Theory and Decision 76 (2014): 95-118

DOI: http://dx.doi.org/ 10.1007/s11238-013-9356-5

Different Carrots and Different Sticks: Do we reward and punish differently than we approve and disapprove?

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Abstract: This paper reports lab data from four games in order to analyze and compare the motivations behind monetary punishment and reward and their non-monetary counterparts, disapproval and approval, an important question given that both types of punishment/rewards affect cooperation and norm compliance. The results in our games support the hypothesis that a motivation akin to reciprocity plays the key role for approval and disapproval whereas payoff comparisons play the key role for monetary rewards and punishment.

Keywords: Approval; disapproval; inequity aversion; monetary/non-monetary punishment and reward; reciprocity; social norms.

JEL Classification: C70, C91, D63, D74, Z13.

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1. Introduction

In many social interactions, the availability of approval and disapproval seems to affect behavior.[1] On one hand, social approval for generosity and courage may provide an incentive for charitable donations (Vesterlund, 2006) and military service (Frey, 2007). On the other hand, disapproval from work colleagues may prevent highly productive employees from exceeding the formally agreed rate of output (Homans, 1961), or preclude workers from underbidding the prevailing wage in a community (Akerlof, 1980). In a more anecdotic example, people sometimes take queue-jumpers to task, which probably attenuates such opportunistic behavior. Finally, some controlled lab evidence shows that approval and disapproval can foster pro-social behaviors (Masclet et al, 2003; Rege and Telle, 2004; Noussair and Tucker, 2005; Xiao and Houser, 2005; Ellingsen and Johannesson, 2008; Xiao and Houser, 2009; Dugar, 2010).[2]

In this paper we report data from two experimental treatments which complement the previous literature. The research goal of our first treatment is to investigate the determinants of approval and disapproval. In this manner we can understand better what situations are more likely to trigger negative or positive reactions, an important issue if we want to explain behaviors like the ones cited above or, in general, if we believe that such reactions are deterrents of norm deviance or amplifiers of socially desirable behaviors like cooperation.

Participants in this treatment play four simple games with a two-stage structure. In the first stage, the first mover A chooses between two allocations of monetary payoffs for her and the second mover B. In the second stage, the second mover can then assign negative/positive points to A conditional on A's choice; these points do not affect A's payoff but it is common knowledge that they respectively signal disapproval/approval by B. The four games differ systematically in the available allocations, which renders it possible to explore several potential determinants of disapproval and approval. In particular, whether the second mover disapproves/approves because the first mover (i) chose the allocation in the game with the minimum/maximum payoff for B –i.e., A harmed/helped B (see Holländer, 1990 for a model in

[1] Disapproval can take many forms: humiliation, insults, shaming or social ostracism, while honors and praise are examples of social approval.

[2] The reason why approval and disapproval influence behavior is not yet fully clarified. It might be that they affect a player's utility because (some) people are averse to being disapproved, and like to be approved. This is explored in López-Pérez and Vorsatz (2010). We note that approval and disapproval are sometimes respectively called non-monetary reward and punishment in the experimental literature.

this line), (ii) deviated from/chose a strictly egalitarian allocation, or (iii) chose an allocation where she gets a larger/lower payoff than B.

Our second treatment is identical to the first one, except that the negative/positive points here reduce/increase A's payoff and are not explicitly described as disapproval/approval. By comparing the results from both treatments, we aim to compare the determinants of approval/disapproval with those of *monetary* punishment/reward, which directly affects the pecuniary payoff of the punished/rewarded agent. Are these determinants similar? This research question is motivated by two issues. On one hand, a large experimental literature shows that the availability of monetary punishment and rewards can promote cooperation, generosity, and fairness (Güth et al. 1982; Ostrom et al., 1992; Andreoni et al, 1993; Fehr and Gächter, 2000; Anderson and Putterman, 2006; Gürerk et al, 2006; Walker and Halloran, 2004; Sefton et al, 2007, Vyrastekova and van Soest; 2008; Ertan et al, 2009). On the other hand, we suspect that these laboratory findings may be difficult to extrapolate to the field, where the use of monetary sanctions goes often against the law or prevailing social norms. For instance, destroying some of another person's wealth, which is an extreme example of a monetary sanction, is condemned by many people. In contrast, the use of disapproval is arguably less regulated, and we conjecture that most non-institutionalized sanctions outside the lab take the form of disapproval. If there are substantial differences in the determinants of monetary and non-monetary punishment, therefore, we need to be particularly careful when extrapolating lab findings on monetary sanctions.

Overall, our findings suggest some key differences in motivation for punishing/rewarding and disapproving/approving. On one hand, we find that factors (i) and (ii) above play the key role for disapproval and approval: People disapprove choices that harm them or deviate from a strictly egalitarian allocation, and approve those that help them or achieve strict equality. On the other hand, we observe that monetary punishment and reward are most affected by factor (iii) and to some extent (i): Punishment/reward increases if player A gets a larger/lower payoff than player B (for related evidence see Zizzo, 2003; Falk et al., 2005; Dawes et al., 2007) and if player A harmed/helped B. Thus, our study provides evidence that payoff comparisons are relatively more important to explain monetary punishment and reward suggesting that the punishment/reward technology determines which behaviors are punished and rewarded.

Our paper is related to previous studies comparing monetary and non-monetary punishment and reward. Masclet et al (2003), for example, find in the context of a repeated public goods experiment that non-monetary punishment can be similarly effective as monetary one to raise contributions and earnings. In a similar context, Noussair and Tucker (2005) show that contributions and overall welfare are higher when both types of punishment are available than when only one of the two types is available. Xiao and Houser (2005) study the role of emotion expression in ultimatum games and observe fewer rejections of unfair offers if recipients can send a message to the proposer –see also Ellingsen and Johannesson (2008) and Xiao and Houser (2009), who study emotion expression in a dictator game. In general, the focus of much if this literature is whether the availability of monetary and non-monetary punishment/reward increases cooperation, fairness, or social efficiency, whereas our focus is on motivations, comparing those behind monetary and non-monetary punishment/reward. For this reason, we consider one-shot games which allow us to disentangle between inequity aversion and reciprocity concerns and rule out reputation or temporal effects.[3]

The rest of the paper is organized as follows. The next section describes our experimental design and procedures. Section 3 presents and discusses our results. Section 4 concludes with some ideas for further research.

2. Experimental Design and Procedures

Our experimental design consists of a Monetary (M) and a Non-Monetary (NM) treatment, and each subject participated only in one of them. We describe first the NM-treatment. Participants play four games, all of them two-player games of perfect information with a similar two-stage structure. In the first stage, a player (called A) chooses between two allocations of money between herself and another player (called B). Table 1 shows the two (A, B) payoff allocations available in each game (called left and right). Payoffs are presented in points, at the exchange rate 10 points = 1 Euro; we discuss below the payoffs chosen.

[3] This is a point to keep in mind when comparing our results with those from other papers like Masclet et al (2003) that use repeated games. In particular, the effect of non-monetary punishment/rewards on the first movers' behavior in our games (not the focus of our study, though) might have been attenuated by the lack of reputation effects.

TABLE 1—THE (A, B) ALLOCATIONS IN THE 4 GAMES					
		Game			
		1	2	3	4
Allocation	Left	(250, 100)	(250, 100)	(100, 200)	(100, 200)
	Right	(200, 150)	(250, 250)	(150, 150)	(100, 300)

In the second stage of each game and conditional on A`s choice, B can pay a *fixed* cost of five points from her allocation share to reward or punish A in a *non-monetary* manner. If B pays the five points, more precisely, she can send an "evaluation score" $s \in [-100, 100]$ to A expressing either approval or disapproval of her choice. In this respect, the instructions explicitly used the words "approval" for positive scores and "disapproval" for negative scores. Hence, an evaluation score of s = +100 means maximal approval, and s = -100 means maximal disapproval. The interpretation of score s is common knowledge. If B does not want to send an evaluation score to A, no points are deducted from B's allocation share. As an illustration of the payoff structure, suppose that A chooses allocation (x_A, x_B) in a game. Since B cannot affect A's balance in this treatment, A is then sure to get a payoff of x_A. With respect to B, she would get a payoff of x_B - 5 if she sends an evaluation score, and a payoff of x_B otherwise.

