Group Identity as a Social Heuristics: An Experiment with Reaction Times

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CLASSIFICATION

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Abstract A large amount of evidence indicates that group identity influences social interactions and, in particular, economic decisions. In this paper we test the hypothesis that group identity triggers social norms or heuristics, using reaction times collected in a series of simple distributive tasks (mini-dictator games). We control for individual preferences using the degree of selfishness expressed in the allocation decisions, and we account for variations in the difficulty of decisions by conditioning on subject's pro-social inclination. Our results support the heuristic hypothesis: generosity seems to be an effect of 'fast and frugal' behavioral rules that simplify decisions, especially when it conflicts with an underlying tendency to behave in a self-interested manner. In the language of 'dual-process' theories, group identity triggers 'System 1' processes that facilitate choice and override slow, calculative decision-making.

Significance Groups play an important role in human sociality and human evolution. As a consequence, the capacity to identify group membership is a crucial cognitive skill that we constantly use to modulate our social interactions. An important open question is whether group identity should be understood as a a set of 'fast and frugal' rules that simplify our decisions or as a systematic modification of other-regarding preferences. Using reaction time evidence, we show that group identity facilitates the decisions of selfish subjects when they make an altruistic choice. This suggests that group identity does not merely change social preferences, but influences the very mode of decision that is involved when subjects make a specific kind of difficult choice.

Many important social interactions take place in the context of groups: humans depend on teamwork and cooperation for production, exchange, insurance, but also for aggression, deterrence, and defense. Unsurprisingly, therefore, humans have developed sophisticated cognitive skills for the identification of groups, and make extensive use of symbolic markers to represent group affiliation [1-3]. Several decades of research in psychology and social science have demonstrated that group identification may be based on rather flimsy analogies and even arbitrary labels [4, 5]. As a consequence, minimal manipulations of symbolic markers suffice to make people more altruistic, egalitarian, trusting, trustworthy, and cooperative toward in-group members, while encouraging competition, inequality, and the punishment of out-group individuals [6-12].

Two main explanations of these effects are currently popular in the scientific literature. According to the first one, group identity changes the preferences of decision-makers [13, 14]. According to the second one, it triggers social norms or heuristics that prescribe specific behaviors toward others, depending on their group affiliation [5, 15-17].

These two hypotheses have different implications. The Social Preference Hypothesis (SPH) entails that the behavior induced by group identity can be described using an other-regarding utility function that is stable across different games and contexts. Attempts to estimate this utility function however have produced mixed results, suggesting that the effect of group identity is context-specific and varies across situations [13, 14, 17]. According to the Social Heuristic Hypothesis (SHH), in contrast, group identity should induce ‘fast and frugal’ procedures of decision-making that help people to cope with complexity, uncertainty, and to resolve conflicts between different motives [17, 18]. As such, it should have a significant effect not only on choice behavior, but also on the time and effort invested in decision-making. Although research on the neural basis of group identity is still in its infancy, brain-imaging studies are broadly consistent with the latter picture: limbic, automatic processes seem to be more active in subjects who are sensitive to group identity, while regions associated with cognitive control are relatively more active in subjects who are immune to group discrimination [19].

In this paper we investigate SHH analyzing decision times across a unique set of 26 mini-dictator games, where the decision-maker (the 'dictator') is asked to choose between two different allocations of money to herself and to an anonymous individual (the 'recipient'). In our set of games the dictator always faces a conflict between self-interest (giving money to oneself) and altruism (giving money to the recipient), although the cost of giving varies from task to task. In one game, for example, subjects may have the opportunity to choose between a 'selfish' allocation of 13-5 (13 euro to the dictator, 5 to the recipient) and an 'altruistic' allocation of 11-9, with a cost of giving of 0.5. In another game the options may be 16-6 and 12-8, raising the cost of giving to 1 euro.[*]

To test SHH we induce group identity prior to the allocation task by means of arbitrary labeling coupled with the performance of a simple collective task (see Methods section). We first test the prediction that group identity, operating as a 'fast and frugal' heuristic, reduces average reaction time. This conjecture must be handled with care however because it relies on a controversial assumption, namely, that the same processes are engaged in self-interested and pro-social decision-making. Several studies carried out in the last decade have shown that subjects are faster when they make pro-social decisions in some experimental tasks [20-25] and slower in others [26, 27]. In two recent papers Krajbic et al [28] and Evans et al [29] have tried to reconcile these results arguing that decision time varies with the difficulty of the task, and that the latter depends in part on the preferences of decision-makers. Thus, in mini-dictator games, individuals with a selfish attitude may be faster when they choose allocations that maximize their own monetary gains, but slower when they choose altruistic options. Conversely, subjects with an altruistic tendency may be faster when they choose altruistic allocations and slower when they maximize their own individual payoffs.

