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Luigi Bosco

Competition for power and altruism

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Abstract - The paper analyzes the trade-off between power and altruism by using an experimental framework which involved a group of experimental agents, undergraduate students of the University of Siena. The results show that the introduction into the experimental structure of a tournament for the power appreciably altered the behaviour of agents. More specifically the degree of altruism, measured by the dictator offers, significantly decreased when the agents were able to trade altruism for power. The results were more clear-cut and robust in the case of the dictator game, but also in the case of the ultimatum game the introduction of the tournament for power altered the behavior of subjects. A significant gender effect emerged.

JEL classification: C91, D64
Keywords: Altruism, Dictator game, Ultimatum game, Hierarchy

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Luigi Bosco, Dipartimento di Economia Politica, Università di Siena – bosco@unisi.it

Introduction

A world in which agents are heterogeneous and selfish individuals cohabit with other-regarding ones and in which agents display reciprocative behaviour raises completely new problems in the design of an optimal economic policy (Bowles, 2006). Already analyzed has been the problem of motivational crowding-out (and crowding in) which emerges when external intervention via monetary incentives or punishments may undermine (and under different conditions strengthen) intrinsic motivation (Frey and Jegen, 2001). As a consequence, agents' behaviour is affected by the rules used to interact with other subjects, and the institutional framework in which they are bounded to play significantly shapes their behaviour. The institutional setting and the social values systems play a crucial role in supporting and spreading certain behaviours among agents. Even in the absence of crowding out/in effects, the institutional design would play an important role in shaping individual behaviour by harnessing selfish actions and fostering pro-social actions.

To date, very little attention has been paid to analysing how different institutional frameworks and different rules of interactions among agents affect the behaviour of individuals and mainly their social preferences. A notable exception is Camerer and Fehr (2006). They investigate the conditions under which the canonical model of the *Homo Economicus* prevail even in presence of agents who display social preferences and bounded rationality, and they state that the institutional mechanisms which rule the interactions among heterogeneous individuals are crucial in explaining when the canonical model is able to affect aggregate behaviour and when it is not.

The aim of this paper is twofold. It intends to verify experimentally whether power, or better, the search for power is an intrinsic motivation able to crowd out another intrinsic motivation, i.e. altruism, and whether a particular system of rules governing the way in which individuals interact with each other is able to affect other-regarding preferences and the aggregate behaviour of a group of heterogeneous agents. I defined power in a very strict sense as "possession of control, authority, or influence over others" (Merrian-Webstair Dictionary); in our framework, it was the power to influence the utility a group of subjects by determining the amount of their monetary reward. As far as I know no one has ever addressed this question by considering the search for power one of the determinants of agents behaviour. Some interesting and recent contributions which analyze a similar although different question, that is the role of power and hierarchy in team, confirm that the issue is of interest and deserves more careful attention (Heijden, Potters, and Sefton, forthcoming)

The paper reports the result of an experiment taken at University of Siena and involving 72 subjects. They were divided into groups and played a series of dictator and ultimatum games with the members of other groups; for each experimental euro individual subject earned, the experimenter assigned half of it to the group. I differentiated one setting from the other according to how the group surplus was distributed among group members. In the control setting (treatment A) the group surplus was distributed equally among group members, while in the power setting (treatment B) there was a ranking of the earnings in the group, and the subject who had earned the largest sum was given the power to decide the distribution scheme of the surplus for a group different from his/her own. In other words, in this treatment, individuals may compete to acquire power. Moreover, I also run an experiment in which I employed a third setting (treatment A2); in this setting there is no competition for power, as in the control setting, and the distribution of the group surplus was randomized to replicate the same situation in term of risk of the power setting.

In order to plainly discriminate between intrinsic (the desire to acquire power) and the extrinsic (the amount of money gained throughout the experimental sessions) motivation, the design of the experiment did not allow individuals who has acquired the power, to decide the distribution of the surplus of their own group and then to decide the amount of money they receive. The acquisition of power in treatment B did not encompass any personal monetary advantage and thus did not modify the opportunity cost of altruism [1].

[1] However, it cannot be denied that a leader who is not assigned the central role of deciding the surplus distribution of his/her own group is a *lame duck* leader. In popular culture, power and wealth are strongly linked and the artificial separation that I have introduced may have weakened the idea of power perceived by our experimental subjects. In a companion paper (Bosco and Marcheselli, 2006) the case in which the leader has the power to decide the distribution of surplus of her own group is analyzed. The two experiments were partially different and therefore the data are not directly aggregatable; needlessly to say, in this latter case, the

I found that the introduction of a hierarchical structure generated a significant decrease in the rate of altruism, measured in terms of the allocation given to the receiver in the dictator game. In this case the tournament among group members for leadership and the competition for power was a strong means to induce behaviour more in line with the classical assumption of economics. A remarkable gender effect emerged, suggesting that women are less attracted to and trapped by competition for power.

The Experiment: design and procedure

The experiment took place at the University of Siena. The participants were 72 undergraduate students recruited through advertisements asking for participants in a paid experiment. The experiment was conducted with double blind anonymity ensured: the choice of the subjects could not be observed either by the experimenter or by the other experimental subjects.

I analyzed the behaviour of experimental subjects in two different institutional settings. In one of these settings, I sought to replicate the interactions of individuals in a group competing with each other to climb the group's hierarchy, and to obtain the power to decide how the profit of a group different from her own was to be divided. Twenty-four students were involved in each treatment.

In both settings players were divided into three groups of six subjects each. They could earn money from the two activities in which they were involved. These activities consisted of a series of ultimatum games and a series of dictator games. In particular the subjects performed 12 sequences of activities which always consisted of four actions: an ultimatum game[2] as *proposer*/*responder*, a dictator game[3] as *proposer*, an ultimatum game as *responder/proposer* and another dictator game as proposer. In other words, the experiment was designed so that at the end of a sequence of activities, four rounds, a subject had played two ultimatum games, one as proposer and one as receiver, and two dictator games as proposer.