The M-treatment is identical to the NM-treatment, except for two important differences. First, B can affect the monetary payoff of the co-player –i.e., she can reward or punish A in a *monetary* manner. More precisely, B can either increase or decrease A's payoff by up to 100 points if she previously pays five points from her allocation share. If B does not want to affect A's balance, no points are deducted from her allocation share. Second, the instructions never used the terms "approval" or "disapproval". To clarify further the payoff structure, suppose that A chooses allocation (x_A, x_B) in a game. If B decides not to pay the five points, allocation (x_A, x_B) is implemented. If she pays the five points fee, however, she can choose a "point score" $s \in [-100, 100]$ so that A's payoff in the game is $x_A + s$, while B gets a payoff of $x_B - 5$. For simplicity, s had to be a multiple of 10.

Note that subjects must pay a (small) fixed fee to punish/reward in both treatments. When choosing this technology of punishment/reward, we had in mind our research goals and this related question: What design facilitates most the interpretation of the determinants of punishment/reward, making possible as well a clean comparison across treatments? To think more about this issue, consider the following alternative technologies: (i) costless punishment/reward and (ii) costly punishment/reward where costs directly depend on the assigned point score s. In contrast to (i), our technology with a costly fee prevents random choices from selfish players, which could theoretically occur if punishing/rewarding was costless and would complicate the interpretation of our results.[4] Furthermore, we chose a fixed fee to facilitate comparisons of the strength of sanctions and rewards across treatments. If players have to pay a non-negligible cost for each point assigned to the co-player, in contrast, there are reasons to believe that the strength of approval and disapproval could be distorted.[5]

We conducted seven sessions at the Universidad Autónoma de Madrid. 92 subjects participated in the M-treatment and 84 in the NM-treatment. Participants were students from different disciplines (9.6 percent came from the faculty of economics) and not students of the experimenters. The experimental procedures were identical in both treatments. Before the start of each session, we distributed instruction and decision sheets (dependent on role) in a class room, leaving enough space between seats to ensure anonymity.[6] Then the subjects entered in the room. The sheets were initially covered and the subjects could freely choose their seat; in that manner, we assigned them to be either an A- or a B-player. Subjects could read the instructions at their own pace and questions were answered in private. We avoided terms such as "punishment" or

[4] One potential problem of the fee is that we lose evidence from those subjects who are very sensitive to the cost of punishing/rewarding. Since the fee is very small, however, we believe that this potential problem is not significant.

[5] To clarify this, suppose that each point assigned is costly and A chooses an allocation where she gets a higher payoff than B. Since approval and disapproval do not affect A's payoff, the assignment of points by B would decrease B's payoff and hence increase A's payoff advantage. This might affect the behavior of those B-subjects concerned about payoff differences, assigning few points even if they possibly disapprove strongly that choice. This is not a significant problem with our technology, as the fee is very small.

[6] The instructions for the B-players in the M-treatment and the NM-treatment are in appendix I and II, respectively. They have been translated to English. See also the online appendix available at http://www.uam.es/raul.lopez for the A-players' instructions in both treatments. We note in this respect that the A-players' instructions in the NM-treatment contain a small typo, as they state in the first paragraph that A`s money payoff depends "on your decisions and the decisions of another participant". The rest of the instructions clearly indicate that B cannot affect A's balance, and one control question explicitly asked: "Can B ever affect your balance?" Hence, we doubt that the A-subjects misunderstood the instructions (in fact, no subject claimed so). In any case, note that the typo could not affect the B-subjects' behavior, which is the focus of this study.

“reward” in the instructions. Before proceeding with their decisions, participants had to fill out control questions to make sure that they understood the rules.

In each treatment, subjects played the same four games in the same role and with the same anonymous co-player. We presented all four games on the same decision sheet and subjects were allowed to make their decisions in the order they wanted and revisit their choices at any moment before we collected their decision sheets. To prevent repeated game effects and changes of mood which would severely complicate the data analysis (e.g., the mood of a B-player could change depending on the A-player’s choice in a preceding game), no subject was informed of her counterpart’s actual choice in any game. Therefore, we employed the strategy method to elicit the decisions of the B-players, i.e., they indicated in each allocation of each game whether they wanted to pay the five points fee, and if this was the case, we asked them which score s between -100 and 100 they wanted to assign to their co-player.[7] In addition, we elicited the A-players’ expectations of punishment and reward in both treatments –see López-Pérez and Kiss (2012) for an analysis of expectations and their accuracy; the B-players did not know about this elicitation so that it could not affect their behavior.[8]

After subjects made their decisions in the four games, they answered a brief questionnaire. Then we collected their decision sheets and only thereafter selected one game randomly for payment in order to prevent income effects. These and the previous features of the experiment were common knowledge. Subjects were paid privately, and earned on average 18.3 Euros in the M-treatment and 20.6 Euros in the NM-treatment. All A-players were informed at the time of payment about the score sent by his/her co-player B (if any) at the payoff relevant allocation. Each session lasted approximately 60 minutes.

To finish, note that our selection of games renders possible to explore several factors that might explain potential treatment differences. Taking into account the related experimental literature (see for instance Zizzo, 2003; Falk et al., 2005; Dawes et al., 2007; and Falk at el,

[7] A further advantage of the strategy method is that it maximizes the amount of statistical data gathered. In principle, this method might induce different behavior than the specific response method where participants know the choice made by the co-player. Falk et al. (2005) investigate this issue with respect to monetary punishment and find no differences in subjects’ punishment patterns, although the strength of punishment seems to be somewhat lower overall with the strategy method. In addition, Brandts and Charness (2011) review the experimental studies that use both methods and find no treatment differences in most of them. Moreover, they find that differences are particularly unlikely in experiments in which players make numerous choices (as in ours).

[8] The online appendix includes the first two pages of the A-players’ decision sheet in the M-treatment, detailing how expectations were elicited in game 1 (the procedure was identical in the other games and the other treatment).

2008), we conjectured that both (a) the existence of payoff differences and (b) being harmed/helped were important to understand monetary punishment and reward. Observe in this regard that inequity aversion models (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) predict punishment of the A-player in treatment M if she has a larger payoff than the B-player, and reward if she has a smaller payoff; whereas reciprocity models (Rabin 1993; Dufwenberg and Kirchsteiger, 2004) predict punishment if the B-player was harmed by the A-player's choice (i.e., in our games if A chooses the allocation where B's payoff is smallest), and reward if she was helped.[9] Table 2 summarizes the predictions for inequity aversion and reciprocity in each allocation of the four games in the M-treatment.

TABLE 2—PREDICTIONS OF MONETARY PUNISHMENT/REWARD

Game	(A, B) allocation			Predictions Left		Predictions Right	
	Left		Right	Punishment	Reward	Punishment	Reward
1	(250, 100)	vs.	(200, 150)	IA, RP	----	IA	RP
2	(250, 100)	vs.	(250, 250)	IA, RP	----	----	RP
3	(100, 200)	vs.	(150, 150)	----	IA, RP	RP	----
4	(100, 200)	vs.	(100, 300)	RP	IA	----	IA, RP

The following notation is used: IA = Inequity aversion, RP = Reciprocity.

The factors affecting non-monetary punishment and rewards are much less clear. It is possible that they are used differently than their monetary counterparts. One reason is that some individuals might punish/reward *only* if that conveniently alters the distribution of pecuniary payoffs between themselves and other individuals, or if it can be used to retaliate. For instance, a purely inequity-averse agent (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) would punish/reward only if that helps to reduce the payoff distance with other players. As non-

[9] Given the small cost of punishment/reward, these predictions hold for a very large range of the models' parameters. Yet the models predict no punishment and reward if the respective parameters are sufficiently close to zero (i.e., as the standard model of selfish types). A proof of these statements can be requested from the authors.

monetary punishment and rewards cannot affect others' monetary payoffs, this kind of individuals would spend no money or effort to punish or reward in a non-monetary manner.