Following this line of reasoning, we control for the effect of individual preferences when we

[*] The list of mini-dictator games is in the Supplementary Information Appendix. The cost of giving varies from a minimum of half a euro to a maximum of two for each given euro.

measure reaction times. As we shall see, group identity affects the time of decision asymmetrically, making altruistic choices 'easier' for selfish subjects in particular. This suggests that identity does not simply change social preferences but influences the way in which subjects solve specific decision problems, as reflected in reaction times.

Results

We first look briefly at aggregate choice data (N=64; n=1664). Our main comparisons take place between a 'Baseline' condition in which subjects face 26 binary (mini-dictator) games, and an 'Ingroup' condition in which subjects face the same games after they have been primed using a standard minimal group manipulation (Methods). The altruistic option was chosen 12.7% of the time in the Baseline condition, and 16.6% of the time in the Ingroup condition. The difference is statistically significant (Fisher exact test, p=0.016) and confirms that our manipulation worked as expected – it increased dictators' generosity toward in-group members.

To test our first hypothesis, we compare dictators' reaction times across the experimental conditions (Figure 1a). Group identity reduces average decision time, from 7.13 seconds in the Baseline condition to 6.44 seconds in the In-group condition (Mann Whitney test, p=0.017). The data thus seem to support the interpretation of group identity as a heuristic device that simplifies decisions and allows agents to economize on cognitive effort.

Before we endorse this conclusion, however, it is necessary to control for the effect of preferences on decision times. If pro-social decisions were generally faster than self-interested ones, as some experiments suggest [19-24], then group identity could decrease average reaction time simply by making dictators more altruistic. Our data in the Baseline condition, however, do not support this interpretation: dictators on average are slower when they make altruistic rather than selfish decisions (9.2 and 6.8 seconds, respectively – see Figure 1b).

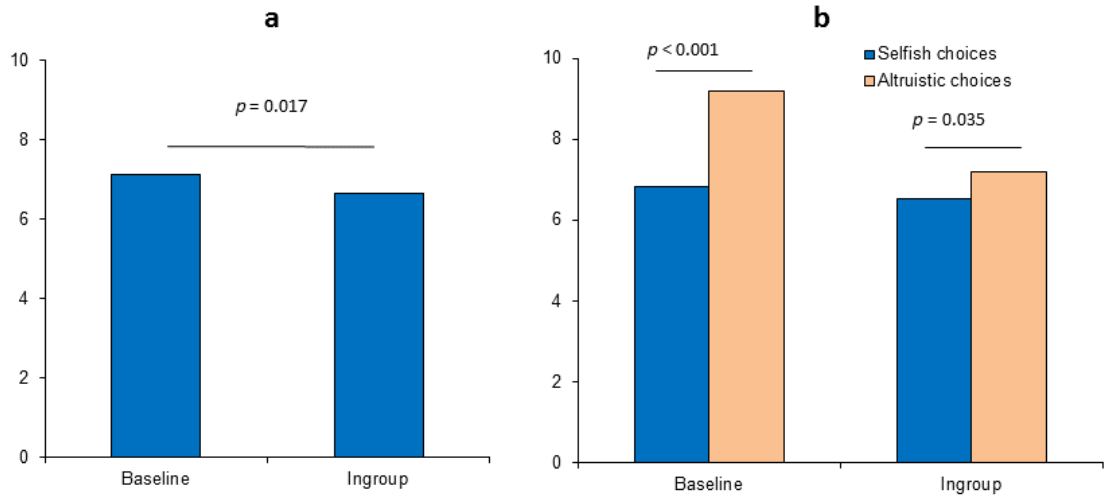

Figure 1. The effect of group identity on reaction times. (**a**) Group identity reduces decision time. (**b**) Altruistic choices are slower than selfish ones, but group identity reduces especially the time of altruistic decisions.

To control for the effect that the individual characteristics of dictators may have on decision time, we first run a panel estimation using the whole set of individual choices (N=1664). Panel estimates allow to control for any observable and unobservable characteristic that is constant at the individual level, including the degree of subjects' selfishness. The results show that reaction times are still 2.5 seconds higher on average when subjects make an altruistic decision in the Baseline, compared to a selfish decision (p=0.004). The same exercise delivers interesting results in the Ingroup condition: average reaction time does not differ between selfish and altruistic choices after the minimal group manipulation (0.02 seconds, p=0.941).

Group identity thus seems to have two effects: on the one hand, it reduces average decision time, but on the other hand it works as an 'equalizer', erasing the difference between altruistic and selfish choice that is observed in the Baseline condition. Group identity in particular seems to facilitate altruistic choice, increasing generosity and reducing the time it takes to make an otherwise 'difficult' decision.

