

# Choice of the Group Increases Intra-Cooperation

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**Abstract.** This research investigates how variation in sociality, or the degree to which one feels belonging to a group, affects the propensity for participation in collective action. By bringing together rich models of social behavior from social psychology with decision modeling techniques from economics, these mechanisms can ultimately foster cooperation in human societies. While variation in the level of sociality surely exists across groups, little is known about whether and how it changes behavior in the context of various economic games. Specifically, we found some socialization task makes minimal group members behavior resemble that of an established group. Consistent with social identity theory, we discovered that inducing this type of minimal sociality among participants who were previously unfamiliar with each other increased social identity, and sustained cooperation rates in the newly formed groups to the point that they were comparable to those in the already established groups. Our results demonstrate that there are relatively simple ways for individuals in a group to agree about appropriate social behavior, delineate new shared norms and identities.

**Keywords:** collective action, group formation, cooperation

## 1 Introduction

Humans as “social animals” like to be around each other. More than mere liking, it has been proposed that social affiliation, specifically feeling a sense of belonging in a social group, is a basic human need [4]. Given the fundamental importance of social belongingness to survival, it follows that humans have

evolved specialized affective and cognitive tendencies related to group membership. This can be seen both in the extreme suffering caused by social isolation and loneliness and also in the feelings of affiliation and acts of commitment associated with group membership. The focus of our program of research is on the influence of group membership on cognitive processes and their attendant behavioral outcomes such as economic decisions.

**Definition 1.** *Sociality, even in a very minimal form, serves as a natural mechanism to promote sustainable cooperation among group members.*

**Definition 2.** *Sociality, or social utility, is defined here as an additional component of the subjective utility function that reflects the value of contributing to group outcomes and cohesion, and is derived at least in part from a sense of social identity.*

A recent study from our group found that socialization in the form of brief group-based social interactions prior to a Prisoners Dilemma or Ultimatum Game added social utility to choices that punished group members who did not cooperate (e.g., free-riders), but not to choices that punished the group as a whole [5]. A current research goal is to find an effective mechanism of sociality induction that allows members of a minimal group to mimic the economic behavior of those from the established group.

Our laboratory model of sociality [13] combines the classic “minimal group” paradigm from social psychology [20] with group-based manipulations that induce a sense of social connectedness in humans to allow us to measure the degree of utility conferred by sociality that otherwise has no economic utility. Testing this model would enable social psychology and economics to make a connection, such that the former can represent group membership in terms of a value calculation and the latter can inform its decision making models with empirical insights into the factors that guide human behavior in a social environment.

Traditional economic analysis generally makes the simplifying assumption that people are exclusively utility-maximizing and self-regarding. However, the breakdown point of economic models is in explaining behaviors that are altruistic, fair and trusting [11]. Such behaviors are inseparably linked with social context. Factors such as group membership, social identity and affiliation motives induce prosocial behaviors through additional utility that is rarely included in formal models of economic behavior. There are many ways of manipulating sociality for the purpose of testing its effect on economic decisions. To our knowledge, a formal typology of the various kinds of sociality is not currently available, even though such a typology would be quite useful for the present line of research and related efforts. A key contribution of this paper is to use various manipulations of sociality, to compare their effects on human choice behavior, and select an effective one that boosts sociality of strangers in a group to the level of behavior seen within established groups. Comparing these manipulations will have a broad impact on the field because researchers are in need of procedures that can reliably manipulate sociality. Individuals that identify with certain social groups

are often involved in power struggles in that they try to establish, change, or defend a power structure. Sociality in the minimal form is a way to make struggles and protests lead to pro-social outcomes.

## 2 Economic Decisions in a Group Context

Prosocial behaviors are innate to humans because our survival individually and as a species depends on collective action and achievement of common goals [1, 6]. Since [8] researchers argued that distinctive features of human sociality resulted from selection among individuals who live in groups. Voluntary social integration of people into groups occur for the reasons of need for affiliation (inclusion) [4], need for power dependence (control), need for intimacy (affection) [18], need for achievement [14], proximity in distance and in social self (attachment), and making sense of the world (principle of “social proof” to validate your own existing beliefs).