For each sum of experimental money earned by a subject through these two activities, the experimenter assigned half to the group to which the individual belonged. This latter amount of experimental money constituted the group's surplus to be distributed. The two treatments differed in the way that this surplus was divided among group members. In treatment A (the control setting), the profits accumulated by the group were equally divided among the group's members [4].

In treatment B (the power setting), the framework was more complex. Firstly, every four rounds the subjects in each group were ranked according to their individual profits, and they were assigned to a position in the group's hierarchy according to their rank. There were three different positions in the hierarchy (table 1) [5].

Table 1

Role	Profit accumulated in individual activities
D	The player who made the highest profit
F	The two players who made the second and third highest profits
A	The three players who made the smallest amount of profit

effect on altruism was even stronger

[2] The ultimatum game is an experimental game in which the first player, the *proposer*, proposes how to divide a sum of money with the second party. If the second player, the *responder*, rejects this division, neither gets anything. If the second accepts, the first gets her demand and the second gets the rest (see Camerer, 2003).

[3] The dictator games is an ultimatum game in which the responder's ability to reject an offer is removed, so that she has a merely passive role

[4] In treatment A2 instead the distribution was randomly chosen.

[5] Players were informed of their ranks every two games.

The player who took position D then autonomously decided how the accumulated profit of a group different from his/her own should be divided among the group members. S/he could choose one of the distribution schemes reported in table 2.

Moreover, s/he could also create his/her own distribution scheme by autonomously deciding the proportion of group surplus going to the three positions.[6] The redistribution schemes varied from a egalitarian distribution (IV) to a distribution in which the player in position D could be given the lion's share (II).

Table 2

	Share of group profit			
Role	I	II	III	IV
D	45%	100%	60 %	16.6 %
F	20%	0%	20%	16.6 %
A	5%	0%	0%	16.6 %

The experiment started with a draw. Each subject took a one Euro coin from a bag (his/her participation fee); six of them got a coin issued outside Italy.[7] These latter were sent to a different computer room (room B), while the others remained in the main computer room (room A). In both rooms, the subjects were seated in front of computer screens. The subjects in room B were soon informed that they would play an almost passive role in which they merely commented on the choices of the subjects in room A. After the experimenter had read out the instructions (see appendix A for an English version of the instructions), and had publicly answered some questions raised by the subjects, the experiment started.

Then, with the help of a computer program, the subjects in room A played a series of ultimatum and dictator games. They always played ultimatum games with subjects belonging to a different group and they never played more than once with the same subject in the same role. Moreover they never knew the identity of the subject with whom they were playing. Subjects always played dictator games as the proposer, while the role of responder in this game was played by subjects in room B (they had no other way to earn money, except for a small participation fee), and by a charity organization chosen by the experimental subjects from a list provided by the experimenter (specifically, they played 18 times with the charity organization and 6 times with other individuals).

I chose dictator games because these are best suited to analysis of the degree of altruism of individuals. The sum that the proposer assigns to the responder is mainly, if not solely, motivated by altruistic reasons, in fact. Two broad classes of altruistic motives have been analyzed in the literature. The first is unconditional altruism broadly defined as comprising warm-glow altruism (Andreoni, 1989), and various forms of egalitarianism (Fehr and Schmidt, 1999; Loewenstein et al., 1989). This form of altruism is unconditional since it does not depend on the characteristics or intentions of the recipients. The second is reciprocal or conditional altruism; in this case, the altruism is conditioned by the behaviour or on the characteristics of the other subject.

I introduced two different kinds of receivers in the dictator game in order to capture these two different motives for altruism; when a donor gave to another student, s/he was motivated by unconditional altruism since the donation was not conditioned either by a certain behaviour of the receiver who did nothing or by particular features of the student that made him/her particularly worthy of a donation [8]. In this case a donation can be motivated also by preference for equality of the donor. On the contrary, the donation made in favour of a charity organization chosen by the donor from a list of several charity societies provided by the experimenter, is clearly a form of conditional altruism; in this case, the decision is conditioned by the characteristics of the receiver and the decision to donate strictly depends on evaluation of the past activities of these organizations. In this case the donation can be seen as a result of a reciprocative behaviour since the

[6] Players could not differentiate among subjects in the same hierarchical position.

[7] Euro coins have one side that is common to all euro countries while the other side is country specific.

[8] Generally a dictator has no reason for considering another student more worthy to receive a donation than him/herself.

dictator could make a contribution only if s/he trusted the charity organization and expected that his/her kind behaviour would be reciprocated by the organization.[9]

The main hypothesis that I wanted to test was whether the tournament taking place among the group members and the competition for leadership of the group determined any change in the rate of individual altruism. If our hypothesis was supported, there would not only be a significant decrease in the rate of altruism among individuals in treatment B, but there would also be evidence that the difference between the rates of altruism in the two settings increased as the experiment proceeded. Another interesting question that I wanted to address was whether the two altruistic motivations were affected in the same way.

I also ran a series of ultimatum games; in this case I were interested in verifying whether the hierarchical setting of treatment B modified the behaviour of both proposers as far as the sum allocated to the receiver was concerned, and receivers, as far as the rate of rejections of low offers was concerned. It was interesting to verify whether the desire to climb the group's hierarchical scale in order to obtain an higher payoff and, more importantly in this case, to acquire the power to decide, affected the value of ultimatum offers and the rate of rejection of low offers.

In each round of the experiment the proposer in both the dictator and ultimatum games had an average of 90 experimental euros to be divided with the receiver [10]. The conversion rate of experimental euros into real euros was set at 0.0025; therefore, about 400 experimental euros were necessary to earn a real euro. By the end of the experimental session, each experimental subject could have earned up to a maximum of about 20 euros (plus the 1 euro presentation fee). At the end of the experiment, agents in room A had earned on average about 12 euros (about 15 dollars), ranging from 6 euros to 19 euros.

