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by

Subhasish M. Chowdhury*
Joo Young Jeon*
Bibhas Saha**

*School of Economics and CBESS, University of East Anglia
**University of Durham

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Centre for Behavioural and Experimental Social Science
University of East Anglia
Norwich Research Park
Norwich NR4 7TJ
United Kingdom
www.uea.ac.uk/cbess

Gender Differences in the Giving and Taking Variants of the Dictator Game*

Subhasish M. Chowdhury, [a] Joo Young Jeon, [a] and Bibhas Saha [b]

[a] School of Economics, Centre for Behavioural and Experimental Social Science, and Centre for Competition Policy, University of East Anglia, Norwich NR4 7TJ, UK, S.Modak-Chowdhury@uea.ac.uk, J.Jeon@uea.ac.uk

[b] Durham University Business School, University of Durham, Durham DH1 3LB, UK b.c.saha@durham.ac.uk

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* Corresponding author: Bibhas Saha (b.c.saha@durham.ac.uk), Phone: +(44) 0191 33 454 33

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1. Introduction

Researchers in economics and in other related disciplines have a considerable interest in understanding social preferences. Investigating why an individual may behave altruistically and how to measure such altruism have intrigued researchers over time. In this context, the 'Dictator game' has been one of the most popular experimental workhorse to understand and estimate altruism. In the standard form (Kahneman et al., 1986; Forsythe et al., 1994) of the dictator game, a subject (called the dictator) is given a certain amount of money and is asked to decide upon how much of that money to allocate between himself and a passive subject (called the recipient). Since the dictator does not otherwise have any incentive to share the money with the recipient, the amount allocated is often used as a measure of altruism. Indeed, several experiments consistently find that dictators, on average, allocate a non-trivial sum of money (Camerer, 2003; Engel, 2011). Various social preference theories such as pure altruism (Becker, 1974), inequality aversion (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), impure altruism (Andreoni, 1989) etc. are proposed to explain this behavior. Due to its easy and interpretable structure, this game is employed in various forms and frames to investigate specific questions related to altruism. A Google scholar search to date returns a few thousand published and unpublished papers in economics, management, psychology, and other areas implementing a dictator game.

The interpretation that one 'gives' in this game, however, is not free from criticism. It is observed that this game can be prone to the house money effect (Ruffle, 1998), be affected by experimenter demand effect (Zizzo, 2010), become sensitive to contexts (Eckel and Grossman, 1998) and cues (Bateson et al., 2006). It is also argued that the outcomes can be sensitive to the framing (Bardsley, 2008; List, 2007). Understandably, if the results of the game do depend on the frame, they cannot be interpreted as general.

A frame different from the 'giving' frame that is often employed in a dictator game setting is a 'taking' frame. Whereas in a standard dictator game (the 'giving game', or GG) the dictator owns some money and decides to 'give' a part of it to the recipient, in the taking game (TG) the recipient owns some money and the dictator decides upon how much to take from him. There is an experimental literature on crime in which this game is employed and is called a 'gangster game' (Eichenberger and Oberholzer–Gee, 1998; Falk

and Fischbacher, 2002). This, however, is introduced in the social preference literature by Suvoy (2003) who implements a within-subject design in which the dictators play the two games simultaneously. Suvoy (2003) does not find a difference in the money given in a GG versus the money not taken in a TG. Bardsley (2008) and List (2007) extend this to the case when the dictator can either give to, or take from the recipient. Hence, along with changing frames they also alter the decision space. Results from both the experiments show that the availability of a taking option in a giving game decreases the amount given to the recipient, confirming the sensitivity to framing in dictator decision.[1]

Since then, there have been a series of studies that employ this frame in investigating various questions and the result is mixed. There is a set of studies that show no difference between the amount given in the GG and the amount not taken in the TG. This result is obtained by Dreber et al. (2013) who run lab and online GG / TG games in which the recipient is a specific charity, by Grossman and Eckel (2015) who use a charity of dictator's choice as the recipient in a laboratory experiment, and by Rubinstein (2014), who runs it online with no money or real recipient involved. In a meta-analysis Engel (2011) also finds no effect of framing in dictator allocation.

