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- Experimental evidence from dictator games -

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Do great distance and discussion among dictators facilitate self-interest of people? - Experimental evidence from dictator games -

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Abstract

The authors examine how an individual or a group makes a donation to those living in a distant place by introducing three factors into experiments of the standard dictator game. The first factor is group decision making or individual decision making. The second factor is a dictator is in the same place as the recipient or in a distant place. As the third factor, a subject with a fixed role (dictator or recipient) plays the game in three rounds. In each round, group members are exchanged with other dictator subjects in the group dictator experiment. The original findings in this paper are as follows. A dictator group or an individual dictator donates more to a neighborhood than to a distant recipient. The more experiences that the dictators accumulate in group decision making, the more selfish they become. It is also confirmed that a group dictator donates less than an individual dictator.

Keywords: inter-regional transfer, dictator game experiments, group decision, distant place, random matching

JEL classification number: C92, D63, D79

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1 Introduction

This paper examines the effects of reciprocity or altruism on inter-regional transfer expenditures in an area. As an example, many countries implement a financial transfer system to reduce the fiscal disparities among regions. One of the reasons for introducing such a system is the fairness motivation (see Musgrave and Musgrave (1980)). However, it is important to know how this system affects the welfare of the residents in the donor region, as explained in the following. Suppose that the residents in the donor region contribute the same amount of money to two different regions, X and Y. In this case, their welfare may be higher when they donate to the residents in region X than when they donate to the residents in region Y. Thus, the welfare in the donor region should be considered when an inter-regional transfer system is designed.

Experiments using the dictator game are suitable for analyzing inter-regional transfer expenditures. In this game, a rational or selfish player would not distribute an amount of money to any kind of recipient. However, in most experiments, a certain proportion of the players do contribute a positive amount of money. Such behavior is interpreted as altruism or reciprocity.

In an inter-regional transfer expenditure, the amount that the residents in the donor region donate to the recipients depends on where the recipients live. For example, the residents in the donor region may feel more familiar with the recipients living close to them and may be willing to donate more money to them.

Nevertheless, there may be an emotional backlash between residents in two neighboring places. The emotional backlash is less between distant places than between neighboring places. In the case of a distant place, since there are few interests shared between residents in both places, such feelings may not arise. Therefore, the residents in the donor region may distribute more money to the residents in a distant place.

In an inter-regional transfer expenditure, the decision maker can be the local government. In other words, the decision making is not individual, although the residents in the donor region must agree to the donation. Therefore, we analyze the effect of group decision making. In addition, this decision making is not a one-time-only event because it is repeated. For this reason, we introduce three factors into the dictator game experiment: a distant place, group decision making, and repetition of the group decision with changes of the group members.[1]

[1]Political decision makers often are replaced by the movement of residents or the result of a local government election. Therefore, the same subjects participate in a group in only one round in our setting, and a new group is formed in the next round.

We form the following three hypotheses to examine the effects of group decision making and of a distant place. First, the donation rate of a dictator will be lower in a distant place from a recipient than in the same place as a recipient. We regard the distance between a certain place and another place as one of the forms of social distance. Reciprocity may decline, because the dictator's place is distant from the recipient's place. Second, the donation rate will be lower in the case of a group decision than in the case of an individual decision. We check this hypothesis in a different way than that of Luhan, Kocher, and Sutter (2009). Third, one may be influenced by other people's opinion or decision-making process. A person is likely to change his/her opinion as the number of people advising him/her increases. Thus, in the third hypothesis, when a dictator has more opportunities to negotiate donations with other dictators, he/she donates less to his/her recipient.

Examining these hypotheses, we conduct two experiments: one is an individual dictator game, and the other is a group dictator game. Every experiment consists of four treatments, based on the distance between the dictator and the recipient. Each treatment consists of three rounds. In all the treatments, the role of a subject is fixed throughout the treatment. All the treatments were conducted in two places in Japan, Hiroshima and Yamagata. Hiroshima is approximately 800 kilometers away from Yamagata and the human interaction between both places is almost nonexistent. In two of the treatments, a dictator (a dictator group) makes a decision whether to donate his or her (its) money to a recipient living in the same place as the dictator. That is, the dictator (a dictator group) in Hiroshima (Yamagata) makes a decision whether to donate to the recipient in Hiroshima (Yamagata). In the remaining two treatments, a dictator (a dictator group) makes a decision whether to donate his or her money to a recipient living in a distant place from the dictator. That is, the dictator (a dictator group) in Hiroshima (Yamagata) makes a decision whether to donate to the recipient in Yamagata (Hiroshima). Note that in the group dictator experiments, all members of the group are replaced in every round.

