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Group Uncertainty and Social preferences

Taha Movahedi*

Abstract

This paper studies the effect of uncertainty in group identity on social preferences. We run a laboratory experiment to investigate the uncertainty choice and its impact on social preferences. Firstly, we have replicated the result of the literature on in-group favouritism and out-group discrimination in experimental works in psychology and economics. Secondly, we find that only 60 percent of participants are willing to know the identity of their matched counterparts. The participants who decide to know the identity of their counterparts are 64 percent more likely to choose social-welfare-maximising outcome but show 27 percent decrease in charity concerns toward an in-group member. Moreover, the subjects are less likely to reward and more likely to punish when their counterpart is an in-group member. The participants who decide not to know the identity of their counterpart are more reciprocal than participants who choose to know the identity of their counterpart. They are more likely to reward and less likely to punish their counterparts.

1 Introduction

Group identity is described as the feeling of belonging to a social group. Although group identity might not be the only element to determine the behaviour of the group members, it is argued to have an important effect on the interaction between people (Glaeser et al., 2000;

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Fershtman and Gneezy, 2001; Bernhard et al., 2006). The evidence show that there is an in-group favouritism (Tajfel et al., 1971) and a strong effect of social identity on the decisions of the people (Shih et al., 1999). Chen and Li (2009) show stronger charity concerns and less envy, higher likelihood to reward, lower chance to punish and more willingness to choose a social-welfare-maximising outcome toward an in-group member.

The information on identity plays a role in social and economic interaction. Ai et al. (2016) report the result of a field experiment on the micro-finance platform for lending, Kiva, in which people receive an email about the identity of other lenders, in particular the location similarity and loan history similarity, and are recommended to form a group with them. The result shows that one-third of the lenders open the email and from whom the ones with location similarity recommendation are most effective in joining a lending group. They show that this kind of intervention improves the level of contribution by the lenders.

Accessing the identity information of whom the individuals interact influences charity behaviour. Jenq et al. (2015) show that the information on the physical appearance of borrowers through their profile in the Kiva website favours the lenders toward more light-skinned and less obese borrowers. This shows that there is a systematic bias in decision making based on the beauty and physical features and the individuals are willing to gain information about the appearance of the borrower before they make their lending decision.

This paper investigates the role of uncertainty in the group membership of the players on other-regarding behaviour toward counterparts. To the best of our knowledge, this is the first study to look at the effect of uncertainty in group identity information in the context of pro-social behaviour. This paper study the generalizability of other-regarding preferences, the effectiveness of group identity and contextual change in altruistic behaviour in order to understand the subjects' preference in the context of uncertain group identity.

In order to study the effect of optional identity information, we provide a free choice to learn the counterpart's identity for each subject. We examine if the subjects behave the same when they are given the identity of their counterpart compared with an option to learn their counterparts' identity. We look at their decision on knowing the identity of their counterpart as well as their choices after they decide to know or not to know and investigate how the counterpart identity information changes their choices.

We follow social psychology literature using minimal group paradigm to induce group identity with random assignment of the groups. The experiment has two treatments, with certainty and uncertainty in group identity of the counterpart and one control. We use twelve games from Charness and Rabin (2002) to determine the effect of group uncertainty on distributional preference, reciprocity and preference to choose the social-welfare maximising outcome.

We successfully replicate the result of group favouritism. Induced uncertainty in identity, for the subjects who reveal the identity of their counterpart and are matched with an in-group member increase the likelihood of choosing the social-welfare-maximising outcome but decreases the charity concern. The participants that skip the identity show more reciprocity than those who see the identity of their counterparts. Although the choice to see the identity of the matched player is free, only 60 percent of the subject choose to reveal the identity information. This revelation of the counterpart identity, increased the likelihood to punish their counterpart even when the subject is from the same group.

In section 2, we review the literature on social identity theory and its application in experimental games. Section 3 presents the experimental design including the stages, games and treatments of the experiment. Section 4 demonstrates the result of the experiment with the presentation of the result on distribution parameters, reciprocity and the maximisation of welfare.

2 Literature Review

The discussion on social identity started by the work of Tajfel and Turner (1986). Tajfel and Turner (1986) run experiments on different group identity and conclude that "the trivial, ad hoc intergroup categorisation leads to in-group favouritism discrimination against the out-group". Their work followed by a series of experiments on social identity theory that shows the effect of social idenitty in forming the decisions (Hogg, 2002; Deaux, 1996; Tajfel and Turner, 1979).

More recent literature in experimental economics shows the significant effect of group identity on individual's decisions and economics outcome. Chen and Chen (2011) propose a group-contingent social preference model and show that social identity affects the selection of the equilibrium. McLeish and Oxoby (2011) show that cooperation is higher in ultimatum bargaining game when the subjects are primed with a shared identity. Croson et al. (2008) argue that there is more coordination and efficiency in the threshold public good game between the female subjects, while there is less for male subjects.