On the contrary, Zhang and Ortmann (2014) use Engel (2011)'s data but a different econometric model and find result similar to Bardsley (2008) and List (2007). Korenok et al. (2013) employ a frame similar to List (2007), and find that not taking is not equivalent to giving; whereas Korenok et al. (2015) show that dictators are averse to join a TG compared to a GG. Cappelen et al. (2013), employing a 2×2 design where the GG and the TG are interacted with whether the amount is earned versus when it is a windfall, discover that introducing a take option always decreases the allocation to the recipient, but the effect of the origin of the amount is not significant.

The studies discussed so far do not consider the effects of gender. However, this area of literature also indicates asymmetric effects of gender on subject behavior.[2] Alevy et al. (2014) employ a 2×2 design in which the GG and the TG are played anonymously

[1] With similar framing Brosig et al. (2007) investigate within subject behavior in repeated GG and TG games. They find that dictators take almost all the amount with experience. Keysar et al. (2008) apply deception and find that the act of giving is objectively considered more generous than the act of not taking.

[2] The results in a standard GG are known to be affected by dictator gender (Eckel and Grossman, 1998). The context of an experiment also has asymmetric effect across gender (Croson and Gneezy, 2009).

versus when the dictator decisions are observed. Supporting the results of Dreber et al. (2013) and Grossman and Eckel (2015), they find no difference in allocation under anonymity. However, males take less and females remain unaffected in allocation decisions while being observed. In a study along the same lines, Chowdhury et al. (2014) find males take less and females take more in presence of social cues in a TG. Kettner and Ceccato (2014) investigate the effects of framing while interacting with revelation of dictator and recipient gender. They obtain no overall framing effect on allocation when gender is not revealed. But dictators take significantly less when the recipient is of the opposite gender.

Hence, in summary, when the GG and the TG are played while not changing the decision space, the literature broadly finds no difference in dictator allocation to the recipient. The two games may show different results when the decision space or the price of taking are altered, or the subjects are offered a choice between the two games. There are indications from related studies that there may also be asymmetric effects of gender in the two games. Although no study, till date, investigated this issue.

The current study is aimed at this particular question. However, before proceeding it is useful to explore the data from the existing studies to understand any possible trend. Below in Table 1 we provide the descriptive statistics from the relevant treatments run in the studies of Dreber et al. (2013) and Grossman and Eckel (2015). In Dreber et al. (2013), the endowment was $10, the subjects played the game online in M-Turk and the recipient was a specified charity. But in Grossman and Eckel (2015) the endowment was $20 and subjects in the laboratory themselves chose 1 out of 10 possible charities as their recipient.

Table 1. Descriptive statistics from existing studies

Amount allocated to the recipient		**Total**		**Male**		**Female**	
		Giving game	Taking game	Giving game	Taking game	Giving game	Taking game
Dreber et al. (2013)	Mean	2.62	2.28	2.710	1.952	2.474	2.517
	Std. Dev	(2.423)	(2.619)	(2.636)	(2.692)	(2.091)	(2.586)
	No. Obs	50	50	31	21	19	29
Grossman and Eckel (2015)	Mean	3.56	3.6	1.813	2.364	6.667	7
	Std. Dev	(5.292)	(5.846)	(1.797)	(4.414)	(7.810)	(8.071)
	No. Obs	25	30	16	22	9	8

Note: We sincerely thank the authors of the two studies for sharing their data with us.

In Table 1, it seems from the data in Dreber et al. (2013) that male dictators allocate more in the GG whereas female dictators allocate more in the TG. This result, however, is not tested statistically in the paper. The results from Grossman and Eckel (2015), due probably to the low number of observations, is unclear.