Experimental Results

By the end of the experiment, each of the 18 experimental subject had played 24 dictator games, always as the dictator, and 24 ultimatum games, 12 as proponent and 12 as responder, and s/he had never played the same game, with the same role, with the same player more than once. I therefore had the results of 432 dictator games and 216 ultimatum games. This section sets out the main results.

Dictator games

The main aggregate results from the dictator games are reported in table 3. In a setting characterized by double blind anonymity the mean offer is quite low [11]. However, it has been shown that the mean allocation increases when the responder is not a physical person but a charitable body worthy of a donation [12]. In addition, there is also evidence that when the donor can observe the identity of the responder the mean allocation increases even if the choice of the proposer is still unobservable by the responder and by the experimenter (see for example, Bohnet and Frey, 1999).

In the control treatment, the mean allocation given to the receiver was about 17%, in line with the result obtained in other experiments; in more than 25% of the cases proposers left zero to the receiver. Moreover, dictators gave on average slightly more to the charity organization than to real subjects. This means

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[9] The definition of reciprocity that I adopt here is that of *strong reciprocity* (Fehr et al., 2000,. Bowles and Gintis, 2002). Strong reciprocator shows a combination of altruistic rewarding, which is a predisposition to reward others (at a cost of oneself) for cooperative, norm-abiding behaviour and altruistic punishment, which is a propensity to impose sanctions (at a cost of oneself) on others for norm violations (Camerer and Fehr, 2006).

[10] In order to minimize any automatism in the choice the sum assigned to the proposer was half of the times 100 experimental euros and half of the times 80 experimental euros.

[11] For example, in Hofman et al. (1994), 70% of the subjects did not give anything and the mean allocation was about 10%, significantly less than 20% which is the mean allocation in the experiments without double anonymity. See also Camerer, 2003

[12] Eckel and Grossman, 1996, for example, obtained a rather higher allocation mean using the Red Cross as responder.

that the conditional altruism was a more powerful motive for donation than unconditional altruism. This is clearly in line with experimental results in which the role of reciprocal altruistic is supported (Fong, 2006).

Table 3
Offers in dictator games

	Offer frequencies (percent offered)							Mean			Median	SD
Treatment	0	0-10	11-20	21-30	31-40	41-50	> 50	disaggregate		total		
A (control)	27.5%	20.4%	16.0%	16.4%	5.6%	10.6%	3.5%	charity	17.0	16.7	11.1	17.8
								subjects	15.9			
B (power)	33.4%	17.4%	15%	21.1%	9.3%	2.3%	1.6%	charity	14.3	13.7	7.1	15.9
								subjects	12.7			

However, our interest was not in the degree of altruism per se, but rather in the change caused to the degree of altruism by the settings of treatment B. From this point of view, it seems quite evident that the desire to achieve leadership of the group induced players to reduce the sum they decided to offer to the other player in the dictator games. Both when the receiver was another student and when it was a charity organization, proposers offered less in treatment B than they did in treatments A. The number of subjects allocating nothing (33%) or less than eleven per cent (51%) to the receiver was somewhat higher in treatment B than in treatment A (27% and 48% respectively). The mean contribution when subjects were divided into groups but without any hierarchical rating and with an automatic and egalitarian rule on splitting the group surplus was more than 20% higher than in the case in which there is an hierarchical organization (16.7 versus 13.7). Since the two distributions of allocations are both highly positively skewed, comparing medians is almost as informative as comparing means. Of interest is the marked difference between the median values: the median in the power setting is more than 50% higher in the control treatment. It is also interesting to note that the competition for power has more effect on the donation to subjects, unconditional altruism, which is 25% higher in the control setting than in power setting; conditional altruism, the donation to charity, is 18% higher in the control setting.

In order to evaluate the statistical significance of the these findings, I employed the Mann-Whiteny test [13] which evaluated whether two independent samples (groups) come from the same population. Results are reported in Table 4.

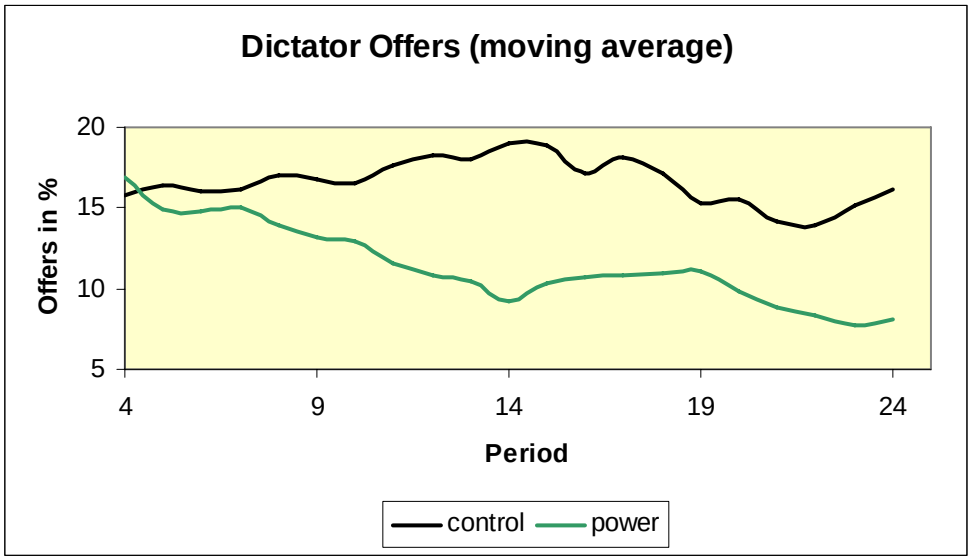
Table 4
Mann-Whitney Test

	Treatment	Median	z	p
All 24 games	A control	11.1	-2.23	0.026
	B power	7.1		
First 8 games	A control	16.5	-0.745	0.456
	B power	14.2		
Second 16 games	A control	17.3	-3.22	0.001
	B power	10.1		

The first row of the table gives the result of the test when all the periods are considered; it is evident that I can reject the null hypothesis that there is no difference between the two median values and therefore between the two distributions at a significant statistical level (less than 5%). Therefore the difference in the behaviour of subjects in the two treatments appears to be statistically robust.

