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Parochial altruism in inter-group conflicts

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ABSTRACT

We investigate parochial altruism, the combination of in-group altruism and out-group hostility, in an experimental conflict game preceded by a prisoner's dilemma. Our data are consistent with parochial altruism, but cannot be explained by in-group pro-sociality or out-group hostility alone.

1. Introduction

The pattern of results from a variety of experimental games with human groups reveals a remarkable coexistence of pro-social and anti-social behaviour. In public-good games, people typically contribute to the common benefit, despite the dominant strategy of keeping everything, and even spend some of their own resource to punish free-riders (Isaac and Reynolds, 1988; Fehr and Gächter, 2000).

Other paradigms tend to trigger aggressive behaviour towards members of other groups. In the group rent-seeking game one observes conflict contributions that are much higher than those seen for individuals, and people even spend some of their own resources to punish members of their group who do not punish others strongly enough (Abbink et al. (2010), Leibbrandt and Sääksvuori (forthcoming), Ahn et al. (2011)).

Parochial altruism, where altruism towards one's own group members goes along with hostility towards the members of the out-group, may be one important clue to reconcile these seemingly contradictory observations. Evolutionary biologists have recently suggested that such parochial altruism may be key to the understanding of the evolution of behaviour in both cooperation and conflict. Recent evolutionary models such as those of Choi and Bowles (2007), Lehmann and Feldman (2008), and Bowles (2008) suggest that violent conflict between groups, in the early history of humankind, may have been a trigger for the evolution of parochial altruism.

In this paper, we report an experiment specifically designed to disentangle the two components of parochial altruism. Our experimental design gives us full control over variables which are unobservable in actual conflicts and enables us to identify parochial altruism as the motivational principle behind the observed group conflicts, and rule out competing explanations.

2. Experimental design and procedures

We have two treatments. Each treatment has two parts, one to measure pro-social orientation and one to measure conflict

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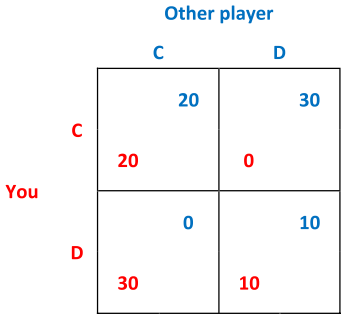

Fig. 1. Prisoner's dilemma game from part 1 of the experiment. Strategy D ("defect") is the optimal choice for a selfish player. Choosing strategy C ("cooperate") indicates a willingness to give up some of one's own reward for the benefit of the other player.

behaviour. It is the combination of the evidence from these two parts that allows us to pin down the existence of parochial altruism. In part 1, we gather, following Herrmann et al. (2010), decisions from participants in a one-shot prisoner's dilemma (PD) game, as depicted in Fig. 1. This part yields independent evidence on the pro-sociality or selfishness of the individuals who subsequently participated in the inter-group conflict.

In this PD game, we asked for unconditional decisions (choose without knowing what the other player does) as well as conditional decisions (choose separately for the case that the other player chooses C and for the case that the other chooses D). One participant's conditional decision was then randomly matched with another participant's unconditional decision. We did not provide feedback on the PD outcomes until after part 2 of the experiment in order to rule out contamination between the data sets. According to their conditional decisions we classify participants as altruists (always choose C), conditional cooperators (choose C if the partner chooses C, D otherwise), pro-selfs (always choose D), or non-classifiable (choose C if the partner chooses D, D otherwise).

In part 2, participants played an inter-group conflict game, repeated over 20 rounds in fixed groups. In Abbink et al. (2010), we study this game in isolation with another subject pool and other parameters. The conflict was a contest between two four-person groups, X and Y, for a given prize of 2000 money units [MU], shared evenly among the members of the winning group. This design is an abstract representation of a situation of inter-group rivalry as it may occur in ethno-political conflicts and wars, in which two groups strive for a resource that only one of them can obtain.[1] At the beginning of each round, we endowed every participant with 1000 MU. Each member i of group X then had to decide on the amount x_i to contribute to the group's total fighting effort. The contest was symmetric: the situation for the members of group Y was exactly the same. After all participants had made their decisions, the winner of the contest was determined based on the relative fighting efforts. The prize was allocated to group X with probability $\Sigma x_i/(\Sigma x_i + \Sigma y_j)$ and allocated to group Y with probability $\Sigma y_i/(\Sigma x_i + \Sigma y_j)$. From a societal viewpoint, fighting expenditures are unproductive: they do not generate benefits beyond increasing the probability of winning. Social efficiency is thus higher the lower the investment.