Groups, in turn, are complex adaptive systems, they are “entities that emerge from the purposive, interdependent actions of individuals” [15]. In fact, observation of naturally occurring groups in public places reveal that dyads are common and few groups contain more than five or six people [7, 16], this justifies our decision to divide participants in groups of six people. In small self-organized groups norms emerge that guide coordinated action, including cooperation [2, 4]. Previous evidence suggests that endogenously formed groups, unlike exogenously formed alliances, lead to the creation of social ties and trust that favorably affect cooperation in economic games such as the Prisoners Dilemma (PD; [10, 21]. Moreover, autonomy in group membership can transform competition of individual outcomes to be a competition of generosity and other prosocial traits. It has been proposed that choosing a group in animal and human societies can reflect your willingness to follow the leaders of a group; in this case, group members will endorse the norms of the leader and the leader will influence the members to achieve efficacy in a task performance. We compared the economic behavior of players under variations of sociality in an experimental setting. Specifically, our central comparison is between the cooperative behavior of people in groups formed around minimal social characteristics and people in already-established groups that were based on relatively longstanding and salient identity features.

## 3 Current Study

This paper reports on the results of a series of laboratory experiments that systematically varied the type of sociality induction and measured economic decisions as participants interacted anonymously with others in their in-group or in an out-group. In particular, experiments with different social group composition were considered: participants in the Assigned condition (number of subjects:  $N=108$ ) were randomly assigned to a group to socialize and play with; participants in the Established condition (number of subjects:  $N=60$ ) were invited as

a part of established group (group formed long before the experiment) to socialize and play with; participants in the Choice condition (number of subjects:  $N=108$ ) were randomly assigned to choose a group with whom they socialized and played.

In our previous study [5], we coupled a classic “minimal group” paradigm from social psychology with group interaction-based manipulations to induce a sense of social connectedness in our participants. This experiment allowed us to measure the degree of utility conferred by sociality that otherwise has no economic utility. We found that socialization, or group interactions immediately prior to the focal economic games, created and sustained fairness during the economic games even though this social interaction was logically irrelevant to the games. In this study, we changed the socialization pattern and altered a second dimension of sociality, i.e. the manner in which the group was assembled. By making only one change in our socialization task we kept sociality in a relatively minimal form: strangers are allowed to interact for 15 mins and form groups endogenously. Our desire is to find a group-based manipulation that causes economic decisions made under minimal sociality resemble those of established and real life cultural groups under strong sociality.

## 4 Materials and Methods

The study procedures involving human participants were approved by the Skolkovo Institute of Science and Technology (Skoltech) Human Subjects Committee. Written informed consents were obtained from participants. Experimental data are readily available on Dropbox.<sup>7</sup>

Subjects (total number of subjects:  $N = 276$ , 174 males) for this set of experiments were recruited from the students at the Moscow Institute of Physics and Technology (MIPT). The MIPT Experimental Economics laboratory was used to carry out all experiments. Each experiment (total number of experiments: 23) consisted of a different set of 12 students, pre-selected before the experiment to be unfamiliar with one another (except for the Established condition). We acknowledge that some of the pre-selected students might know each other, however, we tried to avoid it by selecting distant year students from different departments, distinct science orientation within one department (linked to a particular research institution) and by checking their Vkontakte.ru (biggest Russian social network) profile and friend circles. In the Established condition we purposefully invited groups of 6 people that know each other and share an affiliation of some sport club or a hobby. In order to carry out experiments in this condition an advertisement recruiting participants in Vkontakte specifically requested established groups of 6 formed around hobby or sport to sign up. In particular, one of the group members was asked to enter 6 names of participants including himself and the meaningful condition around which the group was formed. Each experiment lasted a bit longer than 1 hour and was divided into 3 consec-

<sup>7</sup> <https://dl.dropboxusercontent.com/u/7646503/ChoosingYourTeammatesdata.zip>

utive phases (Fig.1) that occurred in a fixed order.

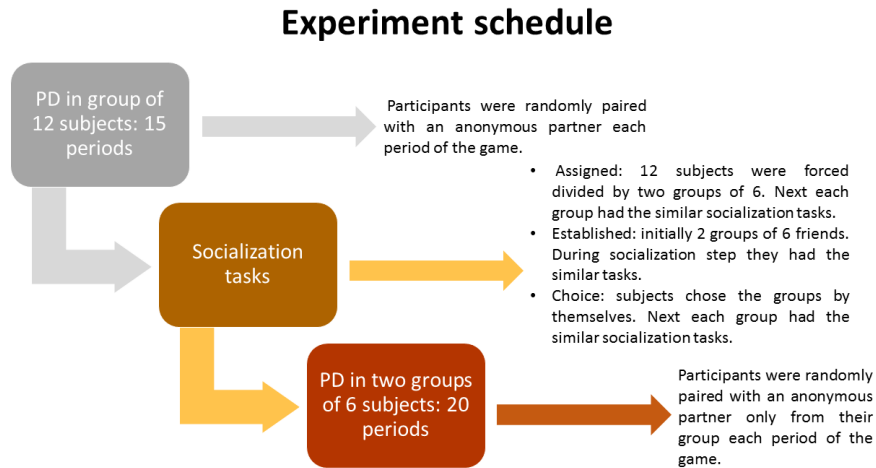


Fig. 1. Phases of the experiment depending on types of the groups.