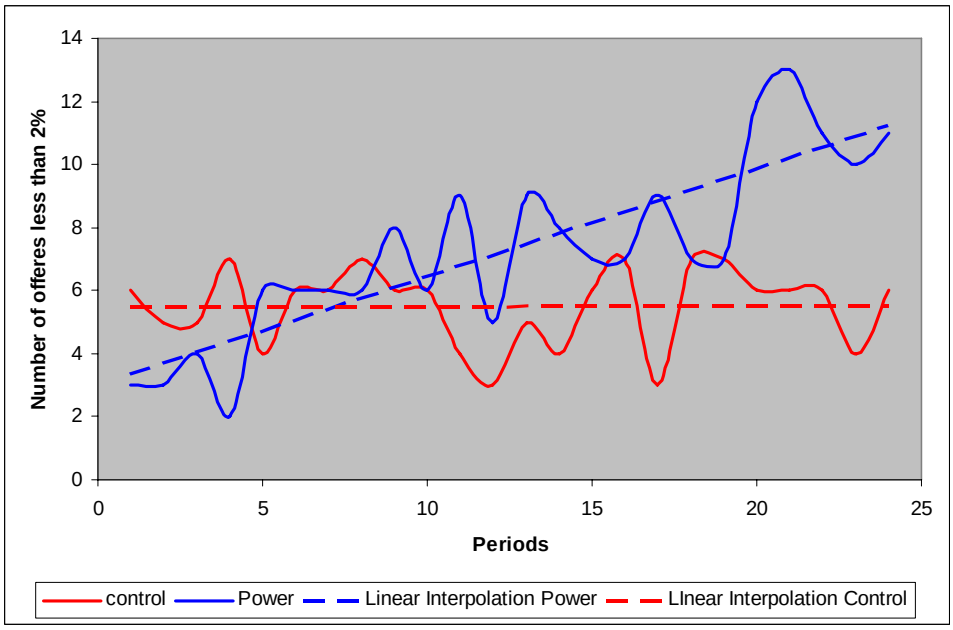
[13] The Mann-Whitney *U* test is a non-parametric test for assessing whether the medians between two samples of observations are the same. The null hypothesis is that the two samples are drawn from a single population, and therefore that the medians are equal

Figure 1



The meaning and the interest of this result is reinforced when the dynamic behaviour of subjects is analyzed. Figure 1 shows the four-period moving average allocation given by the proposer to the receiver in each period in the two different settings. It is evident that the behaviour subjects progressed very differently in the two settings. While in treatment A the mean allocation is almost constant over periods, in treatment B the mean allocation to the receiver keeps on decreasing over time. The ratio between the mean allocation in the first and in last period is 0.95 in treatment A and 0.51 in treatment B.

Figure 2



This conclusion is confirmed by figure 2, in which the number of offers smaller than 2% in each period are reported for the two treatments. It appears quite clear that while in the control setting, the number of almost completely selfish behaviours does not display any positive trend over time, in the other treatments there is a plain tendency for the number of pure selfish allocations to increase. Until the fifth period, soon after the second session, the number of pure selfish allocations is smaller in treatment B than in treatment A, while thereafter the number of very low allocations constantly increases in treatment B, while remaining almost constant in treatment A. It is very difficult no to explain this performance with the role played by the tournament mechanism, which determined a change in the behaviour of subjects in treatment B.

Table 4 gives statistical support for this finding. I split all the experiment into two parts, the first with

the initial 8 dictator games and the second with the remaining 16 dictator games. I cannot reject the null hypothesis that the two medians are the same in the two treatments as far as the initial part of the experiment is concerned, while this hypothesis is significantly rejected in the second part of the experiment. Therefore the behaviour of donors is statically indistinguishable at the beginning of the experiment, while it becomes increasingly different as the experiment proceeds.

This evidence warrants further discussion. It provides indirect, yet rather robust, confirmation of our hypothesis. At the beginning of the experiment there was no significant difference between the two treatments as far as mean allocation was concerned. Interestingly enough, in the first period the mean allocation was higher in the power setting than in the control setting (22,5% and 17.5% respectively). It was the tournament for the power that, period after period, gave rise to different behaviour among the agents, inducing increasingly selfish behaviour and yielding an allocation to the receiver which diminished as the experiment progressed. In other words, the endeavor to assume leadership and to acquire the power to decide seemed to be a very powerful selfishness-inducing device.

Other interesting issues can be addressed by disaggregating the previous figures and by looking at the individual data. It is apparent that subjects were heterogeneous and behaved very differently. There were subjects who left more than 30% to the receiver in both treatments. In a certain sense, they can be defined "purely altruistic". Interestingly, their number (2) is the same in the two treatments. Moreover, also the number of pure selfish individuals, who gave nothing at the onset and who kept on giving zero in almost every periods, are roughly the same in the two treatments (two subjects in both treatments gave zero more than 20 times out of 24).

These data suggest an interesting consideration. The change in the framework and the introduction of a tournament for power had almost no effect on the behaviour of some agents. The power setting, in fact, did not modify the behaviour of a pure altruistic individual, who did not assign any positive weight in his/her utility function to power and considered neither the behaviour of others nor his/her position in the hierarchical ranking to be important. Obviously, neither would a pure selfish individual have modified his/her behaviour because s/he would always have behaved so as to maximize his/her material payoff.