The second treatment involved the same conflict situation, but enriched with the possibility of peer punishment within each group, as in the seminal article by Fehr and Gächter (2000). Now, subjects were able to reduce the earnings of their fellow group members after learning about their individual contributions. A 10 MU reduction cost the punisher 1 MU. Subjects were able to choose freely whether to reduce others' earnings. The joint analysis of the decisions in both parts of the two treatments allows us to examine in how far subjects' social attitudes are correlated with their behaviour in the conflict game.

The participants were 128 students from the Universitat Autònoma de Barcelona. A statistically independent observation comprises two competing groups of four subjects each, and the statistical tests we use treat the data in this way. The experiments were computerized and conducted under anonymous conditions.

There are four benchmark investment levels that will be important in our analysis below. The first is social efficiency, which is maximized if one group invests 1 MU and the other nothing. The second benchmark is the Nash equilibrium based on individualistic preferences, for which the aggregate contribution per group is 125 MU. This level comes about when each person makes his/her choice in isolation and tries to maximize his/her individual payoff while taking the choices of all others as given. In this equilibrium, own-payoff maximizing individuals tend to let the others in their group fight for them. In our third benchmark, all group members aim to make investment decisions in the best interest of their own group. The equilibrium conflict expenditure per group is 500 MU. Here, each group collectively best responds to the other group, but the flipside is a substantial reduction in social efficiency, due to the increased conflict intensity when the intra-group free-riding problem is overcome.

Any investment level in excess of 500 MU is harmful to the own group, as it reduces the group's expected payoff. However, such excessive investments could arise under between-group hostility. If, in the extreme, group members seek to maximize the payoff differential between their own group and the rival group, the equilibrium total investment per group will amount to 1000 MU, our fourth benchmark. Any investments above this level would mean that the two groups jointly spend more than the 2000 MU the prize is worth.

3. Results and conclusions

Four pieces of evidence are necessary to show that observed behaviour is consistent with parochial altruism and not with either a pure pro-social motivation or with pure hostility. First, we look at inter-group conflicts in the absence of within-group peer punishment. Fig. 2 shows average aggregate conflict expenditures over the 20 rounds of the experiment. The initial level is extremely high, and is consistent with relative payoff maximization between groups. The level at the end of the experiment is consistent with group members seeking to maximize the income of their own group. Thus, although the conflict intensity decreases over time, the contributions remain well above the benchmarks of social efficiency and selfish rationality.

Second, also visible in Fig. 2, the presence of punishment increases the contributions to conflict even further ($p = 0.002$ using Fisher's two-sided two-sample randomization test). The average conflict expenditures are far above any of our benchmarks and, in the aggregate, exceed the value of the prize. Towards the end, the contributions approach the benchmark of payoff differential maximization.

Fig. 3 shows the third piece of evidence, the conflict contributions of pro-selfs and pro-socials. Almost all participants were either pro-selfs (46.9%) or conditional cooperators (48.4%). Altruists who always choose C were rare (3.1%). We pool altruists and conditional cooperators as pro-socials (our conclusions remain unchanged if we focus on conditional cooperators only).

[1] Our game is an extension of the rent-seeking contest introduced by Tullock (1980). Some prominent experiments with this game are given by Isaac and Reynolds (1988), Millner and Pratt (1989), Öncüler and Croson (2005), Sheremeta and Zhang (2010) and Sheremeta (2011). These studies observe the behaviour of individual players, without an inter-group conflict.

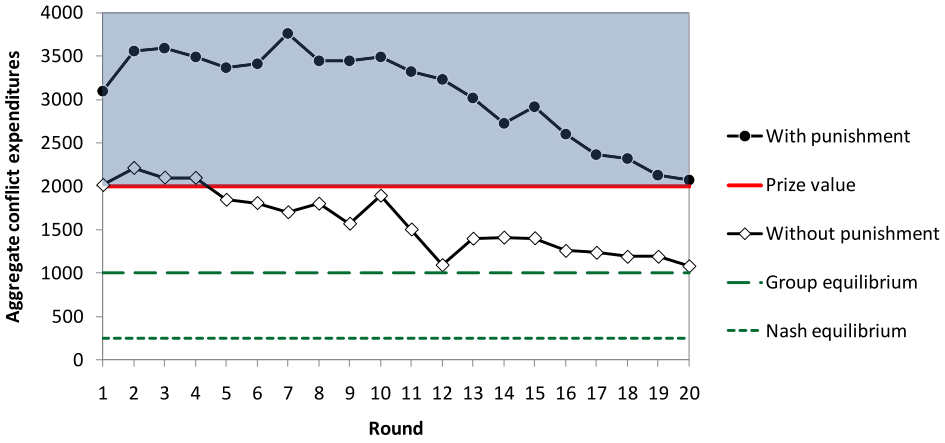

Fig. 2. Mean aggregate conflict expenditures (total of both groups) over the 20 rounds. The shaded area illustrates the range in which total investments in fighting exceed the value of the prize.

