

Giving Choices in Dictator Games: Social Information, Motives, and Fairness Preferences^{*}

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An experimental dictator game has been conducted to examine whether subjects modify their allocation choices when information about the actions of others is provided. Experimental results show that (a) information on their own rank or absolute earnings of other dictators modestly reinforces subjects' selfishness, (b) the frequency of a zero transfer increases with the knowledge of other subjects' choices, (c) lower ranked subjects are more likely to give more or less in a new round, (d) the effects of information on rank are not different from those of information on absolute amount, (e) the stronger subjects' altruism motive and fairness preference, the more they give, while the stronger subjects' money-seeking motive, the less they give, and (f) money-seeking motive positively contributes to the likelihood of giving constantly zero in every round. The results have implications for future research focusing on distributional choices and social information.

JEL Classification: C91, D64, D80

Keywords: dictator game, giving behavior, social information, relative standing, motives, altruism, money-maximizing, fairness preferences, experimental economics

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1. INTRODUCTION

Experimental economists have continuously found unselfish behavior with a set of simple games. For example, in the simplest dictator game, where subjects have a choice of dictating an uneven split favoring themselves, more than 60% of subjects give a positive amount of money to a recipient, with the mean transfer roughly 20% of the endowment.¹⁾

While dictator giving has proven hard, many experimentalists still cast doubt on generous transfers of dictator games. Bardsley (2008, p. 123) says that “could people always make anonymous donations to random strangers in everyday life, for example by mailing cash to persons sampled from the telephone directory?” Several models have been put forward to test the robustness of experimental data from games: whether recipients are charities or individuals (Eckel and Grossman, 1996), social distance influences giving (Hoffman *et al.*, 1996), and income is earned or unearned (Cherry *et al.*, 2002). The evidence has tended to be that dictator giving, thus unselfish behavior, is sensitive to experimental treatments. As List (2007, p. 484) points out, the simple manipulation of the action set leads to drastic changes in behavior toward selfish allocation. The general findings are that dictators’ allocation choices are probably more volatile than a literal interpretation of other-regarding motivation as causing a desire to share the endowment.

A novel direction of exploration is to introduce a factor of social comparisons in the experimental contexts.²⁾ In particular, one might ask whether observation of other players’ action affects players’ strategies according to the equilibrium predictions of game theory. How information about others’ decisions influences one’s own is now an area of growing interest in experimental economics. Both economists and psychologists assume that higher contribution rates are observed when information is provided that many others contribute. This social comparison hypothesis is

¹⁾ See Camerer (2003) and Engel (2011) for comprehensive and excellent surveys.

²⁾ The term “social comparisons” refers to information on such “others”, as defined by Bohnet and Zeckhauser (2004).

actually supported in many experiments.³⁾ For instances, a study by Frey and Meier (2004) supports the theory of conditional cooperation in a charitable giving experiment, but the effect varies depending on past contribution behavior. In Shang and Croson (2009), social information increases voluntary contributions of public goods by 12%. On the other hand, Poulsen and Tan (2007) show that free information about other players' action can be a disadvantage: proposers in ultimatum game earn a lower payoff than he would obtain had he been uninformed.

Allowing for observation of how other players play the game is a step in the direction of resembling everyday life decisions. People with incomplete information make decision with uncertainty, but continuously gather available information which might help them revise subsequent decisions. Rational people also learn through social networks of neighbors or by word-of-mouth. This means that, at a minimum, they need information on what others are doing. They use this information to learn to play by using other's behavior as a reference point for decisions. Thus providing information on others' behavior may be important, and people will learn quickly to play in accordance with the equilibrium predictions of game theory, relative to the case where no information is available.

This paper examines the effect of social information on other subjects' allocation choices in a dictator game experiment. Dictator subjects in a competitive environment might learn through observation of others and change behavior in accordance to information for a variety of reasons. First, they do not have a concrete idea on what is "appropriate behavior" in the dictator game. According to Bohnet and Zeckhauser (2004, p. 496), information on average behavior establishes a social norm. If dictator subjects care about this social norm, they will respond to information provided and tend to gravitate towards other subjects' allocation. Second, subjects may not only care about the absolute amount of money they earn,

³⁾ Prosocial behavior, defined as actions intended to benefit one or more people other than oneself, may be due to various reasons, such as conformity, social norms, or reciprocity.

but also about their standing relative to other subjects. It is generally accepted by economists that economic performance is enhanced by competitive motives, and Bolton (1991) and Andreoni (1995), for example, find experimental evidence that interpersonal competition further promotes selfish behavior.

The exploration whether information affects dictator subjects' behavior is not new. In Cason and Mui (1998), where information only about one other dictator's offer is provided, relevant information prohibits some subjects from moving toward more self-regarding choice. In Duffy and Kornienko (2010), subjects receiving information about their relative standing with respect to all other dictators in the room tend to give less when placed in an earning tournament, but give more when placed in a generosity tournament.

In this study, two different forms of information are provided to dictator subjects, in contrast to Duffy and Kornienko (2010) who provide information only about ranks. In treatment 1, dictator subjects receive information about their rank in their group in just-completed round. This condition will be called Rank Information. In treatment 2, dictator subjects receive information about the individual amount of earnings of all other subjects in their group in just-completed round, called Earnings Information.