This paper is organized as follows: In Section 2, we describe previous studies related to our experiment. Section 3 provides the details of our experiment. Section 4 describes the results of our experiment. Section 5 discusses various aspects of the results. Section 6 concludes the paper.

2 Related work

Since Kahneman, Knetsch, and Thaler (1986), there have been many papers on dictator game experiments. Camerer (2003) presented a survey of some results. The main results are as follows:

- In dictator game experiments, dictators give their recipients 13% to 50% of their own endowments.
- Anonymity decreases the average donation rate.
- There is no difference in the average offer rate between genders. However, female dictators are easily influenced by the size of their own endowments.

Hoffman, McCabe, and Smith (1996) and Rankin (2006) studied how a "social distance" influences the donation rates in dictator game experiments. Hoffman et al. (1996) conducted dictator games by using the double-blind method. In the experiment, Hoffman et al. (1996) controlled the social distance not only between the dictator and the recipient but also between the dictator and the experimenter and then examined the donation rate. To change the social distance, the experimenter was not in the lab in an extreme treatment or the experimenter put the rewards into an envelope in another treatment. They found that the nearer the social distance between the dictator and the experimenter, the higher the donation rate.

Rankin (2006) examined the social distance between the dictator and the recipient. He conducted dictator games in the 2×2 factorial design, in which one factor is communicability and the other is anonymity. Each treatment involved 8 rounds with random matching. The donation rate was 6% in the anonymous and no-request treatment, 26.3% in the anonymous and request treatment, 39% in the face-to-face and no-request treatment, and 27% in the face-to-face and request treatment. This indicates that a request from the recipient increases the donation rate in the anonymous case, but not in the face-to-face case.

We found that Johannesson and Persson (2000) also studied the relation between a distant place and a dictator's behavior. They conducted dictator games in which the subjects donated some money by mail to a person, who lived in Sweden and was selected at random[2]. In this experiment, one-third of the recipients donated positive amounts of money. The difference between the donation rate in the above experiment and the donation rate in a normal dictator game was not significant. They concluded that the dictator may donate positive amounts of money for a reason different from the expectations of reciprocity[3] in the dictator game experiments because there is scarcely any expectation of reciprocity in this experiment. However, it should be noted that these researchers paid

[2]The recipients had no ex-ante information about this experiment.

[3]Expectations of reciprocity is an idea to explain the positive donation rates in dictator games. When subjects make a decision in an experiment, they take into account the possibility of finding a person who learns of their decision in the experiment at a future time.

less attention to the physical distance and did not control the physical distance between the dictator and the recipient.

Some experiments considered whether a group decision is more rational than an individual decision. Kocher and Sutter (2005) examined repeated beauty-contest game experiments and found that the number selected is smaller in the group treatment than in the individual treatment. Sutter (2005) also conducted repeated beauty-contest game experiments and showed that the larger the group size is, the smaller the number they choose. Rockenbach, Sadrieh, and Mathauschek (2007) reported that the choices of lotteries by groups are consistent with the portfolio selection theory. Bornstein, Kugler, Budescu, and Selten (2008) conducted repeated price-competition game experiments and obtained the result that the group sellers choose lower prices than do the individual sellers.

In particular, Cason and Mui (1997) and Luhan et al. (2009) examined whether the decision of the dictator group is more selfish than that of the individual dictator.[4] Cason and Mui (1997) conducted dictator games in which a dictator group consisted of two subjects and examined the group polarization. Group polarization means that the group decision becomes more radical than the individual decision. According to these researchers, there are two theories to explain group polarization. One is the persuasive arguments theory (PAT) and the other is the social comparison theory (SCT). PAT states that the winning arguments will tend to be more extreme in a group discussion.

SCT states that a person observes others' opinions to evaluate his or her opinion and tries to make an idealized decision. In experiments, each seller group forced a buyer to buy a good for the price that the seller group decided freely. The time limit to decide the price was five minutes. Cason and Mui (1997) showed that a group of altruistic individuals makes an other-regarding decision. They concluded that their result supported SCT.

Luhan et al. (2009) conducted dictator games of three rounds. In the first and the third rounds, an individual dictator game was played. In the second round, three subjects formed a group and participated in the group dictator game. After every round, the experimenter announced the existence or non-existence of a next round. The average donation rate was 19, 11, and 13% in the first, second, and third round, respectively. The difference between the first and the third rounds was significant but the difference between the second round and the third round was not significant. They concluded that the group decision is more selfish than the individual decision and the group decision making shifts the individual's attitude toward being more selfish.

