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# Essays on Group Identity and Social Preferences

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To my Munes, father and wife

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by

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## Abstract

This thesis studies the effect of uncertainty in the group identity or the payoffs on social preferences. It also tests the robustness of Dana, Weber and Kuang's results and presents a model to understand the findings of the experiment.

Chapter 1 investigates the effect of uncertainty in group membership of the subjects on social preferences. We find that the decision to know the group identity of the counterparts' who turn out to be an in-group member in the dictator and response games increases the likelihood of choosing the social-welfare-maximising outcome. The revelation of matched player's identity decreases the likelihood to reward and increases the likelihood to punish.

Chapter 2, studies the effect of uncertainty in payoffs on social preferences in the presence of group identity. We find that the uncertainty on payoffs does not reduce the fair choices if the subjects are matched with an in-group member. However, the decision to know the payoffs of an out-group counterpart increases the likelihood of choosing self-interested choice.

Chapter 3 tests the robustness of Dana, Weber and Kuang's result in a within-subjects experiment. Our data confirm the DWK's findings, but there is an increase in the number of self-interested choices in the hidden-payoffs treatment.

Chapter 4 presents a model that combine Fehr and Schmidt preferences and prospect theory in order to understand the result of second treatment of DWK's experiment. In the treatment, the subjects have an option to reveal their counterparts' payoffs. We find a threshold for  $\beta = \frac{1}{5}$  beyond which the utility of revealing the hidden payoffs and choose the fair choice is higher than not revealing. Also, the combination of Fehr-Schmidt preferences with two alternative decision theories, expected utility and prospect theory, produce the same  $\beta$ .

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# Declaration

Chapter 2 entitled “Uncertain Group Identity and Social Preferences” is a joint work with:

- Dr. David Rojo Arjona

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# Introduction

Social psychology literature emphasises on the effect of group identity on the social interactions. In the literature, social identity is defined as a feeling of belonging to a group which makes the individual follow the behavioural pattern of the group and with the in-group members more than out-group members. The seminal works in social psychology show discrimination between an in-group and out-group member in favour of the in-group member. In particular, Tajfel and Turner (1971) are the first to present foundation of the social identity theory and present the evidence of group attachment.

In economics, Akerlof and Kranton (2000) incorporate social identity to economic model for the first time. In the model, any deviation from the social norm is associated with a decrease in the utility. They analyse the economy of poverty Akerlof and Kranton (2000), the economics of education Akerlof and Kranton (2002) and contract theory Akerlof and Kranton (2005) with the model of identity. Chen and Li (2009) study the effect of induced group identity on social preferences. They find that matching with an in-group member increases the charity concerns and decreases envy. The participants are more likely to reward an in-group member, and there is less likely to punish them. It is more likely to choose social-welfare-maximising outcome if the participants are matched with an in-group member.

To the best of our knowledge, existing group identity research study the participants' decisions when the group identity is certain and fully transparent. Chapter 1 studies the effect of *uncertainty* in the group identity on social preferences. The research question examines the participants' decisions to acquire identity information of their counterpart when there is a voluntary and costless option to know.

To investigate these questions, we have experimented using induced group identities in the laboratory. Following the experimental literature on group identity, the

groups were created with the minimal group identity paradigm. The experiment includes two treatments and one control. There are three stages in each treatment. In stage one, the subjects are primed the group identity at the beginning of the sessions. In stage two, to enhance the effect of group belonging, the subjects participate in other-other allocation tasks Turner (1978). In the last stage, the participants are asked to make choices in a series of twelve sequential games selected from Charness and Rabin (2002). The game set includes three dictator games and seven response games.

In spite of the fact that revealing the identity of the counterpart is free, We find that there is only 60 percent of the subjects who decide to know the identity of their matched player. The likelihood to choose social-welfare-maximising outcome is 64 percent higher if the subjects reveal the identity of their counterparts' who turns out to be an in-group member. Also, the revelation of identity information, if it turns out to be an in-group member, decreases the likelihood to reward and increase the likelihood to punish the matched player. The reciprocal behaviour is higher among the participants who stay ignorant about the identity of their partners. Irrespective of the group identity of their counterpart, they reward the matched player with a higher likelihood, and it is less likely to punish them.

In chapter 2 studies the effect of uncertainty in the counterparts' payoffs on the pro-social behaviours in the presence of group identity. The literature on the altruism demonstrates giving behaviour in the various experimental studies. In the dictator game, the subjects give more than 20 percent of their endowments (Camerer 2003). In the double-blind anonymity, a positive amount is given to an unknown receiver. However, other research on altruism shows that giving behaviour depends on the situational factors [Barsley(2008), List(2007)]. Dana, Weber and Kuang(2007)(henceforth DWK) demonstrate that reduction of transparency in the cause of actions decreases the number of givers in the dictator game. The authors provide several excuses for the dictators and show that the presence of such "Moral Wiggle Room" produces more self-interested choices compared with no "Moral Wiggle Room" situation. This chapter introduces the group identity to the non-transparent experiment of DWK and studies the change from fair choices to self-interested actions. We investigate the effect of optional payoffs information

revelation on other-regarding behaviour. We conduct an experiment that has two treatments. While in the transparent treatment there is no uncertainty over the payoffs, in the hidden-payoffs treatment the subjects are given an option to reveal the payoff of their counterpart who is an in-group or an out-group member. The subjects play a set of nine games that include the dictator and response games and are selected from Charness and Rabin(2002). Strategy method is used in this treatment, and the participants make choices for both in-group and out-group members.

We find that fair choices are robust across treatments in the presence of group identity. Although only half of the subjects reveal the actual payoff matrix for their counterparts, the change in fair choices for an in-group matching is not statistically significant. The discrimination between an in-group and out-group matching is observed in the participants' choices if they choose to reveal the payoff matrix of their counterparts.

In chapter 3, we have designed an experiment to test the result of DWK's experiment. We replicate the second treatment of the DWK's experiment using within-treatment design to test the robustness of "Moral Wiggle Room". The subjects participated in the transparent treatment and the hidden-information treatment sequentially. While the dictator's counterpart's payoffs are known for the transparent treatment, they are given a choice to observe the counterparts' payoff in the hidden-information treatment. The choice is an envelope including the actual payoffs of the counterpart which is free and voluntary for the dictators. By implementing the within-treatment design in a classroom experiment, we confirm DWK's findings with more self-interested choices.

In chapter 4, we combine the Fehr-Schmidt preferences (FS) with two decision theory, expected utility and prospect theory to understand the result of second treatment of DWK's experiment. We find that the decision to reveal the receiver's payoff (clicking) depends on the value of the advantageous inequity parameter in FS preferences,  $\beta$ . We find a threshold for  $\beta$  that make a difference in the dictator's choice. For the value of  $\beta_d$  larger than  $\frac{1}{5}$ , the utility of revealing the actual payoff and choose fair choice (choice  $B$ ) is higher than self-interested choice and not revealing choice. On the other hand, for a lower value of  $\beta$ , the utility of clicking and not clicking is the same, so the dictator is indifferent between these two choices. The

dictator with  $\beta < \frac{1}{5}$  chooses self-interested choice (choice  $A$ ) irrespective of revealing payoff decision.

Finally, chapter 5 concludes the thesis and suggests a further area for the research in group identity and social preferences.

# Chapter 1

## Group Uncertainty and Social Preferences

### Chapter Abstract

This paper studies the effect of uncertainty in group identity on social preferences. We use a laboratory experiment to measure the group identity choice and its impact on social preferences. We replicate the literature on the in-group favouritism and the out-group discrimination in experimental works in psychology and economics. We find that only 60 percent of participants are willing to know the identity of their matched player. We also find that the participants who decide to know the identity of their counterpart who turns out to be an in-group member are 64 percent more likely to choose social-welfare-maximising outcome and show 27 percent less charity concern. However, they are less likely to reward and more likely to punish even when their matched player is an in-group member. The participants who decide to skip the identity choice are more reciprocal than people who choose to see the identity of their counterpart. They are more likely to reward and less likely to punish the matched player.

### 1.1 Introduction

Group identity is defined as the sense of perceived belonging to a social group. The feeling of attachment makes people follow the norm of the group, to prefer the aggregate benefit of the group and show more cooperation with the in-group

members. Group identity is shown to be an important factor in understanding social interaction in psychology, social psychology, political science and economics. It is used to explain political campaign, race conflicts and discrimination in group tasks. Glaeser et al. (2000) show in two experiments that difference in race and nationality has an impact on the level of trust between subjects. The subjects transfer more money to an ingroup member as opposed to an outgroup member. Fershtman and Gneezy (2001) find discrimination between different ethnic groups. There is lower rate of trust on Eastern origin men among Israeli Jewish participants. Bernhard et al. (2006a) show that in the dictator game with third party punishment, punisher shows more altruism when the victim is in the same social group. Also, the subjects show more tolerance if the norm violator is an ingroup member as opposed to an outgroup member.

Most of the research on social identity theory is in social psychology literature. The seminal work in social identity by Tajfel et al. (1971) tries to show the discrimination between an in-group and an out-group member. They present the foundation of social identity theory and argue that there are three main components: categorisation, identification and comparison. The first component is to categorise people into different social groups. This sense of belonging to a group and exclude anyone out of the group, make categorisation in mind. The literature on social psychology shows that people make the classification very quickly and easily. The second factor of the social identity theory, identification, is the feeling of attachment to the group. An in-group member is defined as people who are associated with us, and out-group members are people who are not considered in the same group as us. The last factor, comparison, is the process of comparing the in-group members with another group. This comparison makes discrimination between in-group and out-groups toward an in-group bias.

Group identity has various implications for the human behaviour. People adopted the social norms related to the group, and the stereotype affects the individual's behaviour. Evidence shows that emphasis on social identity influences strongly the performance of the participants Shih et al. (1999). The experimental works in social psychology have studied the effect of social identity on behaviour and show the degree of discrimination between an in-group and an out-group member. The

typical methodology in social identity work is minimal group paradigm in which the subjects are divided into groups randomly. This paradigm aims to categorise people based on a possible meaningless and trivial way. The result of most experiments confirm Tajfel et al. (1971)'s finding that there is in-group favouritism in interaction compare to an out-group member. The subjects reward in-group member more than an out-group member and give higher rank to an in-group member than an out-group Turner (1978).

Introduction of social identity into economic models started by a seminal work of Akerlof and Kranton (2000). In their paper, they propose a neoclassical model in which identity is related to the different groups and conformity to social norm is expected from the in-group members. The individual obtains highest possible utility if they follow the social norm entirely and any deviation from the norm reduces the utility. The application of the model is studied in various economic problems such as sex-discrimination and the household division of labour (Akerlof and Kranton (2000)), the economics of education (Akerlof and Kranton (2002)) and economics of organisation (Akerlof and Kranton (2005)).

On empirical literature of social identity, Chen and Li (2009) study the effect of group identity on social preference. They use inducement of group identity based on painting choice of the subjects. They find that participants show more charity concerns and less envy if they are matched with an in-group member. Moreover, Chen and Li (2009) argue that there is a higher likelihood to reward an in-group member and a lower chance to punish them. Participants are more willing to choose social-welfare-maximising outcome if they play experimental games with an in-group member.

In this paper, we use a laboratory experiment to measure the effect of uncertainty in the social group on social preferences. We follow social psychology experiment to induce group identity using random assignment of the groups. Different from economic literature on group identity, we study identity information acquisition and its effect on the subjects' choices. Moreover, we use a large range of games that enable us to systematically determine the effect of group uncertainty on social preferences from different aspects. Specifically, we measure distributional preference, reciprocity and preference to choose the social-welfare maximising outcome. We

adopt games from Charness and Rabin (2002) and Chen and Li (2009) to estimate the effect of group uncertainty on social preference.

The research questions of this paper are as: What is the effect of optional identity information of the counterparts on the participants' choice? Do the subjects behave the same when they are given the identity of their counterpart compared with an option to learn their matched players' identity? Are the participants willing to learn the identity of their counterpart if the option is voluntary and has no cost? In particular, we study distribution preference, reciprocity behaviour and the likelihood of choosing socially-welfare-maximising choice in the presence of uncertain group identity.

These questions help to understand the effectiveness of group identity on the participants' choices. This paper study the generalizability of other-regarding preferences, the effectiveness of group identity and contextual change in altruistic behaviour. This paper aims to understand the subjects' preference in the context of uncertain group identity.

## 1.2 Literature Review

In this section, we present the review of social identity literature. Although the main body of the social identity literature is in social psychology, there are recent works in experimental economics. There is a tremendous number of studies in social identity starting from 1971. In this part, we cover some of the seminal works in social psychology that have formed the foundation of social identity. Social identity literature has started with several survey articles that try to study group favouritism. Tajfel and Turner, two psychologists who start the field by running several experimental works on social identity Tajfel and Turner (1986). Later, there are follow-up experiments on social identity theory that have attempted to enhance the understanding of identity and its effect on decisions (Hogg (2002), Deaux (1996), Tajfel and Turner (1979)).

Priming natural social identities, and inducing group identities are two methods in empirical work in social psychology on social identity. While, priming natural social identity is based on physical features of subjects (test performance, walk speed and

so on), induced group identity is an experimental method to create social groups in the laboratory (Joshua et al. (1998), Bargh et al. (1996), Bargh and Pietromonaco (1982)).

In this part, we focus on induced social identity as this method is used to run the experiment. Many works on social identity work in experimental economics depend on induced social identity method. Tajfel and Turner (1979) has used this method to test social identity theory. In particular, this method is used to create groups based on irrelevant activities to the primary task of the experiment. They call this method as minimal group paradigm. Tajfel and Turner (1986) and McDermott (2009) show that with minimal group paradigm, having most trivial categorisation, there is a difference between in-group and out-group members.

Tajfel and Turner (1986) demonstrate six requirements for a group to follow minimal group paradigm. In addition to anonymity, there should not be any face to face interaction between in-groups or out-groups or within groups. Secondly, there should not be any link between the categorisation criteria and response of subjects in their tasks. They also claim that there has to be no utilitarian value for the subject's response and the strategy they use to differentiate in-group and out-groups has to compete with other utilitarian principles like maximising benefits. Lastly, Tajfel and Turner (1986) argue that rewards have to be important for the subjects and they should not take their responses as evaluation of others.

In summary to the literature review on social identity research with minimal group paradigm, Tajfel and Turner (1986) concludes that "the trivial, ad hoc inter-group categorisation leads to in-group favouritism discrimination against the out-group. Mullen et al. (1992) in the review of literature in social psychology on inter-group relation conclude that attachment to in-group is vital while the discrimination toward out-group is not.

Although there is evidence to show that categorisation even in a trivial way creates group affiliation, but there is no consensus on the cause of this group effect. Tajfel and Turner (1986) claim that simple categorisation is the leading cause of this difference in intergroup behaviour. They claim that there is no evidence to show that 'groupness' generates an expectation of reciprocity within the group. They explain that social categorisation guide subjects to make discriminatory decisions toward

in-group and out-groups. They show that the subjects maximise their intergroup difference and minimise the intra-group differences.

Yamagishi and Kiyonari (2000) claim that exception of other members' behaviour is the primary incentive of in-group favouritism. There is reciprocity within the group that makes them a response in favour of in-group members. They assume an implicit interaction between members of a group in a way that existence of the group is the reason for reciprocity or general exchange. Similarly Insko et al. (2001) adopt a notion of entitativity from sociology to explain that perceived entity between in-group make them interconnected and raise in-group favouritism Mullen et al. (1992).

### **1.2.1 Social Identity in the Experimental Games**

In this section, we present the literature on experimental games with social identity and social norms. Social norms are the common belief among the members of a group that creates a standard in the behaviour of the members. The existence of social norms depends on the presence and the formation of the group (Bernhard et al., 2006b). The critical element in generating social standard is the interaction between the group members. Group norms determine the group culture and therefore is the crucial aspect of normative behaviour. Enforcement of the within-group social norm improves group survival.

Bernhard et al. (2006b) show that in the dictator game with native groups and an egalitarian norm, the punishment rate is lower if the punisher and the norm violator are from the same group. They show that there is a tendency to give a break to norm violator if the third party punisher and norm violator are from the same group.

Burger et al. (2004) show the result of four studies in which incidental similarities between subjects enhance the likelihood of compliance with the request from a requester. The result shows that people use heuristics in response to a request and the similarities between the subjects is an effective element in increasing the probability of compliance.

Charness et al. (2007) show that there is a difference between the minimal-group paradigm and the salient group in inducing the group identity. While the minimal-group paradigm does not have a significant effect on the behaviour, the salient

group membership increases the effect of group membership. They use Prisoner's Dilemma and Battle of sexes and to find a significant impact of group membership on individual's decision.

Group identity affects the level of coordination in the coordination game. Chen and Chen (2011) propose a group-contingent social preference model and show that social identity affects the selection of the equilibrium. They test the model with the experiment of the minimum-effort coordination game. The result of the experiment show low-effort equilibrium for no social identity group and high-effort equilibrium for the participant with salient group identity. McLeish and Oxoby (2011) show that cooperation is higher in ultimatum bargaining game when the subjects are primed with a shared identity.

Group identity has a strong relationship with gender. Croson et al. (2008) show that there is more coordination and efficiency in the threshold public good game between the women subjects, while there is less for men subjects. They conclude that gender and group identity can be used for the provision point mechanism (Bagnoli and Lipman, 1989).

Drouvelis and Nosenzo (2013) claim that group identity is an effective but breakable tool for enhancement of cooperation. They test the effect of identity on a three-person sequential voluntary contributions game experiment and show that group identity improve the level of cooperation (30%) only when the leader and both followers have the same identity. Any other matching of identity between followers and the leader does not influence the identity.

Team identity enhances the production of the team through enhanced production of the team member. In a public good game with team identity, the level of cooperation for the treatment with team identity is higher than the benchmark with no team identity (Eckel and Grossman, 2005).

Goette et al. (2006) present evidence of in-group favouritism and out-group hostility in the prisoner dilemma game with groups of the officers from different platoons. The novelty of this experiment is a random assignment of the officers who spend three weeks interacting with each other and leave the platoon a week after the experiment. The level of cooperation in the prisoner dilemma game is higher among the subjects from the same platoon.

There is also higher punishment from the third party in the prisoner dilemma game if the victim of non-cooperative behaviour is from the same group as third-party punisher (Goette et al., 2006).

Social ties between the subjects have a qualitatively stronger effect on cooperation between in-group members Goette et al. (2012). It is concluded by Goette et al. (2012) that labelling and social ties have to be considered in the social identity theories as they influence the subjects' choices significantly.

Guala et al. (2013) run an experiment with prisoner dilemma and group identity. They show that coordination is higher in prisoner dilemma only if the group affiliation is common knowledge between the subjects. Using treatments for symmetric and asymmetric knowledge of group affiliation, Guala et al. (2013) claim that beliefs play an important role in cooperative behaviour in prisoner dilemma game.

In the papers above, group identity is an essential factor in shaping people's decision. Group identity influences the cooperation and affects the level of altruism in the experimental games. While the effect of group identity presented in the experiments is significant, there is an area for the research on the motivation of in-group favouritism and out-group discrimination. In another word, the effect of situational clues and environmental pressure on the decision for in-group and out-group is not apparent. The optional and voluntary information on group identity, provide a space for the subjects to show the actual preferences with no situational or environmental pressure. In this experiment, the participants have a free option to learn the identity of their counterpart.

### **1.3 Experimental Design**

The experiment involves two treatments and one control. In the treatment sessions, there are three stages. The first stage is group assignment in which subjects divided into two groups; blue and green. The second stage is an other-other allocation in which each participant allocates a certain amount of tokens to two other participants. This stage is designed to improve the attachment of subjects to their groups. The third stage is a series of dictator and response games. The subjects play a set of 12 games in which they make choices depends on their role in the game. While

the subjects in the treatments participate in all three stages, the subjects in control sessions only participate in the third stage.

### **1.3.1 Stages**

#### **Stage 1: Group assignment**

Following the literature on social identity, we use the minimal group paradigm to create the group in the laboratory. First component of minimal group paradigm is “categorization” Tajfel et al. (1971). In this stage, subjects are randomly assigned into two groups; the green group and the blue group. At the beginning of the experiment, a stack of envelopes containing blue or green slip is given to each subject. Each participant draws one envelope and finds her membership based on the colour of slip; blue or green. The colour of slip determines whether they are assigned to the green group or the blue group. Experimenter checks the colour before it enters to the computer to make sure that the right colour is entered to the system<sup>1</sup>.

The matching protocol assures that there is an equal number of members in each group. Therefore, there are eight envelopes with green colour and eight envelopes with blue colour. This method of matching is necessary as there has to be one-to-one matching in the third stage, two-person sequential games. After experimenter makes sure that there are eight subjects in each group of blue and green, the second stage starts<sup>2</sup>.

While the subjects in the Certainty treatment and Uncertainty treatment participate in this stage, there is not grouping stage for the participants in control session.

#### **Stage 2: Other-Other Allocation**

In the second stage, the subjects face five rounds of the other-other allocation task. In this task, the subjects allocate a certain number of tokens between two other

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<sup>1</sup>Chen and Li (2009) use two methods, the preference over five pairs of painting and random assignment based on the colour of slips, to create groups. They show that there is no significant difference in results for these two methods of creating groups. Yamagishi and Kiyonari (2000) have also used the same method.

<sup>2</sup>Chen and Li (2009) have an online chat and NoChat treatment treatments after categorisation. They show that the online chat over paintings does not have a significant impact on the enhancement of group affiliation.

anonymous subjects. The subjects could not allocate any token to themselves. This method has been used extensively in social psychology literature. Turner (1978) shows that the individuals allocate more to their in-group than out-group members. Thus, other-other allocation followed with self-other allocation improves the sense of belonging to a group (Turner (1978)). We use this method to follow the experimental method in social psychology on social identity and replicate their result.

We use the same other-other allocation as Chen and Li (2009). In this stage, there are five rounds of allocation from round 1 to 5. The subjects are given the total number of tokens to allocate in each round. The total number of tokens in round one is 200 tokens, and there is an increase with an increment of 50 tokens in each round. In each round, there are three scenarios to allocate tokens, and two subjects are chosen randomly in the following manner:

- Both randomly selected subjects come from subjects' group,
- Both randomly selected subjects come from the other group
- One randomly selected subject comes from the same group as the allocator, and the other comes from the other group

The computer sets up a random sequence of IDs at the end of the stage to compute the payoffs for this stage. These IDs is used to control who allocates tokens to whom and so calculate the payoff for each subject. The payoff for each subject is determined by the sum of allocated tokens from the subjects whose IDs preceded her. Also, each subject allocates to two other participants whose IDs are after her in the sequence of IDs. For instance, ID 6 receives payment based on the decision by ID 4 and 5 in the sequence. For example, ID 1 receives payoffs from ID 16 and 15 and allocate tokens to ID 2 and 3. This allocation follows for all subjects and payment is calculated at the end of the experiment. The subjects are paid by only one of their allocations that are randomly selected by the computer, and they do not receive any feedback about others' allocations till the end of the stage. The payment protocol is public information and explanation of IDs is presented to the participants at the beginning of this stage.

### Stage 3: Experimental Games

Stage one and two were attributed to induce and strengthen the group identity. While the group assignment was designed to cause categorisation and identification, other-other allocations were to fulfil comparison component of social identity procedure. We use stage three to examine the impact of uncertainty in group identity on social preferences.