The Earnings Information essentially contains the Rank Information because subjects can calculate their rankings from the amount of earnings of others. But these two forms of information might yield differences in dictators' behavior. The information on the individual amounts kept or given by others might provide subjects with social norms of keeping or giving, and thus affect dictator giving. Duffy and Kornienko (2010), for example, do not provide information on the individual amounts to avoid the possibility of desires for social acclaim from the experimenter or from other subjects. "Ranking was done without disclosing the actual amounts that were given and kept so as to minimize the possibility of conformism or other norm-driven behavior (p. 83)". However, no attempt has been made yet to examine whether individual amounts of giving provides dictator subjects with a different "frame" from relative standing, and thus Earnings

Information and Rank Information differently affects dictators' allocation.⁴⁾

The experimental treatment design in this paper is able to investigate (i) whether subjects modify their behavior in a direction of what classical economic theories predict when they are provided with social information on other subjects' choices; (ii) whether Rank Information has different effects on dictators' allocation from Earnings Information; (iii) which form of information is more relevant in explaining self-regarding behavior, and; (iv) the effects of subjects' behavioral motives and fairness preferences on their dictator giving behavior. Thus, to my knowledge, neither existing models nor existing methodologies address what this study explores.

2. EXPERIMENTAL DESIGN AND PROCEDURES

Subjects first carry out a dictator game where they are asked to divide 10 thousand Korean Won (\$1≈KRW1,100 at the time of the experiment) between themselves and an anonymous recipient. As Cason and Mui (1998, p. 251) noticed, ten-dollar stakes are commonly used in the dictator game literature, so this stake generates monetary incentives that are roughly consistent with previous research. Both the dictators and the recipients are recruited from university students in the spring of 2012 and randomly matched, but the recipients are students in a different region to avoid generous offers to their peers. Subjects know that they are paired with a different player in each round.⁵⁾ The subjects are allocated randomly to one

⁴⁾ It is generally found that the framing of the game affects game's outcome. In Croson (1996), rejection rates and average demand made by responders in the treatment where offers are made in percentage terms are significantly higher than those made in the dollar treatment. On the other hand, proposers' offering patterns are identical in both treatments. There is also interesting experimental evidence that "category reporting" affects people's contributions. For example, Harbaugh (1998) finds that category reporting affects subjects' allocation decisions by shifting contributions toward the lower end of each category. In Andreoni and Petrie (2004), category reporting gets people to round up donations into a higher category.

⁵⁾ Pairing players together only once in a repeated game does not appear to have a significant effect on dictator giving because reputation building is not important in a dictator game.

of the two treatments. They are identified by a seat number for anonymity, which are fixed during the experiment. Subjects are allowed to talk only to an experimenter. No subject participated in more than one treatment.

All subjects first make decisions as to how they wish to divide the KRW10,000 that has been provisionally allocated to them. They, with no information other than the instructions, must specify amounts for themselves and recipients that add up to KRW10,000 on proposal forms for round 1. Next, proposal forms are collected and recorded in an excel file. Dictators' earnings are ranked in descending order and basic statistics are calculated by the experimenter. Seat number and her rank are written on the "information report form" for the Rank Information treatment, while individual dollar amounts kept by dictators (say, frequency distribution of dictators' earnings) including an average earning are printed for the Earnings Information treatment. All information report forms are privately distributed by the experimenter.

In round 2, subjects in both treatments receive an information form. Subjects in the Rank Information treatment are specifically instructed that their rank does not determine their payoff in any way, but the amount of money they decide to keep for themselves determines their payment. Therefore, truly selfish subjects should have avoided conditioning on the Rank Information given.

Once subjects in both treatments have enough time to observe their respective information, a new round begins. All subjects are given new proposal forms for round 2, on which they propose a second allocation. The same procedure is repeated again for round 3. I believe, given the simplicity of the dictator game, that 3 rounds are enough for university students to adapt to their social surroundings (say, less than 30 subjects in the same treatment) and develop their optimal behavior with the same group of dictators.

A total of 73 dictators participate in the experiment: 37 in the Rank

However, it might be important in minimizing dependence between rounds.

Information treatment, 36 in the Earnings Information treatment. The instructions (available from the author upon request) are read aloud by the experimenter while subjects follow along on their own copy. Although subjects only require a few minutes to make their decisions, collecting proposal forms and distributing information forms in a paper and pen experiment cause the whole experiment to last one hour.

Following the completion of round 3, subjects are asked to complete a questionnaire. Subjects are paid privately at the end of the experiment. The amounts of money they decide to keep for themselves in two of the three rounds, randomly chosen at the end of the experiment, are paid to them in cash. Thus the most selfish dictators can earn KRW20,000.

3. EXPERIMENTAL RESULTS

3.1. Giving Behavior by Round and Treatment

The main experimental hypothesis in this study is that the information about other subjects' allocation behavior reinforces subjects' intrinsic selfishness. If this hypothesis holds, then dictators would give less in rounds 2 and 3 than round 1. Figure 1 shows dictators' giving amounts by round. The first thing to note is that, in round 1, the subjects in both treatments give on average 16% (KRW1,641/KRW10,000) to their recipients. This amount of giving is a little bit lower than what Camerer (2003) and Engel (2011) report in their survey literature.⁶⁾

As predicted, dictators' mean giving diminishes to 12% in round 2, by an average of KRW471. However, this difference is statistically insignificant ($t = -1.56, p = 0.12$) at a conventional level. By contrast, in round 3, subjects slightly increase their giving amounts by a statistically insignificant amount of KRW67 relative to round 2.