[4]Dufwenberg and Muren (2006) examined the relation between the other-regarding behavior and the gender.

The method of communication in Cason and Mui (1997) was face to face. This study concluded that the group decision making is less selfish than the individual decision making. However, the method in Luhan et al. (2009) was an online chat. This study concluded that the group decision making is more selfish than the individual decision making. According to Luhan et al. (2009), whether the group decision making is more selfish than the individual decision making depends on anonymity.

3 Experiment

The following three hypotheses are tested to answer our research questions.

Hypothesis I: The donation rate of a dictator is lower in the distant place from a recipient than in the same place as a recipient.

Hypothesis II: The donation rate is lower in the case of a group decision than in the case of an individual decision.

Hypothesis III: As a round goes on, the group decision becomes more selfish than that in the previous round.

The hypotheses are not consistent with classical economic theory. In other words, rational and selfish subjects would not donate any amount.

3.1 Experimental design

Table 1: Experimental profile: Design of group and individual experiments. First letter and second letter "H (irhosima)" or "Y (amagata)" indicate the place of the dictator and the place of the recipient, respectively.

Same\distance place as Dictator's place	Hiroshima	Yamagata
Same place	HH	YY
Distant place	HY	YH

There are two experiments in this paper. One is an individual dictator game experiment, and the other is a group dictator experiment.

The individual dictator game experiment consists of four treatments, and the difference of each treatment is where the dictators and the recipients are, as Table 1 indicates. "H" indicates that the subjects are in Hiroshima City and "Y" indicates that the subjects are in Yamagata City. For example, in treatment HY, the dictators are in Hiroshima and the recipients are in Yamagata.

The experimenters randomly gave each subject in HH and YY the role of either dictator or recipient at the beginning of the experiment. A subject in Hiroshima and Yamagata

was assigned the role of dictator in treatments HY and YH, respectively. As in the related studies, the dictators were in a different room from the recipients in treatments HH and YY. The roles given to the subjects did not change during a treatment but the dictator was randomly matched with the recipient in each round. The subjects in the dictator role were informed about this in the instructions. The experimenters carried out the dictator game for three rounds in each treatment, although they actually told the subjects that the game would be repeated for several rounds. The experimenters gave each subject in the dictator role JPY800 as the endowment in each round.[5] The experimenters requested that each dictator subject should decide the amount of money donated to the recipient paired with the dictator.

In the group dictator experiment, the procedure was almost the same as that of the individual dictator game experiment. The differences in the procedures between the two experiments are as follows. A decision maker was not an individual subject but a group of three subjects. The experimenters randomly reconstructed each dictator group and recipient group in each round. The experimenters gave each subject in the dictator role JPY800, that is, the total endowment of one dictator group was JPY2400 in each round. The experimenters requested that the subjects in the dictator group come to an agreement of the amount of money donated to the recipient group that was paired with that dictator group.[6] The subjects in each dictator group adjusted their opinion of the amount of money through a five-minute online chat.

Our dictator game experiments are different from typical dictator games in that the recipients are in a place far away from the dictators in some treatments.[7] Furthermore, our dictator game experiment is different from Luhan et al. (2009) in the following point. In Luhan et al. (2009), the subjects in the dictator role in the dictator game played a group dictator game after they had played the individual dictator game. In our experiments, one set of subjects participated in the group dictator game experiment and another set of subjects participated in the individual dictator game experiment.

3.2 Overview

The two experiments were carried out at Hiroshima City University and Yamagata University from October 2007 to December 2009. Each treatment took approximately 100

[5] JPY800 ranged from USD7 to USD9 in the exchange rate at that time.

[6] Each recipient group would receive the money from the dictator group that was paired with the recipient group, and the money would be equally divided among the subjects in the recipient group. The experimenters decided not to pay the subjects in a dictator group any reward if they failed to agree on the amount of money, although the experimenters did not encounter this situation.

[7] We experimented in Hiroshima City and Yamagata City, which are a distance of eight-hundred kilometers apart. Traveling between these cities distance takes five hours or longer.

minutes to complete. In the group dictator game experiment, 54 undergraduate students at Hiroshima City University and 48 undergraduate students at Yamagata University participated in the dictator role. In the same experiment, 15 and 16 undergraduate students participated at Hiroshima City University and Yamagata University, respectively, in the recipient role. In this experiment, a recipient received a donation from three different groups in each round. Therefore, a recipient belonged to three recipient groups. This was not told to the subjects in the dictator role. Each subject of the dictator role could participate in only one treatment.