As discussed in Dreber et al. (2013), investigation aiming at whether giving in a GG frame is equivalent to not taking in a TG frame is important, since this allows one to understand the robustness of the results of the game, as well as robustness of the behavioral theories that are constructed and tested using this game.[3] But one cannot compare framing effects whenever the decision space is altered simultaneously with frames. Hence, the studies of Bardsley (2008), List (2007) and others who use similar designs are not appropriate to test pure framing effect on altruism. A specific test of the framing would be to compare the GG and the TG, while keeping the decision space the same. Furthermore, to avoid any behavioral spillover, the design should be between-subject. In this study we do exactly that. We employ between subject GG and TG frames in which the dictator has the option to allocate an amount of £10. As a result, our study is very close to the ones by Dreber et al. (2013), Alevy et al (2014), Rubinstein (2014) and Grossman and Eckel (2015). But both in focus and in analysis we maintain a specific focus on the gender of the dictator.

We find support for the overall result by the above mentioned studies that giving in the GG is equivalent to not taking in the TG. But investigating further, we find that the framing has opposing effects on males and on females. The latter are significantly more generous in the TG than in the GG, whereas the males are significantly less generous in the TG than in the GG – nullifying the effect in the overall data. Moreover, there is no significant difference in the allocation distribution in the GG by gender. But the allocation distributions are the polar opposite across gender in the TG. Whereas most males show pure selfishness in the TG, females tend to behave broadly as egalitarians. Hence, framing does not affect overall allocation, but its effect is asymmetric and opposing across gender.

The approach is as follows. Section 2 describes the experimental design, Section 3 reports the results, and Section 4 concludes.

[3] Standard social preference models such as pure selfishness, pure altruism, impure altruism, inequality aversion etc. in general predict the same allocation in the GG and in the TG. See Korenok et al. (2015) for a detailed discussion in this.

2. Experimental Design

We employed a between-subject Dictator game with 280 subjects spread over 2 treatments. Each treatment had 70 dictators and 70 recipients. To ensure gender balance, in each treatment we recruited 35 male and 35 female dictators. Only one treatment was run in a particular session. In each session, subjects were randomly and anonymously placed into pairs and were asked to sit in cubicles. They were then assigned the role as either a dictator or a recipient (however, we did not use those terms). Each subject played only one role and the roles remained the same until the end of the session.

All subjects were told that they would receive a £3 show-up fee. In the 'Giving' treatment the dictator was given access to an additional £10 fund and could transfer any amount between £0 and £10 (in denominations of 1 penny) to the recipient. In the 'Taking' treatment the recipient was given access to an additional £10 and the dictator could transfer any amount between £0 and £10 (in denominations of 1 penny) to himself. We executed neutral word such as 'transfer' instead of 'give' and 'take', and 'access' instead of 'belong' to minimize any experimenter demand effect (Zizzo, 2010) arising from the instruction (the instructions are in the Appendix). The roles of the recipients were passive, meaning they had to accept the dictators' decision.

Each session consisted of two parts. In the first part, the dictators made decisions. In the second part, the recipients had to guess the amount the dictator had given or taken. If the absolute difference between the actual amount and the guess was within 50 pence, then the recipient received an extra £1.[4] As we did not find any treatment or gender effect in the guesses, this element is not discussed further.

Subjects were students at the University of East Anglia, with no prior experience of participating in a GG or a TG experiment, recruited randomly through the online recruitment system ORSEE (Greiner, 2015). The sessions were computerized with z-TREE (Fischbacher, 2007). A subject could participate in only one session. Each session took around 30 minutes and the average payment was £8.

[4] This incentive mechanism for guess is similar to the one by Chowdhury and Jeon (2013). The instructions for the second part was given only after the first part was finished. It was also mentioned in the instruction of the first part that the recipient's decision was payoff irrelevant to the dictator, restricting any strategic interaction between dictator decision and recipient anticipation.