⁶⁾ In Hahn (2011), Korean college subjects offer on average 42% of the total stake in the ultimatum bargaining experiment.

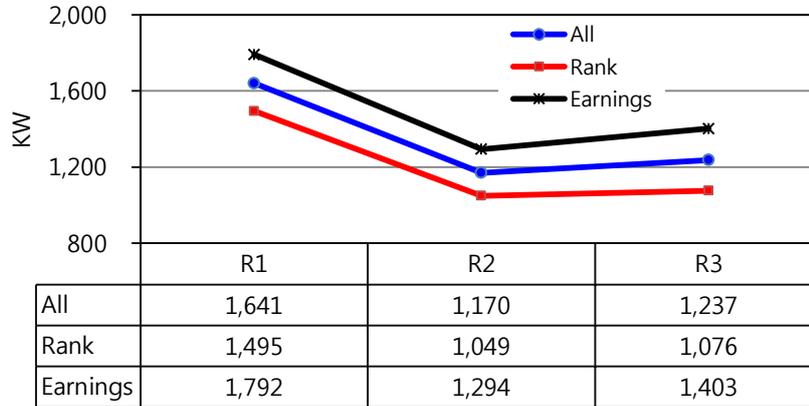
Figure 1 Average Giving by Round

Figure 1 also shows dictator giving behavior of subjects by treatment. Note that subjects in the Rank Information group consistently exhibit more selfish behavior than them in the Earnings Information group. Subjects in the Rank Information treatment give on average 15% (KRW1,495/KRW10,000) to their recipients in round 1, and then decrease to 10% (by KRW446) in round 2. But the difference in average giving between rounds 1 and 2 is statistically insignificant ($t = -1.13$, $p = 0.26$). Similar results are obtained for the Earnings Information treatment. Average giving starts at 18% (KRW1,792/KRW10,000) in round 1, and then declines to 13% (by KRW498), followed by a slight rebound in round 3. However, none of the paired differences in average giving among 3 rounds is statistically significant at a conventional level.

The significance of differences in dictators' giving behavior over rounds can also be tested with a Wilcoxon-Mann-Whitney (hereafter WMW) test. Differences in choice distributions between rounds 1 and 2 are not significantly different (WMW $p = 0.46$ for Rank Information and $p = 0.38$ for Earnings Information). However it is premature to conclude, with these results, that either Rank or Earnings Information has no effects on dictators' average giving. This issue will be addressed in details at the end of this section.

The next hypothesis to be considered is whether Rank Information and Earnings Information have different effects on subjects' dictator giving. These two forms of information might provide different social comparisons to subjects with a different frame. Self-regarding subjects in the Rank Information group may behave more selfishly in the following round, but they are still ignorant of the amounts given by others and a social norm. On the contrary, information on absolute amount offered by others may serve as a kind of a social norm. Subjects who care not only their rank but also this norm correct their behavior by adjusting giving amounts.

To test this hypothesis, subjects' giving choices in the two treatments are compared for each round. The mean giving in the Rank Information treatment is not different from that in the Earnings Information in any round ($t = -0.66, p = 0.51$ for round 1, $t = -0.61, p = 0.55$ for round 2, and $t = -0.78, p = 0.44$ for round 3). The WMW test also shows that choice distributions between the two treatments are insignificantly different in any round ($p = 0.65, 0.92, 0.68$ for rounds 1-3 respectively).

As a whole, these test results show that Rank Information has no different effects on dictators' allocation from Earnings Information. It seems to be that, because subjects can calculate their rankings from the absolute earnings of others, both information sets essentially provide similar information to the subjects. Further, information on the individual amounts given by others fails to play as a social norm of giving. In a simple dictator game where an experimental context is straightforward and no strategic behavior is required, information about relative standing and information on absolute amounts have identical influence on dictators' allocation decisions.

Before concluding this section, it should be pointed out that the insignificance of differences between either two rounds or treatments might be a consequence of restricted changes in giving amounts. Notice that those subjects who give zero in round 1 are unable to cut their giving further in round 2, and therefore they have no choice but to choose the same zero amount even when competitive information is provided, while those subjects who give positive amounts in round 1 have freedom to either increase or

decrease their dictator giving. Recognizing this restriction in money-maximizers' choice domain suggests that simply comparing mean giving or choice distributions of the entire subjects between rounds 1 and 2 may yield a biased result toward no differences.

To tackle this issue, one could test for a significant change across the two rounds with truncated samples by excluding subjects who offer a zero transfer in round 1.⁷⁾ The data show that subjects in the Rank Information treatment reduce their giving in round 2 by average of KRW974, which, as expected, is more than two times than that for the entire samples (KRW446). The decrease in average giving between rounds 1 and 2 for truncated samples is now statistically significant, albeit at a marginal level ($t = 1.84$, $p = 0.075$). Their choice distributions are also significantly different (WMW $p = 0.062$). Likewise subjects in the Earnings Information treatment reduce their giving in round 2 by KRW995, even more than the subjects in the Rank Information treatment. This difference in average giving between rounds 1 and 2 is also marginally significant ($t = 1.70$, $p = 0.098$), but their choice distributions are insignificantly different (WMW $p = 0.122$). Finally, even for truncated samples, no difference in giving amounts in round 2 is found between Rank Information and Earnings Information ($t = -0.75$, $p = 0.457$).