In the individual dictator game experiment, 40 undergraduates at Hiroshima City University and 38 undergraduates at Yamagata University participated in the dictator role and the same numbers of the undergraduates participated in the recipient role. The amount of money paid to the subjects ranged from JPY 0 to JPY 2400.[8] We used a copy of z-Tree (Fischbacher (2007)) as the application software for the experiment. In the HY and YH treatments, the z-Tree server was set up at Yamagata University and each z-Leaf was connected to the server via the Internet.

The following are details of the interaction between the dictators (or dictator groups) and recipients (or recipient groups). In treatments HH and YY in both experiments, the subjects in the dictator role entered a different room from that of the subjects in the recipient role, and so the dictators did not come in contact with any recipients before, during, or after a treatment.

4 Experimental results

In this section we verify the three hypotheses and calculate some results statistically. Before conducting the statistical analyses, we summarize the outcomes of our experiments below.

4.1 Data summary

For the analysis, we utilize three kinds of data. Data A is the individual decision-making result in the individual dictator game experiment. Data B is the group decision-making result in the group dictator game experiment. Data C is the individual decision-making result in the group dictator game treatment, which divides data B individually. Let us

[8] To keep the chat rule, each subject of the recipient role observed the online chat in all of the treatments, although the observed chat was not that of the paired dictator group. The experimenters did not inform the subjects in the dictator role that the subjects in the recipient role were observing them, although the experimenters did inform the subjects in the dictator role that somebody would be observing their chat. To increase the reward to the subjects in the recipient role, the experimenters paid JPY 1000 per subject to each in this role as a reward for this work. The subjects in the dictator role did not know the recipients were paid this fixed reward.

merge data A and B into "Decision Maker's Data" and data A and C into "Individual Data."

Tables 2 and 4.1 summarize data A and data B, respectively. In these tables, the first, second, and third lines indicate the number of observations, the average donation rate, and the standard deviation of the donation rate, respectively.[9]

Table 2: Summary of data A: the individual dictator game experiment.

Treatment		Round 1	Round 2	Round 3	Total
HH	Number of observations	21	21	21	63
	Average donation rate	0.243	0.203	0.233	0.226
	Standard deviation	0.227	0.208	0.233	0.220
HY	Number of observations	19	19	19	57
	Average donation rate	0.187	0.126	0.161	0.158
	Standard deviation	0.214	0.171	0.198	0.193
YY	Number of observations	15	15	15	45
	Average donation rate	0.238	0.245	0.245	0.243
	Standard deviation	0.188	0.193	0.190	0.186
YH	Number of observations	23	23	23	69
	Average donation rate	0.217	0.228	0.266	0.237
	Standard deviation	0.198	0.208	0.246	0.216

These tables show that it is important whether a dictator is in the same place as his/her recipient. Table 4.1 tells us that as a round goes on, the donation rate and its standard deviation decrease in the group dictator game experiment. In contrast, Table 2 tells us that the round as a variable has no effect on the offer rate in the individual dictator game experiment.

4.2 Econometric analysis

For the examination of Hypothesis I, we conducted a random-effects Tobit analysis for the donation rate of data A because data A is panel data. We conducted the Tobit analysis for the donation rate of data B because all the members are replaced in each round in the group dictator game treatments. [10] Tables 4 and 5 summarize the regression results. In these tables, the variables are defined as follows. SP is the same place dummy. When dictators are in the same place as their recipients, it is 1; otherwise, it is 0. YD is the Yamagata dictator dummy. When dictators are in Yamagata, it is 1; otherwise, it is 0. $R2$

[9] In Table 4.1, one group is excluded in the first round of the YH treatment because not all members understood the instructions of the experiment.

[10] Note that the donation rate lies in the interval $[0, 1]$ and that all the groups in all the rounds are different because a group is newly formed in each round.

Table 3: Summary of data B: the group dictator game experiment.

Treatment		Round 1	Round 2	Round 3	Total
HH	Number of observations	9	9	9	27
	Average donation rate	0.163	0.132	0.052	0.116
	Standard deviation	0.198	0.141	0.085	0.151
HY	Number of observations	9	9	9	27
	Average donation rate	0.134	0.052	0.013	0.068
	Standard deviation	0.179	0.054	0.022	0.117
YY	Number of observations	8	8	8	24
	Average donation rate	0.213	0.122	0.083	0.139
	Standard deviation	0.198	0.161	0.093	0.160
YH	Number of observations	7	8	8	23
	Average donation rate	0.116	0.047	0.008	0.054
	Standard deviation	0.192	0.087	0.022	0.121

is the second round dummy; when dictators donate in the second round, it is 1; otherwise, it is 0. $R3$ is the third round dummy. When dictators donate in the third round, it is 1; otherwise, it is 0. GE is the gender dummy. When a dictator is male, it is 1; otherwise, it is 0.