Yet another possibility is that the main forces behind approval/disapproval are *akin* to those behind monetary rewards/punishment. A force akin to inequity aversion means that individuals disapprove choices that leave them disadvantaged with respect to the co-player, and approve those in which they get a larger payoff than the co-player. Further, a force akin to reciprocity implies that individuals approve choices that help them, and disapprove those that harm them (see Holländer, 1990, for a formalization of this idea).[10] Since we have allocations where either none, one or both forces predict punishment and reward (see Table 2), our choice of games allows us to compare the corresponding frequencies of punishment and reward across games and treatments, and hence ascertain which (if any) of these forces play a role in each treatment. In addition, games 2 and 3 also include a strictly equal payoff allocation to investigate a potential role of strict equality in determining punishment and rewards.

3. Results

This section is divided into four parts. First, we present the overall pattern of punishment and rewards in both treatments, and investigate and compare the frequency of punishment and rewards in each allocation of the four games. Second, we analyze whether our data is consistent with some hypotheses regarding motivational differences across treatments. Third, we study the determinants of the intensity of punishment and rewards in both treatments. Finally, we briefly describe the A-players' behavior.

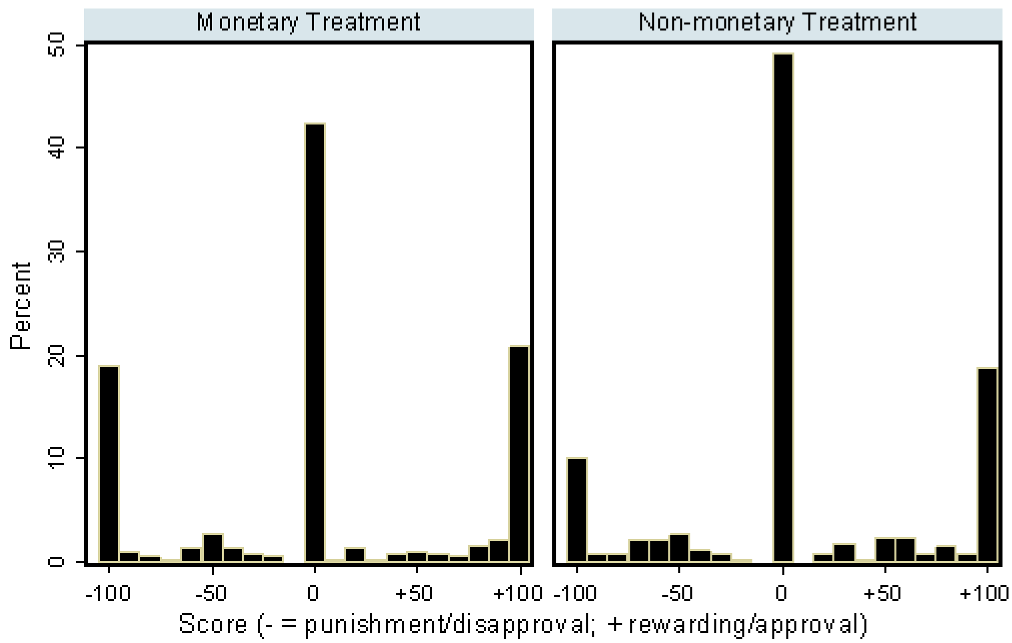
3.1 Punishment and Rewarding: Overall Patterns and the Frequency of Punishment and Reward in each Allocation

Figure 1 shows for both treatments the distribution of choices by the B-players in the four games (this means a total of 368 choices in M and 336 in NM). We observe in both treatments the same three spikes at s = -100, s = +100, and s = 0 (i.e., B did not pay the five points fee).

[10] Note well that we talk of forces 'akin' to reciprocity/inequity-aversion. Pure models of inequity-aversion and reciprocity posit that players' utility depends on the distribution of monetary payoffs (or on beliefs about such distributions) and hence cannot account by themselves for approval and disapproval, two behaviors which have no effect on monetary payoffs (leaving aside the fact that B-players must pay 5 points to approve or disapprove, which is immaterial in this respect). In what follows, however, we use the terms "reciprocity" and "inequity-aversion" in a flexible manner to refer not only to the theories that apply to monetary punishment/reward, but also to their analogues for disapproval/approval.

Further, the distributions are similar and only marginally statistically different (two-sample Kolmogorov-Smirnov test, p = 0.093). The average scores and frequencies to pay the fee are also similar and only marginally significantly different (s = 2.6 in M and s = 8.3 points in NM, Mann-Whitney test, z = 1.17, p = 0.24; 49% in M vs. 42% in NM, chi-squared = 3.19, p = 0.074).

Fig. 1: Distribution of B-player Behavior in both Treatments



Nevertheless, we observe that subjects make significantly more frequent use of punishment than disapprovals. 27.7 percent of the decisions in M are to punish the other player (s < 0) compared to only 21.1 percent in NM (two-sided Fisher's exact test, p = 0.044). Moreover, the average punishment is stronger than the average disapproval. For all choices s < 0, the average score is -85.8 points in M compared to -78 points in NM (Mann-Whitney Test, z = 2.30, p = 0.021). Note also that 19.0 percent of the choices in M correspond to maximal punishment (s = -100) compared to only 10.1 percent in NM. In contrast, we do not find that subjects make significantly more use of rewards than approvals. The frequencies of monetary rewards and approval (s > 0) are very similar in M and NM (29.9 versus 29.8 percent, respectively; Fisher's exact test, p = 1). Further, the average monetary reward is s = 88, which is similar to the average approval (s = 83.8, z = 1.26, p = 0.206). Note also that the maximal reward (s = +100) occurs in 20.9 percent of the cases in M and in 18.8 percent of the cases in NM.

Result 1: *Overall, individuals use monetary punishment more frequently and stronger than disapproval. There are no such differences between monetary rewards and approval.*

We now take a closer look at differences and similarities for each allocation of each game. We first consider *punishment*. Table 3 shows for each allocation in both treatments, (a) the frequency of B-players who invested five points to punish (i.e., to assign a score s < 0), and (b) the average score among those players who punished. In game 1 (250/100 vs. 200/150), for instance, we observe that 45.7 percent of the B-players in M punish at the left-hand allocation (250/100), and that the average punishment is s = -99.5. The corresponding numbers for the same allocation in NM are 38.1 percent and s = -78.8.

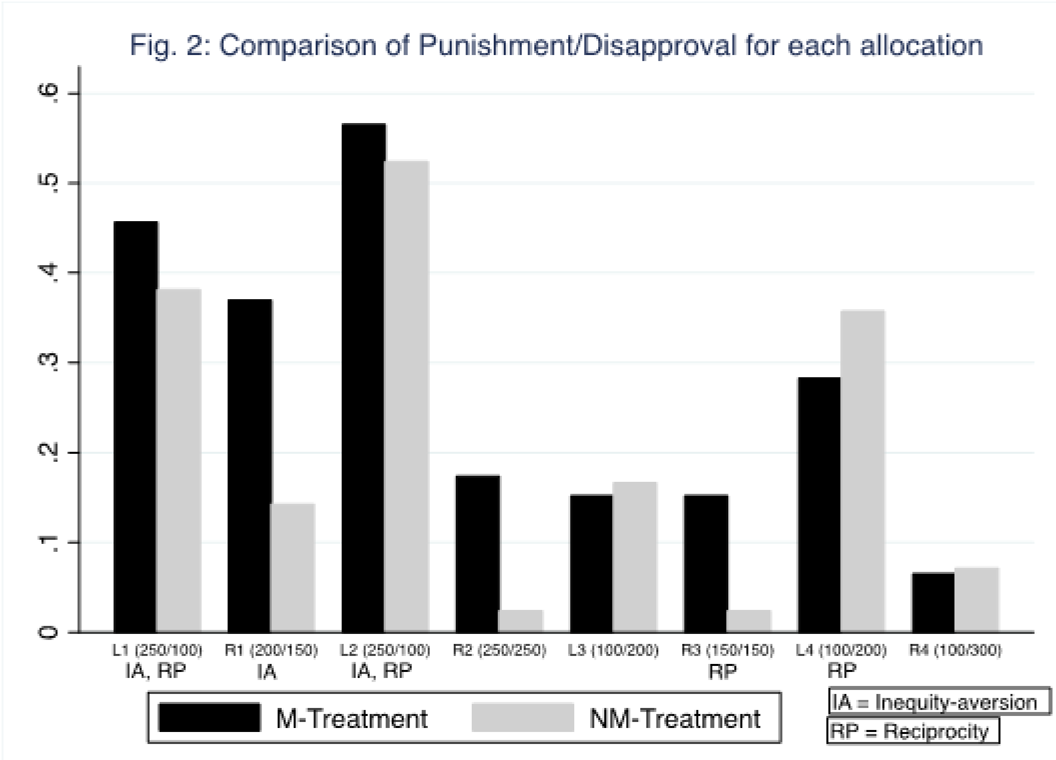
TABLE 3—OVERVIEW OF PUNISHMENT: Frequency and strength