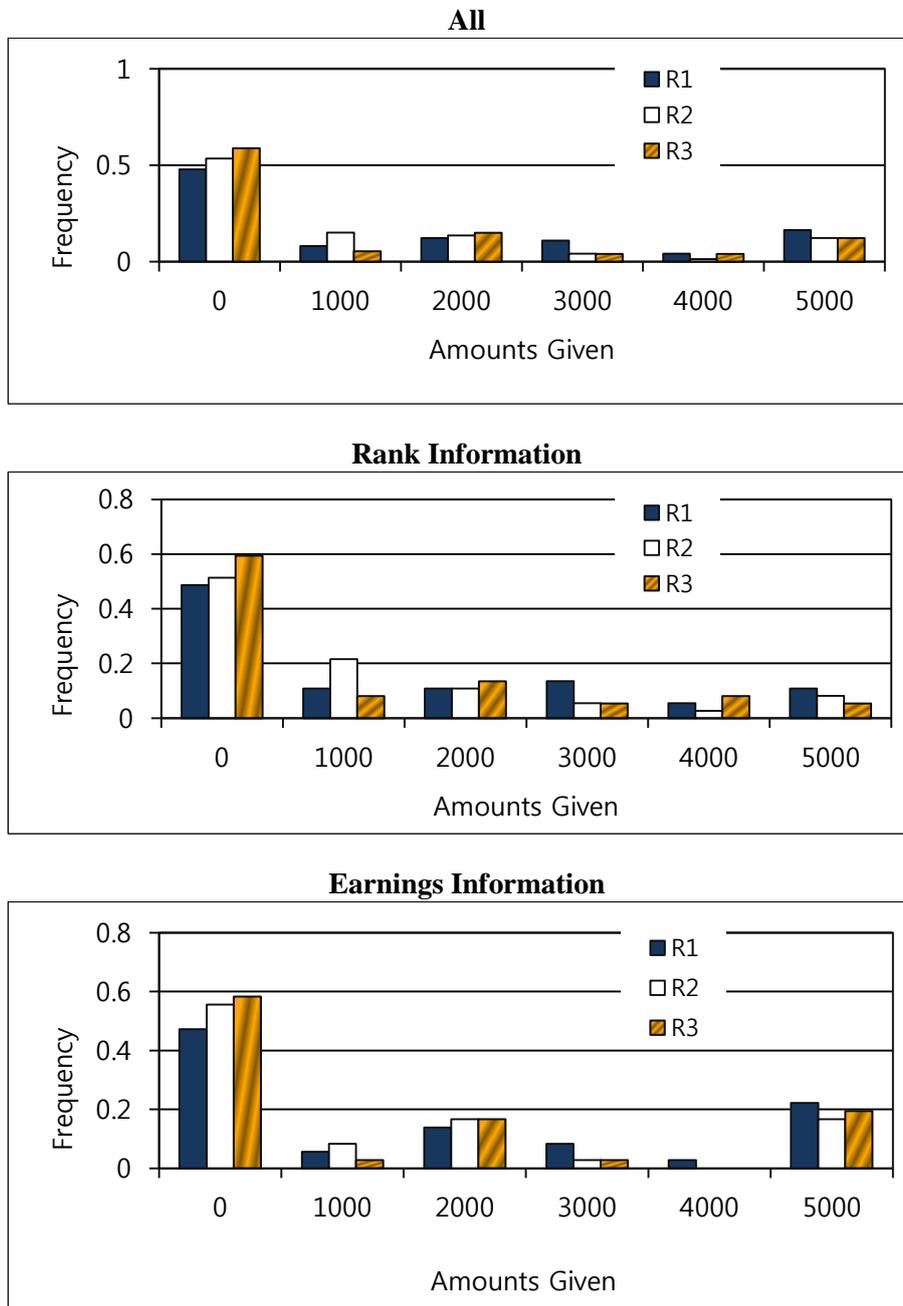
3.2. Frequency Analysis

The frequency distribution shown in the upper panel of figure 2 exhibits a pronounced mode at zero giving, consistent with other dictator game findings. Those subjects who are simply maximizing their monetary payoff choose a zero amount for giving. In the experiment, 48% of overall subjects decide a

⁷⁾ Descriptive statistics for average giving for truncated samples are as follows:

	No. of subjects	Round 1	Round 2
Rank Treatment	19	KRW2,911	KRW1,937
Earnings Treatment	19	KRW3,395	KRW2,400

Figure 2 Frequency Distribution of Giving



zero transfer in round 1, consistent with previous experimental studies reporting that it is common for over 50% of subjects to give money away (Camerer, 2003). Then subjects were informed about the other subjects' choices in just-completed round. Knowledge of other subjects' dictator behavior alters their choices more selfishly: the frequency of zero offers increases to 53% in round 2, and further to 59% (43 of 73 subjects) in round 3. A second mode is observed both around KRW1,001-2,000 with the highest frequency in round 3 (15%) and around KRW4,001-5,000 with the highest frequency in round 1 (16%).