Table 4: The random-effects Tobit analysis of the individual dictator game experiment.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
SP	$0.108^{\dagger}$	(0.056)
YD	0.130^{*}	(0.057)
$R2$	-0.029	(0.020)
$R3$	0.002	(0.020)
GE	0.162^{**}	(0.061)
Intercept	-0.027	(0.076)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 5: The Tobit analysis of the group dictator game experiment.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
SP	0.113^{**}	(0.043)
YD	-0.014	(0.043)
$R2$	$-0.099^{\dagger}$	(0.051)
$R3$	-0.194^{**}	(0.053)
Intercept	0.069	(0.046)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

To examine Hypothesis II, we divide the Decision Maker's Data into six groups depending on the round and on whether SP is equal to 1 and conduct Tobit analyses for the donation rate of all the data groups (Tables 6 to 11). In these tables, the variable G is the group decision dummy. It is 1 when a dictator is a group; otherwise, it is 0.

Table 6: The Tobit analysis of round 1 and the same place ($SP = 1$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.072	(0.070)
YD	0.025	(0.066)
Intercept	0.213**	(0.048)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 7: The Tobit analysis of round 1 and the distant place ($SP = 0$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.108	(0.076)
YD	0.009	(0.067)
Intercept	0.168**	(0.054)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 8: The Tobit analysis of round 2 and the same place ($SP = 1$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.130†	(0.068)
YD	0.041	(0.063)
Intercept	0.183**	(0.046)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 9: The Tobit analysis of round 2 and the distant place ($SP = 0$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.193**	(0.072)
YD	0.074	(0.062)
Intercept	0.105*	(0.050)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 10: The Tobit analysis of round 3 and the same place ($SP = 1$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.242**	(0.072)
YD	0.036	(0.065)
Intercept	0.202**	(0.047)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 11: The Tobit analysis of round 3 and the distant place ($SP = 0$) data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
G	-0.369**	(0.095)
YD	0.081	(0.075)
Intercept	0.132*	(0.060)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Furthermore, we conducted a random-effects Tobit analysis for the donation rate of the Individual Data. Table 12 summarizes the results of the regression. In this table, variable I is the individual decision dummy. It is 1 if the experiment is the individual dictator game; otherwise, it is 0.[11]

[11] We set $I * YD$ as the independent variable because the coefficient of YD is significant in Table 4 and insignificant in Table 5. Similarly, we set $G * R2$ and $G * R3$ as the independent variables because the coefficients of $R2$ and $R3$ are significant in Table 5 and insignificant in Table 4.

Table 12: The random-effects Tobit analysis of the Individual Data.

Variable	**Coefficient**	**Std. Err.**
Dependent variable: offer_rate		
SP	0.091**	(0.029)
G	-0.043	(0.041)
$I * YD$	0.074†	(0.044)
$R2$	-0.029	(0.024)
$R3$	0.002	(0.024)
$G * R2$	-0.072*	(0.033)
$G * R3$	-0.200**	(0.034)
Intercept	0.116**	(0.037)

Significance levels: † : 10%, ∗ : 5%, ∗∗ : 1%

Table 13: Variable list for the econometric analysis.

Variable	Explanation
SP	1 if a dictator is in the same place as a recipient; otherwise, it is 0.
YD	1 if a dictator is in Yamagata; otherwise, it is 0.
$R2$	1 for round 2; otherwise, it is 0.
$R3$	1 for round 3; otherwise, it is 0.
G	1 for group dictator game experiment; otherwise, it is 0.
I	1 for individual dictator game experiment; otherwise, it is 0.
GE	1 if a dictator is a male; otherwise, it is 0.

4.2.1 Effect of "distant place"

Hypothesis I is supported since the coefficient of SP is positive and weakly significant ($p < .10$) in Table 4 for the individual dictator game experiment, and positive and significant ($p < .05$) in Table 5 for the group dictator game experiment. Furthermore, SP is positive and significant ($p < .01$) in Table 12.