In prisoner dilemma experiment, with groups of the officers from different platoons, there is an in-group favouritism and out-group hostility between the subjects (Goette et al., 2006). There is a higher level of cooperation in the prisoner dilemma game if group affiliation is a common knowledge between subjects (Guala et al., 2013).

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).

Although the studies above show that group identity is an essential factor in shaping people's decision and influences the cooperation in the experimental games, it's claimed that group identity is an effective but breakable tool for enhancement of cooperation (Drouvelis and Nosenzo, 2013). Drouvelis and Nosenzo (2013) 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.

In line with the research on the extent in which group identity affect the individuals decision, we present an experiment that test the role of uncertainty in identity on pro-social behaviour. The participants have a free and voluntary option to click on a button to learn the identity of their counterpart before they make decision in 12 sequential experimental games. Our experiment aims the investigate the strength of identity on the participant's choices and if an uncertainty in information identity of the matched player would undermine pro-social behaviour. Also, we believe that the existence of an optional button mitigate usual situational pressures to help others in experimental games (Dana et al., 2007; Tirole and Bènabou, 2006) and enable us to see actual preference of them.

There are two methods in empirical studies 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). Tajfel and Turner (1986) and McDermott (2009) show that with minimal group paradigm, having most trivial categorisation make a difference between in-group and out-group members. Following the research on group identity (Chen and Li, 2009), we use minimal group paradigm to induce group identity in the lab to categorise subjects into two groups.

3 Experimental Design

The experiment in this paper involves two treatments and one control. Each treatment session has three stages and subjects are divided randomly into two groups, blue and green, in the first stage. The second stage is an other-other allocation in which each participant allocates a certain amount of tokens to two other participants excluding herself. 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 depending 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 and play 12 games.

3.1 Treatments and General Procedure

We have run the total of 10 independent computerised sessions including two control sessions, four sessions in the uncertainty and four in certainty treatment. In each session, the order of the games is random and the subjects play different order of games in each session. Table 1 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, there is no inducement of group identity, and the subjects play 12 consecutive games without any information about the identity of their counterparts.

In the certainty, 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 is not matched with the same subject twice. The subjects are explicitly told the group identity of their coplayer(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) with the difference that instead of using strategy method, we elicit the actual choice of the subject, either for an in-group or out-group co-player.

The 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 with no cost.

Table 1: Treatments and Stages

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

The co-players are not informed about clicking choices and 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 participated 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 rate for the experiment was determined to 100 tokens for £1. In addition to payoffs for stage 2 and 3, the subjects were paid the £2 show-up fees. The average payment for each subject was £16.20 in the treatment and £14.30 in the control sessions.

3.2 Stages

3.2.1 Stage 1: Group Assignment

Following the literature on social identity, we use the minimal group paradigm to create the group in the laboratory. The 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 is entered to the computer to make sure that the right colour is entered to the system[1].

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 that the experimenter makes sure that there are eight subjects in each group of blue and green, the second stage starts[2].

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

3.2.2 Stage 2: Other-Other Allocation

In the second stage, the subjects face five rounds of the other-other allocation task. In this task, each subject has to allocate a certain number of tokens between two other anonymous subjects. The subjects could not allocate any token to themselves. Turner (1978) shows that this stage improve the sense of belonging to the group and more token is allocated to the in-group members. This method let the subjects identify themselves as part of the group through allocation of tokens between an in-group and out-group member (Turner, 1978).

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, each subject allocate tokens under three scenarios:

- Both randomly selected subjects come from subjects' group,
- Both randomly selected subjects come from the other group

[1] 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.

[2] 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.

- One randomly selected subject comes from the same group as the allocator, and the other comes from the other group

To compute the payoff for this stage, two subjects are chosen randomly in the following manner. The computer sets up a random sequence of IDs at the end of the 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.

3.2.3 Stage 3: Experimental Games

Stage one and two were aimed to attribute 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. Aim of stage three is 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 the games that have the highest and lowest differences between the in-group and out-group members in the result of Chen and Li (2009) experiment.

Table 2 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 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. Feedback is provided only at the end of the experiment. After all subjects played 12 games, the computer selects two of the games randomly to determine the payoff for each subject. The payment process is the same as Chen and Li (2009) and was announced in the instruction.

Table 2: 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)

3.3 Hypothesises

H1: (Replication of in-group favouritism) the other-regarding behaviour toward in-group is higher in the certainty treatment than in the control treatment.

H2a: (No harming effect of uncertainty) The other regarding behaviour is at least as high in the 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. If in-group favouritism is robust across different contexts, then we would expect to observe this behaviour for the subjects who click to see the identity of their counterparts.