The lower panel of figure 2 exhibits the frequency distributions by treatment. A pronounced mode at zero giving is commonly observed for both treatments. In the Rank Information treatment, 49% of subjects decide to give KRW0 in round 1, and the ratio increases to 51% in round 2 and further to 59% in round 3. This indicates that the information on rank of the previous round makes some subjects become more selfish. A very similar pattern is also observed in the Earnings Information treatment. The zero offer frequency increases from 47% in round 1 to 58% in round 3.

A closer look at the frequency at which subjects change their giving choices enables us to investigate whether subjects, being informed of allocation by some others in the society, might respond to social information in a direction of what classical economic theories predict. It is of importance to note here that the information provided contains not only self-regarding, but other-regarding allocation. As we have already seen from figure 2, nearly half of subjects in round 1 reveal that they have money maximizing preferences, while 16% of subjects show generosity by giving half of the stake. Therefore, it is possible that subjects, when information of allocation by some others is provided, might respond in two divergent directions.

Considering the frequency changes and how many subjects increase or decrease their dictator giving between their first and second giving decisions enables us to identify dictators' response to the information. As shown in table 1, 12 of the 37 subjects (32%) change dictator giving between their first

Table 1 Frequency of Changes in Dictator Giving by Treatment

	First Giving > Second Giving	No Change between First and Second Giving	First Giving < Second Giving	Total
Rank Treatment	10	25 (16)	2	37
Earnings Treatment	9	26 (16)	1	36
Total	19	51 (32)	3	73
	Second Giving > Third Giving	No Change between Second and Third Giving	Second Giving < Third Giving	Total
Rank Treatment	7	27 (18)	3	37
Earnings Treatment	2	33 (19)	1	36
Total	9	60 (37)	4	73

Note: Numbers in parentheses are dictators who give zero in both rounds.

and second decisions in the Rank Information treatment, and they change their giving by an average of KRW1,375. Of 12 subjects who change their giving decisions, 10 become more self-regarding by selecting a lower giving amount on their second decision, while only 2 become more other-regarding by selecting a higher giving amount. This result suggests that information about rank may make subjects more selfishly in a dictator game, as classical economic theories predict.

Similar results hold for subjects in the Earnings Information treatment. Of 36 subjects, 10 (28%) change dictator giving between their first and second decisions, with a decrease in giving by an average of KRW1,790. Of 10 subjects who change their giving decisions, 9 become more self-regarding by selecting a lower giving on their second decision, while only 1 become more other-regarding by selecting a higher giving. Overall, changes to self-regarding allocation are much more frequently observed than

other-regarding allocation when information on other dictators' giving amounts is presented.

The information, however, tends to affect subjects' giving behavior much less in round 3 than in round 2. Of 37 subjects, 10 (27%) change dictator giving between their second and third decisions in the Rank Information treatment, while only 3 of 36 subjects (8%) in the Earnings Information treatment. The majority (73% in the Rank Information treatment and 92% in the Earnings Information treatment) choose not to change their dictator giving from round 2. One could conjecture that most college students are able to fully adjust their allocation to the social information within 2 rounds in a simple dictator game.

While some subjects respond to social information by changing their giving choices, it is also noteworthy that there are more subjects who do not change their giving. These subjects can be classified as either "money-maximizing" or "resolute". Those subjects who give zero in round 1 are unable to cut their giving in round 2 because they already behaved as money-maximizers, securing rank 1. More than half of subjects (16 of 25 subjects in the Rank Information treatment and 16 of 26 subjects in the Earnings Information treatment) can be regarded as money-maximizers: they are not affected by social information. By contrast, those subjects who give positive amounts in round 1 and continue to give the same amount in round 2 can be regarded as resolute dictators who refuse to respond to social information. Nine of 25 subjects in the Rank Information treatment and 10 of 26 subjects in the Earnings Information treatment can be called resolute dictators.

Analysis of frequency distribution enables us to identify the reason why differences in subjects' choices between rounds 1 and 2 turn out statistically insignificant, as was discussed in the first section. The reason is that, irrespective of money-maximizers or resolute dictators, more than two thirds of subjects (68% for the Rank Information treatment and 72% for the Earnings Information treatment) do not change their giving behavior, while only less than one third of subjects change in response to social information.

3.3. What Affects Changes in Giving Choices

Frequency of changes indicates that some subjects may respond to social information, while others do not. A logit model is used to examine some characteristics of subjects who are more likely to give more or less between their decisions over rounds. Table 2 presents estimation results.

'PRERANK' is a subject's own rank in just-completed round. As predicted, it has a positive and significant sign for the Rank Information group, implying that lower ranked (more altruistic) subjects in terms of their monetary payoffs in a previous round are more likely to change their giving choices in the next round. The positive sign can also be interpreted alternatively: those subjects who give zero in a previous round and thus ranked 1 are more likely to remain selfish by sticking to the previous choice. Overall, this result shows that social comparisons containing information on what others do affect dictators' behavior. Those subjects who give a positive and generous amount to recipients in round 1 find their rankings low when information on ranking is provided: they tend to change their giving choices in round 2, mainly exhibiting more self-regarding behavior.