Game	(A, B) allocation			monetary punishment				non-monetary punishment			
				%	Average	%	Average	%	average	%	Average
	Left		*Right*	*Left*	*Left*	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*
1	(250,100)	vs.	(200,150)	45.7	99.5	37	68.2	38.1	78.8	14.3	58.3
2	(250,100)	vs.	(250,250)	56.5	93.5	17.4	77.5	52.4	82.7	2.4	60
3	(100,200)	vs.	(150,150)	15.2	87.1	15.2	75.1	16.7	65.7	2.4	100
4	(100,200)	vs.	(100,300)	28.3	80	6.5	80	35.7	83.3	7.1	80

Note: '%' refers to the percentage of subjects who punished/disapproved at the corresponding allocation. 'Average' refers to the mean punishment/disapproval by those subjects who punished/disapproved.

Figure 2 uses the data from Table 3 to illustrate differences in *frequencies* between the two treatments and across allocations. The dark bars show the frequency of punishment in each allocation in M – the allocations are ordered from the left-hand allocation in game 1, referred in the x-axis as L1, to the right-hand allocation in game 4, referred as R4; intermediate allocations are analogously denoted. In turn, each grey bar shows the frequency of disapproval in NM in the corresponding allocations. For later discussion, the figure also indicates the allocations at which inequity aversion (IA) and reciprocity (RP) predict punishment, taking into account the predictions included in Table 2 above.

We observe at first sight treatment differences in three allocations: R1, R2, and R3. The differences between the frequencies of monetary and non-monetary punishment in these allocations are significant in game 1 (two-sided Fisher's exact tests, p = 0.03), and 2 (p = 0.03), and marginally significant in game 3 (p = 0.06). In all these allocations, monetary punishment is more frequent than non-monetary punishment. In contrast, the frequencies of punishment in the other five allocations are not significantly different between treatments (p > 0.49).



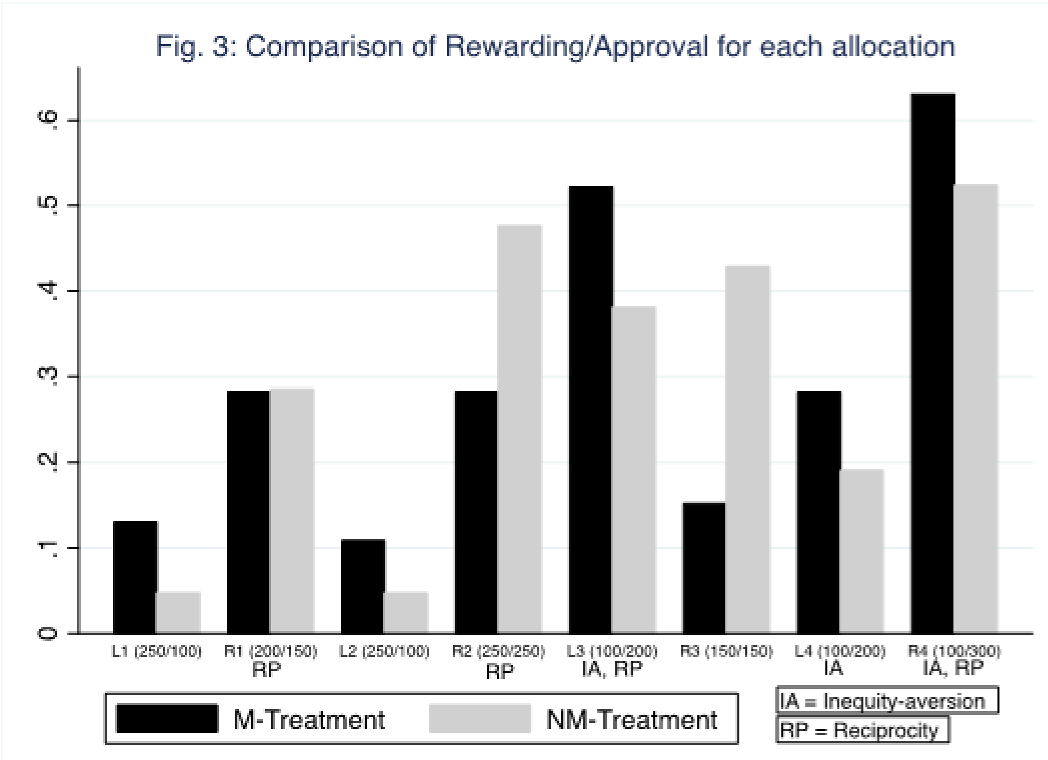
With respect to monetary and non-monetary *rewards*, Table 4 presents for each allocation of each game in both treatments, (a) the percentage of B-players who invested five points to reward (i.e., to assign a score s > 0), and (b) average reward among those players who rewarded. In game 1 (250/100 vs. 200/150), for instance, we observe that 13 percent of the B-players in M reward at the left-hand allocation (250/100), and that the average reward is of s = 83.3. The corresponding numbers for the same allocation in NM are 4.8 percent and s = 75.

TABLE 4—OVERVIEW OF REWARD: Frequency and strength

				monetary reward				non-monetary reward			
Game	Allocation			%	Average	%	Average	%	average	%	Average
	Left		*Right*	*Left*	*Left*	*Right*	*Right*	*Left*	*Left*	*Right*	*Right*
1	(250,100)	vs.	(200,150)	13	83.3	28.3	81.5	4.8	75	28.6	73.3
2	(250,100)	vs.	(250,250)	10.9	70	28.3	92.3	4.8	75	47.6	90.5
3	(100,200)	vs.	(150,150)	52.2	90	15.2	95.7	38.1	80.6	42.9	84.4
4	(100,200)	vs.	(100,300)	28.3	82.3	63	92.1	20.1	78.8	52.4	86.8

Note: '%' refers to the percentage of subjects that rewarded/approved at the corresponding allocation. 'Average' refers to the mean reward/approval by those subjects who rewarded/approved.

Figure 3 is the analogue of Figure 2 for monetary rewards and approval. The dark bars show the frequency of monetary rewards in each allocation of M and are ordered from L1 to R4, as in Figure 2. The grey bars show the frequency of approval in the same allocations in NM. For later discussion, the figure also indicates the allocations at which inequity aversion (IA) and reciprocity (RP) predict rewards.



The right-hand allocations of games 2 and 3 are the only allocations in which we observe differences in the frequency of rewarding at the ten percent significance level (game 2: $p < 0.08$; game 3: $p < 0.01$). In these allocations, approval is more frequent than monetary reward. In the other six allocations there are no significant differences ($p > 0.2$).

Result 2: *Monetary punishment is used significantly more frequently than disapproval in 3 out of 8 allocations. Monetary rewards are used significantly less often than approval in 2 allocations. There are no significant differences in these two respects in the remaining allocations.*

3.2 Motivational Differences across Treatments

In this section we discuss potential explanations for results 1 and 2. Our conjecture is that they are partly due to the existence of motivational differences across treatments, and the next two results will present evidence in this line. The first refers to punishment.

Result 3: *Disadvantageous payoff differences (inequity aversion) and the existence of harm (reciprocity) affect the frequency of monetary punishment. The existence of harm (reciprocity) mainly affects the frequency of disapproval.*

Evidence: If inequity aversion and reciprocity were the main forces behind monetary punishment, the frequency of punishment in M should be highest in allocations L1 and L2, where both forces predict it; reach an intermediate level in allocations R1, R3, L4, where only one force predicts it; and a lower level in the remaining allocations, where none of these forces predict punishment (see Table 2). Except for allocation R3, Figure 2 is in line with this predicted ranking of frequencies. Indeed, players are more likely to punish in L1 and L2 than in R3 and L4 ($p < 0.046$, Wilcoxon signed-rank test) and punishment is marginally more likely in L2 than in R1 ($p = 0.083$, Wilcoxon signed-rank test). Moreover, players are also more likely to punish in R1 and L4 than in R4 and L3 ($p < 0.034$, Wilcoxon signed-rank test).