H3a: (Harming effect of uncertainty) the other regarding behaviour toward an in-group is less in the 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 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.

4 Results

In this section, we first show the results of stage 2, other-other allocation and demonstration of 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. We also analyse reciprocity behaviour for all treatments and present the result for socially-welfare-maximisation choices for the subjects.

4.1 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.

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. Vertical axis is the number of token that each subject allocates to two other participants and it changes in each round.

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. 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. [3] On the contrary, in the bottom panel, the subjects allocate significantly more to the in-group members on average(blue triangle) compare to an out-group member (red square). 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.

[3] 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.

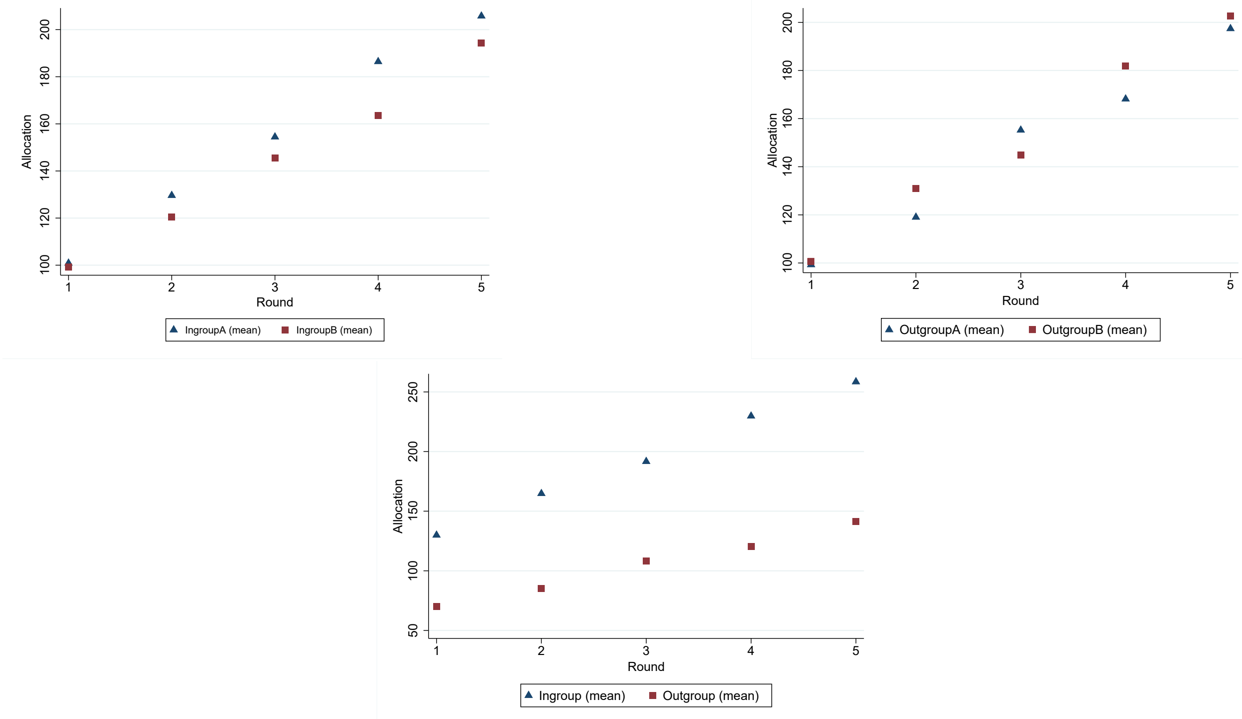

Figure 1: Other-Other Allocation

4.2 Distribution parameters

We examine the effect of uncertainty in the group identity on the distributional parameters, charity and envy, using the extended model of social identity by Chen and Li (2009). This model includes both social preferences parameters (ρ and σ), and social identity parameters, (a and b).

$$U_B(\pi_A, \pi_B) = w_A^I \pi_A + (1 - w_A^I)\pi_B \tag{1}$$

In this model, π_A and π_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. w_A^I is the weight that player B assign on monetary payoff of player A incorporating player A's identity:

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

The parameters ρ and σ demonstrate 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. The parameters a and b measure the additional factors of charity and envy for with the group membership. 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, might be zero if players are from different group or one, if player A and B belong to the same group.

We use player B's data to estimate charity, envy and identity parameters for all the treatments. 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.

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

Table 3 and 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 3: Distribution Parameters for Control and Certainty Treatments

	Charity	Envy				
	ρ	σ				
Control	0.247	-0.139				
(N=30)	(0.051)***	(0.073)*				
	out-group Charity	out-group Envy	in-group Charity	in-group Envy	Identity parameters	
	ρ_O^C	σ_O^C	$\rho_I^C(1+a)$	$\sigma_I^C(1+b)$	a	b
Certainty Treatment	0.26	-0.21	0.42	-0.23	0.64	0.11
(N=64)	(0.05)***	(0.07)***			(0.34)	(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(ρ) and envy(σ) 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 Uncertaintyon distribution preferences.