It is therefore clear that the aggregate outcome was determined by the behavior of subjects who were neither purely altruistic nor purely selfish. It is consequently important to understand the motivations that prompted the majority of the agents to change their behaviour when a tournament for power was introduced. Firstly, it should be noted that the main difference between the control and the power treatments was that in the latter the agents could exploit a trade-off between altruism and power which was absent in the control treatment; in other words, in the power setting agents could trade some altruism, by decreasing the dictator offers, in exchange for the chance to climb the power hierarchy, while in the control setting agents could trade altruism only for money. Thus, the fact that in the power setting the degree of altruism significantly decreased means that some of the agents decided to exchange some altruism for a slice of power. In other words, there were agents who were unwilling to trade more altruism, measured by the sum of money that they left to someone else, for money but they were keen to trade altruism for power. In the control setting this trade-off did not exist, so that agents did not have this opportunity. When an agent in the power setting decreased his/her allocation to the receiver, s/he knew that his/her reward would be not an extra quantity of money but a chance to climb the power ladder and ascend the hierarchy of the organization.

Another important consideration is that power, as I interpreted it in this experiment, is clearly a positional good (see Hirsch, 1976 and Pagano, 1999). Indeed, its inherent characteristic is that only the player in position D had the right to decide, that is, possesses power. In the control treatment, there was no positional good because agents could not see the ranking of earnings and therefore every agent played without knowing their relative position. If some agents had preferences not only for their absolute level of well-being, but also for their relative position, they would clearly have been affected by the power setting because they had an opportunity to change their relative position in the social scale.

Finally, if the share of subjects who display reciprocative behavior is not negligible, I have a powerful device spreading the selfish behavior among agents. Reciprocative agents, in fact, will respond to the competitive and less altruistic performance of others by decreasing their own allocations as well. It is worth noting that in this framework reciprocative behaviour is slightly different with respect to the standard case: in fact, by decreasing the offer, the dictator directly affects the welfare of a third party, the *guiltless* receiver, not

the welfare of the other dictator. However, two things should be taken into account here. Firstly, the only way in which an agent can punish the selfish player is to become selfish him/herself and compete for leadership. Secondly, it appears that the reciprocative agent reacts to the environment: as it grows increasingly competitive and tough, the agent is negatively influenced and modifies his/her behaviour, becoming less and less altruistic.

To conclude, I can say that the two treatments deliver very different results in terms of proposer allocations. When a hierarchy and a tournament for power are introduced there is an evident decrease in the level of altruism and agents become increasingly selfish.

This result strongly supports the hypothesis that an individual's behaviour is significantly influenced by the institutional setting in which s/he must take a decision. This may be possible if one assumes that individual preferences are not totally exogenous, as economists (but not advertising agencies) take for granted, and if one assumes that they are influenced by the institutional context or by the choices of other economic subjects, companies or consumers (Bowles, 1998). This has an important policy implication, for if social preferences are at least partially affected by the institutional framework, it may be desirable to design institutions able to enhance social preferences and to discourage egoistic behaviour.

Treatment A2

The design of the experiment assures us that the opportunity cost of altruism is the same in the two frameworks. However it can be argued that in the power treatment there is more uncertainty and therefore in this latter case altruism is a riskier activity than in control setting. While subjects in control treatment, in fact, knew with certainty that they would receive one out of twelve of what individually earned when the group surplus is redistributed, subjects in power treatment did not know with certainty how much they would receive when the redistribution took place. In order to rule out the increase in risk and differences in risk preference as possible explanation of the decrease in altruism, I arranged a version of the control treatment in which the distribution of the group surplus was randomized. Subjects were told that one of the four distribution schemes, shown in table 2, was randomly selected and that the group surplus would be distributed according to the selected quotas; moreover, each subject was informed of the probability that each scheme had to come out (table 5). The probability was taken from the decisions of leaders in power setting: when the leader had chosen a free distributional scheme, it was approximated to the closest predetermined pattern.

Table 5

	Share of group profit			
Role	I	II	III	IV
D	45%	100%	60 %	16.6 %
F	20%	0%	20%	16.6 %
A	5%	0%	0%	16.6 %
Probability	0.1	0.1	0.3	0.5

Again we employ the Mann-Whitney test to verify whether the introduction of a random distribution scheme in the control treatment modifies our result in a significant way. The test suggests that there is not any statistically significant difference between the randomized control treatment and the control treatment, while there is a significant difference between power setting and the randomized control setting. Thanks to this result we can conclude that the result discussed in the previous sections was not driven by risk preferences.

Table 6
Mann-Whitney Test

Treatment	Mean	Median	z	p
A control	16.7	11.1	-2.093	0.026
B power	11.7	7.1		
A2 control	15.2	14.2	-2.333	0.018
B power	11.7	7.1		
A control	16.7	11.1	-0.447	0.001
A2 control	15.2	14.2		

Ultimatum game

This section presents the main results of the ultimatum game. As already noted, the subjects played the ultimatum game half of the times as proposers and half of the times as responders, and with subjects of a group different from their own. I consequently analyze both their behaviour as proposers and their behaviour as responders and evaluate the effect exerted by the two settings on their choices. The results reported in the literature are that the modal and median of ultimatum offers are usually 40-50 percent and means are 30-40 percent; the literature also shows that while offers of 40-50 percent are rarely rejected, offers below 20 percent are rejected most of the time (Camerer, 2003).

I first examine the offers that the proposers made in the first step of the ultimatum game. The main figures on offers are reported in table 7.

This finding shows the introduction of the tournament for power changed the behaviour of subjects also when they played the ultimatum game in the proposer's role. In the power setting very low offers (from 0 to 10%) were fewer than the offers in the control setting; moreover, also very high offers were notably fewer in the power than in the control setting. In the power setting more than 60% of the allocations proposed to the receiver were in the central interval 11-30% .