3. Results

Table 2 shows the average amount allocated (amount given in the GG, or (£10 – amount taken) in the TG) for both aggregated data and also for male and female by treatment. In the GG, an average of £2.066 is given to the recipients. In the TG, the dictators take on average £7.87 and as a result, the amount left to the recipient is £2.13. A Mann-Whitney test shows no significant difference in final amount allocated to recipients between the two treatments (p-value = 0.583). This result is consistent with the established result (Dreber et al., 2013; Alevy et al. 2014; Rubinstein 2014; Grossman and Eckel, 2015) that there is no effect of framing in dictator allocation.

Table 2. Average (Standard Dev) allocation to recipient

Data	Giving game	Taking game	Mann-Whitney test (Giving vs. Taking)
All (70 obs. / treatment)	2.066 (1.734)	2.13 (2.394)	No difference (p=0.583)
Male (35 obs. / treatment)	2.117 (1.530)	0.997 (1.589)	Different at 1% (p = 0.001)
Female (35 obs. / treatment)	2.014 (1.938)	3.263 (2.543)	Different at 5% (p = 0.039)
Mann-Whitney test (Male vs. Female)	No difference (p=0.594)	Different at 1% (p= 0.0001)	—

We now investigate these actions across gender. Male dictators on average allocate £2.117 in the GG and £0.997 in the TG towards the recipients, and a Mann-Whitney test shows significant difference at 1% level. However, the average allocation by female dictators are £2.014 in the GG and £3.263 in the TG, and the difference is significant at 5% level. The results also confirm within treatment gender differences. In the GG, there is no difference in the amount given by gender (p-value = 0.594). The TG, however, shows gender differences. The average amount left by the male dictators is significantly lower than the amount left by the female dictators at 1% level.

The non-parametric tests, however, does not incorporate the cardinal information in the data. To incorporate the same, to control for interactions, and to test robustness of the results above, we further run a series of OLS regressions as reported in Table 3. The

dependent variable is the amount allocated to the recipient and the independent variables are treatment dummy, gender dummy, their interactions and an age dummy (Age_{21}=1 if age $\leq$ 21). We run the analysis for the whole data and separately for males and females.

Table 3. Regression of amount allocated to the recipient

OLS	Total	Total	Male	Female
Intercept	0.720	0.242	0.164	2.588**
	(0.738)	(0.721)	(0.765)	(1.150)
Giving game	-0.004		1.159***	-1.186**
	(0.345)		(0.373)	(0.552)
Female	1.097***			
	(0.342)			
TG × Female		2.262***		
		(0.464)		
GG × Male		1.155**		
		(0.465)		
GG × Female		1.084**		
		(0.467)		
Age_{21}	0.037	0.033	0.036	0.029
	(0.029)	(0.028)	(0.031)	(0.047)
# of Obs.	140	140	70	70
Adjusted R^2	0.059	0.133	0.109	0.051

Note: Standard errors in parentheses. ***,** and * indicates significance at the 1%, 5%, and 10% level.

In the first column in Table 3 we use a dummy for the GG to test for the framing effect while controlling for gender and age. Complying with the result in Table 2, the coefficient for the GG is insignificant, but the coefficient of Female is positive and significant at 1% level. This implies that there is no overall treatment effect, but that female dictators are more generous than males. This mirrors the findings of Dreber et al. (2013, Table 1), who report similar result from their lab experiment.

This result, still, does not reveal any effect of framing on gender. The existing literature (Dreber et al., 2013; Alevy et al. 2014; Rubinstein 2014; Grossman and Eckel, 2015) also do not focus on this issue. Therefore, to examine the gender effect further, in Colum 3 of Table 3 we introduce an interaction of gender and treatment. It shows that females allocate significantly higher amounts in the TG frame compared to their male counterparts. Then we run the same regression, without the interaction terms, for males

and females separately and discover a gender-wise treatment effect. In particular, males allocate more amount in the GG compared to the TG (at 1% level), but females do exactly the opposite (at 5% level).