In this stage, participants made decisions on a set of 12 two-person games. These games are the same games the same games as Chen and Li (2009), adopted initially from Charness and Rabin (2002). We selected these games based on the result of Chen and Li (2009) experiment. These games have the highest difference between in-group and out-group in their result.

Table 1.1 presents the description of all 12 games including three dictator games and nine response games. In all games, the subjects are randomly assigned to role A or B. In dictator games, the role A does not have any choice to make and only role B makes choice b1 or b2. The role of the participants varies in each game.

Player A decides between choice A1 and A2. Player A choose the outcome of the game by choosing A1 and let player B determines the outcome of the game by selecting A2. The subjects with role B are given the instruction that player A has picked A2 and it is their decision that determines the outcome of the game.

Response games are in three types that help us to investigate reciprocity, social welfare maximisation and altruism/envy behaviour. In the first category, player B does not lose any token to help or punish player A. For the games in the second category; player B has to incur a cost to benefit player A. In the third category, player B has to pay from his payoff if she wants to punish player A.

These games are selected based on the difference in choices for in-group and out-group matchings in Chen and Li (2009)'s result. These games show the highest difference (6 games) and lowest difference (6 games) between in-group and out-group matchings amongst all games used in their experiment. This selection ensures the study of uncertainty in both cases; where uncertainty in the group identity has had the highest and lowest impact on the subjects' choices.

In the sessions for all treatments, the subjects play 12 games sequentially. To avoid order effect, participants play games with a different order in each treatment.

The computer randomly determines the order of games and sessions before the experiment. The participants are randomly paired with another subject for each game and the roles, A or B, is assigned randomly. There is no provision of feedback until the end of the experiment. After all, subjects played 12 games, two of the games is randomly selected by the computer to gauge the payoff for each subject. The payment process is the same as Chen and Li (2009) and was announced in the instruction.

Table 1.1: Two Person Sequential Games

ID	Games	A stays out	If A enters, B chooses
Two person dictator game			
1	Dictator 2		(400,400) vs.(750,375)
2	Dictator 4		(200,700) vs.(600,600)
3	Dictator 5		(0,800) vs.(400,400)
B's payoff identical			
4	Resp 1b	(550,550)	(400,400) vs.(750,400)
5	Resp 7	(450,900)	(200,400) vs.(400,400)
B's sacrifice helps A			
6	Resp 2a	(750, 0)	(400,400) vs.(750,375)
7	Resp 3	(750, 100)	(300,600) vs.(700,500)
8	Resp 4	(700,200)	(200,700) vs.(600,600)
9	Resp 8	(725,0)	(400,400) vs.(750,375)
10	Resp 9	(450,0)	(350,450) vs.(450,350)
B's sacrifice hurts A			
11	Resp 11	(400,1200)	(400,200) vs.( 0, 0)
12	Resp 12	(375,1000)	(400,400) vs.(250,350)

### 1.3.2 Treatments and General Procedure

In this experiment, we have one control and two treatments. We have run the total of 10 independent computerised sessions including two control sessions, 4 No Group Uncertainty and 4 Group Uncertainty treatments. In each session, the order of the games is random and the subjects play different order of games in each session. Table 1.2 presents details of each treatment including stages, whether a treatment has uncertainty in the group, number of sessions and number of subjects that participate in each session. The experimental instruction and the summary statistics of the experiment are in the appendix.

In the control treatment, the subjects only participate in stage three, where there

Table 1.2: Treatment of the Experiment

Treatments	Group Assignment	Other-Other	Group Uncertainty	No.Sessions	No. Subjects
Control	N/A	N/A	No	2	30
Certainty	Yes	Yes	No	4	64
Group Uncertainty	Yes	Yes	Yes	4	64
Total				10	158

is no inducement of group identity, and they play twelve consecutive games without participating in other-other allocation. In the “Certainty Treatment”, for each game, the subjects are randomly matched with an in-group or out-group member. The computer ensures that the subjects are paired with an in-group member in half of the games and with an out-group member half of the time. The matching protocol ensures that each subject does not match any subject twice. The subjects are told that the group identity of their co-player (i.e. there is no uncertainty about the group identity of the co-player). This treatment is necessarily the original treatment in Chen and Li (2009). The only difference is that we elicit only one choice, either for an in-group or out-group co-player. However, Chen and Li (2009) use strategy method and ask the subjects to make decisions for both matchings; in-group and out-group co-player.

The ”Group Uncertainty Treatment” is the same as the first treatment with the differences that i) subjects are not told the identity of their randomly matched co-player before the game and ii) subjects can learn the identity of the other player by clicking a button. The co-players are not informed about clicking choices. Both players, A and B, have the opportunity to click the button and learn the identity information of their counterpart.

All treatments were conducted in the experimental lab at the University of Leicester from October to December of 2016 yielding a total of 158 subjects. The ztree software Fischbacher (2007) was used to program the experiment. Each subject participates in only one session, and subjects are undergraduate students from different departments at the University of Leicester. While treatments lasted around one hour, control sessions took around 30 to 40 minutes. The exchange for the experiment was determined to 100 tokens for £1. In addition to payoffs for stage 2 and 3, the subjects were paid £two show-up fees. The average payment for each subject was £16.20 in the treatment and £14.30 in the control sessions.

## 1.4 Results

In this section, we discuss the results of the experiment from different aspects. We first present the hypothesis of the experiment. Then, we show the results of stage 2, other-other allocation, in which we show the effects of categorisation on the allocation of tokens between the subjects. Then, we investigate the impact of uncertainty in group identity on the distribution of payoffs using the model of group identity (Chen and Li (2009)). We also analyse reciprocity behaviour for all treatments and present the result for socially-welfare-maximisation choice.

### 1.4.1 Hypotheses

H1: (Chen and Li Replication) the other-regarding behaviour is higher in the certainty treatment than in control.

H2a: (No harming effect of uncertainty) the other regarding behaviour is at least as high in the Group Uncertainty treatment as in the Certainty treatment.

H2b: (Control for clicks) H2a should be particularly true in the case of subjects who click in order to know the identity of their counterpart.

H3a: (Harming effect of uncertainty) the other regarding behaviour is less in the Group Uncertainty treatment compare to the Certainty treatment. Extremely strong support for the harming effect of uncertainty would be reduction in other regarding behaviour in the Group Uncertainty treatment as in the Control treatment.

H3b: (Control for clicks) H3a should be particularly true in the case of subjects who did not click in order to know the identity of their counterpart.

### 1.4.2 Other-Other Allocation

In this section, we investigate the effect of categorisation on subjects' allocation. This stage figures out whether in-group favouritism affects allocation between two other participants. The subjects in 'Certainty' and 'Group Uncertainty' treatments participate in this stage. Recall that there are five rounds of other-other allocation in which each participant has to decide on the allocation of the tokens between two other subjects. The allocations are under three scenarios; both players are from the same group as the decision maker, both are from another group, one from the same

group and one from another group. The participants could not allocate anything to themselves.

The literature on the other-other allocation shows that while the participants allocate equally between two other subjects from the same group and another group, they allocate differently between members of their group or another group. The subjects allocate more tokens to an in-group member compare to an out-group member. While in the social psychology experiments, the financial payoff is not paid to the subjects in this stage, we exchange tokens into real money at an exchange rate<sup>3</sup>.

Figure 1 presents the result of other-other allocation under three scenarios. On the horizontal axis, there are five rounds that the subjects allocate tokens to two other participants. The vertical axis is the number of tokens allocated to two other participants.

The top-left chart shows the average allocation between two in-group members and top-right chart presents average allocation between two out-group members. The bottom chart exhibits the average allocation between an in-group member and out-group member. In all graphs, the horizontal axis is the number of rounds, and the vertical axis is the number of tokens allocated to each participant. These graphs show the result of five periods where the number of tokens increases from 200 to 400. On average, the participants allocate almost the same amount of tokens between two other participants, if both other participants are from the same group. <sup>4</sup> On the contrary, in the bottom panel, the average allocation to an in-group member (blue bullet) is significantly higher than the allocation to an out-group member (red ball). The difference between the average allocation of an in-group member and out-group member is around 32 to 35 percent (the difference is normalised by endowments). This difference is statistically significant at 1 percent level for all rounds using t-statistics for a one-tailed test for paired samples. This result is the replication of in-group favouritism in minimal group paradigm.

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<sup>3</sup>Please see the instruction for the details.

<sup>4</sup>The difference between the allocation of two in-group members and two out-group members are not statistically different. Thus, the participants allocate almost the same number of tokens between two in-group members and two out-group members.

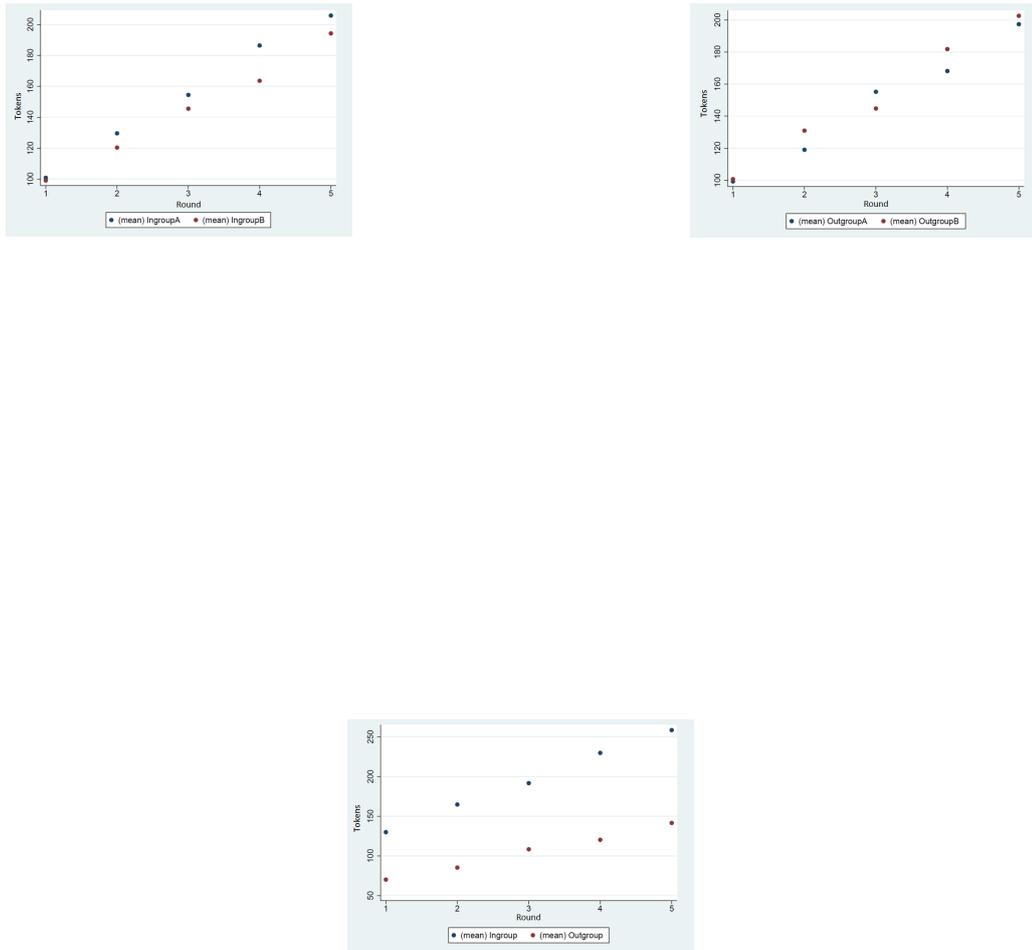


Figure 1.1: Other-Other Allocation

### 1.4.3 Distribution parameters

In this section, we examine the effect of uncertainty in the group identity on the distributional parameters. We analyse distribution preferences, i.e. charity and envy for all treatments. Chen and Li (2009) presents an extended social preferences model of Charness and Rabin (2002) to incorporate social identity. This model includes both social preferences parameters ( $\rho$  and  $\sigma$ ), and social identity parameters, ( $a$  and

b). We briefly review the model and present the results of the experiment.

The social preferences model is as following, where  $\pi_A$  and  $\pi_B$  are player A and B's financial payoffs, and  $w_A^I$  is the weight that player B assigns to player A's payoff:

$$U_B(\pi_A, \pi_B) = w_A^I \pi_A + (1 - w_A^I) \pi_B \quad (1.1)$$

In the group identity model (Chen and Li (2009)),  $w_A^I$  is defined as the weight that player B assign on monetary payoff of player A incorporating identity of player A:

$$w_A^I = \rho(1 + Ia)r + \sigma(1 + Ib)s$$

The parameters  $\rho$  and  $\sigma$  compute player B's charity and envy concerns respectively. The charity and envy concerns raise when player B has higher or lower payoff than player A respectively. The parameters  $a$  and  $b$  measure the additional factors of charity and envy for an in-group member. In the weight function,  $r = 1$  if player B has higher payoff and  $r = 0$  otherwise. Similarly, if player A's payoff is higher  $s = 1$  and  $s = 0$  otherwise. The identity parameter,  $I = 1$  if player A and B belong to the same group while  $I = 0$  if they both players belong to the different groups.

We use player B's data to estimate charity, envy and identity parameters. The logit specification of the maximum likelihood estimation on choices is used to estimate the parameters. The subjects have binary decisions in each of the two-person consecutive games.

$$Pr(action1) = \frac{e^{\gamma u(action1)}}{e^{\gamma u(action1)} + e^{\gamma u(action2)}}$$

Parameter  $\gamma$  measure the reflection of the choices to differences in the utility function.  $\gamma = 0$  reduces the model to a random choice with the probability of half. The prediction of the model has more accuracy for a higher value of  $\gamma$ .

Table 1.3 and 1.4 reports the estimation of the charity and envy parameters. The control treatment is the benchmark and Certainty treatment is the replication of Chen and Li (2009). Envy and charity parameters for control and certainty treatment is presented in Table 1.3. Table 1.4 reports the estimation of parameters for the uncertainty treatment. We show parameters for the in-group and out-group

matching as well as clicking decision to learn the identity.

Table 1.3: Distribution Parameters for Control and Certainty Treatments

	Charity	Envy				
	$\rho$	$\sigma$				
Control (N=30)	0.247 (0.051)***	-0.139 (0.073)*				
	out-group Charity $\rho_O^C$	out-group Envy $\sigma_O^C$	in-group Charity $\rho_I^C(1+a)$	in-group Envy $\sigma_I^C(1+b)$	Identity parameters	
Certainty Treatment (N=64)	0.26 (0.05)***	-0.21 (0.07)***	0.42	-0.23	0.64 (0.34)	0.11 (0.45)

**Result 1** *We successfully replicate Chen and Li (2009)’s result of in-group favouritism. The parameters in the control and certainty treatments are in the same direction as Chen and Li (2009)’s result with different magnitudes. The charity concerns are higher toward an in-group member than an out-group member. Also, the charity and envy in certainty treatment are different from control treatment, although the difference is not statistically significant.*

As we see in Table 1.3, charity( $\rho$ ) and envy( $\sigma$ ) parameters in the control sessions are 0.247 and  $-0.139$ . In certainty treatment, for the out-group matching and in-group matching, the parameters are 0.26 and 0.42 for charity and  $-0.21$  and  $-0.23$  for envy respectively. These estimations are statistically significant at the 1 percent level (t-test) for out-group matches in certainty treatment and 5 percent level for envy in control sessions (t-test). The identity parameters,  $a$  and  $b$  are respectively 0.64 and 0.11.

The results indicate that the subjects show 42 percent more charity concerns when they are matched with an in-group member compared to an out-group matching. The replication of Chen and Li (2009)’s result in charity concerns is the first result of the paper. The null hypothesis that there is no effect of group membership on the distribution preferences of the participants is rejected. In table 1.4, we present the result of uncertainty treatment and discuss the impact of group uncertainty on distribution preferences.

Recall that in uncertainty treatment, the participants have an option to decide whether they want to see the identity of their counterpart(show) or not(skip). In table 1.4, the first panel presents the results for the participants who decide to skip the choice to see the group of their counterpart. The second panel of the table shows

Table 1.4: Distribution Parameters for Uncertainty Treatment

	Charity	Envy					
	$\rho^{Sk}$	$\sigma^{Sk}$					
Uncertainty-Skip (N=64)	0.42 0.05***	-0.11 0.06*					
	out-group Charity $\rho_O^{Sh}$	out-group Envy $\sigma_O^{Sh}$	in-group Charity $\rho_O^{Sh}(1+a^{Sh})$	in-group Envy $\sigma_O^{Sh}(1+b^{Sh})$	Identity parameters $a^{Sh}$ $b^{Sh}$		
Uncertainty-Show (N=64)	0.27 0.06***	-0.16 0.09*	0.27	-0.02	0.012	-0.8792	
					0.4418	0.46011*	

the distribution parameters for the subjects who have clicked on the button to know the identity of their counterparts.

**Result 2** *Skip and Control: The uncertainty in the group membership enhances the charity behaviour. The charity concerns are significantly higher when the subjects decide to stay ignorant about the group membership of their counterparts in comparison with the control group. Unknown group membership of the matched player does not influence envy.*

Support. Result 2 compares the distribution parameters in the uncertainty treatment for the participants who do not click to learn the group identity with the control group. In both cases, the participants have no information about the matched player’s group identity when they make their choices. In the control sessions, there is no introduction of group identity, however, in the skip sessions, the subjects have the group identity, but they decide to stay ignorant about the identity of their counterparts. Table 1.4 shows the parameters of this comparison. While we do not observe any significant difference in the parameter of envy between the control and the skip sessions, the charity concerns increase from  $\rho = 0.24$  in the control sessions to  $\rho = 0.42$  in the skip sessions (statistically significant at 5 percent level).<sup>5</sup>

This result suggests that ”groupness” enhances the charity concern in the two-person games. The participants who are primed to group identity help their matched player more than the subjects who have not been introduced to group identity. This increase in charity concerns

<sup>5</sup>The envy parameter changes from  $\sigma = -0.14$  in the control treatment to  $\sigma = -0.11$  in the skip case of uncertainty treatment.

is irrespective of the group membership of the subjects' matched player. Moreover, the uncertainty in the group identity of the subject's counterpart does not change the envy significantly. Thus, there is the higher weight on the matched player's payoff for charity if the subjects are primed the group identity.

**Result 3** *Skip and Show: Participants exhibit greater charity concerns if they decide to stay ignorant about the group membership of their counterparts (skip). The revelation of group membership of the subjects' counterpart (show) does not influence the charity concerns, but significantly reduce the envy toward an in-group member.*

Support. Result 3 suggests that there is a significant effect of group uncertainty on envy toward an in-group member. The participants who decide to click and learn the group identity of their counterparts show 87 percent less envy if it turns out that they are matched with an in-group member. On the contrary, the revelation of group membership of the matched player's identity does not influence the charity concerns. The charity parameter  $\rho$  does not change significantly if the subjects skip the counterpart's identity choice compared to the revelation of the matched player's identity.

Moreover, there is no significant change in envy between in-group and out-group if the subjects learn the identity of their counterparts. The weight on the in-group matching is almost the same as the out-group matching for the charity concerns. More importantly, the weight on the in-group matching is less if the subjects learn the identity of their counterparts who turns out to be an in-group member in comparison with no revelation of the matched player's group identity. This result suggests that the subjects help their matched player more if they skip the identity choice. The revelation of counterparts' group identity decreases the charity concern irrespective of any possible matching.

**Result 4** *Show and Certainty: The option to know the counterpart's group identity does not influence charity and envy concerns toward an out-group member. However, it reduces charity concerns for an in-group member significantly, and this reduction*

*is higher in envy.*

The charity parameter for an in-group member in the certainty treatment,  $\rho_I^C = 0.42$  is significantly higher than the charity parameter for an in-group matching in the uncertainty treatment,  $\rho_I^{Sh} = 0.27$ . However, revelation of the counterpart's identity decreases the level of envy toward an in-group member to  $b^{Sh} = -0.87$ . This parameter is significantly smaller than  $b^C = 0.11$  in the certainty treatment (t-test).

#### 1.4.4 Reciprocity

In this section, we examine the effect of uncertainty in the group membership on reciprocity. We use the logit model for player B's data to study the positive and negative reciprocity formally. In the set of games, there are different types of response game to explore the reciprocity level. The positive reciprocity is related with the good intention of player A to enter the game when entering the game is in favour of player B. Contrary, games with the negative reciprocity demonstrate a bad intention of player A when entering the game reduce the player B's payoff.

We study the effect of uncertain group identity on reciprocity on three types of response games. Player A's decision to enter the game might be seen as negative or positive intention depending on the nature of the games. In the first type, there is no difference in player B's payoff when player A enters the game. In the second and third types, player A shows respectively good and bad intention by entering the game.<sup>6</sup>

Player B decides to reward player A if she perceives entrance to the game as a good intention. Alternatively, she might make player A pay a cost if there is a perception of a negative intention. We use three explanatory variables to measure reciprocity in these three types of games; B's cost to reward A, A's benefit from the reciprocal behaviour of B and B's payoff lag when B rewards A. B's cost to reward is the difference between her payoff from the reciprocal action and the alternative. Player A's benefit from B's reciprocal behaviour is the payoff that A obtains if B chooses the reciprocal choice. Player B's payoff lag is the measurement of the difference

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<sup>6</sup>For The complete description of games look at the table 1.1.

between B and A's payoffs when player B has a lower payoff and has decided to reward player A. In the positive reciprocity games; player B gets a lower payoff by rewarding A. Thus we can examine the effect of envy on positive reciprocity.

Table 1.5: Positive reciprocity

	Control	T1 NoInteraction	T1 Interaction	T2 Skip	T2 Show	T2 Show Interaction	T2 Click NoInteraction	T2 Click Interaction
cost	0.1 (0.32)	-0.49 (0.23)*	-4.78 (1.91)*	-0.3 (0.48)	-0.07 (0.29)	-2.1 (2.03)	-0.35 (0.38)	-2.15 (2.34)
benefitA	0.01 (0.05)	0.09 (0.04)*	0.07 (0.24)	0.16 (0.06)**	0.18 (0.06)**	0.29 (0.33)	0.09 (0.06)	0.29 (0.3)
Bbehind	-0.03 (0.07)	-0.23 (0.06)**	-1.37 (0.47)**	-0.17 (0.12)	-0.08 (0.07)	-0.6 (0.48)	-0.15 (0.09)	-0.89 (0.55)
Ingr		-0.02 (0.07)	-6.38 (3.51)		0.1 (0.11)	-21.26 (3.71)**	-1.09 (0.78)	-4.61 (3.32)
cost_ingr			4.57 (2.69)			0.59 (3.00)	0.41 (0.55)	1.61 (2.4)
benefitA_ingr			0.62 (0.32)*			5.39 (0.37)**	0.19 (0.10)	0.85 (0.44)
Bbehind_ingr			0.51 (0.66)			0.54 (0.70)	0.09 (0.13)	0.31 (0.60)
click							-0.07 (0.11)	-2.49 (3.37)
cost_click								0.93 (2.55)
benefitA_click								0.19 (0.37)
Bbehind_click								0.4 (0.66)
_cons	-0.19 (0.4)	0.39 (0.31)	5.29 (2.60)*	-0.01 (0.58)	-0.56 (0.45)	1.16 (2.71)	0.21 (0.48)	2.27 (2.89)
N	80	160	160	57	100	100	157	157

\*`cost_ingr`, `benefitA_ingr` and `Bbehind_ingr` study the interaction between variables and ingroup dummy. `cost_click`, `benefitA_click` and `Bbehind_click` investigate the interaction between variables and click dummy.