Table 4: Distribution Parameters for Uncertainty Treatment

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

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 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). [4]

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 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*

[4] The envy parameter changes from $\sigma = -0.14$ in the control treatment to $\sigma = -0.11$ in the skip case of uncertainty treatment.

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 ρ 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).

4.3 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.[5]

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 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.

[5]For The complete description of games look at the table 1.1.

Table 5: Positive reciprocity

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

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 uncertaintyon 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[6].

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

[6]The coefficient is not significant.

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 affects 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 6: Negative Reciprocity

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

4.4 Socially Welfare Maximization(SWM)

In this section, we study the effect of uncertaintyon 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 favouritism 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 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 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 9: Test within Uncertainty Treatment

	In_Show > Out_Show	*In_Show>Skip*	*Skip>Out_Show*
Player A	0.0068	0.57	0.0019
Player B	0.0094	0.09	0.11
Overall	0.0003	0.19	0.0023

Table 10: Test Certainty and Uncertainty Treatment

	Skip > Control	*In_Show>In_T1*	*out_Show>out_T1*
Player A	0.21	0.15	0.56
Player B	0.08	0.02	0.27
Overall	0.06	0.01	0.35

5 Conclusion

The literature on social identity theory have tried to explain a variety of behaviours such as commitment, prejudice and social competition (Haslam (2004)). In economics, social identity has been incorporated into the economic model for the labour market (Akerlof and Kranton (2000), Akerlof and Kranton (2002), Akerlof and Kranton (2005)) and to investigate the effect of social identity on the economic choices (Chen and Li (2009)).

In this paper, we investigate the economic choices under uncertainty of the counterpart's group identity. The aim is to shed lights on the robustness and strength of identity information on pro-social behaviour by introducing uncertainty on group identity and measure the effect of this uncertainty on social preferences.

We run an experiment following minimal group paradigm and using the random assignment to create groups in the laboratory. We use an other-other allocation, in which 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. We examine the effect of uncertain group identity on distribution preferences for altruism and envy, reciprocity and social-welfare-maximisation actions.

We have successfully replicated the result of in-group favouritism in the literature and when identity information is certain (certainty treatment), there is an 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 uncertaintyon 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 economics'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 learning 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.

6 Appendix

Table 11: Summary Statistics in Treatment Sessions

								in-group				out-group				Skip				Show-in-groupin-group				Show-out-group			
		A stays out	If A enters, B chooses	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right	out	Enter	Left	Right
Game	Two-person dictator game															-	-										
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
	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
	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
	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