Until now we have analyzed the average amount allocated, and found asymmetric effects of framing on gender. But this analysis cannot reveal the mechanism through which this asymmetry arises. Understanding this, however, is important since it is related to the distribution of the 'social type' of the dictators. To visualize the allocation distribution in these two frames, we plot the proportion of dictators by amount allocated (in approximated blocks) to the recipients in Figure 1. Note that whereas the allocation in the TG follows an almost bimodal distribution between selfish (who takes the whole pie) and egalitarian (who splits the pie to half) dictators, it does not seem to follow a particular pattern for the GG. This suggests that although in terms of the average allocation combining both genders 'giving' turns out to be equivalent to 'not taking', in terms of invoking the social type of the dictators the two frames work differently.

Figure 1. Allocation in GG and TG.

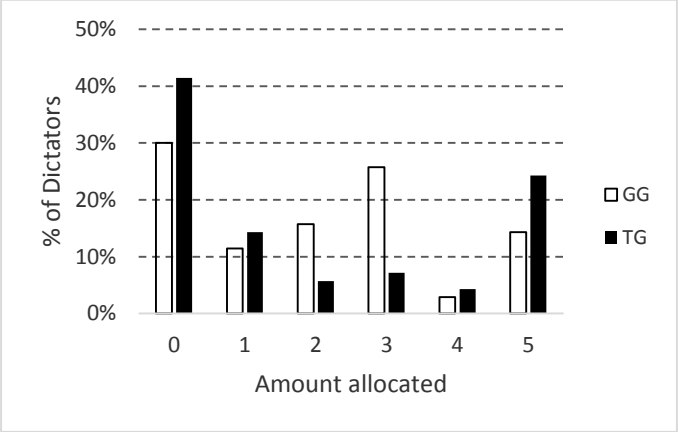
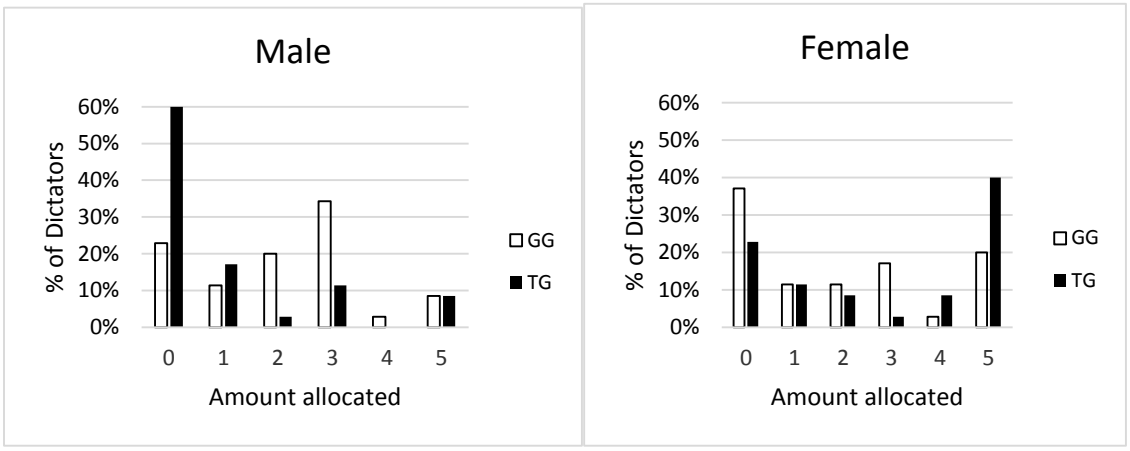


Figure 1 also prompts us to investigate the framing effect on dictators' social type by gender and we plot the allocation distribution in these two frames by gender in Figure 2. As can be noted, the allocation distribution for the GG does not show a specific pattern for either gender. But it is right skewed for males and left skewed for females in the TG, i.e., the overall bimodal distribution in the TG comes from a peak in the egalitarian allocation by the female dictators and a peak in the selfish allocation by the male dictators.