To test this conjecture, we replicate the exercise of Krajbic et al [28] and identify the revealed preferences of each dictator using a simple behavioral measure, that is, the frequency with

which he or she chooses the selfish option in our 26 mini-dictator's games ($Prob_{self}$). This parameter is then correlated with the difference between the average time the dictator spends to make an altruistic decision, and the average time he/she takes to make a selfish decision (RT_{alt}–RT_{self}). The data from the Baseline condition (n=15) display a positive correlation between degree of selfishness and reaction-time difference: as predicted, 'selfish' subjects are slower when they make altruistic decisions (Figure 2). The effect of group identity is quite striking: in the Ingroup condition (n=27) the negative correlation between attitudes and reaction times disappears. 'Selfish' subjects do not take more time to make altruistic decisions, as in the Baseline condition, and become indistinguishable from 'altruistic' subjects from this respect.[†]

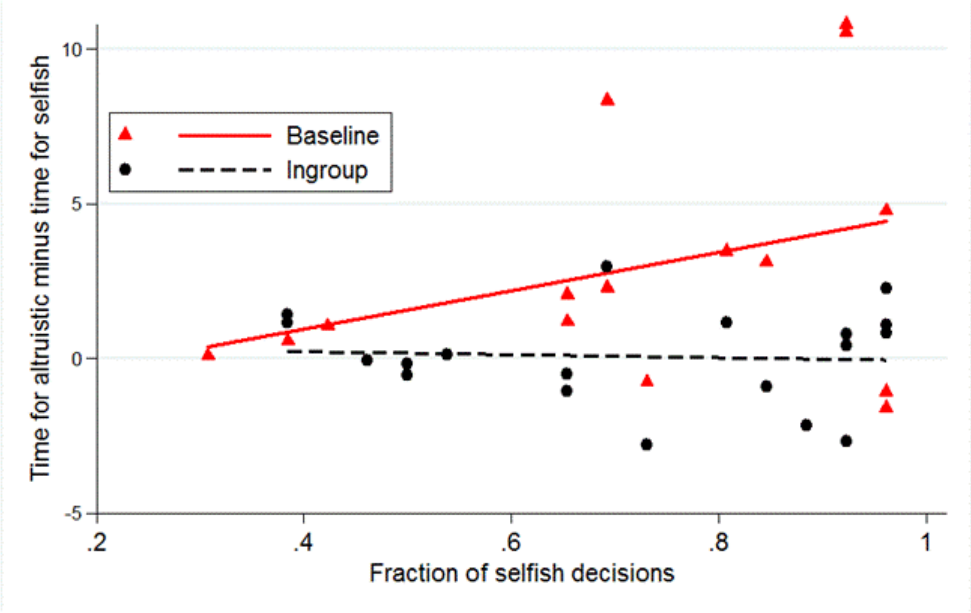

Figure 2. Difference in average RT between altruistic and selfish choices in the Baseline (triangles) and in the Ingroup (dots) conditions, as a function of the overall probability of choosing the selfish option. Each triangle/dot is an individual subject. The solid and dashed lines are linear regressions.

[†] Notice that seventeen subjects are excluded in the Baseline and seven in the Ingroup condition, because they always choose the selfish option. Consistently with the 'difficulty' hypothesis, their average RT is smaller than the RT of the remaining subjects when they make a selfish decision.

The results in Figure 1c are based on one observation per subject. Although the trends are unambiguous, the low number of observations prevents a proper test of statistical significance. A similar exercise, however, can be performed using a regression that includes all individual choices (N=1664).[‡] The reaction time is modelled as a function of the type of choice (altruistic vs selfish) and its interaction with the fraction of selfish decisions. Fixed effects allow to control for any observable and unobservable individual characteristic, including preferences. Table 1 shows that in the Baseline condition reaction time increases significantly with the difficulty of making an altruistic choice, while this pattern vanishes in the Ingroup condition.[§] The results confirm the intuitive interpretation of Figure 1c: group identity facilitates altruistic decisions for selfish subjects in particular.

Table 1: Panel estimation of reaction times of individual choices. The reaction time of making an altruistic choice increases with the degree of selfishness, only in the Baseline condition.

Dependent variable: Reaction time	Baseline		Ingroup	
	Coeff.	t-stat	Coeff.	t-stat
Altruistic choice	-2.44*	1.93	1.17	1.44
Altruistic choice*fraction of selfish choices	7.78***	2.89	-1.84	1.25
Fixed effects	yes		yes	
N	832		832	
R^2	0.17		< 0.01	

[‡] The results described in this paragraph continue to hold if we eliminate from the estimation those subjects who only make selfish choices.