6.1 Experimental instruction

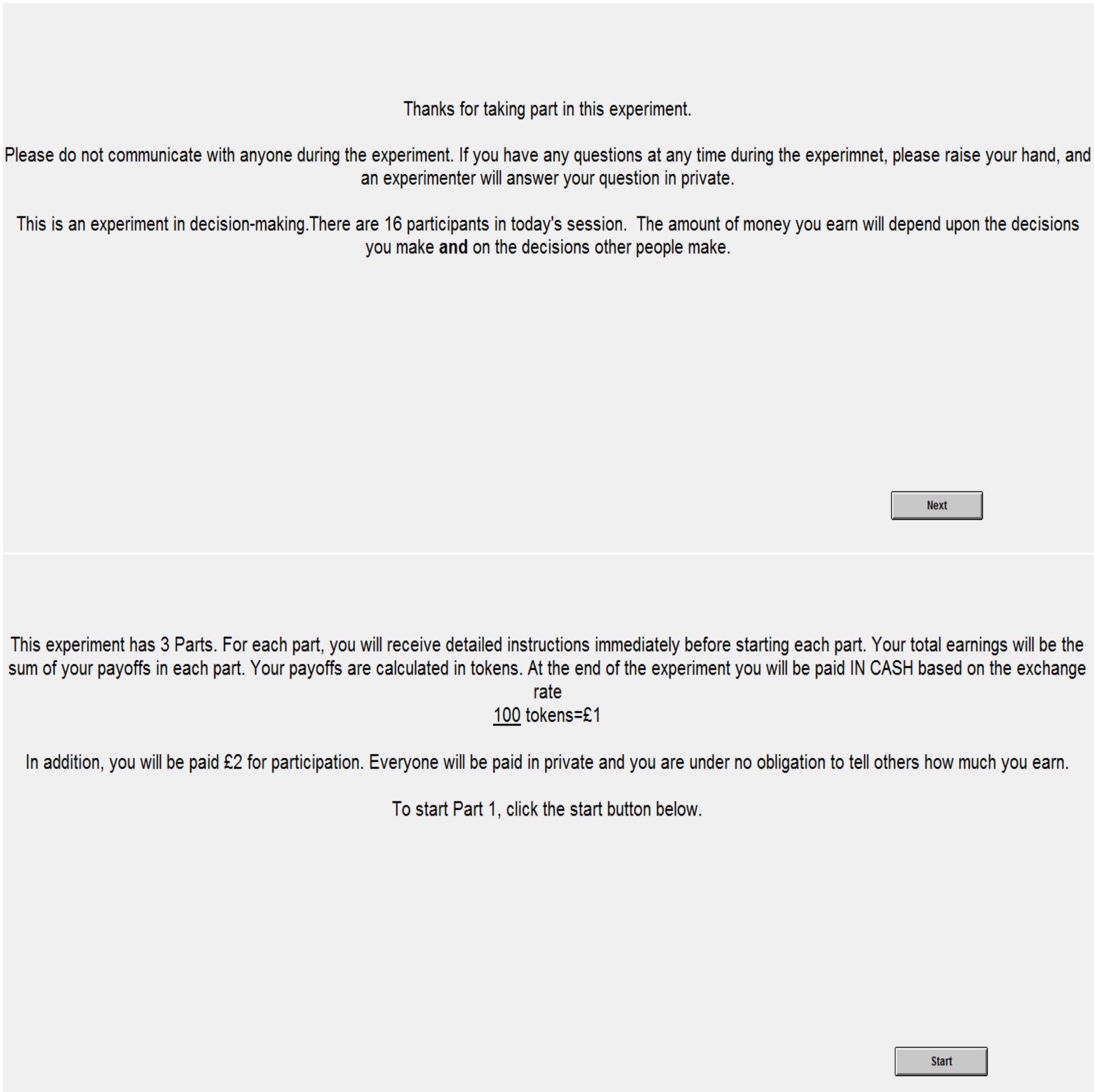

Figure 2: Group Generation For Certainty and Uncertainty Treatments

Figure 3: Group Creation For Certainty and Uncertainty Treatments-Continued