1. Anonymous Game phase, where participants played the two-person one-shot Prisoners Dilemma (PD) (the parameters of the PD game are shown in Fig.2). Participants were randomly paired with an anonymous partner each period of the game (economists refer to this as one-shot games) and alternated roles on subsequent trials between column chooser and row chooser for the PD for the dynamic of the experiment. This game phase is repeated for 15 periods, though this number was not known to participants at the start of the phase. Each period participants were given information only about their profit for that period.

2. Socialization (10-15 minutes). Experiments were randomly assigned to their sociality manipulation condition. Critically, participants were socialized with either assigned others (i.e., chosen by the experimenter) or chosen others (i.e., chosen by the participants). For the Established condition participants were pre-selected to be familiar with each other in a meaningful social group of 6. Assigned: All 12 participants completed the Sociality induction, an icebreaker called “Snowball”: First participant said his/her name and an adjective that started from the same letter, second subject repeated first subjects name and adjective and said his/her own name and adjective, and so on till the last participant said all names and adjectives in order. Then, in a reverse order each participant shared his/her life facts, including major, year, and hobby. Participants formed a circle during this task. Finally, participants were randomly divided into two groups of 6 and each group completed the task of identifying

### Prisoner's Dilemma (PD) Game

		<u>Column chooser</u>	
		<i>Left</i>	<i>Right</i>
<u>Row chooser</u>	<i>Up</i>	<b>5, 5</b>	<b>0, 10</b>
	<i>Down</i>	<b>10, 0</b>	<b>1, 1</b>

*Payout for (r, c)*

Fig. 2. Economic games to be played against anonymous partners from the socialized and non-socialized groups. Participants will be row and column chooser in the Prisoners Dilemma (left), and the offerer and responder in the Ultimatum Game (right).

five characteristics that everyone in their group shares, and then selected one of those characteristics as their groups name. The group then provided to the experimenter a list with the characteristics written down and the groups name circled.

**Established:** Participants in this condition completed a sociality “reminder” whereby they were divided into established groups that matched pre-selected meaningful social groups (e.g., members of aerobics team, dorm neighbors, football team fans, etc.) of 6 people, named their group, and in 3 mins shared the group name with the experimenter.

**Choice:** All 12 subjects participated in the same Sociality induction from Assigned condition, an icebreaker in which the participants in a sequence told their names and adjectives that started from the same letter and in a reverse order shared their life facts. After that participants were asked to raise their hands if they volunteer to be a leader. Participants did not know from instructions what responsibilities of a leader will entail. The first two participants with hands raised automatically become group leaders (rules of becoming a leader and rules of group formation are given in the Supporting Information). Players that were not leaders were asked to decide which leader they want to join on a piece of paper. The participants get to choose a group, which easily satisfies the minimal group requirement [19] and social identity theory [20]. Finally, as in Assigned condition each group selected their groups name based on identified

common characteristics and passed it to the experimenter.

3. Socialized Game phase, where participants played the PD with a random human partner from their socialized group of 6. Their anonymous partner changed each round of the game, making it a one-shot game. The participants switched roles on alternating trials: column chooser and row chooser for PD. There was total of 20 periods in this game phase. Number of periods was not known to participants. Each period participants were given information only about their profit for that period.

Our main hypothesis is that participants will behave more cooperatively, and do so in a more sustained way, in the Choice condition compared to the Assigned condition. This is due to the group-based social factors suggested by evolutionary and social psychologists (e.g., autonomy) that alter the expected patterns of economic behavior based solely on a motive to maximize ones own immediate utility. The Established condition was included as a solid test of the strength of this manipulation. This condition allowed us to compare cooperation rates among strangers who underwent a sociality induction in the laboratory (Assigned and Choice conditions) to those of people in established groups who underwent a similar procedure in the field.