**Result 5** *There is less likely to reward player A when the subjects learn their counterparts' identity. However, the participants are more reciprocal if they skip the identity information choice. The revelation of counterparts' group identity reduces the likelihood of punishment for both in-group and out-group matching. The participants are more likely to punish an in-group member if they decide to learn their counterparts' group identity.*

Table 1.5 and 1.6 exhibits the results of logit model for player B's positive and negative reciprocity respectively. The tables show the factors that affect the likelihood of reciprocity behaviour from player B. The coefficients are normalised to 100 tokens in the regressions.

Table 1.5 discuss the result of logit model for the control group (column 2) and certainty treatment (column 3). Column 4 presents the group contingent effect interacting each of covariates with the in-group dummy. The result of uncertainty treatment for the subjects who decide not to learn (skip choice) and learn the identity (show choice) are presented in column 5 and column 6 respectively.

We further investigate the group-contingent for the subjects who decide to learn the identity of their counterpart (show) in column 7 and 8 and its interaction with the dummy click (click-contingent effect) in column 9. Independent variables cost`ingr, benefitA`ingr, Bbehind`ingr present the interaction between the variables with in-group dummy. Moreover, cost`click, benefitA`click and Bbehind`click investigate the interaction between all variables with click dummy.

Firstly, we replicate the result of Chen and Li (2009) for all three explanatory variables. The effect of the cost of rewarding and payoff gap between player A and B are significantly higher than Chen and Li (2009)'s result (respectively -0.49 and -0.23  $p < 0.05$  and  $p < 0.01$ ). Furthermore, in the uncertainty treatment, the participants who do not learn their counterparts' identity are more likely to reward their matched players. Compared with certainty treatment, the participants who skip the counterparts' identity information choice, are more likely to reward even if there is a cost to reward or if there is a gap between their payoff and player A's payoff.

Thirdly, column 7 shows the interaction of explanatory variables and an in-group dummy for the subjects who learn the identity of their counterparts. A 100 increase in the tokens in the benefit of player A increases the likelihood of rewarding player A. In other words, player B's choice of rewarding depends on the consequence of her decision for player A.

There is a distributional effect of group uncertainty on the positive reciprocity. Player B cares about the difference between her payoff and player A's payoff. If rewarding player B makes her payoff less than player A, there is less likely to help player A. We have presented this result in column 3 in which there is 23 percent less probability of rewarding if B's payoff is less than player A in the certainty treatment ( $p < 0.05$ ). The gap between player B and A's payoff seems to be less effective in the uncertainty treatment. Specifically, there is 8 percent decrease in the likelihood of rewarding if player B click to learn the identity of player A. The difference between uncertainty treatment (show) and certainty treatment is significant ( $p < 0.10$ ). This result suggests that there is less decrease in rewarding if there is a gap in payoff between player B and A's payoff and player B choose to learn the identity of player A.

Column 3 of table 1.5 present the explanatory variables for the group-contingent effect. The coefficient of benefits A is statistically significant at 5 percent level. This coefficient shows that player B is more likely to reward player A if player B's choice has a higher effect on player A and player A is from the same group. This intuition is indicated by the marginal effect of interaction between benefitA and an in-group dummy variable (0.62,  $p < 0.05$ ). We do not find an adverse impact of envy toward an in-group member as the interaction between in-group dummy variable and BbehindA is 0.51(not statistically significant).

Column 7 presents the marginal effect of the interaction term (in-group) and the revelation of counterparts' identity (show choice). The interaction between the in-group dummy and the subjects who have learnt the identity of player A is statistically significant when the choice of player B's choice benefits player A (5.39, $p < 0.01$ ). Moreover, the difference between certainty treatment (show choice, benefitA and in-group dummy) and uncertainty treatment (benefitA and in-group dummy) is statistically significant( $p < 0.01$ ). This result suggests that when B choose to learn the identity of A, she is more likely to help if her choice benefits A.

Column 6 and 7 shows the logit specification for uncertainty treatment with and without interaction term of uncertainty, the click dummy. The coefficient of the interaction term, click with cost, benefitA and BbehindA shows that it is more likely to reward player A if player B learn the identity of player A (0.93,0.19 and 0.40 respectively, not significant).

Table 1.6 presents an analysis of the certainty and uncertainty treatments for the negative reciprocity games. Player B's cost to punish, the damage to player A if B punishes and the payoff gap if B punishes are explanatory variables for the negative reciprocity analysis. We construct these variable based on the relative payoff of player B to A. Player B's punishment gets her payoff less, equal or higher than A's payoff. Therefore, there is a trade-off between negative reciprocity and charity behaviour. In table 1.6, we present the result of negative reciprocity for control session in column 1, certainty treatment in column 2 and uncertainty treatment in column 3 to 7.

Column 2 of table 1.6 shows that there is a reduction in the likelihood of an in-group member punishment by 10 percent (not statistically significant). These

results indicate that player B is less willing to punish player A if player A is from the same group. The cost of punishment and the effect of punishment on B and A's payoff is effective in the decision of punishment by player B. In the certainty treatment, when there is an increase in the cost of punishment for player B, it is less likely that player B punishes player A (-0.30,  $p < 0.01$ ). The potential damage to player A's payoff by 100-token increases the likelihood of punishment by 4 percent. Similar to positive reciprocity, decision to punish is affected by the distribution of payoffs. It is less likely to punish if player B has a higher payoff than player A. An increase in the gap between player B and A's payoff with a higher payoff for player B decreases the probability of punishment by player B by eight percent<sup>7</sup>.

In uncertainty treatment, the cost to punish seems to have a significant effect on the participants' behaviour. For the subjects who decide not to learn the identity of their counterparts, the punishment decreases from 30 percent to 2 percent ( $p < 0.05$ ). The differences in the punishment are not significant if it damages player A's payoff and if player B's payoff is higher than player A's payoff.

If the participants click on the button to learn the identity of player A (show) and their counterpart turns out to be an in-group member, there is a higher reduction in the likelihood of punishment (column 5, -0.18,  $p < 0.05$ ) compared with certainty treatment (-0.10, 0.08). Column 6 presents the interaction between explanatory variables and an in-group dummy for player B who decide to learn the identity of player A. These results show that revelation of the counterpart's identity affects the likelihood of punishment directly (-2.77) and indirectly through interaction with the distribution preference and the cost of punishment. The interaction term of the in-group dummy and the cost of player B affect the likelihood of punishment significantly (9.42,  $p < 0.01$ ). This suggests that if the subjects learn the identity of their in-group match, they are susceptible to the cost of punishment. The marginal effect of interaction between the in-group dummy and 100-token damage to player A's payoff is -4.16 ( $p < 0.01$ ). This indicates that clicking to learn the group identity of the counterpart increases the likelihood to punish an in-group member.

Column 8 presents the marginal effect of interaction between the in-group dummy and explanatory variables. It shows that learning the matched player's identity af-

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<sup>7</sup>The coefficient is not significant.

fects the likelihood to punish (0.15). It also influences the likelihood to punish indirectly through interaction with the cost of punishment (-0.48), damaging player A's payoff (-0.33) and if B's payoff is ahead of player A's payoff (-0.33)(All statistically significant at 5 percent level). This result suggests that revelation of the counterpart's group identity reduces the likelihood of punishment for both the in-group and out-group matching.

Table 1.6: Negative Reciprocity

	Control	T1 NoInteraction	T2 Skip	T2 Show NoInteraction	T2 Show Interaction	T2 click NoInteraction	T2 click Interaction
cost	-0.02 (0.01)**	-0.3 (0.06)**	-0.02 (0.01)*	-0.1 -0.07	-1.29 (0.57)*	-0.22 (0.07)**	-0.19 (0.06)**
damageA	0.07 (0.03)*	0.04 -0.07	0.06 -0.03	0.06 -0.07	1.15 -0.88	0.2 -0.11	0.51 (0.15)**
Bahead	0.05 (0.02)*	-0.08 -0.08	0.04 -0.02	0.03 -0.09	0.35 -0.94	0.07 -0.11	0.35 (0.10)**
ingr		-0.1 -0.08		-0.18 (0.07)*	-2.77 -4.5	0.4 -0.62	0.1 -0.16
cost_ingr					9.42 (0.68)**	0.03 -0.09	0.01 -0.02
damageA_ingr					-4.16 (1.26)**	-0.14 -0.17	-0.04 -0.05
Bahead_ingr					5 (1.36)**	-0.11 -0.17	-0.03 -0.04
click						-0.02 -0.08	1.62 0
cost_click							0.15 (0.06)**
damageA_click							-0.48 (0.15)**
Bahead_click							-0.33 (0.11)**
.cons	-0.23 0	-0.02 -0.23	-0.2 0	-0.25 -0.24	-3.5 -3.08	-0.67 -0.37	-1.74 (0.49)**
N	64	128	55	74	74	126	126

\***cost\_ingr**, **benefitA\_ingr** and **Bbehind\_ingr** study the interaction between variables and ingroup dummy. **cost\_click**, **benefitA\_click** and **Bbehind\_click** investigate the interaction between variables and click dummy.

### 1.4.5 Socially Welfare Maximization(SWM)

In this section, we study the effect of group uncertainty on the social-welfare-maximisation (henceforth) action. We present the percentage of the proportion of the participants who have chosen SWM action for all treatments. We exclude game Dict5 as the SWM action in this game is the same as two choices. The results and tests for results are presented in table 1.7 to 1.10.

Table 1.7 presents the percentage of the participants who choose the SWM action. This table shows the results for player A, player B and all players. There is an in-group(column 2) and out-group matching(column 3) for the certainty and uncertainty treatment(column 6 and 7) as well as control sessions(column 3) and skip the counterpart identity (column 4). Table 1.8 presents the p-value for the binomial

proportion in the certainty and the control sessions. Column 1 displays the p-value for the matching if the subjects choose SWM when they play with an in-group member versus out-group member. Column 2 reports the p-value for the test of SWM action in control sessions versus the in-group matching. The last column presents the p-value for the test of the proportion of alternative hypothesis that participant in control sessions are more likely to choose SWM action than out-group matching. Table 1.9 presents similar result as table 1.8 for the certainty treatment, p-value for the test of the proportion of SWM choice within the uncertainty treatment. All p-values are measured based on the standard error at the individual level.

**Result 6** (*Social Welfare Maximization*): *Both player A and B are significantly more likely to choose SWM outcomes if they do not click to learn the group identity of their counterparts' identity. This result is true for the subjects that decide to click the button and learn their matched player's identity who turns out to be an in-group member. The revelation of counterparts' group identity enhances the likelihood of choosing SWM outcome. Moreover, we replicate in-group favoritism in choosing SWM choice in the literature. Participants are more likely to choose SWM decision if they are matched with an in-group member.*

Table 1.10 reports the p-value for the test of likelihood of SWM choice in the certainty and uncertainty treatments. Column 3 and 4 present the p-value for the likelihood of SWM action in the certainty and uncertainty treatment for the in-group and out-group matching. Column 2 gives the test for the alternative hypothesis that SWM action for the subjects who skip the identity revelation choice is higher than the control sessions. Column 3 and 4 test the difference between in-group and out-group matching in the certainty and uncertainty treatments.

Table 1.7(column 5 and 6) shows that 56 percent of the participants choose the SWM action if they decide to stay ignorant about the identity of their counterparts. There is 61 percent of SWM choice for the subjects who choose to learn the identity of their counterparts who turns out to be an in-group member. These percentages are significantly higher than certainty treatment. The test of these differences presented in table 1.10, where the p-values are statistically significant at 1 and 10 percent level. This result suggests that the participants are more willing to choose SWM choice if they skip the identity revelation option. This result is right for the subjects

who decide to learn the identity of their counterparts and figure out that they are matched with an in-group member. The percentage of the participants who choose to learn the identity and pick the SWM choice is the highest across all treatments and the control sessions.

We also find that participants are more likely to withdraw SWM outcome if they are matched with an out-group member. The proportion of SWM choices is around 35 percent for both certainty and uncertainty treatment. This percentage is lower than the control sessions and the uncertainty treatment with out-group matching. In the uncertainty treatment, while subjects are more willing to choose SWM outcome if they skip the identity choice, there is no significant difference between skip and in-group matching (Table 1.9 for uncertainty treatment).

Table 1.7: Proportion of SWM Decision and Uncertain Group Identity

Matching conditions						
	Cer-Ingroup	Cer-Outgroup	Control	Uncer-Skip	Uncer-ShowIngr	Uncer-Showoutgr
Player A	0.47	0.36	0.45	0.56	0.54	0.35
Player B	0.53	0.45	0.51	0.57	0.66	0.49
Overall	0.50	0.41	0.48	0.56	0.61	0.43

Table 1.8: Test for Certainty Treatment

	Ingroup > Outgroup	Ingroup > Control	Control > Outgroup
Player A	0.03	0.37	0.0636
Player B	0.07	0.33	0.1569
Overall	0.01	0.31	0.0341

Table 1.9: Test within Uncertainty Treatment

	Ingroup_Show > Outgroup_Show	Ingroup_Show>Skip	Skip>Outgroup_Show
Player A	0.0068	0.5788	0.0019
Player B	0.0094	0.0945	0.1109
Overall	0.0003	0.1975	0.0023

Table 1.10: Test Certainty and Uncertainty Treatment

	Skip > Control	Ingr_Show>Ingr_T1	outgr_Show>outgr_T1
Player A	0.2145	0.1533	0.566
Player B	0.0803	0.0236	0.2718
Overall	0.0643	0.0145	0.3552

## 1.5 Conclusion

The literature on social identity theory is enormous in the social psychology. The psychologists have tried to explain the variety of behaviours like commitment, prejudice and social competition using social identity theory. Haslam (2004) applies social identity theory to the range of behaviours like conflict management, group performance and industrial protest. In economics, however, social identity has been introduced by Akerlof and Kranton (2000) as a seminal work in the social identity. They incorporate social identity into the economic model for the labour market.

More recently, there is empirical work by Chen and Li (2009) to investigate the effect of social identity on the economic choices. They aim to measure the impact of social identity on the social preferences. There is still a scope to study the relationship between social preferences and social identity more deeply. The economic choices under uncertainty of the counterpart's group identity help to understand the effect of social identity on social preference. Social identity and social preferences have potential to be investigated further. This study sheds light on the critical issues like how general and robust social preference is. This study does so by introducing uncertainty on group identity and measure the effect of this uncertainty on social preferences.

In this experiment, we follow minimal group paradigm by using the random assignment to create groups in the laboratory. In other-other allocation, the subjects allocate a certain amount of tokens to their in-group and out-group members in five rounds. This task is followed by self-other allocation using 12 allocation games sequentially. Data from these games are used to address the research question. The effect of uncertain group identity on social preferences is studied from three aspects: Distribution preferences, reciprocity and social-welfare-maximisation actions.

We replicate the result of Chen and Li (2009) experiment on distribution. In certainty treatment, there is in-group favouritism and out-group discrimination. The charity concerns are higher if the subjects play with an in-group member and lower if they are matched with an out-group member. However, we do not observe much differences in envy for the in-group and out-group matching. The uncertainty in the group identity of the counterparts implies different choices depends on the subjects' decision to learn their matched player's identity. We find that the subjects

who decide to stay ignorant about the group identity of their counterparts show higher charity concerns for their matched player. While the charity concerns of the subjects who decide to learn the counterparts' identity are not significantly different from the certainty treatment, there is a significant reduction in envy toward an in-group member.

We also present the result of the effect of group uncertainty on reciprocity preferences. We find that revelation of the counterparts' group identity reduces the likelihood of punishment irrespective of the group membership. Moreover, the skip of the counterparts' identity information reduces the likelihood of punishment significantly. This reduction is right for the subjects who decide to learn the identity of counterpart and are matched with an in-group member. The likelihood of rewarding matched player is higher when the subjects skip the revelation identity information choice.

Lastly, we find that learning the identity of counterpart generates a higher choice of SWM action. The subjects choose SWM actions if they decide to click on the button and learn the identity and their matched player turns out to be an in-group member. The choice to skip the counterparts' identity makes a higher percentage of SWM action compared to the out-group matching. We found a significant difference in choosing the SWM action for uncertainty treatment in comparison with the control and certainty treatment.

This study is different from psychology and economics literature on several vital points. Firstly, we have used a variety of games in the experiment that enable us to study subjects' behaviour from different aspects. The selection of games includes the games with the highest difference between the in-group and out-group matching in the literature. This selection helps to test the effect of uncertainty on group identity in an accurate design. Secondly, the uncertainty in the group identity and its impact on social preferences investigates the robustness and strength of social preferences. Lastly, we have monetary incentives as payment protocol and no deception in the experimental design.

This paper makes following contribution to the economic literature of social identity and social preference. Firstly, we make a replication of the in-group favouritism and out-group discrimination in the social psychology and economic's literature of

the social identity. We show that random assignment of groups is enough to create differences in the choices for the in-group and out-group matchings. The result of group assignment suggests that simple categorisation creates group effect. Secondly, we replicate the finding of Chen and Li (2009) on the impact of group identity on social preferences. We show that the identity is an effective element in increasing the likelihood of SWM and reducing the likelihood of punishment.

More importantly, we contribute to the information acquisition of group identity and its effect on the social preference. We find that voluntary choice of identity is effective in enhancement of SWM actions and reduction of the likelihood of punishment. The results suggest that the optional revelation of group identity information makes the effect of identity sharper. There is a higher percentage of SWM outcome if subjects are given a choice to know the identity of their matched player. Moreover, uncertainty in the identity of counterpart does not undermine the social preferences of the players.

There are interesting areas for further research in group identity. On the theory part, a formulation of uncertainty in group identity and its application in the economic decisions would help to understand the effect of optional information of group identity on economic organisations. This area of study would also be fruitful to incorporate group uncertainty into social preference models to have a more comprehensive picture of economic behaviour with identity. Empirically, it would be interesting to investigate the effect of uncertainty in social identity on different organisational settings.

# Chapter 2

## Group Identity and Hidden Payoffs

### Chapter Abstract

We study the effect of uncertain payoff on the subjects' other-regarding behaviour in the presence of group identity. While people show in-group favouritism in both transparent and hidden payoffs treatments, they do not exploit this uncertainty to satisfy the self-interested desires. This result suggests that the subjects choose the other-regarding choices, even when they have an option to stay ignorant about the counterparts' payoffs and play selfishly.

## 2.1 Introduction

Experimental evidence shows the subjects' concerns for other's wealth, even when there are not any strategic motivations for selfish behaviour. The individuals prefer to share some of their monetary payoffs to others in one-shot dictator game with an anonymous recipient. Camerer (2003) shows that the average giving across all the experimental dictator games is over 20%. In most of the dictator game, the dictators transfer positive amount to the recipient. Henrich et al. (2001) have collected data for response game from 12 countries in 4 continents. They show that mean offer to the recipient is between 26-58 percent. In the double-blind anonymity of recipient in the dictator game, the positive amount of transfer is replicated Hoffman et al. (1996).

This pattern of altruistic behaviour across experimental games has been interpreted by behaviour economist as other-regarding behaviour [Kahneman et al. (1986), Bolton et al. (1998), Cason and Mui (1998), Forsythe et al. (1994)]. The recent experimental studies argue that altruistic behaviour highly depends on the context of giving. For instance, an increase in the level of anonymity lower the generous behaviour (Hoffman et al. (1996) and possibility of taking away instead of giving declines the rate of generosity [List (2007), Bardsley (2008)]. In Dana et al. (2006) and Lazear et al. (2012), sharing in the dictator game decreases by 40 to 50 percent when the subjects have an option to play or opt out. Dana et al. (2007) makes a mechanism in which the dictators have an excuse to choose the self-interested outcome. They show that such excuses reduce the number of fair choices.

On the other hand, the literature on social identity and social preferences show that the group identity increases pro-social behaviour. Chen and Li (2009) reports that when the individuals are matched with an in-group member, they show 47 percent more charity concerns and 93 percent less envy. The likelihood of choosing socially-maximising-outcome is also significantly higher with an ingroup member. This result is consistent with the in-group favouritism and the outgroup discrimination in the social psychology literature [Tajfel and Turner (1986), Hogg (2002), Tajfel and Turner (1979)].

Studies on contextual altruism suggest that it might not be a preference on other's payoff that leads to fair or generous choices. Instead, there might be other situational

motives such as feeling compelled, image concern or desire to be seen unfair that drive generous behaviour [Dana et al. (2007), Tirole and Bènabou (2006)]. While Self-image concern has also been replicated by experimental studies [Ariely et al. (2009)], there is still a question as to what extent this situational clue affect pro-social behaviour? Could this result be replicated with a broader range of games and in richer moral context? What are effective situational pieces of information that make people behave pro-socially consistently?

In this paper, we investigate the effect of group identity on uncertain payoff in a range of dictator and response games. We ask; does the group identity prevent the subjects from using excuses to implement self-interested outcome as we see in Dana et al. (2007). Does lower level of anonymity motivate people to avoid excuses (uncertainty in payoffs) and keep the level of fair choices? Does the “moral wiggle room” get eliminated if the subjects play with an in-group member? Or the participants use “moral wiggle room” and choose self-interested outcome even in the context of group identity.

We believe that the introduction of group identity in the context of altruistic behaviour contributes to the literature in two senses. Firstly, the literature on group identity shows that group identity is an important element in altruistic behaviour and improve social preferences [Chen and Li (2009)]. Moreover, information on the counterpart’s identity is a more realistic form of interaction. Social psychology literature shows that people readily and rapidly make a group identity of themselves and others.

We use Dana et al. (2007) mechanism to test the effect of group identity on uncertain payoff matrix. They manipulate transparency in dictator game and show that this manipulation change people’s behaviour. They claim that decreasing transparency in dictator game would create what they call “moral wiggle room” for the dictator to behave selfishly. Dana et al. (2007)’s experiment shows that reduction in transparency lowers the rate of generous behaviour. <sup>1</sup>

We apply hidden information treatment from Dana et al. (2007) to a range of dictator and response game with group identity. The hypothesis is that altruistic behaviour in the presence of group identity is higher because Chen and Li (2009) show

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<sup>1</sup>This result is confirmed by Larson and Capra (2009). They have run the experiment using double-blind anonymity.

that group identity enhances charity concern and reciprocity. Also, the hypothesis is that response game is less manipulatable since subjects have more relevant information about their counterpart, contrary to dictator game.

We replicate the result of, other-regarding behaviour for an in-group member, group favouritism and out-group discrimination in transparent treatment when payoff matrix is clear to subjects. Although revealing information is costless, only 50 percent of the subjects have opened the envelope to see the actual payoff matrix. There is no significant change in other-regarding behaviour from transparent treatment to hidden payoff treatment.

## 2.2 Experimental Design

In this section, we present the design of the experiment. The experiment aims to study the effect of identity on the use of moral wiggle room. We study the change in choices from pro-social to more self-interested outcome in the presence of group identity. This experiment has two treatments, Transparent(T) and Hidden Information treatment(H). While the transparent treatment has the transparent payoff in all games, transparency is relaxed in uncertainty treatment. Subjects participate in both transparent then hidden-information treatment. We use strategy method in both treatments asking the subjects to decide for both in-group and out-group matches.