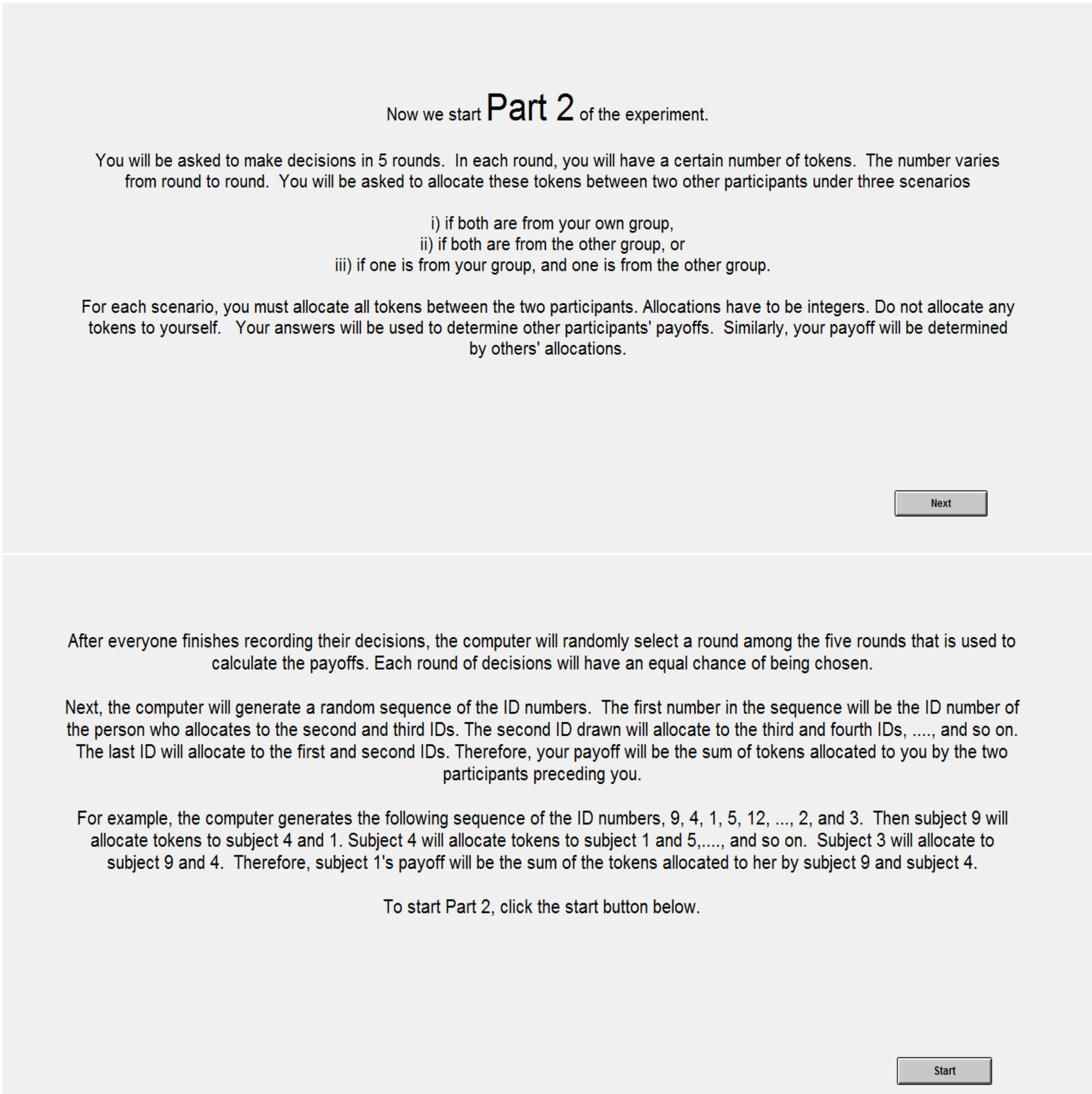

Figure 4: Other-Other Allocation

Figure 5: Other-Other Allocation-Continued

Figure 6: Other-Other Allocation-Continued

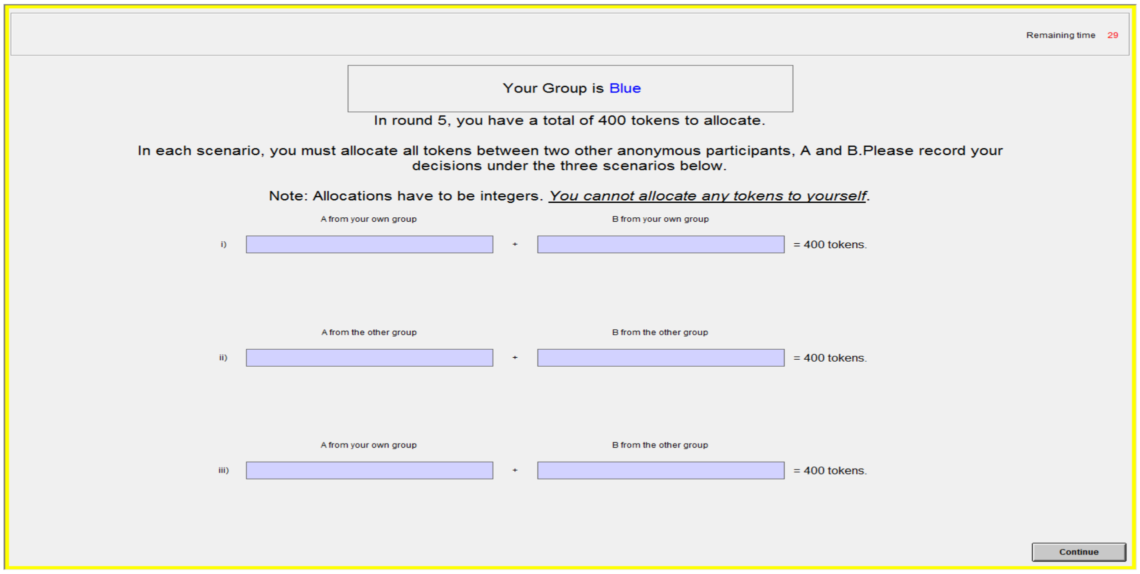