If a force akin to reciprocity was the main one behind disapproval, in turn, the frequency of disapproval in NM should be highest in those allocations in which player B is harmed (L1, L2, R3 and L4), and lowest in the remaining allocations (R1, R2, R4, and L3). Again, the evidence from Figure 2 is consistent with these predictions except for R3. Disapproval in L1, L2, and L4 is always significantly more likely than in R1, R2, R4, and L3 ($p < 0.023$). Note also that the relatively low frequency of disapproval in allocation R1, where a force akin to inequity aversion predicts disapproval alone, suggests that this force is relatively unimportant in NM. This finding might in turn partially explain why disapproval is overall less frequent than monetary punishment (Result 1), which seems additionally affected by payoff comparisons.

The previous ranking predictions are only contradicted by the data from allocation R3. This is particularly true in NM, where only 2.4 percent of the B-players decide to disapprove at R3 (as predicted by reciprocity). In our view, this data suggests that strict payoff equality reduces disapproval in NM (and possibly also punishment in M). We conclude that both harm and strict payoff equality are crucial to explain disapproval. In this line, Table 3 shows that the frequency of disapproval is clearly above average (larger than 35 percent) *if and only if* the B-player is harmed and strict payoff equality is not achieved (i.e. in allocations L1, L2, and L4). In contrast, disapproval is significantly smaller in the remaining allocations, where B is not harmed and/or strict equality is achieved. For example, players are more likely to disapprove in L4 as compared to L3 although the allocations are identical ($p = 0.021$, Wilcoxon signed-rank test).

Our next result refers to rewards.

Result 4: *Advantageous payoff differences (inequity aversion) and the existence of help (reciprocity) affect the frequency of monetary rewards. The existence of help (reciprocity) mainly affects the frequency of approval.*

Evidence: Figure 3 shows that the frequency of reward in M is highest if it is predicted by both inequity aversion and reciprocity (allocations L3 and R4), reaches an intermediate level in those allocations in which it is predicted by one of the two (R1, R2, L4), and a lower level in the remaining allocations (L1, L2, R3). The differences are significant between L3 and R4 as compared to R1, R2, and L4 (Wilcoxon signed-rank test, $p < 0.0045$) and between R1, R2, and L4 as compared to L1, L2, and R3 ($p < 0.058$). With respect to the NM-treatment, a force akin to reciprocity predicts that the frequency of approval should be highest in those allocations in which player B is helped (R1, R2, L3, R4), and lowest in the remaining allocations (L1, L2, R3, L4). In this line, we observe significantly higher approval in R1, R2, L3, and R4 than in L1 and L2 (Wilcoxon signed-rank test, $p < 0.0016$) and L4 ($p < 0.021$; with the exception of R1 which is only $p = 0.248$). The only "outlier" is R3 in which approval is more likely than in R1 ($p = 0.034$).

We argued before that strict payoff equality reduces disapproval. The evidence from game 3 (100/200 vs. 150/150) suggests in turn that it also fosters approval, as 42.9 percent of the subjects approve R3 (even if they have been harmed). This suggests that both help and strict equality are important to explain approval. In this vein, Table 4 shows that a choice is approved above the average (and by more than 35 percent of the subjects) *only* if (i) it helps the B-player and/or (ii) it achieves strict payoff equality (R2, L3, R3, R4). In contrast, approval is very low (< 5%) only in some allocations like L1 and L2, where conditions (i) and (ii) are not satisfied.

We stress that the observed role of strict payoff equality cannot be explained by a force akin to inequity aversion, as this force predicts approval (disapproval) only if the co-player is poorer (richer). In this respect, while Results 3 and 4 already indicate that payoff differences play a comparatively less important role than reciprocity in NM, further data also points in that direction. For instance, when reciprocity predicts approval and inequity aversion the opposite (or vice versa), we observe that the frequency of approval is much higher than that of disapproval (see allocations R1 and L4). In the next section, we offer further evidence for the prevalent role of reciprocity (compared to inequity aversion) in NM.

To finish, other motivations apart from inequity aversion, reciprocity, and strict payoff equality might also play a role in M and hence create further differences across treatments (helping also to explain our previous results). In particular, efficiency concerns or altruism (Levine, 1998; Andreoni and Miller, 2002) may be important for monetary rewards, and spite or the joy of destruction (Kirchsteiger, 1994; Mui, 1995; Levine, 1998; Fehr et al, 2008; Abbink and Sadrieh, 2009) for monetary punishment. Altruism possibly explains why the frequency of monetary rewards is never lower than 13% in all allocations (this is not the case in NM; see Table 4). Spite may also help understanding some treatment differences. For example, it is conceivable that subjects in M punish more frequently the right-hand allocations of games 2 (250/100 vs. 250/250) and 3 (100/200 vs. 150/150) than subjects in NM because of spite. In this vein, we observe that 10.8 percent of the subjects in M punish in at least five allocations (and never reward), while there are no such spiteful subjects in NM. In addition, it is possible that some choices in games 2 and 4 are a reaction to inefficient/efficient choices made by the A-player.

3.3 The Determinants of the Strength of Punishment and Reward

Table 5 complements Tables 3 and 4, presenting the average strength at each allocation (i.e., the average score s; note that we set s = 0 when a B-player does not pay the 5 points fee). In game 1, for instance, we observe that the average strength at the left-hand allocation (250, 100) is s = -34.56 in M, and s = -26.43 in NM. The table also reports the results from two-sided Mann-Whitney tests comparing the average score at each allocation in both treatments. We find significant differences in the right-hand allocations of games 2 and 3. In these two cases, subjects in the NM-treatment choose on average a higher score s.

TABLE 5—AVERAGE SCORE AT EACH ALLOCATION

	Game 1		Game 2		Game 3		Game 4	
(A, B) allocation	(250,100)	(200,150)	(250,100)	(250,250)	(100,200)	(150,150)	(100,200)	(100,300)
M-Treatment	-34.56	-2.17	-45.22	12.61	33.69	3.04	0.65	52.83
NM-Treatment	-26.43	12.62	-39.76	41.67	19.76	33.81	-14.76	39.76
P-value (Mann-Whitney)	0.51	0.22	0.66	*0.017*	0.3	*0.005*	0.26	0.29

Note: P-values come from two-sided Mann-Whitney tests. Differences significant at the 10 percent level are in italics.

To further study the determinants of the strength of monetary and non-monetary punishment and reward, we use a regression approach in which the dependent variable is the score s chosen by each individual at each allocation. As independent variables, models (1) and (4) in Table 6 use the variables *paydiff* and *harm-help*. *Paydiff* defines the difference x_B - x_A between B's payoff and A's payoff in the corresponding allocation. For example, the value of *paydiff* is -50 in the right-hand allocation of game 1 (250/100 vs. 200/150), and +100 in the left-hand allocation of game 3 (100/200 vs. 150/150). *Harm-help* defines the difference between B's payoff in the corresponding allocation and B's payoff in the alternative allocation of the game – in what follows, we talk about *harm* if this variable takes a negative value and about *help* otherwise. For instance, *harm-help* takes value -150 in the left-hand allocation of game 2 (250/100 vs. 250/250), while it equals 100 in the right-hand allocation of game 4 (100/200 vs. 100/300): by choosing this allocation, A "helps" B in 100 units.

Harm-help is interesting because some models of reciprocity indicate that the strength of monetary punishment (reward) in our games depends on the size of the harm (help) inflicted.[11] In turn, we include *paydiff* because models of inequity aversion like Fehr and Schmidt (1999) predict that the strength of monetary punishment (reward) depends on the size of the disadvantageous (advantageous) payoff distance. While both types of models only refer to monetary punishment/reward, we also study the relevance of these two variables in explaining the strength of approval and disapproval in order to make comparisons across treatments.

Model (1) considers decisions in M. We observe that *paydiff* is highly significant ($p < 0.001$). The estimated coefficient tells us that for each point difference, players decide to reduce the difference by 0.196 points. Similarly, *harm-help* is also highly significant ($p = 0.004$). For each point difference in *harm/help*, players decide to decrease/increase s by 0.116 points. The coefficient for *harm-help* is somewhat but not statistically smaller than the coefficient for *paydiff* ($F = 2.45$, $p = 0.124$).