'PREGIVING' is the giving amounts that subjects offer in a previous round. The negative and significant coefficient estimate this variable indicates that, after controlling for previous rank effects, more generous giving amounts in a previous round reduce the likelihood that a subject changes her giving in the next round. In other words, other-regarding subjects are less likely to change their giving choices in the next round, other things being equal.

The third column in table 2 presents estimation results for the subjects in the Earnings Information treatment.⁸⁾ Note that the PRERANK variable still has a positive and significant estimate, though their relative standing is not directly provided. It is likely that, when subjects in the Earnings Information treatment observe giving amounts made by other subjects, they

⁸⁾ The estimation for round 3 in the Earnings Information treatment is unavailable because there are only 3 observations which change giving choices between rounds 2 and 3.

Table 2 Logit Estimates of Change Likelihood Model

Variable or Statistic	Rank Information		Earnings Information
	Round 2	Round 3	Round 2
Constant	-2.320*** (0.806)	-2.952*** (1.013)	-3.205*** (1.175)
PRERANK	0.225** (0.089)	0.195*** (0.067)	0.276*** (0.107)
PREGIVING	-0.001* (0.000)	-0.001** (0.000)	-0.001** (0.000)
Observations	37	37	36
McFadden R^2	0.205	0.286	0.259
AIC	1.164	0.995	1.042
Restricted Log Likelihood	-23.313	-21.591	-21.270
Probability (<i>LR</i> Statistic)	0.008	0.002	0.004

Notes: Dependent variable is 1 if giving choice changes, and 0 otherwise. Standard errors are in parentheses. *** denotes significant at 1%, ** at 5%, * at 10% level.

calculate their rank from the giving amounts before deciding their own giving in the next round.

Overall, logit test results suggest that knowing other subjects' giving behavior has significant effects on the choices in the next round. When social comparisons are given, subjects who experience difficulty in deciding an appropriate giving amount in a previous round are more likely to give more or less by reflecting a social norm, while subjects who give either a zero amount or an equal transfer (say KRW5,000) are more likely to stick to their previous choices.

3.4. Subjects' Motives, Fairness Preferences, and Giving Behavior

In this section this paper explores heterogeneity in subjects' motivation and fairness preferences in an effort to better understand choice behavior in the dictator game. To explore the influence of subjects' various motivations

Table 3 Questionnaire for Subjects' Motives

Motive	Question	Mean(SD) N=73	Correlation with giving	
			Round 1	Round 2
Altruism	1. Feel interest in others' misfortunes.	3.7 (0.9)	0.10	-0.03
	2. Try to do favors for others.	4.0 (0.9)	0.40	0.48
	3. Feel sympathy for those who are less fortunate than me.	4.4 (1.0)	0.33	0.37
	4. Love to help others.	3.7 (0.9)	0.35	0.34
Rivalry	5. Like competitive situations.	2.8 (1.2)	-0.15	-0.21
	6. Feel that winning or losing matters to me.	3.7 (1.2)	-0.22	-0.26
	7. Drawn to compete with others.	2.8 (1.2)	-0.18	-0.23
	8. Feel that I must win at everything.	3.1 (1.4)	-0.17	-0.23
Money	9. Feel that money is important to me.	4.2 (1.1)	-0.32	-0.42
	10. Need much money to get by.	4.0 (1.2)	-0.37	-0.40
	11. Feel that money is all that matters to me.	2.2 (1.4)	-0.37	-0.43
	12. Do not have enough money to satisfy my needs.	3.7 (1.4)	-0.36	-0.42
Demand	13. Care what others think of me.	4.6 (1.0)	-0.15	-0.16
	14. Am concerned with making a good impression on those in charge.	4.7 (1.0)	-0.23	-0.17
	15. Worry what others think of me.	4.4 (1.1)	-0.21	-0.23
	16. Do what those in charge want me to do.	4.0 (1.0)	-0.19	-0.07
Conform	17. Behave conventionally.	3.9 (1.1)	-0.11	-0.04
	18. Take the same route as everyone else.	3.7 (1.1)	-0.18	-0.21
	19. Follow others than to search for my own path.	3.2 (1.1)	-0.11	-0.11
	20. Feel that observing others' choices can help me make good choices.	4.1 (0.9)	-0.17	-0.17
Variety	21. Try change.	3.2 (0.8)	0.08	0.06
	22. Do things not included in a plan.	3.3 (0.9)	-0.04	-0.00
	23. Am willing to try something new.	3.5 (1.1)	0.14	0.20
	24. Seek change however small.	3.3 (1.1)	0.22	0.26

Notes: There are six answer options, "Never (coded as 1)", "Almost Never (coded as 2)", "Sometimes (coded as 3)", "Frequently (coded as 4)", "Almost Always (coded as 5)", or "Always (coded as 6)". The last columns show the correlations of subjects' numerical responses with their giving amounts in rounds 1 and 2.

on their giving behavior, subjects were asked to complete a questionnaire after the experiments, consisting of two separate parts. The first part of the questionnaire is designed to elicit information on subject's motivational factors. It contains 6 distinct motives for subjects' behavior: altruism, rivalry, money-seeking, a desire to please others (demand), conformity, and variety-seeking, consisting of 24 questions (see Duffy and Kornienko, 2010).