Figure 7: Other-Other Allocation-Continued

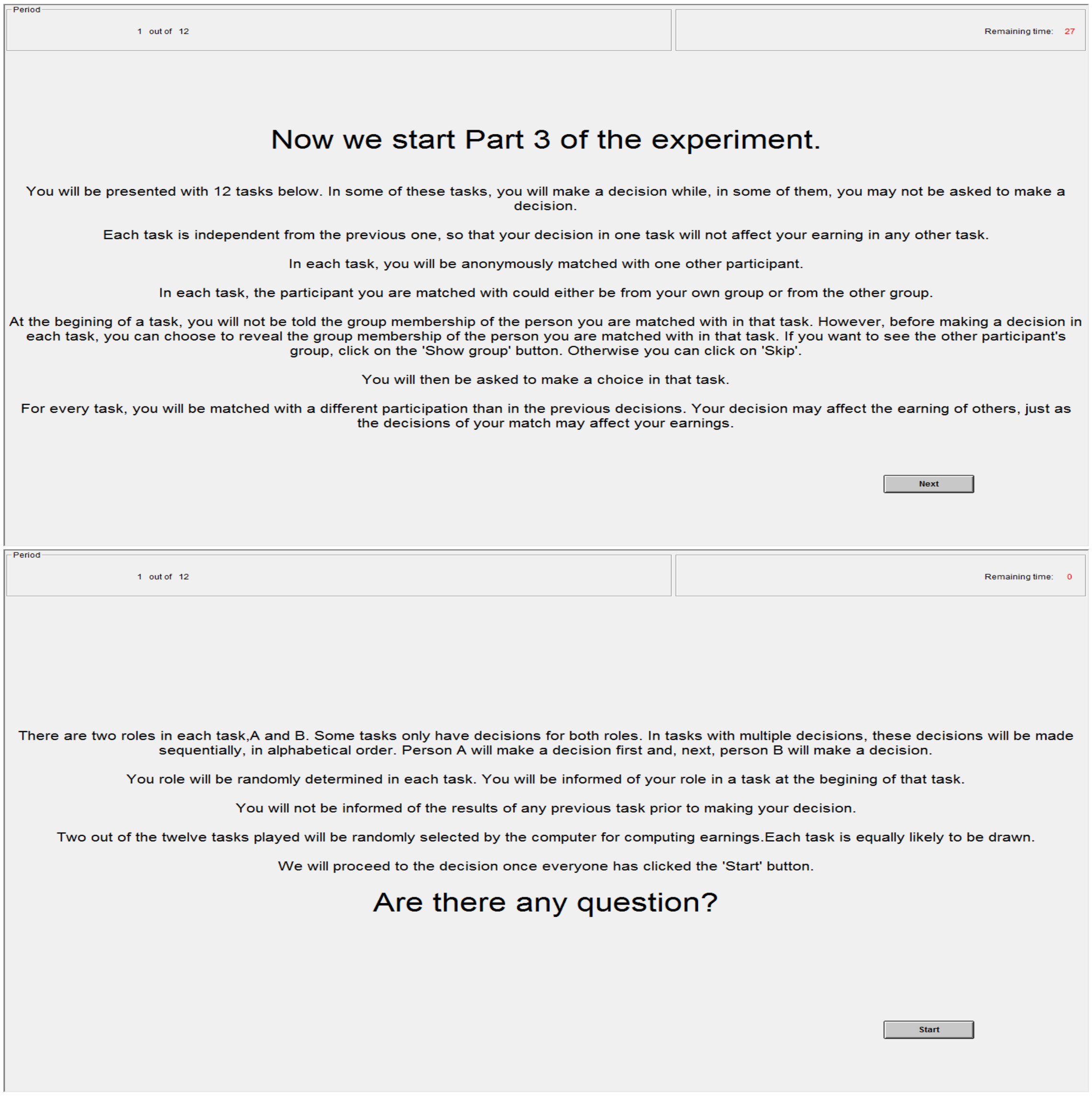

Figure 8: Games

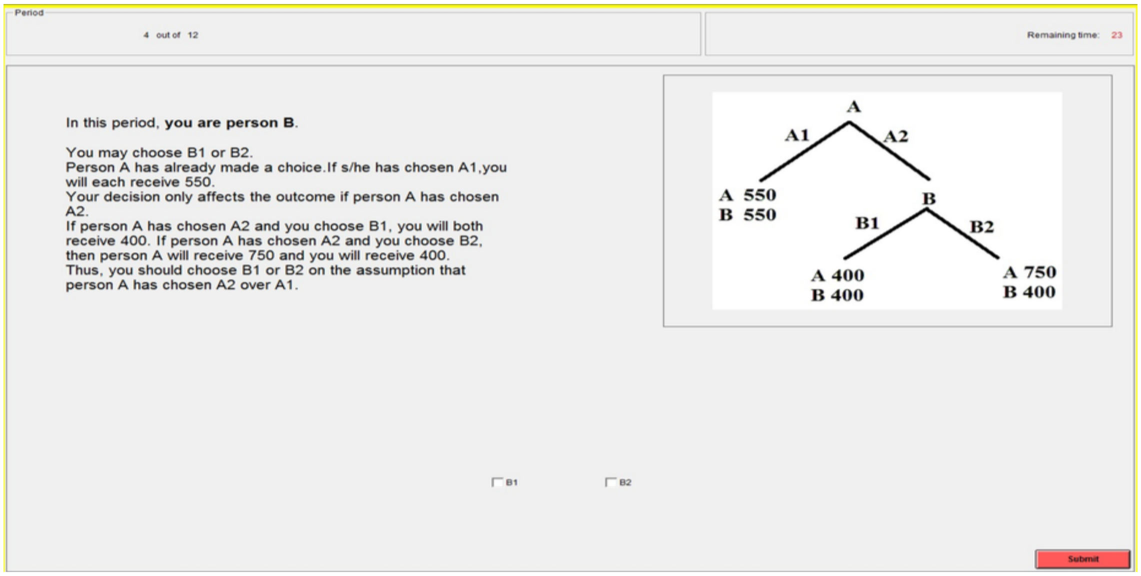

Figure 9: Decision in Games-Control Treatment

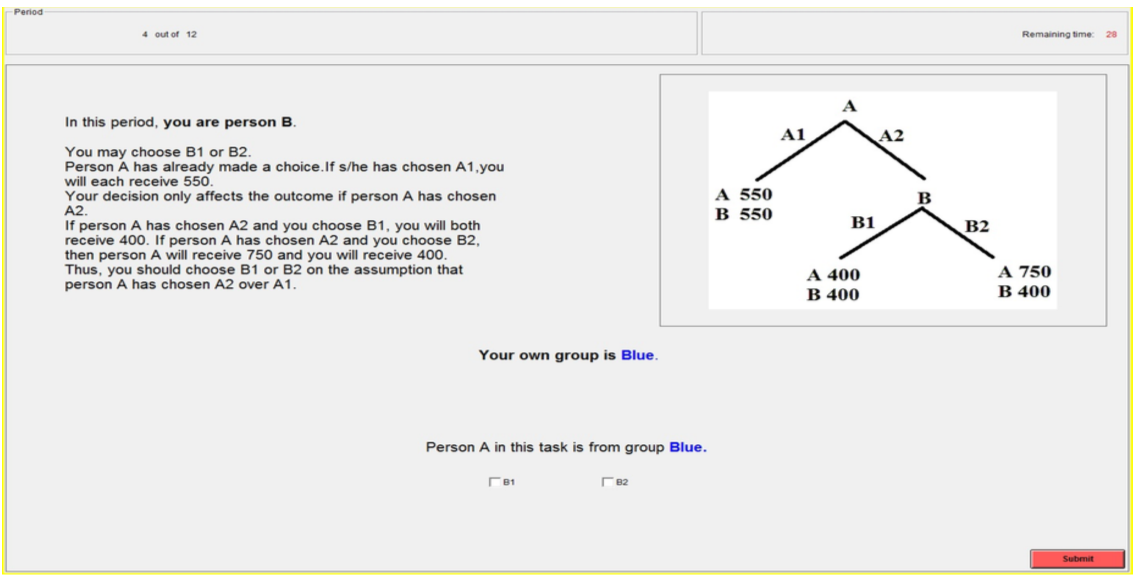