## 5 Results

### **Result 1. Various types of socialization activate sociality and facilitate collective action.**

Across all variations of sociality a cooperative equilibrium was created. Fig. 3 portrays the average mean cooperation rate across three variations of sociality. In each of the sociality manipulations, displayed on the x-axis, there was an increase in the cooperation rate from the Anonymous Game phase (the first stage of each experiment), when subjects played anonymously with other people who were strangers, to the Socialized Game phase (the third stage of each experiment), when the same subjects played anonymously with people who were part of the subjects socialized group. There was a significant elevation of group cooperation rates from the game phase before socialization to the game phase after socialization (Anonymous  $M = 0.21, SD = 0.06$ , Socialized  $M = 0.53, SD = 0.12; t(20) = -5.49, p < .05$ ; Table 1). Each data point is the rate of cooperation (proportion of cooperative choices) averaged across all subjects and all periods within Anonymous and Socialized games in one experiment.

### **Result 2. Stability of cooperation in the newly formed groups with socialization is comparable to that in the established groups.**

Fig. 4 shows the sustainability of cooperation across sociality manipulations in Socialized game phase. The closer the blue bar height (mean cooperation for the first 5 periods) is to the red bar height (mean cooperation for the last 5 periods), the more sustainability there is. It is apparent that there is an increase

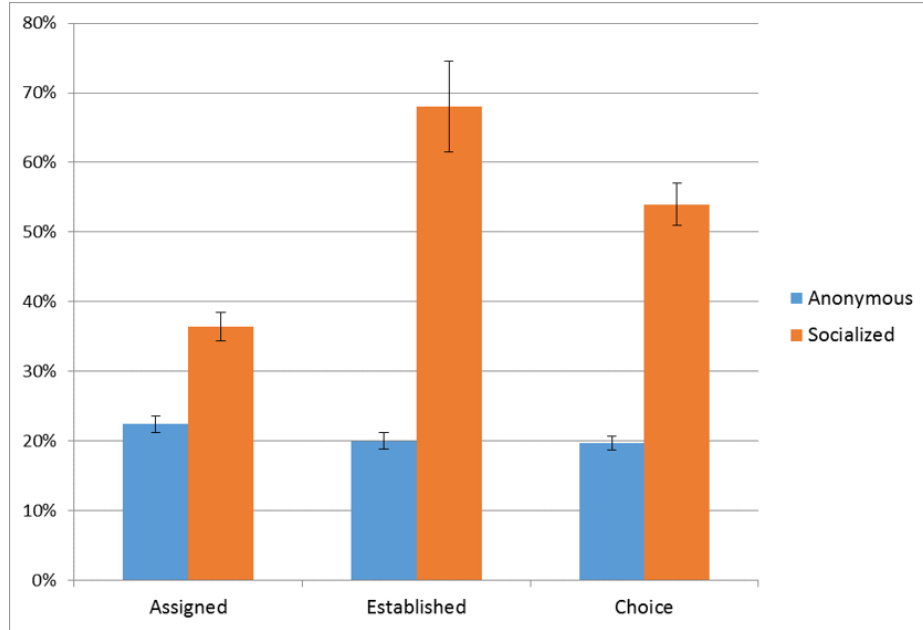


Fig. 3. Cooperation level of socialized group members, Socialized Game, (red) and non-socialized group members, Anonymous Game, (blue) across three types of sociality manipulations. Each bar represents the mean of the cooperation rate for all experiments of a certain condition. Error bars are SE.

from early to late cooperation in the Established group, there is only some decline in the Choice group, and there is a stark discrepancy between the two time intervals in the Assigned group. The average cooperation rates in the Socialized game phase significantly declined in the Assigned group (proportion of cooperative choices for the first 5 periods  $M = .46$ ,  $SD = 0.41$ ; last 5 periods  $M = 0.26$ ,  $SD = 0.35$ ;  $t(47) = 3.37$ ,  $p < .01$ ; see Table 1), whereas there is no significant decline for Choice socialization (average cooperation for the first 5 periods  $M = .59$ ,  $SD = 0.42$ ; last 5 periods  $M = 0.53$ ,  $SD = 0.41$ ;  $t(59) = 1.53$ ,  $p = 0.13$ ; see Table 1). Taking into consideration quartile of experiment duration (4 on 5 periods), there are significant main effects of condition as well as a

Table 1. Cooperation rates

Types	Assigned	Established	Choice
Anonymous Game	22%	20%	20%
Socialized Game	36%	69%	54%
Socialized Game (first 5 periods)	46%	64%	59%
Socialized Game (last 5 periods)	26%	72%	53%



condition-by-time interaction on cooperation, but not of time period, (two-way factorial ANOVA; D.V.: proportion of cooperative choices averaged across all subjects within one experiment; condition:  $F(2, 59) = 107.13, p < .01$ ; quartile:  $F(3, 59) = 1.81, p = 0.16$ ; condition on time:  $F(6, 59) = 3.21, p < .01$ ).