Figure 2. Allocation in GG and TG by gender



To test the significance of these observations, we run two sets of Probit models. The dependent variable in the first set is a dummy for whether a subject is selfish (allocates 0), and in the second set a dummy for whether a subject is egalitarian (allocates half), with independent variables of frames and age.[5] We run the regressions for the whole data, and then separately for males and females. The marginal effects for the gender specific regressions are reported below.

Table 3. Probit Regressions investigating dictators' type

	Male		Female	
	Y=Selfish	Y=Egalitarian	Y=Selfish	Y=Egalitarian
Giving game	-0.389***	0.006	0.075	-0.190**
	(0.110)	(0.067)	(0.107)	(0.109)
Age_{21}	-0.012	0.003	-0.006	0.005
	(0.012)	(0.005)	(0.013)	(0.009)
# of Obs.	70	70	70	70
Pseudo R^2	0.118	0.009	0.011	0.043

Note: Standard errors in parentheses. ***,** and * indicates significance at the 1%, 5%, and 10% level.

Further supporting the observations from Figure 2, the Probit models reveal that there indeed exists a framing effect across gender for the social type distribution. The first

[5] There was 1 male subject who gave £0.09 in the GG. We consider him as a selfish. One Female subject, who took £4.90 in TG, is included into the egalitarian category. There also were 2 female subject who took £2.10 and £0.00 in TG. They are not included in any categories.

two regressions show that the males tend to be more selfish in the TG compared to the GG, but the frame does not affect their likelihood of being egalitarian. In contrast, the females tend to be more egalitarian in the TG compared to the GG, but the frame does not affect their likelihood of being selfish. Finally, the frames do not show a significant effect in the whole data (and hence we do not report the regressions), further supporting the overall results of the existing studies.[6]

4. Discussion

We investigate whether a pure framing effect exists on a dictator game when the decision space remains the same across treatments. We employ a giving and a taking frame and compare the amount given in the giving frame with the amount left for the recipient in the taking frame. Both non-parametric tests and regressions reaffirm the observations from existing studies (Dreber et al., 2013; Alevy et al., 2014; Rubinstein, 2014; Grossman and Eckel, 2015) that overall there is no framing effect within the dictator game and giving is indeed equivalent to not taking.

However, given indications from the literature and directions provided by the existing studies, we expected possible gender effect and hence employed a balanced pool of male and female dictators. Indeed, further investigation by gender show that framing has opposing effects for females and males. Females take less in a taking game compared to a giving game yet males do just the opposite. Furthermore, we find that this occurs since the male dictators are significantly more likely to be selfish in the taking frame compared to the giving frame, but the female dictators are significantly more likely to be egalitarian in the taking frame compared to the giving frame.

These are new and important results. The question, however, remains why do we see gender specific framing effect that previous studies have failed to detect? While we are unable to pinpoint the cause of the same, we infer that there are two possible reasons. First, the change in frame brings in the issues of cognitive biases such as endowment effects (Thaler, 1980) or status-quo bias (Samuelson and Zeckhauser, 1988). It is known that the

[6] To further investigate any difference in allocation distribution we ran a Kolmogorov-Smirnov test corresponding to the actual data of Figure1 and Figure 2. These tests, conforming to the OLS results, show no framing effect in allocation for the whole data and (p-value = 0.288); but a significant effect for males and for females (p-values of 0.001 and 0.039, respectively).