Table 7

	Offer frequencies (per cent offered)				Mean	Median	SD
Treatment	0-10	11-30	31-40	41-50			
A (control)	6.5%	46.3%	36.6%	10.6%	29.0	30.0	11.6
B (power)	4.2%	61.6%	28.2%	6.0%	27.1	25.0	10.4

This result suggests that agents used a different strategy when they played as proposer in the ultimatum games in the two treatments. This becomes much more intelligible if I recall that the proposer's offer in the ultimatum games serves two different purposes. First, it has an altruistic component: the desire to leave something for the other player; second, it is also the result of a strategic consideration: the desire to reduce the probability of a rejection from the responder. The findings on the dictator games suggest quite clearly that the altruistic motivation strongly decreased in the power setting, and this result seems to be sustained by the observation that, in the ultimatum game, offers greater than 40% (which much more than the others signaled altruistic behaviour) were fewer in the power setting than in the control setting. On the other hand, it is evident that in the power setting the cost of a rejections was higher for those agents who wanted to climb the hierarchy, so that they increased their offers in order to reduce the risk of receiving nothing, which would have thus jeopardized their ranking position.

Table 8

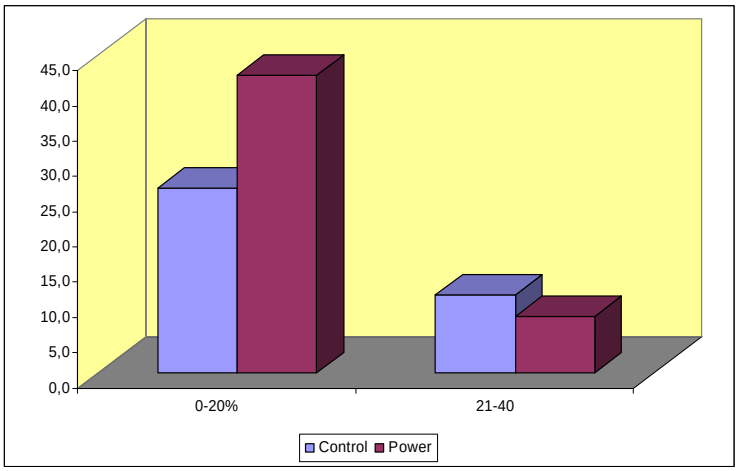
Mann-Whitney Test on ultimatum offers

	Treatment	Median	z	p
All 12 games	A control	30.0	-1.854	0.064
	B power	25.0		

Some proposers reduced the number of very low offers in order to minimize the risk of receiving nothing in the case of rejection, but they also decreased offers of more than a certain value (the value that they believed would minimize the risk of rejections) because they became less altruistic. Therefore, in the power setting the mean value of allocations decreased because the subjects were less altruistic (high offers were fewer) and increased because the agents sought to minimize expected rejections. The net effect on the average allocation was negative, that is, the mean allocation was higher in the control setting than in the power setting. Further evidence which confirms the fact that the allocation decisions were the result of a different behaviour is the value of median, which is 20% higher in the power setting. It is clearly the result of a strategy pursued to minimize both the sum left to the receiver and the probability of a rejection.

In order to evaluate the statistical significance of the these findings, I employed the Mann-Whiteny test, which evaluates whether two independent samples (groups) come from the same population. The results are reported in Table 8. It is evident that I can reject the null hypothesis that there is no difference between the two median values and therefore between the two distributions at an acceptable statistical level (less than 7%).

Figure 3



As far as the behaviour of responders is concerned, it is interesting to look at the results mainly in terms of the rate of rejections. Figure 3 shows the rate rejections in the two treatments. The rate of rejections of low offers (less than 20%) is higher in the power setting than in the control setting. This is particularly interesting because one would have expected the opposite to occur: that is, a lower rate of rejections in the power setting, where the tournament for power would suggest accepting also unfair offers in order to climb the hierarchical ordering and grab a piece of power. The best strategy for an agent who cared about monetary payoff but also about climbing the hierarchy and obtaining some decision-making power would have been to accept more likely low offers. The cost of refusal was no longer just the money lost; there was also an indirect cost represented by the risk of losing position in the ranking.

Even though the subjects were told clearly that they would play ultimatum games only with agents belonging to a group different from their own, I cannot completely rule out that their behaviour was determined by a misunderstanding of the instructions. They therefore rejected low offers in order not to give an advantage to a potential competitor in the tournament for power.

However, I prefer an explanation more in line with the discussion conducted when the dictator game outcomes were analyzed. The power framework affected the behaviour of most of the agents in mainly two ways: firstly, by introducing a “new good”, strictly positional, power that could be exchanged for altruism; secondly, by introducing the ranking and the tournament for power. This gave rise to a much more competitive and aggressive environment which forced those agents who behaved reciprocatively to become more competitive and selfish. In an atmosphere in which acquiring power had became important for at least

some of the agents, these tended to respond to a unfair offer by showing their tough side and rejecting the low offers even if this was not the optimal strategy to win the tournament. Moreover, it should be borne in mind that, in certain sense, rejecting a very low offer was a demonstration of power as well; therefore, the trade-off between altruism and power clearly manifest in the dictator game was much more indistinct in the ultimatum game. Furthermore, when the proposer's offer was low enough, the material advantage of accepting it was negligible even considering its effect on ranking. Lastly, since the decision to reject was also motivated by the desire to punish who offered too less, in the setting in which there was a tournament for power the possible damage was higher than in control setting; having an offer rejected, in fact, could jeopardize the proposer's chance of climbing the hierarchical scale in his/her group.

Figure 3 also shows that the rate of rejections is lower in the power setting when the proposer's offer is higher than 20 %. In this case the rejection is more costly both in terms of money and in terms of the chance to climb the hierarchical scale of the group. Interestingly enough, in this case the results match the expectations: in the power treatment, the rate of rejections of high offers are less than in the control treatment.

Leader's decision

Every four rounds, the agent in position D had to decide the distribution scheme in order to allocate the surplus of a group different from her own among its members. Table 9 shows both the identity of the agent who was in the position D when the moment of the decision arrived and the decision s/he took on the distribution of the surplus of the group over which s/he had authority.