Model (4) is the correlate of model (1) for NM. We observe that *paydiff* is significant at the 5% level ($p = 0.031$). The estimated coefficient shows that for each point of negative/positive difference, players decide to increase the disapproval/approval represented by the score s in 0.08

[11] In Dufwenberg and Kirchsteiger (2004, p. 278), this is true at least if players are heterogeneous with respect to their reciprocity parameter Y and if there is a strictly positive fraction of players for any possible value of Y.

points, which is not even half the size of the corresponding coefficient in model (1). In turn, *harm-help* is highly significant ($p < 0.001$). Interestingly, the estimated coefficient for *harm-help* is almost double the size as compared to model (1) and more than twice the size than the coefficient for *paydiff*: For each point difference in *harm-help*, players decide to decrease/increase s by 0.207 points. Indeed, the coefficient for *harm-help* in model (4) is significantly larger than the coefficient for *paydiff* in the same model ($F = 4.43$, $p = 0.042$).

TABLE 6—PUNISHMENT & REWARD DEPENDING ON TREATMENT AND MOTIVATION: OLS regression analysis

Model	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	M	M	M	NM	NM	NM
Sample	all s	$s \leq 0$	$s \geq 0$	all s	$s \leq 0$	$s \geq 0$
Paydiff	0.196*** (0.032)			0.080** (0.036)		
Harm-help	0.116*** (0.038)			0.207*** (0.039)		
Harm		0.056 (0.046)			0.192*** (0.056)	
Help			0.098** (0.048)			0.161*** (0.038)
Envy		0.207*** (0.049)			0.064 (0.049)	
Aheadness aversion			0.171*** (0.039)			0.066 (0.040)
Constant	1.384 (6.375)	-19.841*** (5.826)	21.321*** (6.122)	7.836* (3.893)	-9.568** (3.830)	19.723*** (4.641)
R-squared	0.190	0.125	0.107	0.184	0.125	0.064
N	368	258	266	336	236	265

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Robust standard errors clustered on individual level in parentheses. Variables are defined in manuscript.

Models (2) and (5) respectively focus on punishment and disapproval and restrict the sample to $s \leq 0$. Models 3 and 6, in contrast, focus on reward and approval, and the sample is restricted to $s \geq 0$. Consequently, the variables *harm-help* and *paydiff* are in these models broken in two parts each. The variable *harm* (*help*) defines the difference between B's payoff in the corresponding and alternative allocations of the game, provided that this difference is *negative* (*positive*) – otherwise it takes value zero. The variable *envy* defines the difference x_B - x_A between B's payoff and A's payoff in the corresponding allocation but equals zero if $x_B - x_A \geq 0$. The variable *aheadness aversion* is defined as *envy*, except that it equals zero if $x_B - x_A \leq 0$.

We observe that *harm, help, envy*, and *aheadness aversion* play different roles in M and NM. In particular, we observe that the two parts of inequity aversion, *envy* and *aheadness aversion*, significantly predict punishment and reward ($p < 0.001$ for both) but neither disapproval ($p = 0.196$) nor approval ($p = 0.106$). In contrast, the two parts of reciprocity, *harm* and *help*, significantly predict disapproval and approval ($p < 0.002$ for both) whereas *harm* does not significantly predict punishment. *Help* predicts reward, however ($p = 0.047$). We can summarize our evidence with regard to the strength of punishment/reward as follows:

Result 5: *The strength of monetary punishment and reward seems to be mainly driven by inequity aversion whereas the strength of disapproval and approval seems to be mainly driven by reciprocity considerations.*

3.4 Behavior of the A-players

Although the main focus of our study is to compare the patterns of punishment/reward from the B-players in both treatments, we briefly comment here on the behavior of the A-players. Their choices in treatments M and NM can be seen in Tables 7 and 8, respectively.

TABLE 7—A-players' Choices (M)

Game	Allocation			Percentage	
	Left		Right	Left	Right
1	(250,100)	vs.	(200,150)	60.9%	39.1%
2	(250,100)	vs.	(250,250)	10.9%	89.1%
3	(100,200)	vs.	(150,150)	30.4%	69.6%
4	(100,200)	vs.	(100,300)	26.1%	73.9%

TABLE 8—A-players' Choices (NM)					
Game	Allocation			Percentage	
	Left		Right	Left	Right
1	(250,100)	vs.	(200,150)	78.6%	21.4%
2	(250,100)	vs.	(250,250)	9.5%	90.5%
3	(100,200)	vs.	(150,150)	4.8%	95.2%
4	(100,200)	vs.	(100,300)	23.8%	76.2%

Comparing choices across treatments, we observe no significant differences in games 2 and 4. In game 1, the A-types are marginally more likely to choose allocation 200/150 in M than in NM ($z = 1.788$; $p = 0.074$), while in game 3 they are significantly more likely to choose allocation 150/150 in NM than in M ($z = 3.101$; $p = 0.002$). In games 1 and 3 of NM, in other words, the A-players are more likely to choose their payoff-maximizing allocation. One might be tempted to conclude from this that the A-players cared relatively less about approval/disapproval than about their monetary counterparts. This is possibly the case in game 1. The evidence is not so clear for game 3, however, because here any choice is highly approved in NM (see Table 4). Provided that the A-players anticipate this pattern, they might choose the payoff-maximizing allocation in game 3 more often in NM even if they care a lot about approval. In addition, the A-types might choose less frequently that allocation in M simply because they expect some monetary reward if they choose the other allocation. We finally note in this respect that López-Pérez and Kiss (2012) have analyzed in detail whether A-players in our games have accurate expectations. They report that average expectations are very often not significantly different than actual averages; interestingly, biases in expectations mostly occur in allocations where rewards are prevalent. In relation to our study, therefore, these results suggest that A-players anticipate reasonably well the motives behind punishment, but no so well the motives behind reward, or maybe the strength of these motives.

4. Conclusion

This paper compares the patterns of monetary and non-monetary punishment as well as rewards. These comparisons are important because both forms of punishment and reward constitute important mechanisms to understand human cooperation and compliance with social norms. We find that monetary and non-monetary punishment and rewards share some similarities but also that there are several significant differences. Our analysis suggests that the likely explanation for the differences is twofold. First, a force akin to inequity aversion plays a relatively minor role for disapproval and approval compared to monetary punishment and rewards. Second, a force akin to reciprocity plays a relatively more important role in explaining approval and disapproval. In addition, we observe as well that strict payoff equality fosters approval and reduces disapproval.

Our study is a first attempt to systematically compare monetary punishment and rewards to their non-monetary counterparts and may encourage more research on this topic. For example, it would be interesting to study whether monetary and non-monetary rewards and sanctions are differentially affected when the cost of punishing/rewarding increases. One may speculate that approval and disapproval are more sensitive in this respect. Another question appears when both types of punishment/rewards are available: When will people use the monetary or the non-monetary version (or both)? It might also be interesting to study if people care less about disapproval if they believe that their behavior was justified.[12]

Finally, our findings are also important for the development of theories of other-regarding preferences. In this respect, we believe that both experimental and theoretical work should go hand in hand, exploring questions like: Why do individuals sometimes change their behavior when they can be approved or disapproved? Why does strict payoff equality play such an important role in affecting approval and disapproval?

[12] Elster (1999, p. 161) provides an example in this respect: "A general who is blamed by his compatriots for a defeat he suffered through no fault of his own might feel bitter, resentful, indignant –but not ashamed. The disapproval of others might be neutralized by one's own knowledge that there is nothing to disapprove of."

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Appendix I: Instructions for Participant B (Monetary Treatment)

Welcome to this experiment on decision making. At the end of the experiment, you will be paid some money; the precise amount will depend on your decisions and the decisions of another participant. During the experiment we always speak of points; note that

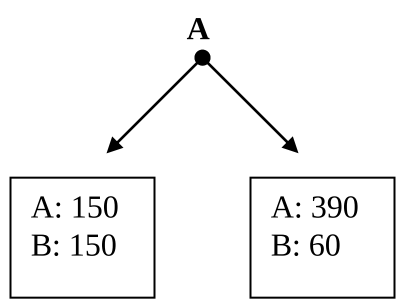
10 points = 1 Euro

Please, do not talk to any other participant during the experiment. If you do not follow this rule we will have to exclude you from the experiment and you will not earn any money. If you have questions, please raise your hand and we will attend you.