4.2.2 Effect of "group decision making"

Tables 6 to 11 indicate that the coefficients of G are negative and significant for rounds two and three ($p < .10$ for round two and $SP = 1$ and otherwise, $p < .01$). Furthermore, in Table 12, $G*R2$ and $G*R3$ are negative and significant while G is insignificant. Hence, Hypothesis II is supported for rounds two and three. This is in agreement with the result of Luhan et al. (2009).

4.2.3 Effect of "iteration of group decision making"

In Table 5, the coefficients of $R2$ and $R3$ are negative and significant and the coefficient of $R3$ is smaller than the coefficient of $R2$, while this is not observed in Table 4 for the individual dictator game experiment. In a similar way, in Table 12, the coefficients of $G * R2$ and $G * R3$ are negative and significant and the coefficient of $G * R3$ is smaller

than the coefficient of $G*R2$, while the coefficients of $R2$ and $R3$ are insignificant. Hence, Hypothesis III is supported.

4.2.4 Other results

In Table 4.1, the standard deviation of the donation rate in the group dictator game experiment decreases. Bartlett's test supports the different variances among the rounds at a significance level of 1% for YH and 10% for HH and HY. For treatment YY, Bartlett's test supports the different variances between rounds one and three at a 10% significance. However, this is not observed in the individual dictator game experiment (Table 2). Furthermore, Table 5 shows that the coefficients of YD and GE are significant.

5 Discussion

5.1 Does the exchange of opinion decrease the donation?

We compare the group and the individual dictator game experiments with Cason and Mui (1997) and Luhan et al. (2009). In the studies of Luhan et al. (2009), an online chat program was used for the procedure of decision making in a group to preserve anonymity. Our study is different from Luhan et al. (2009) in that the group decision was repeated three times and each group has a different subject in each round.

Our comparison results are as follows. First, a group is more selfish than an individual in the second and third rounds. This result is consistent with Luhan et al. (2009). Second and more importantly, as the round goes on, the group decision becomes more selfish than in the previous round,[12] although the same is not true for the individual decision.

This result may provide a clue to learning why a group is more selfish than an individual. We think that the exchange of opinions is the key. In our experiment, the subjects have more opportunities to exchange opinions as the round goes on because a group member is reshuffled in each round. Also, the exchange of opinions disperses "something" to discourage the donation (e.g., expectations of reciprocity or preference) and this dispersal makes the group decision more selfish. With regard to the expectations of reciprocity, the example below is one of many possibilities.

It is pointed out that one of the reasons why a dictator gives money to a recipient is the expectation of reciprocity.[13] However, the expectation of reciprocity is controlled to zero in the ordinal dictator game experiments. Yet, decisions are made with an over-

[12] This change may be related to SCT or PAT in the field of psychology. However, SCT and PAT do not imply the decline of the donation of a dictator group.

[13] See Hoffman et al. (1996). However, Johannesson and Persson (2000) concludes that the dictators donate to the recipient even if there is no expectation at all of reciprocity.

estimated expectation in the one-shot individual dictator game experiment because the average donation rate is significantly positive. As our results indicate, even if the individual dictator game is repeated, the over-estimated expectation may be preserved because of the positive donation in our experiments. In contrast, when a group member is reshuffled in each round and group decisions are repeated, the subjects learn the true expectation of reciprocity by listening to various subjects' opinions. That is, the exchange of opinions disperses the knowledge about the true expectation of reciprocity. Of course, it is also possible that the exchange of opinions disperses the same particular preference. Additional research is needed to confirm our thought.

5.2 Exploring the behavior of the egalitarian

Another question arises from the comparison between data A (Section 4), that of the individual game experiment, and data C (Section 4), the individual data in the group dictator game experiment. The question is whether an egalitarian subject of the group dictator game experiment changed his/her opinion to a selfish one. An egalitarian subject is a subject who donates at least half of the endowment irrespective of his/her recipient's place.

Let us focus on the decision making in the individual dictator game experiment to classify the type of subjects. From the comparison between the distant place and the same place treatments of this experiment, it is highly possible that there are three notable types of people.