We try to explore the effect of uncertainty in payoffs when the subjects have information on group identity of their counterparts compared to the treatment when they do not have this information. In-group favouritism and out-group discrimination imply that the subjects who know the group membership of their counterpart choose to see the payoff of their counterpart if the matched player is from the same group. In contrary, there is expected to be less willing to learn the payoff of the counterpart who belongs to the other group.

### 2.2.1 General procedures

Subjects are undergraduate students at Allameh Tabataba'i University in Iran. Subjects participate voluntarily in the experiment in the classroom of economic depart-

ment. We've had the total number of 93 subjects in 7 sessions and number of participants varies in each session. At the beginning of each treatment, the experimenter instructs the subjects. Then, they are asked to make their choices in all games. Pen and paper are used for the experiment and decisions are recorded in the sheet by writing the decision in front of each box. Subjects are not paid for the experiment, and they do not receive any feedback until the end of the experiment.

The subjects were instructed that they would be playing the set of two-person games. First, the instruction for transparent treatment is presented, and subjects are asked to make their choices for dictator and response games separately. Then, instruction for hidden-info treatment is given and, subjects choose their choices for the set of games. Roles in games are randomly assigned to subjects for each game.

### **2.2.2 Structure of the Games**

We use a set of games to study the pro-social behaviour of individuals when they play with ingroup and face uncertainty payoff. Games have been chosen from Charness and Rabin (2002) and significant work in group identity and social preference by Chen and Li (2009). Game set includes dictator games and different types of response game; player B with the same payoff for different outcomes, player B sacrifice to help player A and player B sacrifice to hurt player A. Games with highest difference between ingroup and outgroup in Chen and Li (2009) has been selected.

Games have been selected in such a way there is a trade-off between self-interested outcome and other-regarded outcome. In each game, subjects need to choose the outcome for two matching scenarios; in-group and out-group. They write down their choices for each of the choices separately. Payoffs are adjusted to Iran's currency to keep the same ratio as in Charness and Rabin (2002). The table below shows the details of games in the experiment.

After receiving the instruction subjects complete one quiz by playing one game to assure that the payoff and games are fully understood. They play this quiz at the beginning of each treatment, and the experimenter addresses any question. The subjects are then given the papers representing games, envelopes including the payoff tables and any necessary information to describe the treatment.

Table 2.1: Two Person Sequential Games

ID	Games	A stays out	If A enters, B chooses
Two person dictator game			
1	Dictator 1		(4000,8000)vs.(13000,7000)
2	Dictator 2		(4000,14000)vs.(12000,12000)
3	Dictator 3		(0,16000)vs.(8000,8000)
Two person response game			
4	Res 1	(15000,0)	(8000,8000)vs.(15000,7000)
B's payoff identical			
5	Resp 2	(15000, 0)	(8000,8000)vs.(15000,8000)
6	Resp 3	(9000,18000)	(4000,8000)vs.(8000,8000)
B's sacrifice helps A			
7	Resp 4	(15000,2000)	(6000,12000)vs.(14000,10000)
8	Resp 5	(0 ,16000)	(0 ,1600)vs.(8000,8000)
B's sacrifice hurts A			
9	Resp 6	(15000,15000)	(16000,4000)vs.(0,2000)

### 2.2.3 Treatments

This experiment has two treatments; Transparent(T) and Hidden-Info(H). We run 7 session and subjects participate in both treatments. In both treatment, subjects make choice for both ingroup and outgroup match for all 9 games. Player B is instructed that player A has decided to enter the game. In all games, we study player B's choice. While in transparent treatment, payoff table is transparent for all games, in hidden-information treatment subjects have an option to stay ignorant on the payoff for the matched player. We study player B's decision to investigate the effect of identity on uncertain outcome.

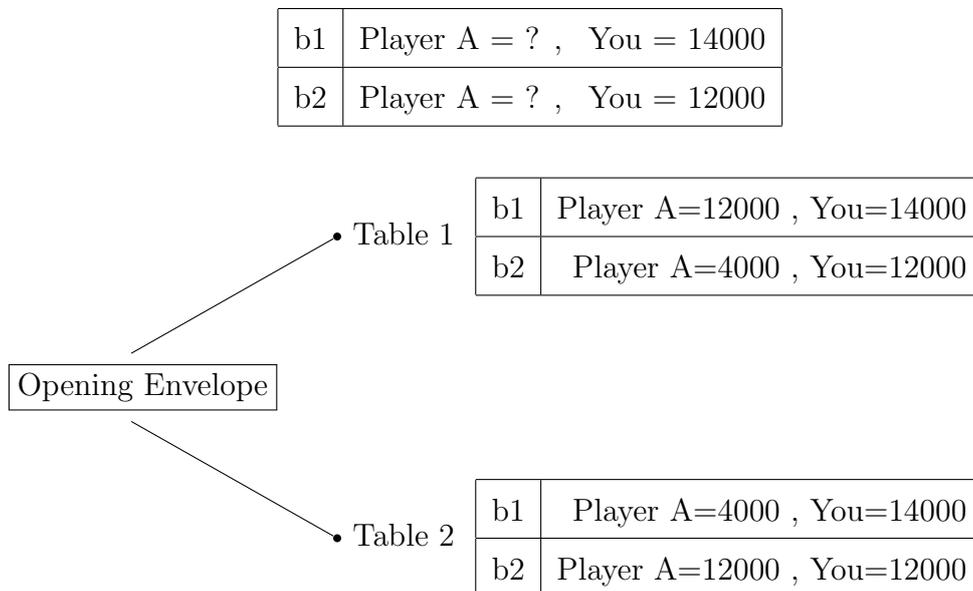
Subjects participate first in the transparent payoff. The payoffs for the decision maker (player B) and the matched player (player B) is known to the decision maker. Player B choose between outcome b1 or b2. In (T) treatment there is transparency between the action and the outcome. Subjects choose between two options, and the payoffs reflect their decision. The table below demonstrates the choices that decision maker faces in (T) treatment.

b1	Player A = ? , You = 14000
b2	Player A = ? , You = 12000

In hidden-information treatment, the decision maker has full access to her payoff,

but the payoffs for the matched player is not revealed. The table below shows the decision that player B faces for dictator game 2. Player B does not have access to player A's payoff until she opens an envelope to see the full payoff table. The subjects are told that a coin determines counterpart's payoffs before the session. As a result of the coin flip, there might be one of two tables in the envelope, Table 1 or Table 2. Therefore, subjects are instructed that by opening the envelope, they will have access to the full payoff table. Table 1 is the same as the table in (T) treatment, and table 2 is the table that assures higher payoff for both players under outcome b1. Outcome b1 and b2 in payoff table one and two are designed in such a way that there is always 50 percent probability of having the same table as (T) treatment if they open the envelope.

Subjects are instructed that there would not be the public release of the true payoff, thus matched player would never know if the decision maker has opened the envelope. But Player A knows that player B would have the option to open the envelope.



## Results

In this section, we discuss the result of the experiment. We first present results for each treatment separately then show the result of both treatments. Recall that in transparent treatment there is no uncertainty with payoffs for player A, however, in

hidden-payoff treatment, the payoff for the matched player is unknown for player B until she decided to open an envelope and see the payoffs. Results are presented based on self-interested versus other-regarding outcomes.<sup>2</sup>

Table 2.3 presents the result of Transparent Treatment. While a more substantial number of subjects choose fair outcome when they are matched with ingroup members, most of the participants choose the self-interested outcome when they play with outgroup member. The number of self-interested choices varies in each game, so table 2.3 demonstrates the subject-game decisions. This number is the total number of subject that have picked self-interested outcome in all settings of games.<sup>3</sup> On average 44% of the participants choose self-interested outcome when they play with ingroup, and 54% percent of subjects prefer self-interested outcome matching with outgroup members.

Kindness toward ingroup is in line with the result of previous sharing experimental studies [Camerer (2003) in chapter 2, Dana et al. (2007)]. Also, the difference between ingroup and outgroup matching is significant. It is consistent with the result of social identity experiments in economics and social psychology. Social identity experiments show that subjects discrimination between ingroup and outgroup matching in giving behaviour [Chen and Li (2009), Tajfel and Turner (1986), Yamagishi and Kiyonari (2000)].

**Result 1: We replicate the result of other-regarding behaviour for in-group matching. A majority of participants choose other-regarding outcome when they match with in-group members. There is the significant difference between in-group and out-group matching in choosing the self-interesting outcome. The participants are more kind with in-group members than out-groups.**

**Result 2: 50.6 percent of all participants across all games decide to open the envelope and see the full payoff matrix. This behaviour is in spite of the fact that player Bs could costlessly open the envelope and see the payoff matrix.** In hidden-info treatment, subjects do not see the payoff of player A, but they have an option to open an envelope they are given to see

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<sup>2</sup>In Game 1 to 8 all b1 choices attributed to the self-interested outcome and b2 decisions as an other-regarding outcome. Table 2.1 demonstrates the games and the difference between outcomes. We exclude game 9 for this part of the result.

<sup>3</sup>The separate result for each game is presented in the appendix.

Table 2.2: Self-interested Outcome in Transparent Treatment

Group Matching	Ingroup	Outgroup
Number of Subjects/Game	329	400
Percentage	0.44	0.54

the payoff of the matched player. By opening the envelope, the subjects might face matrix 1 (the same as the transparent treatment) or matrix 2 (which implies dominant strategy).<sup>4</sup> All subjects are given the envelope, and they have the chance to open the envelope. Out of 827 choices of revealing the payoff table, there is 419 case of opening the envelope across all games. There are only 50.6% of the subjects who decide to open the envelope containing the payoff matrix. This result shows that almost half of subjects prefer to stay ignorant although revealing the payoff matrix is free.<sup>5</sup>

**Result 3: While there is no difference between in-group and out-group matching when player B stays ignorant about player A’s payoff, revealing the payoffs significantly decreases selfish behaviour, both for in-group and out-group matching.**

Table 2.4 presents the result of hidden-info treatment for in-group and out-group matching. Reveal in the table related to the subjects who have opened the envelope to see the full matrix of payoffs and not-reveal is for subjects who have avoided the envelope and decide base on their payoff. Participants who have not revealed to see the complete payoff matrix are 42% for both in-group and out-group matchings. Since player Bs have not opened the envelope, they decide only based on their payoff, and they do not make any discrimination between in-group and out-group.

For participants who reveal the payoff matrix and face precisely the same payoffs as in transparent treatment, 10% chose the self-interested outcome when they match with in-group and 13% with out-groups. The difference between in-group and out-group choices is not significantly different (chi-square = 4.56, p= 0.06), but there is a significant difference between hidden-info treatment and transparent treatment

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<sup>4</sup>For the full description of choices they face and the matrices please look at table 5.2 in the appendix.

<sup>5</sup>Result of revealing the matrix by opening the envelope is presented in the appendix in Table 8.

(chi-square = 2.44, p= 0.03). Self-interested decisions have decreased from 44% to 10% for in-group and from 54% to 13% for out-group.

Table 2.3: Self-Interested outcome for Hidden-Info Treatment for

Matching	Not Reveal		Reveal	
	Ingroup	Outgroup	Ingroup	Outgroup
Matrix 1	42%	42%	10%	13%
Matrix 2			21%	19%

The within treatment design enables us to track subjects' behaviour across treatments. Out of all 93 subjects across nine games, 24% chose socially desirable outcome with in-group in the transparent treatment and decided not to open the envelope and stay ignorant in the hidden-info treatment. Moreover, 18(2%) of player Bs across games who have changed their behaviour from socially desirable outcome in transparent treatment to self-interested outcome in hidden information treatment when they are matched with in-group and face the same matrix payoff. This number is almost the same for out-group matching in hidden-info treatment.<sup>6</sup> This result suggests that the proportion of participants who have changed their behaviour from socially desired outcome to self-interested outcome is not significant.

**Result 4: There is only 2 percent of the subjects across games which have changed their behaviour from socially desired outcome to self-interested outcome when they play with in-group. There is no significant difference between in-group and out-group matching in changing this behaviour. Also, there is 24 percent of the subject who chose SDO in transparent treatment and did not reveal the payoff matrix in hidden-info treatment.**

Set of games in the experiment allows us to analyse the participants' decisions from different aspects. As Table 1 shows, there are three types of response games. The first category are the games in which player B does not suffer any cost to help or punish player A. The second category of the response games includes all games that player B needs to abandon her payoff to help player A. In the third category, player B requires to incur a cost if she wants to punish player A.

Table 2.5 below reports the result of participants' choices for different treatments.

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<sup>6</sup>Details of this case for each game separately is presented in table 9 in the appendix.

Each number in the table shows the percentage of the subjects who have made this choice. There is more participant who sacrifices their payoff in the hidden info treatment when they decide to know the identity of matched player and face matrix one (53%) than transparent treatment(46%)(chi-square = 6.45, p= 0.035). Similarly, subjects' help their in-group matched more in hidden info treatment(80 %) than transparent treatment(63%)(chi-square = 5.25, p= 0.04) when the payoff for player B is equal. A Smaller percentage of the participants' give up their payoff to hurt in-group matches in hidden info treatment(21%) than transparent treatment(43%). The subjects discriminate in favour of the in-group matching in all games.<sup>7</sup>

**Result 5: Participants' are more likely to help and less likely to hurt their in-group counterparts in hidden-info treatment than transparent treatment. This suggests that optional revelation of counterpart's payoffs enhances helping the in-group match. Difference between in-group and out-group is significant across the treatments, and the subjects help the in-group members more than a member of the out-group.**

Table 2.4: Treatments and the Participants' decisions

	Sacrifice to Help		Help with Equal Payoffs		Sacrifice to Hurt	
	In	Out	In	Out	In	Out
Transparent	0.46	0.57	0.63	0.43	0.39	0.42
Hidden info-Matrix 1	0.53	0.41	0.80	0.67	0.21	0.43
Hidden info-Matrix 2	-	-	0.81	0.72	-	-

## 2.3 Conclusion

Experimental studies on the malleability of altruistic behaviour show that subjects' motives for the generous outcome are not based on other-regarding preference. Instead, manipulation of action in experimental design, specifically in the dictator game, lead to more self-interested choices. These works suggest that image concern of not being seen as unfair and feeling compelled are important elements in altruistic behaviour.

On the other hand, the literature on group identity demonstrates that group

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<sup>7</sup>Except sacrifice to help in the transparent treatment. This difference changes reversely in the hidden info treatment.

identity enhances pro-social behaviour. People have more charity concerns and less envy for ingroup members and are more willing to choose the socially maximising outcome. Also, people show more reciprocity in strategic games when they play with ingroup members Chen and Li (2009). Social identity literature in economics discovers the effect of external forces like social norms to shape people's behaviour. People's behaviour depends on what actions are accepted in the society as an appropriate behaviour [Akerlof and Kranton (2000), Krupka and Weber (2009), Croson and Shang (2005)].

To test the possibility of using moral excuse to choose the self-interested outcome, we combine these two elements. In other words, we introduce group identity to a range of dictator and response game with the relaxation of transparency in payoffs. Subjects are provided with an option to keep others ignorant about their decision while they are playing with their ingroup and outgroup members. We study the effect of identity information on the usage of the excuse of unknown payoff matrix to implement self-interested outcome. We investigate the generalizability of contextual altruistic behaviour in the environment of more strategic games with identity matching.

We replicate the result of social psychology in-group favouritism and out-group discrimination. People behave more pro-socially when they are matched with ingroup and choose more self-interested outcome matching with the out-group. Only 50 percent of participants open the costless envelope to reveal matrix payoff.

Participants who do not reveal the payoff matrix, do not make different choices between in-group and out-group. When subjects reveal the payoff matrix, they do not use uncertainty in the payoff to implement self-interested outcome. There only 2 percent of the participants who choose fair outcome in transparent treatment and change their choice to self-interested outcome in hidden information treatment. The difference between other-regarding behaviour in transparent treatment and hidden information treatment is not significant.

The participants are more willing to abandon their payoffs to help their in-group counterparts. The sacrifice of payoffs to help the in-group match player is higher in the hidden-info treatment compared to the out-group match. While the subjects hurt the in-group counterpart less in the hidden-info treatment, the percentage of

hurting choice of out-group match does not change significantly over treatments.

Our work is different from previous studies, and tries contribute to the literature in several aspects. Firstly, we introduce group identity to decision-making context for altruistic behaviour. We aim to study the effect of group identity on the elimination of “moral wiggle room”. Secondly, we propose the wide range of games that include dictator and response games. Most of the experimental works in altruistic behaviour focus on dictator game, however, this behaviour could be studied with more strategic games. Thirdly, our design is within treatment which enables us to track subject’s decision across treatments. Lastly but not the least, this study an experiment with the student in the classroom that makes the design closer to field experiment with real groups.

# Chapter 3

## Robustness Test of “Moral Wiggle Room”

### Chapter Abstract

We design an experiment to study the robustness of Dana, Weber, and Kuang’s (DWK), (2007) result. They find that the manipulation of the dictator game to relax one-to-one map between the dictators’ actions and outcome significantly decrease fair behaviour. The data of this within-subjects experiment confirms DWK’s findings. In Contrary to DWK’s result, we find 10% higher choice of self-interested outcome in the hidden information treatment. In overall, 27% of the subjects deviate from their fair choice of transparent treatment in the hidden-information treatment.

### 3.1 Introduction

The subjects in various experimental research show concern for others’ benefit. Dictator game is the most precise game to show the altruistic behaviour in which dictator distribute an endowment between herself and receiver in a one-shot decision. The receiver must accept the distribution, and there is no strategic motivation for the dictator to allocate an endowment to the receiver. Camerer (2003) shows that a majority of subjects have strong tendency to give a positive amount to the receiver. The average amount of giving in dictator game is over 20%. Double-blind anonymity shows that dictator gives more than zero to an unknown recipient (Hoffman et al. (1994)).

Experimental results on the altruistic behaviour in the dictator game depends on the context that the game is being played. The seminal work in the contextual altruistic behaviour by Hoffman et al. (1996) demonstrates that increasing the level of anonymity reduces the dictators' allocation of the endowment to a recipient. Also, the dictators' giving declines when there is a possibility to take from the recipient List (2007). This result shows that the variation of dictator choice set changes the giving behaviour of the dictators. Introduction of taking from partner's endowment decrease the level of generosity in the dictators' decisions Bardsley (2008).

In a significant work on contextual altruistic behaviour, Dana et al. (2007) (henceforth DWK) design an experiment in which the dictators are given various excuses to choose the selfish outcome. The participants are given an option of either staying ignorant about the consequences of their decisions or click on a button to access information on how their choice would influence their partners' payoff. They reduce the level of transparency on the cause of self-interested choices by introducing the excuses to dictators' decisions. They show that decreasing transparency lower the number of giving and create more selfish behaviour. In the presence of the costless option, almost half of the subjects decide to stay ignorant about the effect of their decision on their counterparts' payoffs and choose the selfish outcome. The number of fair choices decreases dramatically from the treatment where the subjects did not have an option to stay ignorant.

Dana et al. (2007) argue that there might be other important motives for the altruistic behaviour that cannot be captured by solely monetary payoffs. The situational pressure like feeling compelled might be the main force to drive such fair choices, and in the absence of transparency in consequence of the decisions, this apparent generosity is changed to selfish behaviour. They report that "... people feeling compelled to give due to situational factors, while not valuing the corresponding outcomes." (p.77). These findings have a substantial effect on the interpretation of altruistic behaviour and the discussion on the motivation of other-regarding choices. In the first part of this paper, we test the robustness of DWK's results.

This experiment tests the robustness of DWK's results to the different pool of the subjects and a change in experimental design. In a difference with DWK's experiment, we conducted a within-subjects experiment that allows subject to make

choices sequentially across treatments. Within-treatment has a higher power to show the change in the choices across the treatments. Since we track the subjects' choices, we could see the decision in the transparent treatment and if there is any change in the hidden-information treatment. Also, the within-subject design enables us to collect more data in the experiment which makes the statistical analysis more powerful.

We study the effect of uncertainty in the payoff matrix of the counterparts on the subjects' choices. The game that the subjects play in this experiment is the same as second treatment of Dana et al. (2007). We have run this experiment at Tehran University in Iran. While in DWK's experiment, the participants are paid, we do not have financial motives in this experiment. The use of non-financial motivations is not considered as a major difference between two experiment as the psychological motives in a classroom experiment is enough for the effort exertion (Jalava et al. (2015)). Moreover, there is no payment in the hypothetical choices for the dictator in DWK experiment.

Our results confirm the robustness of Dana et al. (2007)'s result with more selfish choice in the transparent treatment and lower level of revealing the game in the hidden information treatment. Tracking dictator's decision across two treatments shows the change in their decision from transparent treatment to the hidden information treatment. Approximately 27% of the subjects choose the fair outcome in transparent treatment but decide to strategically use the uncertainty in the hidden-information treatment to implement self-interested outcome. These number of the subjects are higher than DWK's experiment. However, the difference in result is not statistically significant.

## 3.2 Experimental Design

In this section, we present the experimental design and the result of robustness test for DWK's experiment. While DWK's design is between treatment, we have run within treatment design to observe changes in the subjects' choices over treatments. We use the second treatment of DWK design adjusting monetary payoffs to the local money. The subjects are a total of 97 undergraduate students from the department

of economics at the University of Tehran. The students participate in the experiment voluntarily at the end of their lectures. There are five sessions in total, and at the beginning of each session, the instruction is presented to participants.<sup>1</sup> The subjects are not paid for their choices and at the end of the experiment leave the experiment venue.

There was not any interaction between the subjects, and they played the game independently. The subjects who were acting as dictators were told that there is another group of students who are potential receivers. A role of either the dictator (Player A) and the receiver (Player B) was assigned randomly to the subjects, and they were instructed that dictators and receivers will not know each other even after the experiment to satisfy anonymity condition. The dictators decide the allocation of payoffs to her own and the receiver. We made similar payoff matrices for the subjects by converting DWK's payoffs to Iran's currency using approximated current exchange rate. Therefore, the proportion of payoffs are the same as Dana et al. (2007)'s experiment.

### **3.3 Treatments and Conditions**

#### **3.3.1 Baseline Treatment**

Our baseline treatment is the same as DWK's baseline treatment with the difference that we did not use the computer interface and used pen and paper. The subjects were told that they would participate in a dictator game with an anonymous receiver who is in the other room and they will never know each other. At the beginning of the experiment, the participants were instructed how to play the dictator game. Also, the subjects were given the payoff matrix below and explained how the payoffs for the dictators and receivers are determined. Then, the dictators are asked to make the decision either choice A or B. The payoff matrices are the same as Dana et al. (2007) experiment and only payoffs were converted to Iran's currency.

In the transparent treatment, the payoffs are public information for both dictators and receivers. Therefore, the dictator has complete information on the consequence

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<sup>1</sup>Participants have been chosen from different years of study, but most of them are the first year. The experimenter team believe that lower level of economics especially game theory would lead to the collection of more natural data.

of his action and the receiver knows that the dictator is the sole cause of her payoff received. As we see in matrices, there is a conflict between the dictator and the receiver in matrix 1. In the matrix one choice, A is the self-interested outcome for the dictator (Player X) as it ensures higher payoff for her (The dictator gains 18 units, and the receiver receives three units). For the choice B, both players receive the equal amount of 15 units of the currency. The dictators sacrifice three units less than choice A, and the receiver(Player Y) receives 15 units. We see that there is a conflict of interest in this game. The dictator has to sacrifice her payoff to help the receiver.