context of an experiment can have asymmetric effect on males and females (Croson and Gneezy, 2009). It is very much true also for the cognitive biases discussed above (Dommer and Swaminathan, 2013). Hence, when these biases become salient due to the framing, it can result in gender specific effects. As a result, females may respond to the endowment effects or the status-quo bias by taking less (specifically being egalitarian, as seen in Figure 2) in the TG, compared to their male counterpart. Second, the framing of the GG and the TG introduces a salience of property rights of the pie to be divided. Whereas in the GG frame the property rights belongs to the dictator, in the TG frame it belongs to the recipient: affecting the notion of personal entitlement among the dictators. Existing studies (e.g. Bylsma and Major, 1992) have already pointed out gender differences in personal entitlement, and have shown that males perceive more entitlement that females – even without property rights. Hence, females may take less and males take more in the TG frame.

Our result is of interest for a number of reasons. First, the results essentially imply that the established result of 'giving is equivalent to not taking' is not robust. Hence, one will have to be careful about the gender effects especially while implementing these frames in the field. Second, as a mirror result, one can alternatively use a giving or a taking frame without changing the decision space, so long as the investigation is not focused on gender; or the issue of taking price, or choice of the game (Korenok et al., 2014; 2015) are absent. Hence, the body of work that investigates the dictator game using either frame is able to interpret the results in a more succinct manner. Third, this result sheds light on a very active line of research regarding the gender effect on behavioral decision making. Since the frame invites social-type differences in the dictator but in opposite directions for the two genders, this warrants further investigation in this area of research.

While possible explanations for these results are given above, these cannot be certified within the framework of the current experiment. A further and concrete investigation of the reason of the discovered gender difference is seen as vital and we leave it as a key topic of future research.

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Appendix: Instructions

1. Instruction for Dictator in Taking game

Welcome to this experiment! In this experiment each of you will be paired with a different person. You will not be told who you are matched with during or after the experiment, and he or she will not be told who you are either during or after the experiment.

Your decisions will be strictly anonymous and cannot be linked to you in any way.

The experiment has two parts and is conducted as follows:

- Everyone in this room has already been allocated a show up fee of £3. You have been paired with someone else in the room.
- The other person you are paired with has access to an additional £10.
- In the first part of the experiment, you will have to make a simple decision. You have to decide what portion, if any, of the £10 to transfer to yourself. Your choice can be anywhere from £0 to £10, in 1p increments. Your take-home earnings from this experiment will be your initial £3 show up fee plus the money you transfer from the person you are paired with. The earnings of the person you are paired with will be his/her £3 show up fee plus the money left over from the £10 after you transfer to yourself.
- In the second part of the experiment, the person you are paired with will make a decision, but that decision will NOT affect your earnings.

You will have 1 minute to come to a decision about your choice. Please do not talk to the other people in this room until your session is completed. Do not be concerned if other people make their decisions before you.

2. Instruction for Dictator in Giving game

Welcome to this experiment! In this experiment each of you will be paired with a different person. You will not be told who you are matched with during or after the experiment, and he or she will not be told who you are either during or after the experiment.

Your decisions will be strictly anonymous and cannot be linked to you in any way.

The experiment has two parts and is conducted as follows:

- Everyone in this room has already been allocated a show up fee of £3. You have been paired with someone else in the room.
- You have access to an additional £10. The other person you are paired with does not have access to that extra £10.
- In the first part of the experiment, you will have to make a simple decision. You have to decide what portion, if any, of the £10 to transfer to the person you are paired with. Your choice can be anywhere from £0 to £10, in 1p increments. Your take-home earnings from this experiment will be your initial £3 show up fee plus the money left over from the £10 after you transfer to the person you are paired with. The earnings of the person you are paired with will be the amount you transfer to him/her plus his/her £3 show up fee.
- In the second part of the experiment, the person you are paired with will make a decision, but that decision will NOT affect your earnings.

You will have 1 minute to come to a decision about your choice. Please do not talk to the other people in this room until your session is completed. Do not be concerned if other people make their decisions before you.