[§] Notice that both coefficients must be considered simultaneously, so the negative coefficient in Baseline does not imply that altruistic choices are faster. Since the minimum value of the fraction of selfish choices is 0.308, the minimum value of the two combined coefficients is zero. In other words: within the sample the estimated reaction time of altruistic choices is either equal to that of selfish choices, or higher when the fraction of selfish choices increases.

Discussion

The evidence reported in this paper provides support for a heuristic account of group identity [5, 15-17]. First of all, identity increases altruism and reduces decision time in a series of simple choices among self-other allocations. In the terminology of 'dual-process' theories [30], group identity seems to prime 'System 1' decision processes that override deliberate, calculative decision-making. Second, and more specifically, group identity induces a significant time-reduction of the altruistic decisions made by subjects with a selfish attitude, while there is no effect on the choices made by altruistic subjects. These results overall suggest that faster decisions are not mediated by altruistic preferences: generosity is an effect of 'fast and frugal' behavioral rules that simplify decisions, especially when generosity conflicts with an underlying tendency to behave in a self-interested manner. This conclusion provides preliminary evidence in favor of the heuristic hypothesis. Future research should explore alternative ways to manipulate decision processes, for example by putting subjects under time pressure [20, 21] or by increasing cognitive load [20, 24] in conjunction with the group identity effect.

Methods

The data were collected at the experimental economics laboratory of the University of Parma, Italy. Most subjects were undergraduate students in business and economics and, among the dictators, male subjects constituted 56.45 per cent of the sample. Out of 128 subjects who participated in the experiment, 64 were randomly assigned the role of dictators before they made the allocation decisions. Half of them played the mini-dictator games in a 'Baseline' condition without group identity, and half of them in an 'Ingroup' condition. In the latter condition group identity was induced by arbitrary labeling (subjects were randomly divided in a 'red' and a 'blue' group), and by asking subjects to solve collectively an incentivized memory task. To control for possible confounding effects, the subjects in the Baseline condition performed the memory task individually and were rewarded the same amount of money. At the end of this preliminary phase, the dictators

faced 44 mini-dictator games. Our analysis focuses only on those games (26 in total) in which altruism was costly, to avoid complications arising from envious or spiteful motivations (a complete analysis of the 44 games, not focused on RT data, is available in a separate paper [17]). The games were designed so as to vary the 'price of altruism': generosity was 'expensive' in five games (two euro to the recipient cost four euro to the dictator), and 'cheap' in nine games (four euro to the recipient cost two euro to the dictator); finally, in twelve 'zero-sum' games every euro transferred to the recipient cost exactly one euro to the dictator (see Supplementary Information Appendix).

Each subject sat in front of a computer terminal isolated by partitions. In the Ingroup condition, but not in the Baseline condition, each dictator was reminded about the group affiliation of the recipient (which could be either 'red' or 'blue', but was always the same as the dictator's). The mini-dictator games then appeared in a random sequence on their screens, with clearly labeled payoffs ('You' vs. 'Other'). Dictators chose their preferred allocations by clicking a button with their mouse. Recipients meanwhile sat quietly in front of a blank screen and were only told about the outcome of the experiment at the end of each session.

The games were implemented using the standard z-tree software [31] and incentivized using real money. One of the mini-dictator games was randomly selected at the end of each session, and all dictator-recipient pairs were paid anonymously according to the decision made by the dictator in that particular game. Subjects earned on average 13.5 euro (about 15 the dictators, 12 the recipients) for roughly 70 minutes of participation.

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Author contributions

Both authors proposed the research question, designed the experiment, and collected the data. A.F. analyzed the data, and F.G. was mainly responsible for writing the paper.

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SI - Appendix. List of mini-dictator games

(100 Experimental Currency Units = 1 Euro)

Game ID	Option A		Option B	
	Dictator	Recipient	Dictator	Recipient
1	1200	200	1000	600
2	600	1000	1000	800
3	700	900	500	1100
4	1000	600	1400	200
5	600	1000	400	1400
6	800	600	600	1000
7	900	700	1300	300
8	1200	400	800	800
9	1100	700	700	900
10	400	1200	600	1000
11	1100	500	700	900
12	1100	500	900	700
13	900	700	1300	500
14	1000	600	1400	400
15	800	800	600	1200
16	1200	600	800	800
17	900	700	500	1100
18	1000	600	800	800
19	600	1000	200	1400
20	1000	400	800	800
21	1100	300	900	700
22	700	900	300	1300
23	1200	400	1000	600
24	800	1000	1000	600
25	500	1300	700	900
26	700	900	900	500