The first is the egalitarian type. Approximately 5% of the subjects continued to donate more than half of the endowment in all rounds in the distant place treatment of the individual dictator game experiment. It is highly unlikely that they donated less money to a recipient in the same place as themselves because of the results in Section 4. Hence, it is highly possible that these subjects are egalitarians. If this type is defined in the weaker sense that one donates more than half of the total endowment, it is highly possible that approximately 10% of the subjects in the distant place treatment of the individual dictator game experiment belong to this type.[14]

The second is the selfish type. The subject of this type never donates irrespective of his/her recipient's place. In our experiment, approximately 11% of the subjects never donated in the same place treatment of the individual dictator game experiment (see Table 14). Additionally, as indicated in the results in Section 4, the subject tended to

[14]The egalitarians were observed in the dictator game experiments with the double-blind scheme. See Hoffman et al. (1996) and Johannesson and Persson (2000). Furthermore, the egalitarians were also observed in lost-wallet game experiments. See Charness, Haruvy, and Sonsino (2007).

donate more to the recipients in the same place than in the distant place. Taking these results into account, these subjects would not donate at all, even if they participated in the distant place treatment. Hence, it is highly possible that they belong to the selfish type.

The third is the budging type. This type of subject donates to a neighborhood more than to a distant recipient. Approximately 17% of the subjects never donated in the distant place treatment of the individual dictator game experiment. Because a subject's participation in the same place treatment or in the distant place treatment was assigned randomly, it is conceivable that approximately 17% of the subjects in the same place treatment would never donate in the distant place treatment if they had been assigned to participate in the distant treatment. However, since 11% of the subjects never donated in the same place treatment of the individual dictator game treatment, it is likely that 6% of the subjects (17% − 11%) would change their donating behavior and, thus, can be regarded as the budging type.[15] The subject of this type changes his or her donation according to the extent of the expectation of reciprocity. The lower the expectation of reciprocity is, the less they donate. The difference between the two treatments of the individual dictator game experiment is due to the budging type of subject.

In data C, no egalitarians were observed even in the weak sense.[16] It might be expected that there would be a few egalitarian subjects in the group dictator game experiment, because approximately 5% of the subjects in the distant place treatment in the individual dictator game experiment were egalitarians. This result suggests that the egalitarian subject changed his or her opinion to a selfish one through the exchange of opinions with other subjects. However, it is also possible that the budging subjects learned the true expectation of reciprocity by listening to others' opinions and that they began to behave selfishly. As a result, the subjects with selfish behavior became the majority in each group, even if the egalitarian subject did not change his/her preference. We have no way of ascertaining whether the egalitarian changed his/her opinion. However, whether an egalitarian changed his/her opinion to a selfish one through the exchange of opinions with other subjects is an interesting question.

[15] Needless to say, more than 6% of the subjects may belong to the budging type. Although the budging type consists of those who donate more to the recipients in the same place than in the distant place, we can only distinguish the percentage of subjects who seem to donate a positive amount of money to the same place recipient but no money to the distant place recipient.

[16] That is, no subjects donated more than half of the total endowment. See Table 15.

Table 14: **Distribution of total donations in the individual dictator game.**

Donation rate	Same place	Distant place
0%	11%	17%
0–16.7%	33%	31%
16.7–33.3%	11%	24%
33.3–50%	31%	19%
50–100%	14%	10%

The donation rate is the total donation rate of three rounds.

Table 15: **Distribution of total donations in the group dictator game.**

Donation rate	Same place	Distant place
0%	6%	25%
0–16.7%	61%	56%
16.7–33.3%	31%	19%
33.3–50%	2%	0%
50–100%	0%	0%

The donation rate is the total donation rate of three rounds.

5.3 Comparison between the distant and the same places

We compare the donation of the dictator whose recipient is in the distant place and the dictator whose recipient is in the same place. Our comparison results indicate that the dictator group and the individual dictator donate more in the same place treatment than in the distant place treatment.

The dictator game experiment in Johannesson and Persson (2000) is similar to the experiments in our study because both studies compare the distant place treatment and the same place treatment in the individual dictator game experiments. However, their experiments are different from this study in two ways. First, the recipients in the treatment corresponding to our distant place treatment were randomly drawn from the Swedish general population. Second, all the treatments were conducted with the double-blind scheme. In their experiments, the difference between the control treatment and the distant place treatment was not significant, unlike our result. Their results are interpreted below. Let us focus on the expectations of reciprocity in their control treatment, which corresponds to our same place treatment. Their control treatment was too low to find the difference in the donation rates of the budging subjects between the distant place and the same place treatments, because both treatments were conducted with the double-blind scheme.

5.4 Some implications from our experiments

Our interest is to examine the inter-regional transfer expenditure experimentally. In general, we need to examine the experimental results carefully to apply them to policy decision. For example, though a recipient's behavior does not have any effect on a dictator in a standard dictator game experiment, there are various interactions between a donor and a recipient in the case of an inter-regional transfer system. Furthermore, we need to note whether the outcome of the dictator game experiment is sensitive to an additional condition. It is necessary to compare the result of the dictator game experiment to the result of an ultimatum game experiment or public goods experiment to apply the result of the dictator game experiments to policy decision. In the next paragraph, we present one of many possibilities.