Although the original form of questionnaire has two positively keyed questions as well as two negatively keyed questions for each motive, the one in this paper consists of 4 positively keyed questions. The revision was done so as to avoid the double negative expression in Korean language and thus to eliminate idiosyncratic effects resulting from difficulties in understanding any particular question. The 6 motives, 24 questions, and their means together with standard deviations are provided in table 3. In addition, the table reports the correlation between the mean to each question and giving amounts in rounds 1 and 2, for the pooled subjects.

Using a 6-point scale, the questions that subjects choose relatively high scores are "I am concerned with making a good impression on those in charge (4.7)", "I care what others think of me (4.6)", and "I feel sympathy for those who are less fortunate than me (4.4)", while "I feel that money is all that matters to me (2.2)", "I like competitive situations (2.8)", and "I am drawn to compete with others (2.8)" get relatively low scores. Of six motives, scores for rivalry (3.1) and variety (3.3) are low, while score for demand (4.4) is the highest.⁹⁾

The second part of the questionnaire is designed to measure subject's fairness preferences (see Takezawa *et al.*, 2006). As figure 3 shows, subjects are presented with two decomposed tasks, in which they have to select one of two hypothetical alternatives, allocating money to themselves and another person. These two tasks basically measure how much subjects prefer an equal distribution compared to an allocation leaving them with a

⁹⁾ The score for each motive is the average of numerical responses to 4 questions. The score may be influenced by the experiment. However, I believe that the influence is negligible because the subjects are ignorant of the true purpose of experiments and questionnaire and the relationship between them.

Figure 3 Questionnaire for Subjects' Fairness Preferences

<Task 1> Please select one of following two alternatives.

- Alternative A: gives self KRW15,000 and the other KRW5,000. ()
- Alternative B: gives both KRW8,000. ()

And please indicate the desirability of your choice made in Task 1.

Like it a little	Somewhat like it	Like it	Like it very much

<Task 2> Please select one of following two alternatives.

- Alternative A: gives self KRW15,000 and the other KRW5,000. ()
- Alternative B: gives both KRW12,000. ()

And please indicate the desirability of your choice made in Task 2.

Like it a little	Somewhat like it	Like it	Like it very much

higher payoff.

Individual choice and desirability rating are combined into an 8-point scale, ranging from 1 (like selfish choice very much) to 8 (like altruistic choice very much).¹⁰⁾ Then fairness preferences of subjects are the average of two 8-point scales: higher scores indicate higher preference for equal allocation.

To explore the relationship between subjects' giving behavior in round 1, before any social information is available, and their characteristics, subjects' initial giving amounts are regressed on the motives and some other explanatory variables. Because subjects in the both treatments are proved homogeneous, the data is pooled for the estimation and OLS regression results are presented in table 4.

¹⁰⁾ An 8-point scale is created as follows: 1 = like alternative A very much, 2 = like alternative A, 3 = somewhat like alternative A, 4 = like alternative A a little, 5 = like alternative B a little, 6 = somewhat like alternative B, 7 = like alternative B, and 8 = like alternative B very much.

Table 4 Motives, Fairness Preferences, and Giving Behavior in Round 1

Variable or statistic	Giving in round 1			
	(1)	(2)	(3)	(4)
Constant	274.11 (1,711.01)	375.87 (1,614.14)	-1,014.38 (1,476.14)	1,859.39 (1,492.45)
ALTRUISM	502.88* (277.06)	501.46* (274.93)	739.11** (304.82)	647.87** (273.00)
RIVALRY	34.43 (180.16)	-	-	-
MONEY	-330.65* (194.82)	-329.09* (193.22)	-	-561.38*** (163.34)
DEMAND	-453.97** (221.29)	-445.71** (215.43)	-586.56** (240.42)	-442.29** (220.99)
FAIRPREF	307.64** (146.73)	301.44** (142.05)	515.60*** (132.77)	-
OTHERS	0.51*** (0.11)	0.51*** (0.11)	-	0.56*** (0.11)
Observations	72	72	73	72
R^2	0.536	0.536	0.387	0.504
F	12.514***	15.232***	14.547***	17.024***

Notes: Dependent variable is the amount given to the recipient in round 1 and standard errors are in parentheses. *** denotes significant at 1%, ** at 5%, * at 10% level.

The estimated coefficients indicate that some measured motivational factors of subjects contribute to accounting for their initial giving amounts. The stronger subjects' altruism motive, the more they give, although the significance level is low in columns (1) and (2). On the other hand, the stronger subjects' money-seeking motive, the less they give. The coefficient on the rivalry motive is insignificantly different from zero, while the demand motive has a counterintuitive sign. Contrary to general expectations, subjects who care more what others think of themselves or who are more concerned with making a good impression are estimated to give less. It is plausible that the questions to capture subjects' demand motive are not well-designed.

‘FAIRPREF’ is subjects’ fairness preferences measured in the post-questionnaire. Columns (1) to (3) show that fairness preferences reliably capture subjects’ giving amounts in round 1. The positive and significant coefficients imply that those subjects who prefer fairer allocation tend to give more. In column (4), a FAIRPREF variable is ruled out in consideration of possible correlation between subjects’ fairness preferences and altruism motive. Again subjects’ altruism motive is significantly positive, as predicted.