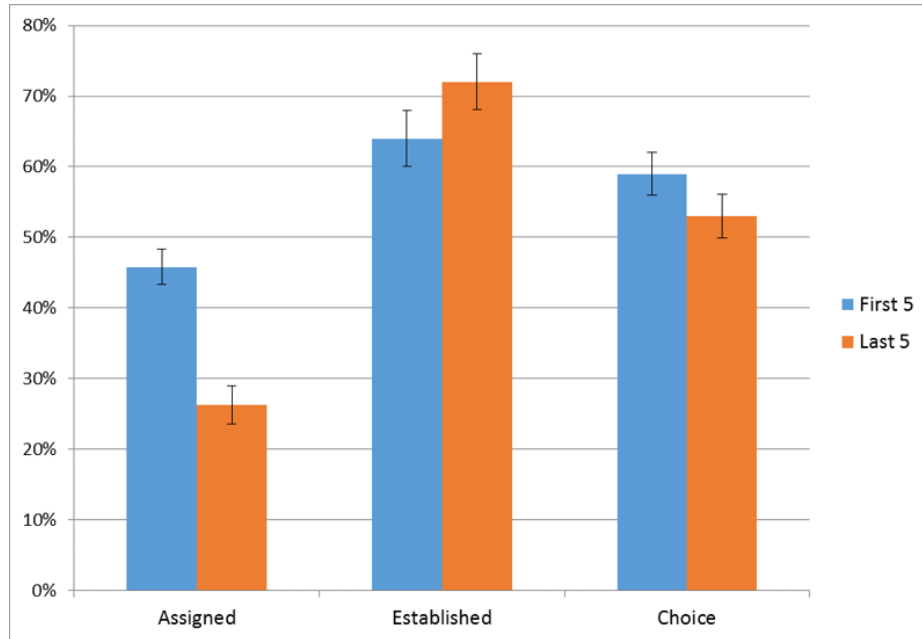


Fig. 4. Cooperation level during first five periods of the Socialized Game Phase (blue) and the last five periods of the Socialized Game Phase (red) across three types of sociality manipulations. Each bar represents the mean rate of cooperation for 5 periods for all experiments of a certain condition. Error bars are SE.

## 6 Discussion

A persistent and curious feature of human behavior in social environments is “prosocial” actions such as fairness, cooperation, and the provision of collective good even at the cost of individual gain. Thus, identifying the mechanisms of collective action in different circumstances is a major puzzle for social science. This paper integrates theories and decision models from economics, social psychology, and neighboring fields, makes them comprehensible for a broad general science audience, and provides insight into the mechanisms of human sociality in the context of during economic choice.

In this paper, we tested predictions from social psychological theory that suggested ways to increase cooperation. In doing so, we identified a promising way to

increase a sense of sociality in a group of relative strangers. We compared different types of sociality manipulations and concluded that each of them facilitated collective action through increasing cooperation among individuals. Through one of the minimal sociality manipulations, i.e. voluntary group choice, group members, who were strangers before experiment, were able to achieve and sustain cooperation comparable to that of the meaningful social groups.

Our research team started with the idea that individual will economically value the outcomes of others in a group to a greater extent when that individual strongly identifies with the group. This idea has been extensively developed by psychologists and suggest that prosocial behaviors are driven not by miscalculations of utility but instead by social factors (which are not mutually exclusive with each other) such as the salience of social identity, the presence of in-group favoritism and group norms, and evolutionary adaptations to foster group success. Economists have only recently begun to incorporate these insights from psychology into their models and studies of decision-making and choice, but at this point several groups are converging on the parsimonious explanation that aspects of the social world impart subjective utility to individual choices that favor group outcomes. Of course, the links between minimal group, social identity, and expected utility theories on the one hand, and the recent developments in the life sciences and neuro disciplines on the other are still tenuous at best. In this paper we have obtained strong evidence to support the idea that “sociality,” or an individuals sense of belonging and connectedness to a group, holds positive subjective utility and thereby can influence economic decisions when they take place in a social context. We conclude that choosing ones group and interacting with your group for a small period of time achieves the level of in-group favoritism of already established groups and believe that our results will encourage other researchers to explore this potentially very profitable domain.

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