<b>Player X's Choice</b>	<b>A</b>	X:18000 Y:3000
	<b>B</b>	X:15000 Y:15000

### 3.3.2 Hidden-Information Treatment

Hidden information treatment was run within treatment with pen and paper, otherwise, is the same as second treatment in DWK's experiment. The instructions were given to the subjects along with a sealed envelope which has the actual matrix of the game. The payoff matrices below show the payoff matrix of the dictator game in hidden-information treatment. The dictators face the payoff matrix that their payoff is presented but the receivers' payoff is unknown.

Payoff Matrix in Hidden Information Treatment

<b>Player X's Choice</b>	<b>A</b>	X:18000 Y:?
	<b>B</b>	X:15000 Y:?

If the subjects decide to see the actual payoff matrix, they need to open the envelope and see the payoff matrix. The payoff matrix might be one of the matrices below. There is a conflict of interest in the matrix 1, and this matrix is the same as in transparent treatment. On the other hand, in matrix 2, the payoff for player X and Y are in line, and both of them earn the higher payoff when choice A is chosen.

The participants do not know which of matrices is in the envelope before they open it, but they were told that the matrix had been determined by a flip coin before the experiment starts. In both matrices, player X's payoff is the same in both choices, but the player Y payoff varies.

Matrix 1

<b>Player X's Choice</b>	<b>A</b>	X:18000 Y:3000
	<b>B</b>	X:15000 Y:15000

Matrix 2

<b>Player X's Choice</b>	<b>A</b>	X:18000 Y:15000
	<b>B</b>	X:15000 Y:3000

The dictators had to decide if they want to see the full actual payoff table before they make their choice. If the dictators do not want to see the actual payoff table, they do not open the envelope and choose without knowing the receiver's payoff (the First table where the payoff for player Y is unknown). This result suggests that the dictators strategically decide to stay ignorant about the receiver's payoff. If the dictators decide to see the payoff matrix with the receiver's payoff, then she opens the envelope, where she sees the appropriate matrix (one of the matrices above), and choose either choice A or B. The order of the treatment are swapped to avoid any order effect in the result. <sup>2</sup>

### 3.4 Result

Table 1 below shows the result of comparison between the transparent and the hidden information treatment. Number and proportion of the subjects that decide to see the full payoff matrix and the corresponding proportion in the transparent treatment are presented. As it is shown in Table 1, 46 subjects out of 72 (64%)

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<sup>2</sup>Instructions of two treatments is in Appendix.

decided to choose outcome B which has equal payoffs for dictator and receiver in the transparent treatment. Although this percentage is 10 percent less than Dana et al. (2007) but the difference is not significantly different (Fisher Exact Test,  $p = 0.5877$ ).

Treatment	Proportion choosing A	Proportion revealing payoffs
Transparent	26/72 (%36)	-
Hidden Info-Matrix 1	25/40 (%63)	24/40 (%60)
Hidden Info-Matrix 2	24/32 (%75)	16/32 (%50)

Table 1: Comparison of Baseline and Hidden Information Treatments

Actual Payoffs	Information acquisition choice	Proportion choosing A
Matrix One	Chose to reveal (24/40 , %60)	10/24 (%42)
	Chose not to reveal (16/40 , %40)	15/16 (%94)
Matrix Two	Chose to reveal (16/32 , %50)	13/16 (%81)
	Chose not to reveal (16/32 , %50)	11/16 (%69)

Table 2: Allocation of Choices by Revealing of Choices in Hidden Information Treatment

Actual Payoffs	Information acquisition choice	Proportion choosing A
Matrix One	Chose to reveal (8/16 , %50)	2/8 (%25)
	Chose not to reveal (8/16 , %50)	8/8 (%100)
Matrix Two	Chose to reveal (10/16 , %63)	9/10 (%90)
	Chose not to reveal (6/16 , %38)	4/6 (%67)

Table 3: DWK Experiment: Allocation of Choices by Revealing of Choices in Hidden Information Treatment

In hidden information treatment, 40 subjects out of 72 (56%) decided to reveal the game by opening the envelope. Although opening the envelope has no cost, only 56% decided to see the actual payoff matrix. This number is the aggregate number of people who had chosen either outcome A or B, in the transparent treatment. This result is the same as DWK.

In total in the hidden-information treatment, 32(44%) of the dictators preferred not to reveal and choose based solely on their payoff. From these 32 subjects, 18 had chosen outcome A in baseline game, and 14 had chosen outcome B in the transparent treatment. These 14 subjects(19.4%) are people who changed their behaviour from the transparent to the hidden information treatment. This 19.4%

percent are the subjects who decide to stay ignorant and choose the self-interested outcome strategically.

Among subjects who had chosen outcome B in the transparent treatment (46), 32(70%) decided to reveal. Among these subjects, 18 of them faced table 1(same as the transparent treatment), and 13(72.2%) chose the fair outcome and 5(27%) of them preferred to choose outcome A. This 27 percent are the subjects who use what DWK call “Moral Wiggle Room” to implement self-interested outcome. <sup>3</sup>

Table 2 presents the choices in the hidden-information treatment separated on the revealing and actual payoff matrices that the subjects face. 60% of the subjects who face matrix 1 decided to reveal the payoff matrix. This percentage is not statistically different from DWK’s experiment (Fisher Exact test,  $p=0.5584$ ). From these subjects who revealed and faced the payoff matrix 1, 42% chose outcome A. This percentage is higher than DWK experiment (25%), but the difference is not statistically significant (Fisher Exact test,  $p=0.65$ ). This result suggests that in this experiment, more subjects revealed the actual payoff and chose the selfish outcome.

The subjects who faced matrix 2, 16 subjects (25%) decided to reveal the game. 13 subjects (81%) of them chose outcome A. The difference with the result of DWK is not significant (Fisher Exact test,  $p=0.54$ ). Also, 11 subjects (68%) chose outcome A, although they have not revealed the game. This percentage is also the same a DWK.

Table 1 shows the use of “Moral Wiggle Room” by the subjects when the payoff matrix is uncertain. Around 27% of the subjects who chose fair outcome in transparent treatment used the excuse, either not to reveal the game or reveal the game and choose the self-interested outcome, to implement self-interested choice.

### 3.5 Discussion

In this experimental study, we investigate the robustness of Dana et al. (2007)’s experiment with two changes in the implementation of the experiment. Different from DWK’s experiment, we use the within-subject design to investigate the change in the subjects’ decision. We were concerned that the between-treatment design

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<sup>3</sup>Details of the statistical analysis for the overall transparent and hidden-information treatment is presented in the appendix.

does not capture the effect of uncertainty in the payoff matrix. Within-treatment design can show the choices in transparent and hidden information treatment and show the change in the choices across treatments for all subjects.

In particular, we examine if the change in the result of strategic ignorance is robust in the within-subject treatment. Also, there is no financial payment for this experiment which is the same as the hypothetical choices in DWK experiment but different from the dictator choices.

We design an experiment to let the subjects to make their choices for the transparent treatment and the hidden-information treatment sequentially. We could observe the subjects' choice and changes in their decision across two different treatment. We observed that, in confirmation of DWK's result, a majority of the participants, whenever they get the chance, decide to stay ignorant about their counterparts' payoffs and choose the self-interested outcome.

From the subjects who had chosen outcome B (fair outcome) in the transparent treatment (46 subjects), 14(30%) decided not to reveal the game. More importantly, 15 subjects (32%) chose outcome A (self-interested outcome) in the hidden information treatment and 19 subjects(41%) implemented fair outcome. Percentage of fair choices in this experiment is slightly more than Dana et al. (2007)'s experiment which shows that more people stay with their fair outcome in the baseline game.

In comparison with Dana et al. (2007)'s experiment, we find a higher percentage of the participants who choose self-interested outcome after revealing the actual payoff matrix of their counterparts. This result suggests that within-subjects design sharpen the effect of uncertainty in matched players' payoff. We observed the change in the choices of the subjects in around 27% of the participants.

Thus, we find that DWK's results are robust to the change in experimental design. Our replication of the results of DWK put forward more question on the motivations of altruistic and fair behaviour that are observed in the lab. Further experimental studies needed to investigate the effect of situational pressure, self-image and other external factors on pro-social behaviour. From theoretical points of view, a comprehensive theoretical model has to explain such changes in the choices of subjects in the lab.

# Chapter 4

## Fehr-Schmidt Preferences and Prospect Theory: A Model for Dana et al. (2007)'s experiment

### Chapter Abstract

Dana, Weber and Kuang(2007) show that various justification in the dictator game influence the generous behaviour. The result of their experiment exhibits that in such “moral wiggle room”, there is a dramatic reduction in givers behaviour. We combine prospect theory with Fehr-Schmidt preferences(FS) to understand the result of their experiment. We show that the decision to reveal the receiver's payoff in the dictator game depends on the value of advantageous inequity coefficient,  $\beta_d$ . While for the value of  $\beta_d > \frac{1}{5}$  utility of revealing the payoff and fair outcome is higher, the dictator chooses self-interested outcome irrespective of revealing decision for  $\beta_d < \frac{1}{5}$ . We do not find any difference between the model of prospect theory and expected utility and FS preferences.

### 4.1 Introduction

The literature on altruistic behaviour shows that the experimental subjects have an apparent concern for the wealth of their counterparts. The simplest experimental game to show this altruistic behaviour is dictator game, where the receiver must accept the dictators' decision of allocations. The studies show that the dictators al-

locate positive amount (over 20%) of their endowment to the receiver, even with the implementation of double-blind anonymity [Camerer (2003), Hoffman et al. (1996)]. Charness and Rabin (2002) show in an experiment with a set of games including dictator games that the dictator sacrifice their own payoff to increase the social wealth.

Social preference theories aim to explain the altruistic behaviour with an assumption that the subjects have a preference for other's welfare. The subjects share with others because they prefer the equitable outcome and they are inequity averse [Fehr and Schmidt (1999), Bolton and Ockenfels (2000)] or their utility increases by an increase in others' payoffs [Andreoni (1990); Andreoni and Miller (2002)]. Also, the subjects prefer to maximize the socially efficient outcomes or the lowest payoff [Charness and Rabin (2002), Engelmann and Strobel (2006)].

More recent research on altruistic behaviour shows that giving in the dictator game depends on the situation and context in which this game is being played. Hoffman et al. (1996) show that an increase in the anonymity of the subjects reduces the generosity. The possibility of taking from the counterpart decline giving significantly and most of the subjects take from their partner [List (2007), Bardsley (2008)]. Dana et al. (2007) find that various excuses for selfish behaviour increase the choice of self-interested outcome and have a significant effect on the number of givers.

Dana, Weber and Kuang(2007)(henceforth DWK) argue that there are other motives for altruistic behaviour that cannot be captured with monetary payoffs. Their experiment shows the effect of situational pressure on altruistic behaviour. They show that in the absence of one-to-one map between the dictators' actions and the outcome, the participants use the "Moral Wiggle Room" to implement self-interested outcome. They claim that this experiment cannot be explained by modelling utility over the monetary payoff. The preference of subjects are the same across treatments and yet the choices are different in the transparent and hidden-information treatment.

In this chapter, I make an attempt to understand the result of "Moral Wiggle Room" from the theory point of view. To achieve this aim, I combine Fehr/Schmidt preferences and cumulative prospect theory with an exogenous reference point in

order to find an explanation for the result of Dana et al. (2007)'s experiment. In the model, Fehr-Schmidt preferences (FS Henceforth) is the dictator's utility function and prospect theory as the decision theory. Fehr-Schmidt preference is a great tool among behavioural theories to explain the other-regarding preference. This theory, in particular, helps to explain the behaviour of the dictator in the dictator game (Fehr and Schmidt, 1999). To make a comparison between the decision theories, we solve the model for expected utility and prospect theory.

We find that the model of FS preferences and prospect theory presents a solution of thresholds for the advantageous inequity parameter of FS preferences,  $\beta$ , beyond which subjects choose the self-interested outcome. This threshold for the dictators is  $\beta = \frac{1}{5}$ . In the other words, for any  $\beta$  less than  $\frac{1}{5}$ , the dictators choose the outcome that ensures higher payoffs for themselves. This result is intuitive as higher  $\beta$  means the participants show higher concern for others and they are expected to choose the fair outcome. We also find that the threshold of FS preferences in the prospect theory model is not different from the expected utility model. To incorporate the role of the receiver's expectation, we consider the expected payoff as an exogenous reference point for the dictators.

In the next section, a brief review of FS preferences is given. In section 3, the model of FS preferences and expected utility for DWK's experiment is presented. Section 4 reviews the main concepts of prospect theory presents the model of DWK's experiment for prospect theory.

## 4.2 Fehr-Schmidt Preferences

We combine FS preferences and prospect theory to make a model to understand altruistic behaviour for DWK's experiment. Before we present the model for DWK's experiment, we briefly review FS utility function since the dictators are assumed to have an inequity aversion utility function. FS model of other-regarding behaviour capture fairness consideration of the subjects as well as their self-interested preferences. The experimental studies show that the subjects not only care about their own payoff but also have concern for the other subjects' payoffs [Kagel and Roth (2016); Camerer and Thaler (1995)]. Moreover, the subjects cooperate with their

partners even when cooperation does not ensure the highest payoff for them [Dawes and Thaler (1988); Ledyard (1994)].

Fehr and Schmidt (1999) present a social preference model in an attempt to explain the observed pro-social behaviour in the lab. The model is a self-centred inequity aversion that considers the fairness concerns as part of the subjects' utility function. These individuals have the tendency toward the equitable outcome and unequal outcome with the others regards as dis-utility. The effect of relative payoff on the subjects' decisions has been studied in the seminal experimental research in psychology too [Adams (1963); Babcock et al. (1996)].

The formal model of inequity aversion is as follows:

$$U_i(x_i, x_j) = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\} \quad i \neq j \quad (4.1)$$

Where  $U_i$  is the utility of player  $i$  when there are two player ( $i \in \{1, 2\}$ ),  $x_i$  and  $x_j$  are the monetary payoff for player  $i$  and  $j$ . In the utility function  $\alpha_i$  and  $\beta_i$  are advantageous and disadvantageous coefficients ( $\alpha_i \geq \beta_i$  and  $0 \leq \beta_i \leq 1$ ). The second term in the utility function is the disadvantageous inequality and the third term measures the dis-utility from advantageous inequality of payoffs. The utility function shows that the individuals suffer from inequality and they lose more if the players they are worse off than the other player. The model demonstrates that the subjects' have a tendency toward egalitarian payoff.

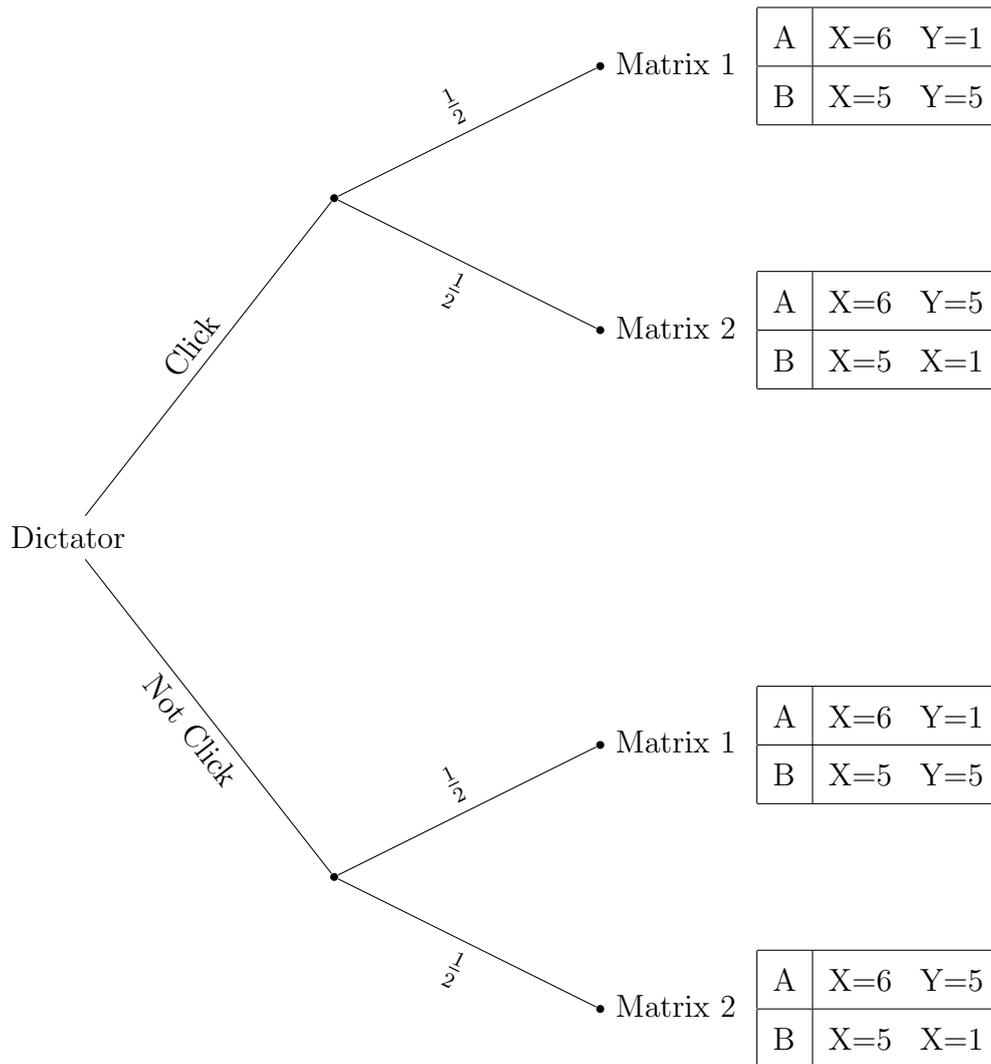
### 4.3 The model: FS Preferences and Expected Utility

In this section the model of expected utility and FS preferences of Dana et al. (2007) experiment is presented. DWK experiment has four treatments. In the baseline treatment, the subjects' payoff matrix is transparent for both dictator and receivers. The dictators have to choose between two choices A and B by clicking one of them. In choice A and B, the dictator receives \$6 and \$5 while the payoffs for the receiver are \$1 and \$5 respectively. In three other treatments, the dictators

play the dictator game with eliminate of the transparency between dictators' choice and the outcome. Our model studies the second treatment of DWK's experiment.

In the second treatment, the receivers' payoffs are uncertain for the dictators. Same as the baseline treatment, each dictator receives \$6 for choice A and \$5 for choice B. However, the dictators do not know the receivers' payoff for choices A and B but they are informed that the receiver's payoff was determined prior to the experiment by flipping a coin. The subjects are told that the payoffs for the receivers might be \$1 and \$5 (same as the baseline) or \$5 and \$1 that choice A makes both players better off. The dictators are given a button to click if they intend to know the receivers' payoffs. Alternatively, the dictators could skip the button and choose choices A or B without knowing the receiver's payoff. Before clicking, the dictator has probabilistic beliefs on the payoff matrices she might be presented with.

Figure 1 below shows the structure of the dictator game in the second treatment of DWK experiment. If the dictator clicks on the button, he observes payoff matrix that includes the dictators and receivers' payoff. His choice depends on the payoff matrix that is observed after clicking. While there is no uncertainty in payoffs after clicking, the dictator has an expectation of which payoff matrix she might face prior to the clicking decision. On the other hand, skip of the clicking makes the dictator ignorant about the payoff matrix and make her choice based on her own payoff. The probability of appearing each payoff matrix on the screen is  $\frac{1}{2}$  since it is determined by tossing a coin. Each case of the dictator's decision is considered separately.



X=Dictator's payoffs

Y=Receiver's payoffs

### 4.3.1 Case 1: Click and Observe matrix 1

When dictator clicks and faces matrix 1, the utility for choosing outcome A is :

$$U_A = 6 - (6 - 1)\beta_d = 6 - 5\beta_d \quad (4.2)$$

Where  $\beta_d$  is dictator's advantageous coefficient.

In equation (4.2),  $U_A$  is Fehr-Schmidt utility when the dictator chooses outcome A. 6 and 1 are dictator's and receiver's payoffs respectively and we have only  $\beta_d$  terms as dictator's payoff is bigger than receiver's payoff. Similarly choice B's utility

is :

$$U_B = 5 - (5 - 5)\beta_d = 5 \quad (4.3)$$

Where  $U_B$  is dictator's expected payoff for choosing outcome  $B$ , 5 and 5 are dictator and receiver's payoffs respectively. Outcome  $B$  is fair outcome here since dictator and receiver's payoffs are the same and there is no inequality in their payoffs.

Comparing equation (4.2) and (4.3) gives an interval for  $\beta_d$ . Dictator would choose outcome  $B$  (fair outcome) if her utility of choosing  $B$  is bigger than choice  $A$ 's utility:

$$U_B \geq U_A \quad (4.4)$$

$$5 \geq 6 - 5\beta_d$$

$$\beta_d \geq \frac{1}{5}$$

If  $\beta_d > \frac{1}{5}$  the dictator's utility in choice B is bigger than A and she chooses fair outcome (outcome  $B$ ).

### 4.3.2 Case 2: Click and Observe matrix 2

For the case of click and observe the payoff matrix 2 For this case, the expected utility for outcome  $A$  is:

$$U_A = 6 - (6 - 5)\beta_d = 6 - \beta_d \quad (4.5)$$

and expected utility of choosing outcome  $B$  is:

$$U_B = 5 - (5 - 1)\beta_d = 5 - 4\beta_d \quad (4.6)$$

The choice A of the matrix 2 makes both players better off. The utility of the dictator and the receiver are higher in choice  $A$  compare to  $B$ . It can be shown by comparing equation (4.5) and (4.6).

$$U_A \geq U_B$$

$$6 - \beta_d \geq 5 - 4\beta_d \implies \beta_d \geq -\frac{1}{3}$$

In Fehr and Schmidt preference  $0 \leq \beta_d < 1$  therefore the interval is always valid. The dictator always chooses outcome  $A$  as a dominant strategy.