Figure 10: Decision in Games- Certainty Treatment

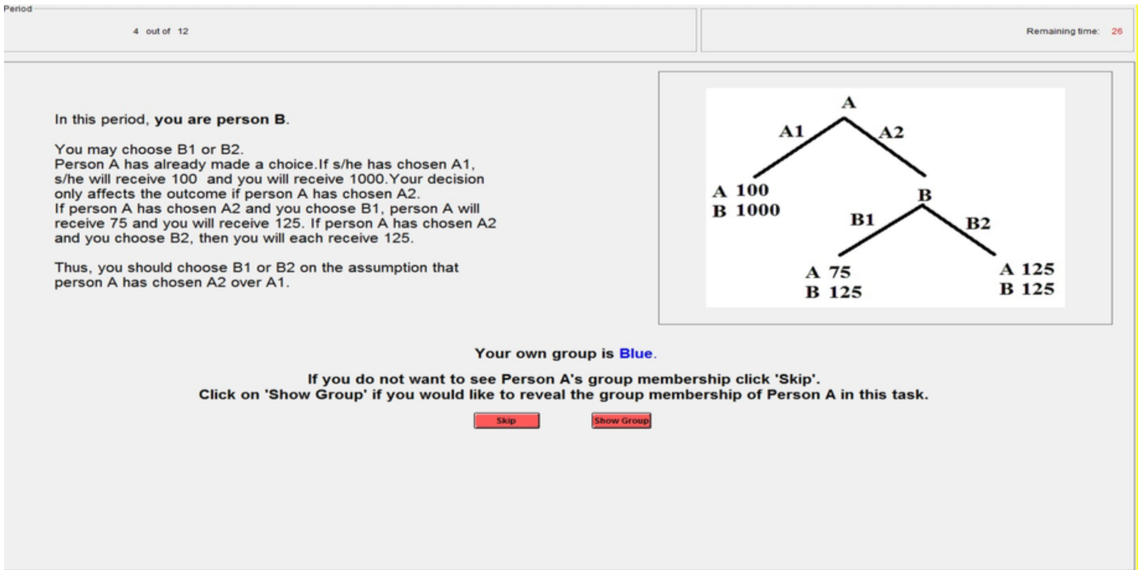

Figure 11: Decision in Games- Uncertainty Treatment

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