There are two types of participants in this experiment: A and B. There is the same number of participants of each type. Previously, the instructor has distributed in a random manner the same number of instructions for each type across the room. Given your seat choice, **you are a type B participant. Further, you will be anonymously matched with a type A participant** (in what follows, we call him/her A)**.** You will never know the type of any other participant, nor will any other participant get to know your type. The decisions in this experiment are anonymous, that is, no participant will ever know which participant made which choice.

Description of the Experiment

You, as player B, and A will take decisions in four scenarios, all of them with a two-stage structure. In the first stage of each scenario, A has to decide between two allocations of points for A and you. In the hypothetical example of the figure, the left-hand allocation gives 150 points to A and 150 points to you. The right-hand allocation gives 390 points to A and 60 points to you.



Remember: 10 points = 1 Euro.

In the second stage of each scenario, you can affect the balance of A. For this, you must pay previously 5 points. If you pay the 5 points, you can then assign to A any amount of points between -100 and +100. This amount will decrease or increase the balance of A by the same amount. If you choose not to pay the 5 points, you cannot assign any points to A so that the allocation chosen by A is implemented.

Example 1: Suppose that A chooses the left-hand allocation in the previously illustrated scenario and that you decide then to spend the 5 points and assign +60 points to A. Then A would have a balance of 150 + 60 = 210, and you would get 150 – 5 = 145 points.

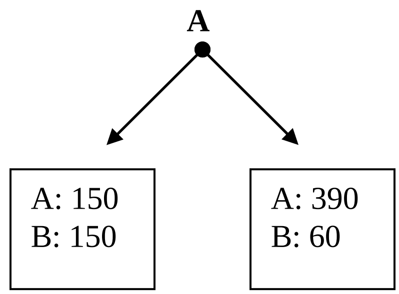
Example 2: Suppose that A chooses the right-hand allocation in the previously illustrated scenario and that you decide then to spend the 5 points and assign -30 points to A. Then A would have a balance of 390-30 = 360, and you would have 60-5 = 55 points.

Important: When deciding, you will not know the allocation actually chosen by A in any scenario. For this reason, you will indicate your decision for any possible choice by A at any scenario. Following with the example of the figure, you should answer four questions: (1) Would you pay the 5 points if A had chosen (150, 150)?, (2) in case you pay the 5 points, what amount of points (between -100 and +100) would you assign then to A?, (3) and (4) the same questions if A had chosen (390, 60).

After all participants have taken their decisions in the four scenarios and answered a brief questionnaire, the instructor will collect your form. Afterwards, one scenario will be chosen randomly (with the roll of a die). This is important because any participant will be paid only for her/his final point score in that scenario (the instructor will divide that score by 10). To finish, note that you will be paid in private and that we will inform you in that moment about A’s choice in the payment-relevant game (without, of course, revealing A’s identity).

Before we proceed with the experiment, please answer the following control questions. Raise your hand after that so that we can verify that the answers are correct.

In the hypothetical example of the figure, assume the following: (a) B decides to pay the 5 points if A had chosen allocation (A: 150, B: 150), and assigns then +100 points to A, (b) B decides not to pay the 5 points if A had chosen allocation (A: 390, B: 60).



Taking into account all this, answer the following questions,

- What would be the final point score of A if she/he chooses (A: 150, B: 150)? ________
- What would be the final point score of B if A chooses (A: 150, B: 150)? ____________
- What would be the final point score of A if she/he chooses (A: 390, B: 60)? _________
- What would be the final point score of B if A chooses (A: 390, B: 60)? _____________

In addition:

- Will you know any of the decisions taken by A before you have made your decision in all four scenarios? Yes No
- Will A know any of your decisions before she/he has made her/his decision in all four scenarios? Yes No
- How many scenarios has this experiment? ___________ How many scenarios will be relevant for your payment? ___________
- Can you ever affect the balance of A without spending 5 points? Yes No

Appendix II: Instructions for Participant B (Non-Monetary Treatment)

Welcome to this experiment on decision making. At the end of the experiment, you will be paid some money; the precise amount will depend on your decisions and the decisions of another participant. During the experiment we always speak of points; note that

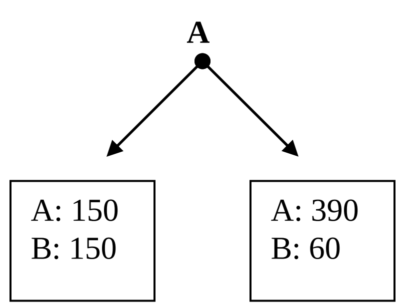
10 points = 1 Euro

Please, do not talk to any other participant during the experiment. If you do not follow this rule we will have to exclude you from the experiment and you will not earn any money. If you have questions, please raise your hand and we will attend you.

There are two types of participants in this experiment: A and B. There is the same number of participants of each type. Previously, the instructor has distributed in a random manner the same number of instruction sheets for each type across the room. Given your seat choice, **you are a type B participant. Further, you will be anonymously matched with a type A participant** (in what follows, we call him/her A)**.** You will never know the type of any other participant, nor will any other participant get to know that you are a type B participant. The decisions in this experiment are anonymous, that is, no participant will ever know which participant made which choice.

Description of the Experiment

You, as player B, and A will take decisions in four scenarios, all of them with a two-stage structure. In the first stage of each scenario, A has to decide between two allocations of points for A and you. In the hypothetical example of the figure, the left-hand allocation gives 150 points to A and 150 points to you. The right-hand allocation gives 390 points to A and 60 points to you.



Remember: 10 points = 1 Euro.

In the second stage of each scenario, you cannot affect the balance of A, but you can approve or disapprove her/his prior choice. For this, you must pay 5 points. If you pay the 5 points, you can then assign an evaluation score between -100 and +100 to A. A negative score indicates that you disapprove A's choice (-100 is maximum disapproval), while a positive score indicates that you approve A's choice (+100 is maximum approval). We note again that, whatever its sign, this score will not affect A's balance. If you choose not to pay the 5 points, you cannot assign a score to A.

Example 1: Suppose that A chooses the left-hand allocation in the previously illustrated scenario and that you then decide to spend the 5 points and assign an evaluation score of +60 to A. That means that you approve A's choice with intensity equal to 60 out of 100. Note also that A's balance is unchanged (A gets 150 points), whereas you would get 150 – 5 = 145 points.

Example 2: Suppose that A chooses the right-hand allocation in the previously illustrated scenario and that you then decide to spend the 5 points and assign an evaluation score of -30 to A. That means that you disapprove A's choice with intensity equal to 30 out of 100. Note also that A's balance is unchanged (A gets 390 points), whereas you would get 60 – 5 = 55 points.

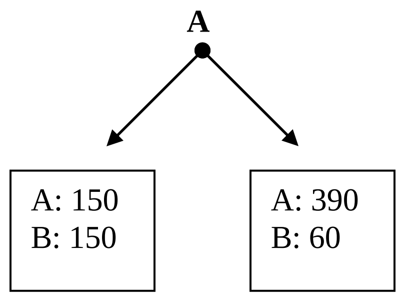
Important: When deciding, you will not know the allocation actually chosen by A in any scenario. For this reason, you will indicate your decision for any possible choice by A at any scenario. Following with the example of the figure, you should answer four questions: (1) Would you pay the 5 points if A had chosen (150, 150)?, (2) in case you pay the 5 points, what evaluation score (between -100 and +100) would you assign then to A?, (3) and (4) the same questions if A had chosen (390, 60).

After all participants have taken their decisions in the four scenarios and answered a brief questionnaire, the instructor will collect your form. Afterwards, one scenario will be chosen randomly (with the roll of a die). This is important because any participant will be paid only for her/his final point score in that scenario (the instructor will divide that score by 10). To finish, note that everyone will be paid in private and that we will inform A in that moment about the evaluation score that you possibly assigned him/her in the payment-relevant game (without, of course, revealing your identity).