### 4.3.3 *Utility of Clicking*

In the case of clicking, as it is shown above, the dictator chooses outcome  $A$  if she observes payoff matrix 2. However, the dictator's decision depends on the  $\beta$ , when she observe payoff matrix 2. Therefore the utility of clicking is the expected utility of these two cases depends on the value of  $\beta$ . The probability of observing each payoff matrix 1 or 2 is  $\frac{1}{2}$ . For the small  $\beta_d$ , the dictator choose outcome  $A$  than implement self-interested outcome, irrespective of the payoff matrix observed.

$$U_c = \frac{1}{2}(6 - 5\beta_d) + \frac{1}{2}(6 - \beta_d) \quad \text{when } \beta_d \leq \frac{1}{5} \quad (4.7)$$

When  $\beta_d > \frac{1}{5}$  the dictator chooses outcome  $B$  if he observes payoff matrix 1. The dictators' payoff function for clicking is as follows:

$$U_c = \frac{1}{2}(5) + \frac{1}{2}(6 - \beta_d) \quad \text{when } \beta_d > \frac{1}{5} \quad (4.8)$$

Th utility of clicking depends on the value of the dictator's  $\beta$ :

$$U_c = \begin{cases} 6 - 3\beta_d, & \text{if } \beta_d \leq \frac{1}{5} \\ \frac{1}{2}(5) + \frac{1}{2}(6 - \beta_d) = 5.5 - \frac{\beta_d}{2}, & \text{if } \beta_d > \frac{1}{5} \end{cases} \quad (4.9)$$

### 4.3.4 *Utility of not Clicking*

If the dictator skip the click button, she decides to choose outcome  $A$  or  $B$  and she does not know the receivers' payoff. The dictator does not aware of the actual matrix and her utility depends on the probabilistic expectation of occurrence each matrix. The dictator's utility for outcome  $A$  is:

$$U(nc, A) = \frac{1}{2}(6 - 5\beta_d) + \frac{1}{2}(6 - \beta_d) \quad (4.10)$$

Where probabilities for facing matrix 1 and 2 are equal to  $\frac{1}{2}$ .

$$U(nc, A) = 6 - 3\beta_d \quad (4.11)$$

Similarly, dictator's utility for outcome  $B$  depends on the actual matrix is:

$$U(nc, B) = \frac{1}{2}(5) + \frac{1}{2}(5 - 4\beta_d) \quad (4.12)$$

$$U(nc, B) = 5 - 2\beta_d$$

Comparison of these two expected utility functions shows the dictator's best strategy :

$$U(nc, A) > U(nc, B) \quad (4.13)$$

$$6 - 3\beta_d > 5 - 2\beta_d$$

$$\text{therefore, } \beta_d < 1$$

$\beta_d$  is always between 0 and 1 thus this inequality is always satisfied. This implies that the strategy (nc, A) is the best strategy for the dictator if she skipped the click button.

### ***Clicking Decision***

The dictator's decision on clicking depends on the value of  $\beta_d$ . As we showed above, the threshold for  $\beta_d$  determines the dictator's choice. There are two intervals for the value of  $\beta_d$ :

Case I) For  $\beta_d < \frac{1}{5}$ : Equations (4.7) and (4.10) show the utility of clicking and not clicking for  $\beta_d < \frac{1}{5}$ . The utility of clicking and not clicking are equal ( $U_c = U(nc, A)$ ), there for the dictator is indifferent between choice  $A$  and  $B$ .

**Proposition 1** *For small value of  $\beta_d$  ( $\beta_d < \frac{1}{5}$ ) utility of choice  $A$  and choice  $B$  are the same. Thus, the dictator is indifferent between clicking and not clicking and she chooses choice  $A$  in both cases. Choice  $A$  implies higher self-interested payoff for*

the dictator as the small value of  $\beta_d$  associated with fewer concerns for the receivers' payoff in the dictator's utility function.

Case II) If the value of  $\beta_d$  is larger than  $\frac{1}{5}$ , the utility of clicking is higher than not clicking:

$$\text{Dictator's comparison for making decision} = \begin{cases} U_c = 5.5 - \frac{\beta_d}{2} & \text{if } \beta_d > \frac{1}{5} \\ U(nc, A) = 6 - 3\beta_d & \end{cases} \quad (4.14)$$

The decision to click and choose fair outcome implies:

$$U_c > U(nc, A) \quad (4.15)$$

$$\beta_d > \frac{1}{5}$$

**Proposition 2** *For the the value of  $\beta_d$  bigger than  $\frac{1}{5}$ , the utility of choice B after clicking is bigger than choice A and not clicking. The large value of  $\beta_d$  implies the concerns for the receiver's payoff that leads to clicking and choosing choice B.*

## 4.4 The Model: FS Preferences and Prospect Theory

In this section the model of Fehr-Schmidt preference and prospect theory for Dana et al. (2007) experiment is presented. This model enables us to compare the result of two different decision theories. Before we present the model for DWK's experiment, we briefly review the prospect theory.

### 4.4.1 Prospect Theory

To work out theoretical proof of the experiment, we would need to briefly explain main features of prospect theory. Two main differences between prospect theory and expected utility are the probability weighting function and loss aversion. Prospect theory was first presented with Kahneman and Tversky(1979). Evidence shows

that the subjects underweight probable outcomes in comparison with a certain outcome. Kahneman and Tversky (1979) argue that the decision makers attach different weights for different outcomes depending on the risk associated with the outcome. Thus, calculation of the final payoffs depends on the weighting function corresponds to the decision. In the model for DWK's experiment, for simplicity of the model, we consider the objective probabilities instead of probability weighting function.

The second component of prospect theory is the value function. Kahneman and Tversky (1979) show that changes in states are more important for the decision makers than final outcomes. In other words, any deviation from a reference point cause utility or dis-utility depends on potential gains or losses of the deviation.

In particular, they consider an asset position which serves as the reference point and compares each outcome with this reference point. If the outcome is higher than the reference point, the decision maker is in the domain of gains. Similarly, if it is lower than the reference point, then the decision maker is in the domain of losses. They also based on the evidence claim that losing is more painful for the individuals than gaining the same amount (loss aversion). Kahneman and Tversky (1979) define value function for the domain of gains and losses as:

$$V(x, r) = V(x - r) \quad (4.16)$$

Where  $x$  is decision maker's outcome and  $r$  is the reference point.  $V$  is the value function that depends on the reference dependence outcome:

$$v(y) = \begin{cases} y^{\gamma^+} & \text{if } y \geq 0 \\ -\lambda(-y)^{\gamma^-} & \text{if } y < 0 \end{cases} \quad (4.17)$$

Where  $y$  is the reference dependent outcome ( $y = x - r$ ) and  $\lambda > 1$  is the coefficient of loss aversion.  $\gamma^+$  and  $\gamma^-$  are constants such that  $0 < \gamma^+ < 1$  and  $0 < \gamma^- < 1$ .

Utility function in Kahneman and Tversky (1979) model has following properties:

$A_1$ :  $v(y)$  is continuous for all  $y$ , twice differentiable for  $y \neq 0$ , and  $v(0) = 0$ .

$A_2$ :  $v(y)$  is strictly increasing.

$A_3$ : if  $y > z > 0$ , then  $v(y) + V(-y) < v(z) + V(-z)$ .

$A_4: v''(x) \leq 0$  for  $y > 0$ , and  $v''(y) \geq 0$  for  $y < 0$ .

$A_5: \frac{v'_-(0)}{v'_+(0)} \equiv \lambda > 1$ , where  $v'_+(0) \equiv \lim_{y \rightarrow 0} v'(|y|)$  and  $v'_-(0) \equiv \lim_{y \rightarrow 0} v'(-|y|)$ .

#### 4.4.2 DWK's experiment; Prospect Theory and FS preferences

The model of DWK's experiment combines FS preferences and prospect theory. The model includes 4 cases for each possible payoff matrix (Figure 1). There are two cases for clicking decision of the dictator and observing payoff matrix 1 and 2. Two other cases consider the skip decision of the dictator. If the dictator skips, she is not aware of the actual payoff matrix but has probabilistic beliefs over matrix 1 and 2. We first define the reference point for the value function then present the model.

##### Defining Reference Point

The reference point is the key in loss aversion model of Kahneman and Tversky (1979). However, the reference point is not specified in the prospect theory as it depends on the context in which reference point is defined. In the literature, status quo, expected wealth or worst case are candidates for reference point [Chernev (2004); Heath et al. (1999); Kahneman and Tversky (1984); Camerer (1998)]. In this experiment, expected payoff is assumed as the reference point as the dictator has probabilistic belief on the occurrence of matrices. In addition, FS utility function is considered as reference depending on the utility function.

$$\text{Reference Point for the dictator} = X - [(X - Y) * \beta_d] \quad (4.18)$$

Where  $X$  and  $Y$  are the dictator and receiver's payoff. Based on the probabilistic belief on occurrence of matrices, the dictator calculates her own and receiver's expected payoffs. The dictator receives \$6 with probability  $\frac{1}{2}$  and \$5 with probability  $\frac{1}{2}$ . Therefore, the expected payoff for the dictator is:

$$\text{Expected Payoff for the dictator} : \left(\frac{1}{2} * 5\right) + \left(\frac{1}{2} * 6\right) = 5.5$$

Similarly, the receiver gets \$5 with probability  $\frac{1}{2}$  and \$1 with probability  $\frac{1}{2}$ . The

receiver's expected payoff is:

$$\text{Expected Payoff for the receiver: } \left(\frac{1}{2} * 5\right) + \left(\frac{1}{2} * 1\right) = 3$$

Substituting expected payoff for the dictator and the receiver in equation (4.18) gives the reference point:

$$\text{Reference Point for Dictator} = 5.5 - (5.5 - 3) * \beta_d = 5.5 - [2.5\beta_d]$$

For DWK's experiment, the value function for each decision determines the gains or losses. The dictator evaluates the decision by comparing the outcome with the reference point. The value function for the dictator depending on the clicking decision and the payoff matrix is presented in four cases below.

#### Case I) Click and Matrix 1

In this case, there is no uncertainty about the receiver's payoffs. The dictator chooses her choice by observing the actual payoff matrix. If the dictator chooses outcome  $A$  the lottery that she plays is as follows:

$$\left((6, 1); 1\right) \quad (4.19)$$

Transformation of the lottery to FS preferences form is:

$$\left((6 - 5\beta_d); 1\right) \quad (4.20)$$

The reference dependant outcome of the value function and the value function respectively are:

$$y = 6 - 5\beta_d - r = 6 - 5\beta_d - [5.5 - 2.5\beta_d] = 0.5 - 2.5\beta_d$$

$$v(0.5 - 2.5\beta_d) = \begin{cases} 0.5 - 2.5\beta_d & \text{if } \beta_d \leq \frac{1}{5} \\ -(2.5)[-0.5 + 2.5\beta_d] = +1.25 - 6.25\beta_d & \text{if } \beta_d > \frac{1}{5} \end{cases} \quad (4.21)$$

Similarly, for choice  $B$ , the lottery, FS preference form of the lottery, reference dependant outcome and the value function are:

$$\left( (5, 5); 1 \right) \quad (4.22)$$

$$\left( (5 - \beta_d(5 - 5)); 1 \right) \quad (4.23)$$

$$(5; 1)$$

$$y = 5 - r = 5 - (5.5 - 2.5\beta_d) = -0.5 + 2.5\beta_d$$

$$V(-0.5 + 2.5\beta_d) = \begin{cases} -0.5 + 2.5\beta_d & \text{if } \beta_d > \frac{1}{5} \\ -2.5[+0.5 - 2.5\beta_d] & \text{if } \beta_d \leq \frac{1}{5} \end{cases} \quad (4.24)$$

Comparison between the value functions in (4.21) and (4.24) determines the dictator's choice. The comparison of value functions for both domains of gains and losses in choices  $A$  and  $B$  are:

$$U_B \geq U_A \quad (4.25)$$

$$-0.5 + 2.5\beta_d \geq 0.5 - 2.5\beta_d$$

$$\beta_d \geq \frac{1}{5}$$

This result shows that in the domain of gains if  $\beta_d \geq \frac{1}{5}$  the dictator chooses choice  $B$ . Intuitively, with high  $\beta$ , the concerns for others is higher, so the fair outcome (choice  $B$ ) has higher utility for the dictator.

For the domain of losses, the second component of value functions for choice  $A$  and  $B$  are considered. The dictator chooses fair outcome(outcome  $B$ ) if:

$$U_B \geq U_A \quad (4.26)$$

$$-2.5[+0.5 - 2.5\beta_d] \geq [+1.25 - 6.25\beta_d]$$

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<sup>1</sup>For simplicity in all value functions we assume that  $\gamma^+ = \gamma^- = 1$

$$\beta_d > \frac{1}{5}$$

The result is the same as the result in the domain of gains. Thus, for both domain of gains and losses,  $\beta_d \geq \frac{1}{5}$  is the interval in which the dictator chooses fair outcome (choice  $B$ ). In other words, if the matrix turns out to be matrix 1 and the dictator's  $\beta_d$  is more than  $\frac{1}{5}$ , then choice  $B$  is chosen. For  $\beta < \frac{1}{5}$ , the utility of choice  $A$  is higher than choice  $B$ .

## Case II) Click and Matrix 2

Similar to the case I, there is no uncertainty about the payoff matrix in this case. The pecuniary lottery, FS preferences lottery, reference-dependent outcome and the value function for the outcome A are as follows:

$$\left( (6, 5); 1 \right) \quad (4.27)$$

$$\left( (6 - \beta_d); 1 \right) \quad (4.28)$$

$$y = 6 - \beta_d - [5.5 - 2.5\beta] = 0.5 + 1.5\beta$$

The reference dependant outcome is always positive as  $0 < \beta_d < 1$ . Thus, the dictator is always in the domain of gains with this outcome and the value function has only gains domain:

$$v(0.5 + 1.5\beta) = 0.5 + 1.5\beta \quad (4.29)$$

Analogously, the reference dependent outcome for choice B is calculated as:

$$y = 5 - 4\beta - [5.5 - 2.5\beta] = -0.5 - 1.5\beta$$

Reference dependant outcome is negative and the dictator is always in the domain losses irrespective of the value of  $\beta$ .

$$V(-0.5 - 1.5\beta) = -0.5 - 1.5\beta \quad (4.30)$$

This result suggests that choice  $B$  leads to a loss for the dictator. Thus, if the

payoff matrix turns to be matrix 2, the dictator's utility for choice  $A$  is always higher than choice  $B$ .

## Utility of Clicking

The utility of clicking depends on the payoff matrix that the dictator would face if she clicks. For matrix 2, choice  $A$  ensures higher utility, however, for matrix 1, the choice depends on the quantity of the advantageous coefficient,  $\beta_d$ .

$$Utility\ of\ Clicking = \begin{cases} \frac{1}{2}[0.5 - 2.5\beta_d] + \frac{1}{2}[0.5 + 1.5\beta_d] & \text{if } \beta_d \leq \frac{1}{5} \\ \frac{1}{2}[-0.5 + 2.5\beta_d] + \frac{1}{2}[0.5 + 1.5\beta_d] & \text{if } \beta_d > \frac{1}{5} \end{cases} \quad (4.31)$$

As we see in the equation (4.31), a large value for  $\beta_d$  (advantageous coefficient) is associated with choosing the fair choice (outcome  $B$ ) in matrix 1 as there is a higher concern for the receiver's payoff. On the Contrary, the dictator chooses choice  $A$  for both payoff matrices if the inequality advantageous coefficient is very low.

## Case III- Utility of Not Clicking

The skipping of click button keeps the dictator ignorant about the receiver's payoff. In other words, there is an uncertainty on the actual payoff matrix. While the dictator only has information of her own payoffs for two outcomes, she has a probabilistic belief about the occurrence of matrices. The probability to face matrix 1 is equal to  $\frac{1}{2}$  and the same probability for matrix 2 to appear on the screen.

Following is the lottery that the dictator plays if she does not click to observe the actual payoff. For the choice  $A$ , the lottery is:

$$A \left( (6, 1), \frac{1}{2}; (6, 5), \frac{1}{2} \right)$$

Where  $(6, 1)$  is the outcome if the payoff matrix 1 appears and  $(6, 5)$  if the dictator faces matrix 2. Probability of occurrence for each of the payoff matrices is  $\frac{1}{2}$ . The transformation of the lottery to FS preferences is:

$$A \left( (6 - 5\beta_d), \frac{1}{2}; (6 - \beta_d), \frac{1}{2} \right)$$

The reference dependant outcome for the lottery is:

$$A \left( (6 - 5\beta_d) - r, \frac{1}{2}; (6 - \beta_d) - r, \frac{1}{2} \right)$$

With Probability  $\frac{1}{2}$

$$V(0.5 - 2.5\beta_d) = \begin{cases} 0.5 - 2.5\beta_d & \text{if } \beta_d \leq \frac{1}{5} \\ -2.5[-0.5 + 2.5\beta_d] & \text{if } \beta_d > \frac{1}{5} \end{cases} \quad (4.32)$$

In the second component of the lottery, the dictator's value function is always in the domain of gains because her reference dependant outcome is always positive.

With Probability  $\frac{1}{2}$

$$v(0.5 + 1.5\beta) = 0.5 + 1.5\beta \quad (4.33)$$

Therefore, equation (4.34) is the dictator's value function for choice  $A$ . This value function depends on the value of the advantageous inequity coefficient  $\beta_d$ :

$$V(nc, A) = \begin{cases} \frac{1}{2}[0.5 - 2.5\beta_d] + \frac{1}{2}[0.5 + 1.5\beta] & \text{if } \beta_d \leq \frac{1}{5} \\ \frac{1}{2}(-2.5)[-0.5 + 2.5\beta_d] + \frac{1}{2}[0.5 + 1.5\beta] & \text{if } \beta_d > \frac{1}{5} \end{cases} \quad (4.34)$$

Similarly, for choice  $B$ , the lottery, FS formation of the lottery, reference dependant outcome and the value function are:

$$B \left( (5, 5), \frac{1}{2}; (5, 1), \frac{1}{2} \right)$$

$$B \left( (5), \frac{1}{2}; (5 - 4\beta_d), \frac{1}{2} \right)$$

$$B \left( (5 - r), \frac{1}{2}; (5 - 4\beta_d - r), \frac{1}{2} \right)$$

$$B \left( -0.5 + 2.5\beta_d, \frac{1}{2}; -0.5 - 1.5\beta_d, \frac{1}{2} \right)$$

The value function for the choice  $B$  for the reference dependant outcome above is:

$$\begin{aligned} & \text{With Probability } \frac{1}{2} \\ V(-0.5 + 2.5\beta_d) &= \begin{cases} -0.5 + 2.5\beta_d & \text{if } \beta_d \geq \frac{1}{5} \\ -2.5[+0.5 - 2.5\beta_d] & \text{if } \beta_d < \frac{1}{5} \end{cases} \end{aligned} \quad (4.35)$$

For the second component of the lottery, the dictator is always in the domain of loss as the reference dependant outcome is always negative irrespective of  $\beta_d$ .

$$\begin{aligned} & \text{With Probability } \frac{1}{2} \\ V(5 - 4\beta_d - r) &= (-2.5)[+0.5 + 1.5\beta_d] = -1.25 - 3.75\beta_d \end{aligned} \quad (4.36)$$

Utility of not clicking for outcome  $B$  using equations (4.35) and (4.36) is:

$$V(nc, B) = \begin{cases} \frac{1}{2}[-0.5 + 2.5\beta_d] + \frac{1}{2}[-1.25 - 3.75\beta_d] & \text{if } \beta_d \geq \frac{1}{5} \\ \frac{1}{2}(-2.5)[+0.5 - 2.5\beta_d] + \frac{1}{2}[-1.25 - 3.75\beta_d] & \text{if } \beta_d < \frac{1}{5} \end{cases} \quad (4.37)$$

The dictator chooses choice  $A$  if  $U_A$  (4.34) is higher than  $U_B$  (4.37):

$$\begin{aligned} & U(nc, A) > U(nc, B) \quad (4.38) \\ & \begin{cases} \frac{1}{2}[1 - \beta_d] > \frac{1}{2}[-2.5 + 2.5\beta_d] & \text{if } \beta_d \leq \frac{1}{5} \\ \frac{1}{2}[1.75 - 4.75] > \frac{1}{2}[-1.75 - 1.25\beta_d] & \text{if } \beta_d > \frac{1}{5} \end{cases} \\ & \beta_d < 1 \end{aligned}$$

This value for the  $\beta$  is always valid as it satisfies the value function factors criteria in the prospect theory. Thus, the dictator prefers choice  $A$  to  $B$  if she does not click to reveal the actual payoffs of the receiver.

**Proposition 3** *The result implies that under prospect theory and FS preferences, choice  $A$  has higher utility than choice  $B$  irrespective of the value  $\beta_d$ . This means that the dictator gains from choice  $A$  if she skips the click button.*

**Proposition 4** *The decision to click the button depends on the value of the  $\beta_d$ . For the value of  $\beta_d$  higher than  $\frac{1}{5}$ , the dictator prefers to click the button and choose fair outcome (choice B). On the contrary, for lower than  $\frac{1}{5}$ , the dictator is indifferent between clicking and not clicking as choice A ensures the highest utility for both of these cases.*

The decision to click the button to reveal the payoff matrix depends on the comparison between the equations (4.31)(utility of clicking) and (4.34)(utility of not clicking). The comparison shows that the clicking decision depends on the value of  $\beta_d$ . For the lower than  $\frac{1}{5}$ , the dictator's utility for clicking and not clicking is the same. This means that she is indifferent between clicking and choose choice A versus not clicking and choose choice A.

However, for the value of  $\beta_d$  higher than  $\frac{1}{5}$ , the dictator's utility from clicking and choosing outcome B is higher than choice A. This suggests that the dictators with high inequity coefficient factor prefer to click and choose the fair outcome(choice B). This result is intuitive as the high value for  $\beta_d$  associated with the higher concern for the others' payoff. Thus, the dictators prefer to observe the payoff matrix and choose the fair outcome as this choice ensures higher utility for them.

## 4.5 Conclusion

Giving behaviour in the dictator game is argued to be contextual. Experiments in altruistic behaviour show that the amount of giving highly depends on the situational cues and social pressures [List (2007), Hoffman et al. (1996)]. In a major study of cotextual generosity, Dana et al. (2007) make the various justification for choosing self-interested outcome and show that such "Moral wiggle room" reduce the generosity. Particularly, in the second treatment of their experiment, they make available a free and voluntary option (click button) for the dictators to reveal the payoffs of receivers. On the contrary, the dictators could skip the button and choose their choices with no information about the payoff of their counterparts. The result exhibits the effect of information of optional payoff revelation in the dramatic reduction in the number of givers.

In this chapter, we combine Fehr-Schmidt preferences with two decision theories;

expected utility and prospect theory to make a better understanding of the dictators' behaviour in DWK's experiment. We find that the click decision depends on the advantageous inequity coefficient  $\beta_d$  in Fehr-Schmidt preferences. We find that for the value of  $\beta_d < \frac{1}{5}$  choice  $A$ 's utility is higher than choice  $B$  for clicking and not clicking. In other words, for the value of  $\beta_d$  smaller than  $\frac{1}{5}$ , the dictator is indifferent between clicking and not clicking. In both cases, the dictator chooses choice  $A$  than ensured highest self-interested payoff.

On the other hand, for the value of  $\beta_d$  bigger than  $\frac{1}{5}$ , the dictator's utility of choice  $B$  after clicking is higher than not clicking. This result suggests that the dictator with large  $\beta_d$  prefer to click and choose fair outcome (choice  $B$ ), as there is a concern for the receiver's payoff. We find that the result for the combination of expected utility and prospect theory leads to the same result.

The future agenda for the research in this context might be to estimate the value of  $\beta_d$  from the data and test the validity of the result for the data. Further research could look at the effect of an endogenous reference point in the model of FS preferences and prospect theory and study the difference with the current model. Also, there is possibility for other social preference theories such as (Bolton and Ockenfels, 2000) to explain the dictator behaviour in DWK's experiment.

# Conclusion

This thesis presented four self-contained chapters on the relationship between the group identity and social preferences in the different contexts. Three chapters are experimental studies on the effects of uncertainty in the group identity or payoffs on social preferences. Chapter 4 presents a theoretical model to understand the subjects' behaviour in Dana et al. (2007) experiment.