From the result that both a dictator group and an individual dictator donate more to a neighborhood than to a distant recipient, it is possible that the disutility of inter-regional transfer can be reduced through an appropriate institutional design. The result implies that a donor has the intention of making a higher donation to a neighborhood than to a distant recipient. This can be interpreted as follows: when making a certain amount of donation, it is more desirable for the donor to donate to a neighborhood than to a distant recipient. That is, in the case of an enforced inter-regional transfer through a tax, the transfer among relatively narrow regions may reduce the disutility of residents in a high-income area. Because the donor is not likely to meet the distant recipient or lacks a sense of intimacy with the distant recipient, the donor feels a reduced expectation of reciprocity. This is the reason that the donation rate is higher in the same place treatment than in the distant place treatment. Therefore, the following may be effective for improving the welfare of the donor residents and for increasing the donation to the distant residents: the promotion of the liquidity of residency and the transmission of regional information. The promotion of the liquidity of residency shortens the sense of distance among groups, encourages a sense of intimacy, and raises the probability that the donor meets the recipient. The transmission of regional information also encourages a sense of intimacy.

6 Conclusion

In this paper, we examined (1) the difference between the donation to a distant recipient and the donation to a neighborhood and (2) the effect of group reconstructing and iterated decision making in the group decision. Our original findings are as follows. (1) A

dictator group as well as an individual dictator donates more to a neighborhood than to a distant recipient, and (2) as a round goes on, the group decision becomes more selfish than the group decision in the previous round. We also confirm that, as Luhan et al. (2009) indicated, a group dictator donates less than does an individual dictator.

The reason why Hypothesis III (i.e., as the round goes on, the group decision becomes more selfish than that in the previous round) is supported was not fully analyzed. As shown in the last section, we presume that the donation rate decreases because each subject learns the true expectation of reciprocity or changes his or her preference by the exchange of opinions with other subjects. To find the answer, an experiment of group decision making with fixed members is required. In such an experiment, we would prevent each subject from coming in contact with others' opinions except for the members of the group to which he/she belongs. If the result of this additional experiment was different from the two experiments in the current study, we would conclude that the random matching, by which each subject has a higher possibility of talking with other selfish subjects, causes the decrease in the donation rate.

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Appendix

A An Example Instruction

The following instructions were provided to the dictators in the HY treatment of the group dictator game experiment.[17]

How to make decisions

You will belong to a group that consists of three people. Your group members will be exchanged with others in this room in every round. Your partner group, which consists of three people, will be anonymous and will be sitting in a room at Yamagata University. *Your partner group will change in every round.*

[17] The instructions were originally written in Japanese.

This experiment consists of some number of rounds. In each round, you should do the following.

- The experimenter will give you JPY 800. That is, the experimenter will give your group JPY 2400 in total.
- You must decide whether to give some money to your partner group. The amount of money must be the same from each group member. To determine the amounts, you can talk to the other members through the online chat. You can donate from JPY 0 to JPY 2400 in total, or JPY 800 per capita, to your partner group. You must come to an agreement on your donation amounts within five minutes.
- The computer console will display your initial endowment (JPY 800) in this round.
- You must enter the agreed donations. If you donate JPY y per capita, you will have to enter y into your computer console and press the "OK" button.
- If the entered donation does not coincide with those of the other members, you can correct the value. (If you make a mistake three times, the rewards of all members and your partner group in this round will become zero.)
- Thus, your partner group receives $3y$ in total, and so each member of your partner group receives y.
- Your partner group does not have an endowment to donate to you. Therefore, they do not make any decisions about donations to you.

Procedure of the online chat

You will talk about the amount of money to be donated through an online chat. The chat lasts for five minutes. At the end, you will have agreed on how much you will give to your partner group.

- You will NOT ask other members for his/her private information such as faculty, university major, gender, age, etc.
- You will NOT input your personal information such as your faculty, university major, gender, age, etc.
- You will NOT reveal what you said in the previous rounds.
- You must input the amount agreed on by you and your group members in the chat.

Monetary reward

Your monetary reward will be the sum of your remaining endowment in all the rounds. In other words, if you donate JPY d_i to your partner, your monetary reward in this round will be JPY $(800 - d_i)$. Therefore, your total monetary reward will be JPY $\sum_{i=1}^{n}(800 - d_i)$.