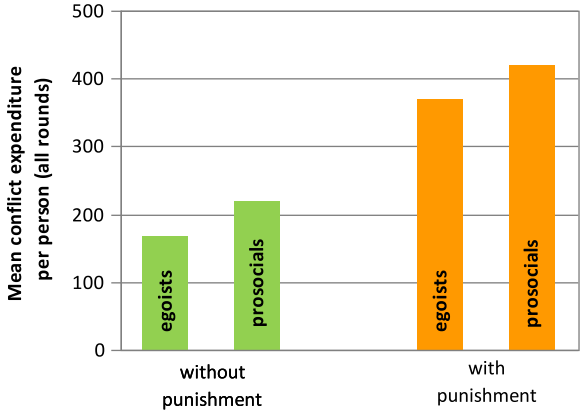

Fig. 3. Contributions by pro-selfs and pro-socials.

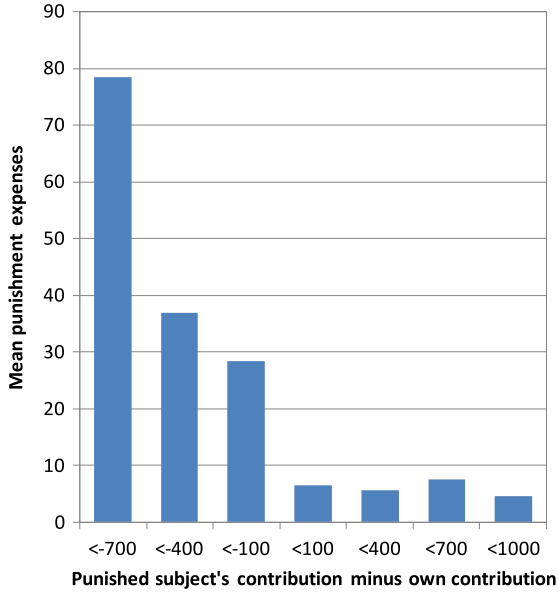

Fig. 4. Punishment behaviour. Punishment is typically carried out by high contributors against "free-riders".

We find a positive correlation between pro-sociality measured in the PD game and contributions in the inter-group contest. In both treatments, pro-socials contribute more to the inter-group conflict than pro-selfs. This difference is statistically significant for the no-punishment treatment ($p = 0.035$). In the punishment treatment, the difference is quantitatively similar, but not statistically significant ($p = 0.144$). The correlation indicates that in-group pro-sociality coincides with out-group aggression. Individuals who forego their own payoffs in the PD game for the benefit of the other player tend to be stronger contributors to wasteful investments in a conflict with an out-group.

Fourth, we examine punishment behaviour. Participants might use punishment to spur on their fellow group members and drive up the intensity of conflict. In this case, low contributors would be punished. Participants might also punish to influence others to reduce their wasteful expenditures. In this case, high contributors would be punished, a pattern which in a public-good setting might be seen as *antisocial punishment* (see Herrmann et al., 2008). The results of Fig. 4 are very clear: the predominant punishment pattern is for high contributors to punish low contributors.

We can now explain how the configuration of the results is consistent with parochial altruism and not with other notions of sociality. Four characteristics of the data lead us to this conclusion.

First, conflict contributions in the absence of punishment imply that social efficiency cannot explain the observed investment levels, since it would predict minimal investment levels.

Second, given conflict efforts far above the non-cooperative Nash equilibrium, both with and without punishment, pure selfish rationality is not a good predictor in this context.

Third, we can rule out that the high conflict intensity is due to our subjects being generally hostile towards others, since those who invest more in conflict display pro-social behaviour in the PD game.

Fourth, punishment behaviour is not consistent with pure pro-social behaviour towards the in-group, without out-group hostility. As seen in Fig. 4, subjects predominantly punish those who contribute less than themselves. Punishing partners in such a way may induce them to increase their expenditures, improving the chances that one's own group wins the conflict. However, collectively the in-group experiences a loss from higher expenditures, since the observed levels are already far too high to benefit the in-group materially. The fact that punishers try to enforce excessively high investments can only be explained with out-group hostility as part of what motivates individuals. To conclude, the combination of in-group altruism and out-group hostility that characterizes parochial altruism fits the data, and both pure altruism and pure hostility do not.

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