In chapter 2, “Uncertain Group Identity and Social preferences”, we study the effect of uncertainty in the group membership and its impact on social preferences. The experimental economics literature on social identity demonstrates that group identity enhances social preferences. Subjects in experiments help their in-group members, and they discriminate between in-groups and out-group members. To the best of my knowledge, existing studies focus on decisions when group identity is known and fully transparent Chen and Li (2009).

This study introduces *uncertainty* in the group identity by providing a costless and voluntary option to experimental subjects to know the identity of the counterparts. The main question is addressed in this chapter as: Is the effect of social identity on social preferences robust in the presence of uncertainty? What is the impact of information of optional identity revelation on participant's choices? Are participants always willing to know the identity of their counterparts when there is no cost? What are the implications of staying ignorant versus informed about the identity of the counterpart for other-regarding and self-interested outcomes?. To investigate these questions, we have experimented using the *minimal group paradigm*. After priming group identity in the lab, subjects are asked to make choices over 12 sequential dictator and response games in each session.

We find that only 60 percent of the participants are willing to know the identity of their matched players, even though this information is free of cost. If the participants

decide to know the identity of their counterparts, who then, turns out to be an in-group member, then they are 64 percent more likely to choose the social-welfare-maximising outcome, but they are 27 percent less likely to be charitable toward the in-group counterpart. The decision to know the identity of their counterpart decreases the likelihood to reward and increase the likelihood to punish even when the subject's matched player is an in-group member. Participants who prefer to stay ignorant are more reciprocal than the subject who click on the button to see the identity of their counterpart. They are more likely to reward and less likely to punish the matched player, irrespective of group membership.

Chapter 3, "Group Identity and Hidden Payoffs" looks into the transition from fair outcome to selfish choices in the presence of group identity. We have experimented to investigate willingness in acquiring payoff information when subjects are matched with in-group and out-group members. The subjects have the option to access information about their counterparts' payoff from their group or the other group. Although only 50 percent of the subjects prefer to know the actual payoff matrix, a majority of the subjects do not change their choices when they are matched with a member of the in-group. The subjects are more inclined to pick self-interested outcomes when they choose to know the payoff matrix and are paired with an out-group member.

Chapter 4 tests the robustness of Dana et al. (2007) experiment in a within-subjects design. We observe that the subjects, when given a chance, change their choices from fair choice to self-interested action. While we find a higher percentage of self-interested choice in the hidden-information treatment, our results confirm Dana et al. (2007) result.

Chapter 5 presents a model that combines Fehr/Schmidt preference and prospect theory to understand the results of the "moral wiggle room" (Dana et al. (2007)) experiment. We find that the subject's decision on revealing the payoffs depends on a threshold for advantageous inequity parameter,  $\beta$  in Fehr/Schmidt preference. While for the value of  $\beta$  lower than  $\frac{1}{5}$  the subjects choose self-interested choice irrespective of revealing decision, for the value of  $\beta > \frac{1}{5}$  revealing the actual payoffs and choice  $B$  has the higher utility. We find that two alternative decision theories, expected utility and prospect theory, leads to the same threshold for  $\beta$ .

These chapters investigate the impact of group identity on social preferences. The experiments aim to contribute to the literature of group identity and social preference and study the contexts in which these two combined and influence the individual's behaviour. There are areas for future research in this context such as the effect of group identity and cooperation games like the public good game, apply the group identity in industrial organisation theories and build comprehensive theories for other-regarding in the presence of group identity.

# Appendices

# Chapter 5

## Appendices

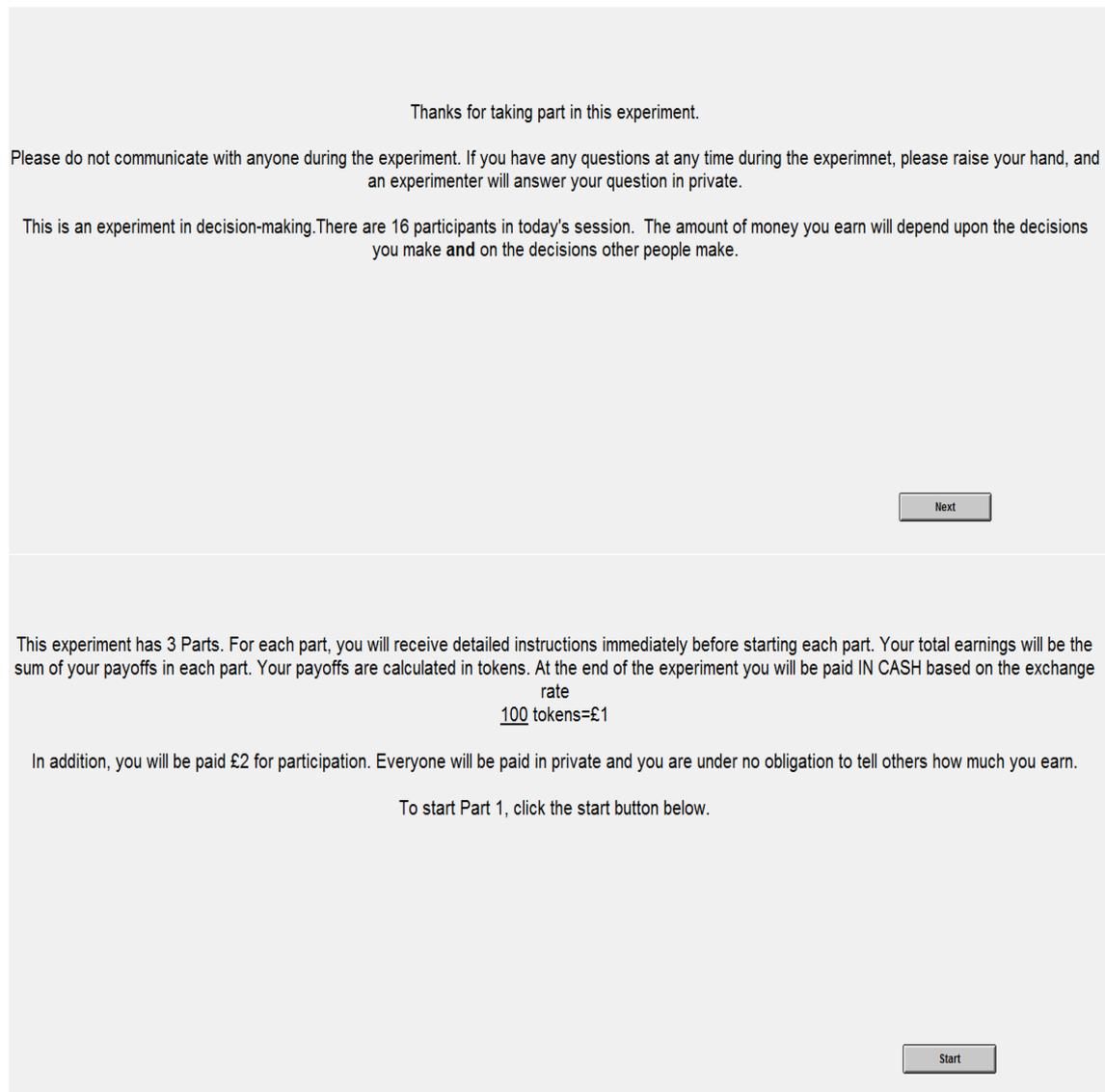
### 5.1 Appendix For Chapter 1

#### 5.1.1 Result Tables

Table 5.1: Summary Statistics in Treatment Sessions

Game	Two-person dictator game	A stays out	If A enters, B chooses	out	Enter	Left	Right	in-group				out-group				Skip				Show-in-group/in-group				Show-out-group			
								out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right
1	Dictator 2	(400,400) vs.(750,375)	-	-	0.69	0.31	-	-	0.88	0.13	-	-	0.88	0.13	-	-	0.78	0.22	-	-	0.71	0.29	-	-	0.88	0.13	
2	Dictator 4	(200,700) vs.(600,600)	-	-	0.56	0.44	-	-	0.31	0.69	-	-	0.69	0.31	-	-	0.42	0.58	-	-	0.25	0.75	-	-	0.50	0.50	
3	Dictator 5	(0,800) vs.(400,400)	-	-	0.81	0.19	-	-	0.63	0.38	-	-	0.75	0.25	-	-	0.62	0.38	-	-	0.44	0.56	-	-	0.80	0.20	
4	B's payoff identical																										
4	Resp 1b	(550, 550)	(400,400) vs.(750,400)	0.64	0.36	0.56	0.44	0.75	0.25	0.50	0.50	0.69	0.31	0.69	0.31	0.87	0.13	0.59	0.41	0.63	0.38	0.00	1.00	1.00	0.00	0.63	0.38
5	Resp 7	(450, 900)	(200,400) vs.(400,400)	0.64	0.36	0.31	0.69	0.81	0.19	0.25	0.75	0.81	0.19	0.38	0.63	1.00	0.00	0.23	0.77	0.90	0.10	0.17	0.83	0.43	0.57	0.38	0.63
6	B's sacrifice helps A																										
6	Resp 2a	(750, 0)	(400,400) vs.(750,375)	0.71	0.29	0.75	0.25	0.56	0.44	0.88	0.13	0.81	0.19	0.75	0.25	0.75	0.25	0.69	0.31	0.38	0.63	0.77	0.23	0.73	0.27	0.43	0.57
7	Resp 3	(750, 100)	(300,600) vs.(700,500)	0.84	0.16	0.63	0.38	0.81	0.19	0.56	0.44	0.94	0.06	0.88	0.13	0.79	0.21	0.55	0.45	0.80	0.20	0.27	0.73	0.86	0.14	0.73	0.27
8	Resp 4	(700, 200)	(200,700) vs.(600,600)	0.85	0.15	0.56	0.44	0.81	0.19	0.19	0.81	0.81	0.19	0.31	0.69	0.77	0.23	0.20	0.80	0.75	0.25	0.25	0.75	0.91	0.09	0.50	0.50
9	Resp 8	(725, 0)	(400,400) vs.(750,375)	0.42	0.58	0.75	0.25	0.56	0.44	0.88	0.13	0.81	0.19	0.63	0.38	0.64	0.36	0.58	0.42	0.67	0.33	0.60	0.40	1.00	0.00	0.80	0.20
10	Resp 9	(450, 0)	(350,450) vs.(450,350)	0.57	0.43	0.63	0.38	0.50	0.50	0.81	0.19	0.50	0.50	0.69	0.31	0.43	0.57	0.79	0.21	0.50	0.50	1.00	0.00	0.63	0.38	0.80	0.20
11	B's sacrifice hurts A																										
11	Resp 11	(400, 1200)	(400,200) vs.( 0, 0)	0.57	0.43	0.88	0.13	0.63	0.38	1.00	0.00	0.31	0.69	0.88	0.13	0.75	0.25	0.92	0.08	1.00	0.00	0.89	0.11	0.50	0.50	0.82	0.18
12	Resp 12	(375, 1000)	(400,400) vs.(250,350)	0.64	0.36	1.00	0.00	0.31	0.69	0.75	0.25	0.31	0.69	0.81	0.19	0.71	0.29	1.00	0.00	0.44	0.56	0.80	0.20	0.38	0.63	0.89	0.11

## 5.1.2 Experimental instruction



Thanks for taking part in this experiment.

Please do not communicate with anyone during the experiment. If you have any questions at any time during the experiment, please raise your hand, and an experimenter will answer your question in private.

This is an experiment in decision-making. There are 16 participants in today's session. The amount of money you earn will depend upon the decisions you make **and** on the decisions other people make.

---

This experiment has 3 Parts. For each part, you will receive detailed instructions immediately before starting each part. Your total earnings will be the sum of your payoffs in each part. Your payoffs are calculated in tokens. At the end of the experiment you will be paid IN CASH based on the exchange rate

100 tokens=£1

In addition, you will be paid £2 for participation. Everyone will be paid in private and you are under no obligation to tell others how much you earn.

To start Part 1, click the start button below.

Figure 5.1: Group Creation For Certainty and Uncertainty Treatments

**This is Part 1.**

In Part 1, you will be assigned to group **Blue** or **Green**.

Open the envelope that you took at the beginning of the experiment. Your group is determined by the colour of slip inside the envelope. Please, choose below the corresponding colour and wait for the experimenter to verify the information.

BLUE  
 GREEN

---

Based on the slip colour, your group is Blue .  
The number of people in your own group is 1 .

Members of each group remain the same for the rest of the experiment. However, you will not be told who the members of your group or the other group are.

Figure 5.2: Group Creation For Certainty and Uncertainty Treatments-Continued

Now we start **Part 2** of the experiment.

You will be asked to make decisions in 5 rounds. In each round, you will have a certain number of tokens. The number varies from round to round. You will be asked to allocate these tokens between two other participants under three scenarios

- i) if both are from your own group,
- ii) if both are from the other group, or
- iii) if one is from your group, and one is from the other group.

For each scenario, you must allocate all tokens between the two participants. Allocations have to be integers. Do not allocate any tokens to yourself. Your answers will be used to determine other participants' payoffs. Similarly, your payoff will be determined by others' allocations.

Next

After everyone finishes recording their decisions, the computer will randomly select a round among the five rounds that is used to calculate the payoffs. Each round of decisions will have an equal chance of being chosen.

Next, the computer will generate a random sequence of the ID numbers. The first number in the sequence will be the ID number of the person who allocates to the second and third IDs. The second ID drawn will allocate to the third and fourth IDs, ..., and so on. The last ID will allocate to the first and second IDs. Therefore, your payoff will be the sum of tokens allocated to you by the two participants preceding you.

For example, the computer generates the following sequence of the ID numbers, 9, 4, 1, 5, 12, ..., 2, and 3. Then subject 9 will allocate tokens to subject 4 and 1. Subject 4 will allocate tokens to subject 1 and 5, ..., and so on. Subject 3 will allocate to subject 9 and 4. Therefore, subject 1's payoff will be the sum of the tokens allocated to her by subject 9 and subject 4.

To start Part 2, click the start button below.

Start

Figure 5.3: Other-Other Allocation

Remaining time 22

**Your Group is Blue**

In round 1, you have a total of 200 tokens to allocate.

In each scenario, you must allocate all tokens between two other anonymous participants, A and B. Please record your decisions under the three scenarios below.

**Note: Allocations have to be integers. You cannot allocate any tokens to yourself.**

A from your own group  
 i)  +  = 200 tokens.

B from your own group

A from the other group  
 ii)  +  = 200 tokens.

B from the other group

A from your own group  
 iii)  +  = 200 tokens.

B from the other group

---

Remaining time 22

**Your Group is Blue**

In round 2, you have a total of 250 tokens to allocate.

In each scenario, you must allocate all tokens between two other anonymous participants, A and B. Please record your decisions under the three scenarios below.

**Note: Allocations have to be integers. You cannot allocate any tokens to yourself.**

A from your own group  
 i)  +  = 250 tokens.

B from your own group

A from the other group  
 ii)  +  = 250 tokens.

B from the other group

A from your own group  
 iii)  +  = 250 tokens.

B from the other group

Figure 5.4: Other-Other Allocation-Continued



Remaining time 29

Your Group is **Blue**

In round 5, you have a total of 400 tokens to allocate.

In each scenario, you must allocate all tokens between two other anonymous participants, A and B. Please record your decisions under the three scenarios below.

**Note:** Allocations have to be integers. *You cannot allocate any tokens to yourself.*

i) A from your own group  + B from your own group  = 400 tokens.

ii) A from the other group  + B from the other group  = 400 tokens.

iii) A from your own group  + B from the other group  = 400 tokens.

Figure 5.6: Other-Other Allocation-Continued

Period 1 out of 12 Remaining time: 27

**Now we start Part 3 of the experiment.**

You will be presented with 12 tasks below. In some of these tasks, you will make a decision while, in some of them, you may not be asked to make a decision.

Each task is independent from the previous one, so that your decision in one task will not affect your earning in any other task.

In each task, you will be anonymously matched with one other participant.

In each task, the participant you are matched with could either be from your own group or from the other group.

At the beginning of a task, you will not be told the group membership of the person you are matched with in that task. However, before making a decision in each task, you can choose to reveal the group membership of the person you are matched with in that task. If you want to see the other participant's group, click on the 'Show group' button. Otherwise you can click on 'Skip'.

You will then be asked to make a choice in that task.

For every task, you will be matched with a different participation than in the previous decisions. Your decision may affect the earning of others, just as the decisions of your match may affect your earnings.

Next

---

Period 1 out of 12 Remaining time: 0

There are two roles in each task, A and B. Some tasks only have decisions for both roles. In tasks with multiple decisions, these decisions will be made sequentially, in alphabetical order. Person A will make a decision first and, next, person B will make a decision.

Your role will be randomly determined in each task. You will be informed of your role in a task at the beginning of that task.

You will not be informed of the results of any previous task prior to making your decision.

Two out of the twelve tasks played will be randomly selected by the computer for computing earnings. Each task is equally likely to be drawn.

We will proceed to the decision once everyone has clicked the 'Start' button.

**Are there any question?**

Start

Figure 5.7: Games

Period 4 out of 12 Remaining time: 23

In this period, **you are person B.**

You may choose B1 or B2.  
 Person A has already made a choice. If s/he has chosen A1, you will each receive 550.  
 Your decision only affects the outcome if person A has chosen A2.  
 If person A has chosen A2 and you choose B1, you will both receive 400. If person A has chosen A2 and you choose B2, then person A will receive 750 and you will receive 400.  
 Thus, you should choose B1 or B2 on the assumption that person A has chosen A2 over A1.

B1       B2

Submit

Figure 5.8: Decision in Games-Control Treatment

Period 4 out of 12 Remaining time: 28

In this period, **you are person B.**

You may choose B1 or B2.  
 Person A has already made a choice. If s/he has chosen A1, you will each receive 550.  
 Your decision only affects the outcome if person A has chosen A2.  
 If person A has chosen A2 and you choose B1, you will both receive 400. If person A has chosen A2 and you choose B2, then person A will receive 750 and you will receive 400.  
 Thus, you should choose B1 or B2 on the assumption that person A has chosen A2 over A1.

**Your own group is Blue.**

Person A in this task is from group **Blue.**

B1       B2

Submit

Figure 5.9: Decision in Games- Certainty Treatment

Period 4 out of 12 Remaining time: 26

In this period, you are person B.

You may choose B1 or B2. Person A has already made a choice. If s/he has chosen A1, s/he will receive 100 and you will receive 1000. Your decision only affects the outcome if person A has chosen A2. If person A has chosen A2 and you choose B1, person A will receive 75 and you will receive 125. If person A has chosen A2 and you choose B2, then you will each receive 125.

Thus, you should choose B1 or B2 on the assumption that person A has chosen A2 over A1.

Your own group is Blue.

If you do not want to see Person A's group membership click 'Skip'. Click on 'Show Group' if you would like to reveal the group membership of Person A in this task.

Figure 5.10: Decision in Games- Uncertainty Treatment

## 5.2 Appendix For Chapter 2

### 5.2.1 Result Tables

Table 5.2: Games in Hidden-Info Treatment

ID	Games	A stays out	If A enters, B chooses
Two person dictator game			
1	Dictator 1		(?,8000)vs.(?,7000)
2	Dictator 2		(?,14000)vs.(?,12000)
3	Dictator 3		(?,16000)vs.(?,8000)
Two person response game			
4	Res 1	(15000,0)	(?,8000)vs.(?,7000)
B's payoff identical			
5	Resp 2	(15000, 0)	(?,8000)vs.(?,8000)
6	Resp 3	(9000,18000)	(?,8000)vs.(?,8000)
B's sacrifice helps A			
7	Resp 4	(15000,2000)	(?,12000)vs.(?,10000)
8	Resp 5	(0 ,16000)	(? ,1600)vs.(?,8000)
B's sacrifice hurts A			
9	Resp 6	(15000,15000)	(?,4000)vs.(?,2000)

Table 5.3: Self-interested outcome for Ingroup Matching in Transparent Treatment

Game	1	2	3	4	5	6	7	8	Total
Number of Subjects	57	31	45	56	40	29	37	34	329
Percentage	0.61	0.33	0.48	0.60	0.43	0.31	0.40	0.37	
Total	0.44								329

Table 5.4: Self-interested outcome for Outgroup Matching in Transparent Treatment

Game	1	2	3	4	5	6	7	8	Total
Number of Subjects	64	47	56	61	46	34	47	45	400
Percentage	0.69	0.51	0.60	0.66	0.49	0.37	0.51	0.48	
Total	0.54								400

Table 5.5: Reveal Decision separated by games

Game	1	2	3	4	5	6	7	8	9	Total
Number of Subjects	50	48	45	52	57	48	39	37	43	419
Percentage	0.54	0.52	0.48	0.56	0.61	0.52	0.42	0.40	0.46	
Total	0.50									419

Table 5.6: Fair choice in Transparent treatment and Self-interest in Hidden-Info

Game	1	2	3	4	5	6	7	8	Total
Number of Subjects	4	1	3	6	0	0	1	3	18
Percentage	0.04	0.01	0.03	0.06	0.00	0.00	0.01	0.03	
Total	0.02								18

## 5.2.2 Experimental instruction

Below is the translation of the experiment's instruction:

### Dictator Game- Transparent Treatment

You are player  $B$  and you face two choices of  $b1$  and  $b2$ . Player  $A$  does not have any choice.

If you choose choice  $b1$ , you receive 8000 Tomans and player  $A$  receives 4000 Tomans.

If you choose choice *b2*, you receive 7000 Tomans and player *A* receives 13000 Tomans.

Please put your choice, either *b1* or *b2*, below:

b1	Player A = 4000 , You = 8000
b2	Player A = 13000 , You = 7000

Please put your choice here:

1- If my counterpart is from Allameh University I will choose: .....

2- If my counterpart is from Tehran University I will choose: .....

This is the original instructions in Farsi:

- شما بازیکن B هستید و گزینه‌های  $b_1$  و  $b_2$  انتخاب‌های پیشی روی شماست.

- بازیکن A در این بازی هیچ قدرت انتخابی ندارد.

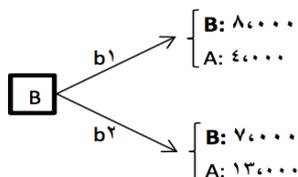
در این بازی شما با جدول زیر روبرو هستید.

گزینه $b_1$	۸ هزار تومان به شما (B) ۴ هزار تومان به بازیکن A
گزینه $b_2$	۷ هزار تومان به شما (B) ۱۳ هزار تومان به بازیکن A

\* اگر شما گزینه  $b_1$  را انتخاب کنید، شما ۸ هزار تومان دریافت می‌کنید و بازیکن A ۴ هزار تومان.

\* اگر شما گزینه  $b_2$  را انتخاب کنید، شما ۷ هزار تومان دریافت می‌کنید و بازیکن A ۱۳ هزار تومان.

لطفاً درباره این تصمیم فکر کرده و تصمیم نهایی خود را مبنی بر انتخاب حالت  $b_1$  و یا  $b_2$  را در پایین برگه ثبت نمایید.



حالا نوبت تصمیم‌گیری شماست:

سناریو یک- اگر بازیکن A علامه‌ای باشد، من گزینه  $\frac{0 b_1}{0 b_2}$  را انتخاب می‌کنم.

سناریو دو- اگر بازیکن A دانشگاه تهرانی باشد، من گزینه  $\frac{0 b_1}{0 b_2}$  را انتخاب می‌کنم.