An additional variable, ‘OTHERS,’ is included in the estimation in order to elicit the effect of subjects’ beliefs about others’ giving on their own giving amounts. Subjects were asked to answer to the following task: please guess at your own best what other subjects on average give to their recipients in this game.¹¹⁾ Subjects answer this question at the end of round 1, before any social information on other subjects’ giving is provided. This variable has a positive and significant sign, implying that subjects who believe other dictators to give more tend to offer more.

Note that two motivational factors, conformity and variety, are not included in the estimation of dictators’ initial giving, because subjects’ choice in round 1 is not likely to be affected by these two motives. Subjects are ignorant of any social comparisons to conform in choosing the initial giving amount. Including these two motivational factors in the estimation yields insignificant estimates as predicted, although results are not reported here.

Instead, these two motives may affect subjects’ giving amounts in round 2. For example, if conformity works, subjects are able to change their behavior in round 2 after they observe other subjects’ choice made in round 1. To test whether conformity and variety-seeking motives have impact on subjects’ choice in round 2, subjects’ giving amounts in round 2 are regressed on these two motives. However, either conformity or variety-seeking motive is insignificant. One can conjecture that the questions designed to address the conformity and variety-seeking motives fail to reliably capture them.

¹¹⁾ Subjects knew that a prize of KRW20,000 would be awarded to the best guess at the end of experiments.

Table 5 Logit Estimates of Resolute Zero Subjects

Variable or Statistic	(1)	(2)	(3)
ALTRUISM	-0.359 (0.460)	-0.284 (0.388)	0.093 (0.488)
RIVALRY	-0.517 (0.367)	-0.410 (0.335)	-0.428 (0.340)
MONEY	0.870 ^{***} (0.337)	0.916 ^{***} (0.323)	0.738 ^{**} (0.346)
DEMAND	-0.303 (0.512)	0.164 (0.401)	0.311 (0.423)
CONFORMITY	0.654 (0.462)	-	-
VARIETY	0.210 (0.365)	-	-
FAIRPREF	-	-	-0.350 (0.278)
OTHERS	-0.001 ^{***} (0.000)	-0.001 ^{***} (0.000)	-0.001 ^{***} (0.000)
Observations	70	72	72
Log Likelihood	-31.668	-33.274	-32.449
AIC	1.105	1.063	1.068

Notes: Dependent variable is 1 if a subject resolutely gives zero in every round, and 0 otherwise. Standard errors are in parentheses. ^{***} denotes significant at 1%, ^{**} at 5% level.

Finally, we can examine whether subjects' motivational factors and fairness preferences explain the behavior of so-called "resolute zero" subjects who give nothing in all 3 rounds. Of all subjects in the two treatments, 30 give a constant zero in all 3 rounds. Table 5 presents logit regressions that show the determinants of the likelihood that subjects offer nothing in every round. Columns (1) to (3) show that the money-seeking motive and OTHERS are significant. The money-seeking motive increases the likelihood that a subject resolutely gives nothing to a recipient, while the belief that other dictators are generous in giving decreases the likelihood. This finding is robust irrespective of the variables used in the estimation.

4. CONCLUSION

The persistent and counterintuitive nature of generous giving in dictator game experiments has presented an important puzzle for economists. Several alternative models have been suggested to address this. This paper conducts an experiment to investigate whether generous giving behavior by some dictators might originate from lack of social information. The results suggest that social comparisons do matter even in a non-strategic dictator game. Providing dictators with social information on other subjects' choices of just-completed round reinforces selfish choices, while money-maximizing subjects continue to behave selfishly. Subjects tend to respond to social information on relative standing as well as absolute payoffs other subjects earn. The percentage of zero giving increases over rounds in both treatments, but the giving choices in the Rank Information group are not statistically different from those in the Earnings Information group. Information on individual amounts of giving fails to provide subjects with a different frame from that on rank in a simple dictator game.

This paper also attempts to uncover the effects of subjects' behavioral motives as well as fairness preferences on their giving behavior by conducting a post-experiment questionnaire. The analysis results show that subjects' initial giving amounts are influenced by their responses to questions addressing altruism and money-seeking motives, and by their fairness preferences. The findings in this paper provide one step in furthering our understanding of the relationship among subjects' properties, distributional choices, and social comparisons.

However, it should be cautioned that the findings in this paper are based on an experimental design and a relatively small group of subjects.¹²⁾ A paper and pen experiment, 3 rounds, and more or less small size of stakes rather than computer-based experiment, longer rounds to control learning

¹²⁾ It is possible that dictator game giving is an artifact of behavioral experimentation (Bardsley, 2008), or some unidentified motives also have the potential to account for subjects' giving behavior.

effect on the game, and a bigger size of stake might fail to extract subjects' honest choices during the experiment. Experimental results found in this paper might not be robust in experimental designs different from the one in this paper. These issues especially for Korean subjects need to be addressed in future researches.

Finally, there are experimental extensions of this paper as well. One testable implication is that information on rank and on absolute amounts would have same influences on subjects' behavior even in more complicated games. The investigation into whether men behave differently than women, whether children behave differently than adults, and what kinds of behavioral properties of subjects contribute to differences in choice behavior in response to social information would be potentially interesting extensions.¹³⁾ The exploration of these tasks is left to future research.

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¹³⁾ See Gneezy *et al.* (2003), Gneezy and Rustichini (2004), and Houser and Schunk (2009) for examples addressing gender effects.

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