First of all, it is worth noting that in each group there was an agent who won most of the times; in group 1 three agents won more than once, and one (agent 5) won the power tournament 7 times; in group 2, two agents prevailed more than once and agent 7 won seven times; in group 3, there were two agents who won several tournaments (agents 16 won seven times and agent 18 won four times).

Table 9

	Sequence	1	2	3	4	5	6	7	8	9	10	11	12
Group 1's leader on group 2'surplus	agent D	6	5	4	5	2	2	5	5	5	6	5	5
	decision	III	I	F	F	F	F	IV	F	F	II	F	F
Group 2's leader on group 3'surplus	agent D	7	12	12	7	7	7	7	7	9	8	10	7
	decision	F	III	III	IV	I	III	F	F	F	F	IV	IV
Group 3's leader on group 1'surplus	agent D	18	18	16	16	16	15	16	18	16	16	16	18
	decision	F	F	IV	III	III	IV	III	F	III	II	III	IV
The distribution schemes (I,II,III,IV) are presented in table 1, while F is the distribution decided by the leader													

The profile of winners and losers is summarized in tables 10 and 11. The first table suggests that the typical winner is a male (only one woman managed to win more than once) and he is selfish (his average offers in the dictator games fell much below the average), and he displayed a noteworthy change in his behaviour during the experiment (his average offer in the last 20 periods was less than a quarter of the average offer).

On average women displayed more altruism both unconditional (the female mean allocation to another student was 16.9 while the male mean allocation was 9.3) and reciprocative (the female mean allocation to charity was 19.3 while the male mean allocation was 10.4) [14]. On average, women did not display a remarkable change in behaviour when the experiment proceeded and the tournament for power started (the female average allocation was less than 15 % lower in the last 8 sequences than in the first 2, while the male allocation decreased by almost 80 % in the last sequences). This evidence would suggest a different attitude of females and males towards altruism and competition. In both treatments females displayed more altruism and

[14] The presence of a gender effect in dictator games is known (Eckel and Grossman, forthcoming). In this framework, the difference is statistically significant in both treatments.

they appeared much less involved in the power tournament than males. This result is in line with some experimental results which, using a completely different framework, suggest that there is a different attitude towards competition between males and females and that females are less likely than men to choose a competitive situation (Datta Gupta et al. 2005, and Price,2006))

Moreover, selfish behaviour in the dictator game was often not sufficient to win the power tournament. An effectual behaviour in the ultimatum game was rather important as well. Subject 18, for example, was indisputably a selfish individual, who always gave nothing to the receivers: nevertheless he won only four times against the seven times of subject 16 because he offered much more than the latter in the ultimatum game, receiving the same number of rejections.

The important role of behaviour in the ultimatum game is confirmed by table 11 in which the profiles of the subjects who never won are reported. Subject 11 is not a model of altruistic behavior, nevertheless she never won the tournament since she played the ultimatum game senselessly. She offered zero the first four times, always obtaining obvious rejections in replay. In the fifth period she offered 10% and was rejected again. Afterward she started to offer too much (more than 30%).

Table 10

Subject	Times in position D	Gender	Dictator offers	First 4 periods	Last 20 periods	Ultimatum offers	Rejections Made (% offered)	Rejections received
5	7	male	1.2	7.1	0.0	28.4	2	1
7	7	male	6.0	19.4	3.8	16.7	0	3
16	7	male	2.5	7.7	1.4	18.8	0	3
18	4	male	0.0	0.0	0.0	29.5	1	3
2	2	male	4.7	15.7	2.5	39.2	7	1
6	2	male	4.4	10.5	2.9	26.8	2	1
12	2	female	10.8	18.6	9.2	27.9	0	4
Winners average			4.2	11.2	2.8	26.7		
Total average		50%	13.8	17.9	12.9	27.2	2.1	2.1

More generally, the subjects who never won were much more altruistic than the average (25 % was the average offer if I exclude subject 11); more interestingly, their behaviour seems not to have been affected by the power tournament (one subject did not change her offer in the last 20 periods, and two subjects even increased their offers in the second part of the experiment).

As far as the choice of leaders is concerned, table 9 shows that leaders rather freely exercised their authority by determining their own distribution scheme (F in the table) in more than the 40% (16 out of 36) of the cases. The distributions chosen were very different, but it is evident that on average it emerged a distribution scheme rather equalitarian (on average they gave 17% to the subject in position D, 14.5% to subjects in position F e 16% to subjects in position A). If I take into account the fact that in 20% of the cases leaders chose the perfectly egalitarian distribution pattern (IV), I can conclude that the leaders decide most of the times in favor of a distribution system which rewards subjects independently of their performance in the tournament for power.

Table 11

Subject	Times in position D	Gender	Dictator offers	First 4 periods	Last 20 periods	Ultimatum offers	Rejections Made (% offered)	Rejections received
1	0	male	26.9	23.5	27.6	28,2	1	2
3	0	female	21.4	30,0	19.7	30,5	5	1
11	0	female	3.8	5	3.6	18,9	0	6
13	0	female	35.3	36.3	35.1	32,3	0	3
14	0	female	31,2	23.4	32.8	26,7	4	3
17	0	female	10.9	11,3	10.8	22,9	0	3
Losers average (excluded sub. 11)			21.6 (25.0)	21.6 (24.9)	21.6 (25.2)	26.6 (28.1)		
Total average		50%	13.8	17.9	12.9	27.2	2.1	2.1

Altruism and prior beliefs

Soon before the onset of the experiment, experimental subjects were requested to answer some questions in order to provide a simple view of their prior beliefs and their values on some issues related to the distributional content of the experiment. In this section I analyze the relationship between the answers to the questionnaire and the behaviour of subjects.

This brief attitudinal survey was not meant to provide a detailed and complete psychological and sociological profile of the subjects, both because it was not the prime aim of the research, and because administration of a far-reaching and therefore long questionnaire would have excessively lengthened the experiment's duration, with a likely negative effect on the quality of the experimental data?.

