	780	20	604	216	760	120
21	135	450	300	780	21	592	216	760	120
22	120	450	300	780	22	580	216	760	120
23	105	450	300	780	23	568	216	760	120
24	90	450	300	780	24	546	216	760	120
25	75	450	300	780	25	520	216	760	120
26	60	450	300	780	26	488	216	760	120
27	45	450	300	780	27	448	216	760	120
28	30	450	300	780	28	395	216	760	120
29	15	450	300	780	29	322	216	760	120
30	0	450	300	780	30	216	216	760	120

#7: Complete list of items for the additional task to measure participants' risk attitudes

Index	Raffle X		Raffle Y	
0	400 JPY with 1/10	320 JPY with 9/10	770 JPY with 1/10	20 JPY with 9/10
1	400 JPY with 2/10	320 JPY with 8/10	770 JPY with 2/10	20 JPY with 8/10
2	400 JPY with 3/10	320 JPY with 7/10	770 JPY with 3/10	20 JPY with 7/10
3	400 JPY with 4/10	320 JPY with 6/10	770 JPY with 4/10	20 JPY with 6/10
4	400 JPY with 5/10	320 JPY with 5/10	770 JPY with 5/10	20 JPY with 5/10
5	400 JPY with 6/10	320 JPY with 4/10	770 JPY with 6/10	20 JPY with 4/10
6	400 JPY with 7/10	320 JPY with 3/10	770 JPY with 7/10	20 JPY with 3/10
7	400 JPY with 8/10	320 JPY with 2/10	770 JPY with 8/10	20 JPY with 2/10
8	400 JPY with 9/10	320 JPY with 1/10	770 JPY with 9/10	20 JPY with 1/10
9	400 JPY with 10/10	320 JPY with 0/10	770 JPY with 10/10	20 JPY with 0/10