Figure 5.11: Dictator Game- Transparent Treatment

### Response Game- Transparent Treatment

You are player  $B$  in this game. Player  $A$  has already made her choice from choice  $a_1$  and  $a_2$  and decided to choose choice  $a_2$ .

If player  $A$  had chosen choice  $a_1$ , she would have received 15000 Tomans and you would have received 0. In that case, your choice would not have had any effect.

But player  $A$  has chosen choice  $a2$  and let you to decide final decision. Now, you can choose among  $b1$  and  $b1$ . In this game, you face following choices:

b1	Player A = 8000 , You = 8000
b2	Player A = 15000 , You = 8000

Please put your choice here:

1- If my counterpart is from Allameh University I will choose: .....

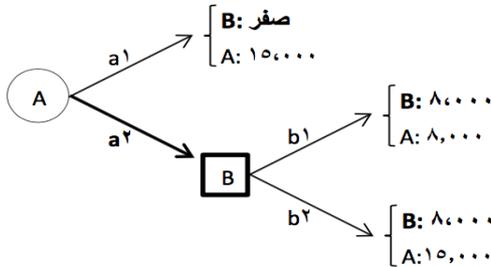
2- If my counterpart is from From Tehran University I will choose: .....

This is the original instructions in Farsi:

- بازیکن A از قبل تصمیم‌گیری کرده و از میان گزینه‌های  $a_1$  یا  $a_2$ ، گزینه  $a_2$  را انتخاب کرده است.  
 اگر او  $a_1$  را انتخاب می‌کرد، وی (یعنی بازیکن A) ۱۵ هزار تومان دریافت می‌کرد و شما هیچی! در این حالت دیگر اصلاً انتخاب شما اهمیتی نمی‌داشت.  
 ولی او گزینه  $a_2$  را انتخاب کرده است و با این انتخابش، فرصت تصمیم‌گیری نهایی را به شما واگذار کرده است و حالا شما می‌توانید انتخاب کنید.  
 - شما بازیکن B هستید و گزینه‌های  $b_1$  و  $b_2$  انتخاب‌های پیش روی شماست.  
 در این بازی شما با جدول زیر روبرو هستید.

گزینه $b_1$	۸ هزار تومان به شما (B) ۸ هزار تومان به بازیکن A
گزینه $b_2$	۸ هزار تومان به شما (B) ۱۵ هزار تومان به بازیکن A

لطفاً درباره این تصمیم فکر کرده و تصمیم نهایی خود را مبنی بر انتخاب حالت  $b_1$  و یا  $b_2$  را در پایین برگه ثبت نمایید.



حالا نوبت تصمیم‌گیری شماست:

سناریو یک- اگر بازیکن A علامه‌ای باشد، من گزینه  $\frac{0 \ b_1}{0 \ b_2}$  را انتخاب می‌کنم.  
 سناریو دو- اگر بازیکن A دانشگاه تهرانی باشد، من گزینه  $\frac{0 \ b_1}{0 \ b_2}$  را انتخاب می‌کنم.

Figure 5.12: Response Game- Transparent Treatment

### Dictator Game- Hidden-Info Treatment

In this game, you are player B and player A does not have any choice. Your choice is the final decision of the game.

In this game, you face with one of the tables below. Before the experiment, we have chosen one of this tables by tossing a coin and put it in the envelopes. You

b1	Player A = 4000 , You = 8000
b2	Player A = 13000 , You = 7000

Table 5.7: Table 1 player B might face

b1	Player A = 13000 , You = 8000
b2	Player A = 4000 , You = 7000

Table 5.8: Table 2 player B might face

don't know which of the table has been chosen for you.

As you can see in the tables, in both tables, you earn 8000 Tomans if you choose choice *b1* and 7000 Tomans if you choose choice *b2*. Also, from the tables above you see that player A's payoff is different in two table. The table is determined by tossing a coin so the probability of occurrence for each of the tables is %50. The table below shows the situation you face now:

b1	Player A = ? , You = 8000
b2	Player A = ? , You = 7000

Now, you (player B) have two options:

- Choose *b1* or *b2* without information of player *A*'s payoffs. In this decision, neither you nor player *A* will not find out which table was the actual table. Both players find out their own payoff. Note that player *A* will not know your decision.

- The second option is to open the envelope next to your seat and see the actual table. The actual table might be one of the tables above, table 1 or 2. The envelope is free and you are not forced to open it too. You can open the envelope ONLY IF you like to know the payoff for player *A*. Please leave the envelope if you do not want to see the payoff for player *A*.

Player *A* will not know your decision and will only know the payoff she receives. Please make your choices about opening the envelope and choosing choice *b1* and *b2*.

Please put your choice here:

1- If my counterpart is from Allameh University I will choose: .....

2- If my counterpart is from From Tehran University I will choose: .....

This is the original instructions in Farsi:

- شما بازیکن B هستید و گزینه‌های  $b_1$  و  $b_2$  انتخاب‌های پیش روی شماست.

- بازیکن A در این بازی هیچ قدرت انتخابی ندارد.

در این بازی شما با یکی از دو جدول زیر روبرو هستید. که البته ما از قبل (با پرتاب سکه‌ای) یکی از دو جدول زیر را برای شما انتخاب کرده‌ایم و آن جدول را در پاکت نامه همراه این کاغذ قرار داده‌ایم و در آن را بسته‌ایم، بنابراین شما نمی‌دانید که کدام جدول برای شما انتخاب شده است!

جدول احتمالی پ		جدول احتمالی الف	
گزینه $b_1$	۸ هزار تومان به شما (B) ۱۳ هزار تومان به بازیکن A	گزینه $b_1$	۸ هزار تومان به شما (B) ۴ هزار تومان به بازیکن A
گزینه $b_2$	۷ هزار تومان به شما (B) ۴ هزار تومان به بازیکن A	گزینه $b_2$	۷ هزار تومان به شما (B) ۱۳ هزار تومان به بازیکن A

همان‌طور که مشاهده می‌کنید در هر دو جدول، شما با انتخاب حالت  $b_1$  مبلغ ۸ هزار تومان کسب می‌کنید و با انتخاب حالت  $b_2$  مبلغ ۷ هزار تومان بدست می‌آورید.

همچنین از جداول بالا مشخص است که جای مبالغ دریافتی بازیکن A در دو جدول معکوس یکدیگر است. و از آنجایی که شما نمی‌دانید که کدام جدول بالا برای شما انتخاب شده است، و از آنجایی که احتمال روی دادن هریک از جداول بالا یکسان و مساوی ۵۰٪ می‌باشد، بنابراین مبلغ قطعی اهدایی به بازیکن A را نخواهید دانست. در این حالت جدول زیر نشان‌دهنده‌ی وضعیت کنونی شما است:

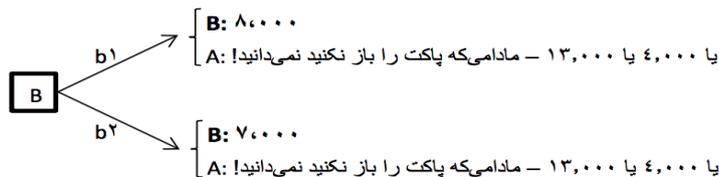
گزینه $b_1$	۸ هزار تومان به شما (B) ؟؟؟ تومان به بازیکن A
گزینه $b_2$	۷ هزار تومان به شما (B) ؟؟؟ تومان به بازیکن A

Figure 5.13: Dictator Game- Hidden Info Treatment

حالا شما (بازیکن B) دو کار می‌توانید انجام دهید:

- بدون دانستن مبلغ اهدایی به بازیکن A، یکی از دو حالت b1 (۸ هزار تومان برای شما) و یا b2 (۷ هزار تومان برای شما) را انتخاب کنید.
  - در این حالت نه شما و نه بازیکن A نخواهید فهمید که با کدام جدول روبرو بوده‌اید. هر دو بازیکن تنها مبلغ دریافتی خود را خواهند فهمید و از مبلغ دریافتی طرف مقابل باخبر نخواهند شد. این نکته را نیز توجه داشته باشید که بازیکن A از انتخاب شما باخبر نخواهد شد.
  - در صورت تمایل می‌توانید پاکت همراه این کاغذ را باز کرده و متوجه شوید که کدام یک از دو جدول الف یا ب برای شما انتخاب شده است و بازیکن B در برابر انتخاب شما چقدر پول دریافت خواهد کرد! سپس انتخاب نهایی خود را بکنید.
- \*\* دقت داشته باشید که شما لازم نیست این پاکت را باز کنید تا از دریافتی طرف مقابل آگاه شوید. تنها اگر دانستن مبلغ دریافتی بازیکن B برای شما اهمیت دارد، پاکت مربوطه را باز کنید؛ در غیر این صورت آن پاکت را به حال خود رها کرده و آن را بسته نگه دارید. در ضمن بازیکن B از تصمیم شما مبنی بر باز کردن پاکت و یا بسته نگه داشتن آن توسط شما باخبر نخواهد شد.
- همچنین مجدداً در این حالت نیز بازیکن B نمی‌داند که کدام جدول برای بازی بین شما انتخاب شده است، و مسلماً به هیچ طریقی نخواهد فهمید که شما چه انتخابی داشته‌اید. تنها مبلغی که به خود او می‌رسد را خواهد دانست و دیگر هیچ!!

لطفاً درباره تصمیم نهایی خود فکر کرده و چه پاکت مذکور را باز کرده و یا چه بسته نگه داشته‌اید، تصمیم نهایی خود را مبنی بر انتخاب حالت b1 و یا b2 را در پایین برگه ثبت نمایید.



حالا نوبت تصمیم‌گیری شماست:

سناریو یک- اگر بازیکن A علامه‌ای باشد، من گزینه  $\frac{0 \ b_1}{0 \ b_2}$  را انتخاب می‌کنم.

سناریو دو- اگر بازیکن A دانشگاه تهرانی باشد، من گزینه  $\frac{0 \ b_1}{0 \ b_2}$  را انتخاب می‌کنم.

Figure 5.14: Dictator Game- HiddenInfo Treatment

Below is the translation of the experiment's instruction:

### Response Game- Hidden-Info Treatment

You are player B in this game. Player A has already made her choice from choice a1 and a2 and decided to choose choice a2.

If player A had chosen choice a1, she would have received 15000 Tomans and you

b1	Player A = 8000 , You = 8000
b2	Player A = 15000 , You = 7000

Table 5.9: Table1 player B might face

b1	Player A = 15000 , You = 8000
b2	Player A = 8000 , You = 7000

Table 5.10: Table2 player B might face

would have received 0. In that case, your choice would not have had any effect.

But player *A* has chosen choice *a2* and let you decide final decision.

In this game, you are player *B* and player *A* does not have any choice. Your choice is the final decision of the game.

In this game, you face with one of the tables below. Before the experiment, we have chosen one of this tables by tossing a coin and put it in the envelopes. You don't know which of the table has been chosen for you.

As you can see in the tables, in both tables, you earn 8000 Tomans if you choose choice *b1* and 7000 Tomans if you choose choice *b2*. Also, from the tables above you see that player *A*'s payoff is different in two table. The table is determined by tossing a coin so the probability of occurrence for each of the tables is %50. The table below shows the situation you face now:

b1	Player A = ? , You = 8000
b2	Player A = ? , You = 7000

Now, you (player *B*) have two options:

- Choose *b1* or *b2* without information of player *A*'s payoffs. In this decision, neither you nor player *A* will not find out which table was the actual table. Both players find out their own payoff. Note that player *A* will not know your decision.

- The second option is to open the envelope next to your seat and see the actual table. The actual table might be one of the tables above, table 1 or 2. The envelope is free and you are not forced to open it too. You can open the envelope ONLY IF you like to know the payoff for player *A*. Please leave the envelope if you do not want to see the payoff for player *A*.

Player *A* will not know your decision and will only know the payoff she receives. Please make your choices about opening the envelope and choosing choice *b1* and *b2*.

Please put your choice here:

1- If my counterpart is from Allameh University I will choose: .....

2- If my counterpart is from From Tehran University I will choose: .....

This is the original instructions in Farsi:

- بازیکن A از قبل تصمیم‌گیری کرده و از میان گزینه‌های  $a_1$  یا  $a_2$ ، گزینه  $a_2$  را انتخاب کرده است.

اگر او  $a_1$  را انتخاب می‌کرد، وی (یعنی بازیکن A) ۱۵ هزار تومان دریافت می‌کرد و شما هیچی! در این حالت دیگر اصلاً انتخاب شما اهمیتی نمی‌داشت.

ولی او گزینه  $a_2$  را انتخاب کرده است و با این انتخابش، فرصت تصمیم‌گیری نهایی را به شما واگذار کرده است و حالا شما می‌توانید انتخاب کنید.

- شما بازیکن B هستید و گزینه‌های  $b_1$  و  $b_2$  انتخاب‌های پیش روی شماست.

در این بازی شما با یکی از دو جدول زیر روبرو هستید. که البته ما از قبل (با پرتاب سکه‌ای) یکی از دو جدول زیر را برای شما انتخاب کرده‌ایم و آن جدول را در پاکت نامه همراه این کاغذ قرار داده‌ایم و در آن را بسته‌ایم، بنابراین شما نمی‌دانید که کدام جدول برای شما انتخاب شده است!

جدول احتمالی ب		جدول احتمالی الف	
گزینه $b_1$	۸ هزار تومان به شما (B) ۱۵ هزار تومان به بازیکن A	گزینه $b_1$	۸ هزار تومان به شما (B) ۸ هزار تومان به بازیکن A
گزینه $b_2$	۷ هزار تومان به شما (B) ۸ هزار تومان به بازیکن A	گزینه $b_2$	۷ هزار تومان به شما (B) ۱۵ هزار تومان به بازیکن A

همان‌طور که مشاهده می‌کنید در هر دو جدول، شما با انتخاب حالت  $b_1$  مبلغ ۸ هزار تومان کسب می‌کنید و با انتخاب حالت  $b_2$  مبلغ ۷ هزار تومان بدست می‌آورید.

همچنین از جداول بالا مشخص است که جای مبالغ دریافتی بازیکن A در دو جدول معکوس یکدیگر است. و از آنجایی که شما نمی‌دانید که کدام جدول بالا برای شما انتخاب شده است، و از آنجایی که احتمال روی دادن هر یک از جداول بالا یکسان و مساوی ۵۰٪ می‌باشد، بنابراین مبلغ قطعی‌ای به بازیکن A را نخواهید دانست. در این حالت جدول زیر نشان‌دهنده وضعیت کنونی شما است:

گزینه $b_1$	۸ هزار تومان به شما (B) ؟؟؟ تومان به بازیکن A
گزینه $b_2$	۷ هزار تومان به شما (B) ؟؟؟ تومان به بازیکن A

Figure 5.15: Response Game- Hidden Info Treatment

حالا شما (بازیکن B) دو کار می‌توانید انجام دهید:

- یا بدون دانستن مبلغ اهدایی به بازیکن A، یکی از دو حالت  $b_1$  (۸ هزار تومان برای شما) و یا  $b_2$  (۷ هزار تومان برای شما) را انتخاب کنید.

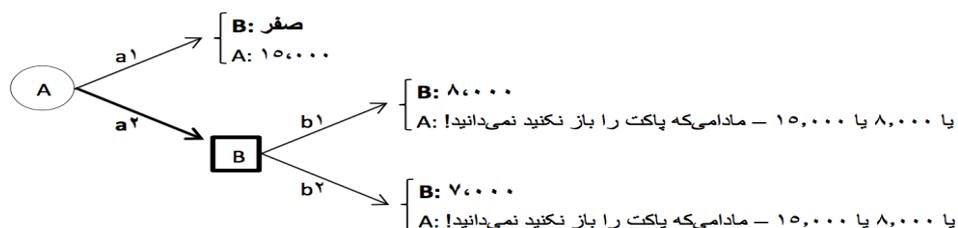
در این حالت نه شما و نه بازیکن A نخواهید فهمید که با کدام جدول روبرو بوده‌اید. هر دو بازیکن تنها مبلغ دریافتی خود را خواهند فهمید و از مبلغ دریافتی طرف مقابل باخبر نخواهند شد. این نکته را نیز توجه داشته باشید که بازیکن A از انتخاب شما باخبر نخواهد شد.

- یا در صورت تمایل می‌توانید پاکت همراه این کاغذ را باز کرده و متوجه شوید که کدام یک از دو جدول الف یا ب برای شما انتخاب شده است و بازیکن B در برابر انتخاب شما چقدر پول دریافت خواهد کرد! سپس انتخاب نهایی خود را بکنید.

دقت داشته باشید که شما لازم نیست این پاکت را باز کنید تا از دریافتی طرف مقابل آگاه شوید. تنها اگر تمایل به دیدن مبلغ دریافتی بازیکن B دارید، پاکت مربوطه را باز کنید، در غیر اینصورت آن پاکت را به حال خود رها کنید و آن را بسته نگه دارید. در ضمن بازیکن B از تصمیم شما مبنی بر باز کردن پاکت و یا بسته نگه داشتن آن توسط شما باخبر نخواهد شد.

همچنین مجدداً در این حالت نیز بازیکن B نمی‌داند که کدام جدول برای بازی بین شما انتخاب شده است، و مسلماً به هیچ طریقی نخواهد فهمید که شما چه انتخابی داشته‌اید. تنها مبلغی که به خود او می‌رسد را خواهد دانست و دیگر هیچ!!

لطفاً درباره تصمیم نهایی خود فکر کرده و چه پاکت مذکور را باز کرده و یا چه بسته نگه داشته‌اید، تصمیم نهایی خود را مبنی بر انتخاب حالت  $b_1$  و یا  $b_2$  را در پایین برگه ثبت نمایید.



حالا نوبت تصمیم‌گیری شماست:

سناریو یک- اگر بازیکن A علامه‌ای باشد، من گزینه  $\frac{0 \cdot b_1}{0 \cdot b_2}$  را انتخاب می‌کنم.

سناریو دو- اگر بازیکن A دانشگاه تهرانی باشد، من گزینه  $\frac{0 \cdot b_1}{0 \cdot b_2}$  را انتخاب می‌کنم.

Figure 5.16: Response Game- HiddenInfo Treatment

## 5.3 Appendix For Chapter 3

### 5.3.1 Result Tables

Table 5.11: The Subjects' Choices across both Treatments- Within-Subjects Design

Total: 72		55.5% 40 R	44.4% 32 nR	
Baseline		Hidden Info		
A	26	36.11%	nR 18	A 18
				B 0
	8	T1- 6	A 5	
		T2- 2	B 1	
B	46	63.89%	nR 14	A 8
				B 6
	32	T1- 18	A 5	
		T2- 14	B 13	
		A 12		
		B 2		

### 5.3.2 Experimental instruction

Here is the translation of the instruction of the experiment:

#### Baseline

Thanks for participating in this experiment. There are 2 envelopes in front of you in which the structure of a game is presented.

You are matched randomly with a player in the next room based on the ID on top of your game sheet. The counterpart is anonymous, therefore you will not know your counterpart and they will not know you. In each game, there are two roles, role  $X$  and  $Y$ . The roles are randomly assigned to the subjects. If you are role  $X$ , you make choices in the game and player  $Y$  does not have any choice to make. The table below is an example of the game that you will play:

A	Player X = 1000 , Y = 2000
B	Player X = 3000 , Y = 4000

In this game you are player  $X$ . You have 2 choices,  $A$  or  $B$ . Player  $B$  does not have any choice and any decision you make will be the final outcome of the game. If you choose choice  $A$ , you will receive 1000 Tomans and player  $Y$  receives 2000 Tomans. Similarly, if you choose outcome  $B$ , you will receive 3000 Tomans and player  $Y$  receives 4000 Tomans.

### **Hidden-Info Treatment**

In this game, you are player  $X$ . You don't know the player  $Y$ 's payoff. Now, you have two choices:

- You can make your choices based on your own payoff if you don't want to know the player  $Y$ 's payoff.
- You can open the envelope that is near to your seat and see the actual payoffs for player  $Y$  if you like to see her payoffs.

Just note that player  $Y$  will never know your decision. In other words, she will not know either your decision to open the envelope or not or the choice you have made.

This is the original instructions in Farsi:

دو تا پاکت روی میزهای شما هستند. هر پاکت مربوط به یک بازی-آزمایش جداگانه هستند. این دو تا بازی به هم دیگه ربطی ندارند، هرچند شباهتهایی بینشون هست.

قصد داریم حدود 160 نفر تو این بازی-آزمایشها شرکت داده بشن. که البته نفرات به صورت تصادفی و یک به یک در برابر هم قرار می گیرن. 80 نفر از اونها که شما جزو اون دسته هستید، تصمیم گیرنده هستن، و 80 نفر دیگه تنها تابع تصمیم شما تصمیم گیرنده ها هستن. پس تو هر کدام از این بازیها، هرکدوم از شماها با یک نفر دیگه از کسانی که در این آزمایش شرکت کردند، وارد یک بازی میشید. ما از قبل افراد رو به طور تصادفی، یک به یک، توی یک بازی قرار دادیم. البته این گروه بندیها بدون نام و غیر قابل شناساییه. طبیعتاً نه شما طرف مقابلتون رو خواهید شناخت و نه بازیکن مقابل شما، شمارو! پس توی هر بازی دو بازیکن وجود داره که یکی از اونها نقش X رو داره و دیگری نقش Y. شما دوستانی که تو این جمع حاضرید همتون نقش X هر بازی رو به عهده دارید. تفاوت بین نقش های X و Y اینه که بازیکن X تصمیم گیرنده است و بازیکن Y قدرت تصمیم گیری نداره و هرچی که بازیکن X حکم کنه باید پذیره. توی هر دوی این بازیها فرض می کنید ما برگزارکنندگان این بازی-آزمایش قراره مبالغی پول رو بین شما (که بازیکن X هستید) و بازیکن Y تقسیم کنیم. هر بازی به صورت چنین جدولی نمایش داده میشه:

(شکل روی تخته سیاه رسم شود:)

1 هزار تومان به بازیکن X	حالت A	انتخاب بازیکن X
2 هزار تومان به بازیکن Y		
3 هزار تومان به بازیکن X	حالت B	
4 هزار تومان به بازیکن Y		

دو گزینه پیش روی بازیکن X (یعنی شما) قرار داره: حالت A و حالت B

در حالی که بازیکن Y حق انتخابی نداره.

مطابق با انتخاب بازیکن X بین حالت A و یا B، مسئولان برگزاری آزمون با توجه به اعدادی که در جدول اومده پول فرضی بازی رو بین دو بازیکن X و Y تقسیم می کنند.

مثلاً مطابق این جدول آموزشی، اگه بازیکن X حالت B رو انتخاب کنه. مسئولان آزمون 3 هزار تومان به او خواهند داد و 4 هزار تومان به بازیکن Y. و یا در حالتی که بازیکن X حالت A رو انتخاب کنه، خودش هزار تومان گیرش میاد و بازیکن Y دوهزارتومن.

البته اعدادی که تو این جدول نوشته شده، صرفاً برای اینه که نشون بدیم که بازی چطوریه. توی بازی-آزمایش اصلی اعداد داخل جدول فرق داره.

در ضمن پاسخهای شما به سوالهای بازی-آزمایش محرمانه تلقی خواهد شد و امکان ردیابی پاسخهای هر یک از افراد به تنهایی وجود نخواهد داشت.

Figure 5.17: Dictator Game

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