The questionnaire that I administered to the subjects is summarized in table 12. There were questions related to objective characteristics of agents (gender, age, number of brothers/sisters), questions related to the subjective degree of satisfaction with their family income or their life experience (income, satisfaction) and other questions meant to investigate the subjects' attitudes and values on issues such as the trustworthiness of strangers (trust), materialism (money), and the cause of poverty (poor); lastly there was a question on the political position of subjects (policy).

Table 12

Variable name	Question	Answer
Gender	*Sex?*	0 male 1 female
Age	*How old are you?*	
Siblings	*How many brothers/sisters do you have?*	
Income	*How do you judge your family income?*	1- very low -, 7 - very high
politics	*As far as your political opinion is concerned, where would you locate yourself on the political spectrum?*	1 - very much on the right, 7 - very much on the left
satisfaction	*Thinking of your current experience, to what extent do you feel satisfied with your life*?	1 - very unsatisfied, 7 - very satisfied
How much do you agree with the following sentences		
Money	*In life, being economically and financially well-off is the most important thing*	1 - fully agree, 7 - fully disagree
Trust	*In relationships with strangers, is strongly recommended to pay attention before trusting them*	1 - fully agree, 7 - fully disagree
Poor	*If a person is poor, this is often the result of a lack of effort on their part*	1 - fully agree, 7 - fully disagree

Table 13 summarizes the average results for all the subjects and for the two treatments. The average experimental subject judges his/her family income as sufficiently good, is moderately leftist on political issues, and does not consider economic well-being as the major goal of his/her life. Moreover, s/he is rather satisfied with life, does not trust strangers but does not believe that the responsibility for poverty lies with the poor themselves. The samples in the two treatments are in some cases moderately different.

Table 13

Variable name	Total average	Control	Power	Male	Female
gender	55% of male	55 % of male	55 % of male		
age	22.2	22.3	22.0	22.2	22.3
siblings	1.2	1.4	1	1.3	1.1
income	3.7	3.4	4.1	3.6	3.9
politics	4.5	4.2	4.8	4.5	4.5
money	3.0	3.6	2.4	3.6	2.8
satisfaction	5.3	5.3	5.3	5.4	5.2
trust	5.8	5.3	6.2	5.4	6.3
poor	2.3	2.5	2.1	2.3	2.3

The regressions results are shown in table 14. Not all the agents' characteristics and opinions are related to their choices in the dictator game. However, these results give us interesting insights and provide indirect but robust support for the outcome discussed in the previous sections. First of all, it appears evident that the donations to charity organization and to subjects are caused by different motivations, confirming that donations capture two different motivations for altruism. In the offers to subjects, almost none of the variables are strongly significant (also the F test is scarcely significant), which supports the intuition that unconditional altruism is explained by other determinants, for example inequality aversion, which were not considered by the questionnaire

The most relevant regressor is the variable 'power'; this is a dummy variable which is set to one in the power treatment. It confirms that the behaviour of subjects is significantly different in the two settings, even after having controlled for the agents' characteristics as scanned by the questionnaire. A significant gender effect is present: women offered significantly more than men whatever their values.

Table 14

	All dictator offers				Offers to Charity		Offers to Subjects	
	Coefficients	t statistics	Coefficients	t statistics	Coefficients	t statistics	Coefficients	t statistics
(Constant)	29,187	1,062	17,648	2,494	15,555	1,737	21,808	2,149
gender	7,864	2,450	7,885	2,754	9,530	2,630	4,652	1,133
income	2,129	1,452	2,573	1,936	3,432	2,040	,857	0,449
money	-3,070	-2,280	-3,847	-3,672	-4,647	-3,504	-2,270	-1,511
poor	-2,581	-2,409	-2,699	-2,682	-2,676	-2,101	-2,734	-1,894
power	-11,472	-3,051	-11,278	-3,470	-12,623	-3,069	-8,604	-1,846
age	-0,591	-0,629						
brother	-0,941	-,474						
politics	1,349	1,251						
trust	0,040	0,034						
satisfaction	-0,831	-0,436						
R^2	0,624		0,596		0,554		0,267	
F	4,152		8,856		7.443		2,181	

The variables income, money and poor appear to be statistically significant. The first seems to suggest that altruism is seen as a superior good, demand for which tends to increase with the subject's income. Another explanation for this result is possible: if the agents had a preference for equality (or an aversion to inequality), it would more likely that they decided to donate both to charity or to other subjects when they appreciated their family income and judged it well in relative terms[16]. As regards the variable 'money', it is

[16] Recall that the question was not about the absolute level of income but the subjective evaluation of the family income.

quite obvious that the sum of money that donors decide to give would depend on the opportunity cost of donation. The question asked can be seen as an indirect evaluation of the preference for money, and then on the cost of a donation. Indirect support for the idea that one motivation for dictator offers was conditional altruism is the significance of the variable poor. The higher the degree of agreement with the statement "*If a person is poor, this is often the result of a lack of effort on their part* " the lower the percentage of the sum that subjects leave to the receiver in the dictator game.

Concluding remarks

The paper has analyzed the trade-off between power and altruism by using an experimental framework. I observed the behaviour of 36 experimental agents, undergraduate students at the University of Siena, as they played a series of dictator and ultimatum games in two experimental settings which differed according to how the group's surplus was distributed among its members. In the control setting (treatment A) the group surplus was distributed equally among members, while in the power setting (treatment B) there was a ranking of earnings in the group and the subject who had earned the larger sum was responsible for deciding the distribution scheme of the surplus in a group different from his/her own.

The results are quite interesting: introduction into the experimental structure of a tournament for the power to decide the allocation of the group surplus appreciably altered the behaviour of agents. More specifically the degree of altruism, measured by the dictator offers, significantly decreased when the agents were able to trade altruism for a chance to gain power. The results are more clear-cut and robust in the case of the dictator game, but also in the case of the ultimatum game the introduction of the tournament for power altered the behavior of subjects.

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