<u>Before we proceed with the experiment, please answer the following control questions. Raise your hand after that so that we can verify that the answers are correct.</u>

In the hypothetical example of the figure, suppose that A chooses allocation (A: 150, B: 150) and that B decides to pay the 5 points, and assigns then an evaluation score +100 to A. In this case:

- What would be A's final balance? _______
- Does B approve or disapprove A's choice? ___________



Suppose now that A chooses allocation (A: 390, B: 60) and that B decides not to pay the 5 points.

- What would be A's final balance then? ________
- What would be B's final balance then? ____________

In addition:

- Will you know any of the decisions taken by A before you have made your decision in all four scenarios? Yes No
- Will A know any of your decisions before she/he has made her/his decision in all four scenarios? Yes No
- How many scenarios has this experiment? __________ How many scenarios will be relevant for your payment? __________
- Can you ever affect the balance of A? Yes No

Web appendix **Not to be published**

Instructions for Participant A (Monetary Treatment)

Welcome to this experiment on decision making. At the end of the experiment, you will be paid some money; the precise amount will depend on your decisions and the decisions of another participant. During the experiment we always speak of points; note that

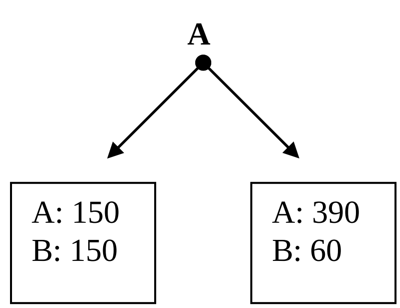
10 points = 1 Euro

Please, do not talk to any other participant during the experiment. If you do not follow this rule we will have to exclude you from the experiment and you will not earn any money. If you have questions, please raise your hand and we will attend you.

There are two types of participants in this experiment: A and B. There is the same number of participants of each type. Previously, the instructor has distributed in a random manner the same number of instructions for each type across the room. Given your seat choice, **you are a type A participant. Further, you will be anonymously matched with a type B participant** (in what follows, we call him/her B**).** You will never know the type of any other participant, nor will any other participant get to know your type. The decisions in this experiment are anonymous. This means no participant will ever know which participant made which choice.

Description of the Experiment

You, as player A, and B will take decisions in four scenarios, all of them with a two-stage structure. In the first stage of each scenario, you have to decide between two allocations of points for you and B. In the hypothetical example of the figure, the left-hand allocation gives 150 points to you and 150 points to B. The right-hand allocation gives 390 points to you and 60 points to B.



Remember: 10 points = 1 Euro.

In the second stage of each scenario, B can affect your balance. For this, B must pay previously 5 points. If B pays the 5 points, B can then assign to you any amount of points between -100 and +100. This amount will decrease or increase your balance by the same amount. If B chooses not to pay the 5 points, she cannot assign any points to you so that the allocation chosen by you is implemented.

Example 1: Suppose that you choose the left-hand allocation in the previously illustrated scenario and that B then decides to spend the 5 points and assigns to you +60 points. Then you would have a balance of 150 + 60 = 210, and B would get 150 – 5 = 145 points.

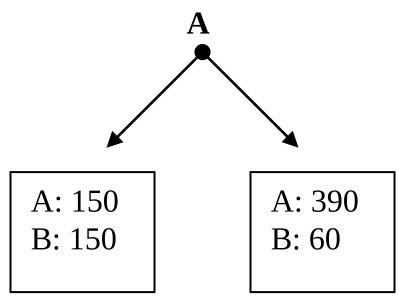
Example 2: Suppose that you choose the right-hand allocation in the previously illustrated scenario and that B then decides to spend the 5 points and assigns to you -30 points. Then you would have a balance of 390-30 = 360, and B would have 60-5 = 55 points.

Important: When deciding, B will not know the allocation actually chosen by you in any scenario. For this reason, B will indicate her decision for any possible choice by you at any scenario. Following with the example of the figure, B should answer four questions: (1) Would you pay the 5 points if A had chosen (150, 150)?, (2) in case you pay the 5 points, what amount of points (between -100 and +100) would you assign then to A?, (3) and (4) the same questions if A had chosen (390, 60).

After all participants have taken their decisions in the four scenarios and answered a brief questionnaire, the instructor will collect your form. Afterwards, one scenario will be chosen randomly (with the roll of a die). This is important because any participant will be paid only for her/his final point score in that scenario (the instructor will divide that score by 10). To finish, note that you will be paid in private and that we will inform you in that moment about B’s choice in the payment-relevant game (without, of course, revealing B’s identity).

Before we proceed with the experiment, please answer the following control questions. Raise your hand after that so that we can verify that the answers are correct.

In the hypothetical example of the figure, assume the following: (a) B decides to pay the 5 points if A had chosen allocation (A: 150, B: 150), and assigns then +100 points to A, (b) B decides not to pay the 5 points if A had chosen allocation (A: 390, B: 60).



Taking into account all this, answer the following questions,

- What would be the final point score of A if she/he chooses (A: 150, B: 150)? ________
- What would be the final point score of B if A chooses (A: 150, B: 150)? ___________
- What would be the final point score of A if she/he chooses (A: 390, B: 60)? ________
- What would be the final point score of B if A chooses (A: 390, B: 60)? ____________

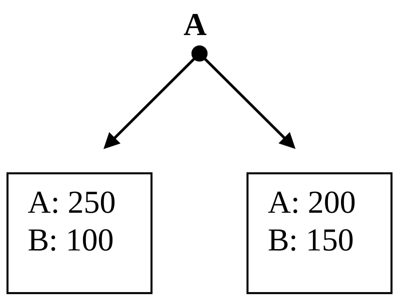
In addition:

- Will you know any of the decisions taken by B before you have made your decision in all four scenarios? Yes No
- Will B know any of your effective decisions before B has made her/his decision in all four scenarios? Yes No
- How many scenarios has this experiment? __________
- How many scenarios will be relevant for your payment? __________
- Can B ever affect your balance without spending 5 points? Yes No

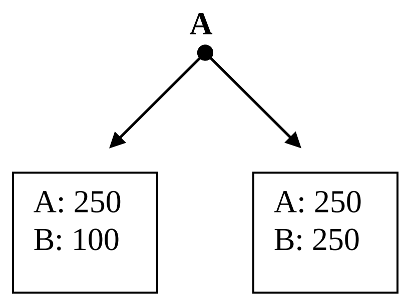
Decisions of a type-A participant

The 4 scenarios

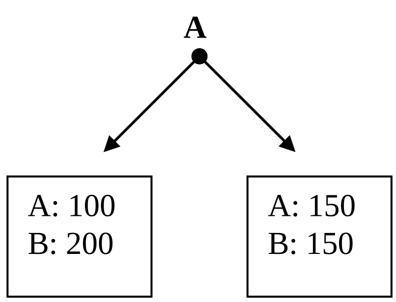
For your information, we present here the point allocations available in each of the 4 scenarios. In the next sheets, you can take your decisions in each scenario.



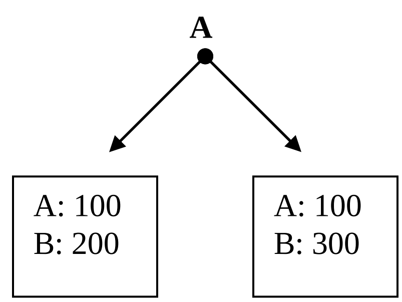
Scenario 1



Scenario 2



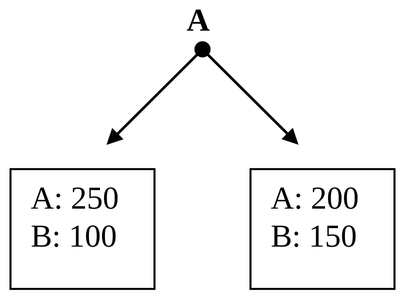
Scenario 3



Scenario 4

Note: In the next sheets, you can take your decisions in any order as you wish (that is, you do not need to start deciding in scenario 1). Until we collect your decision form, moreover, you can always change your decision in any scenario if you decide so (to facilitate this, you can initially use a pencil; write down your final decision with a pen, though).

Scenario 1



Recall: 10 points = 1 Euro

The point allocation that I choose in this scenario is (select it with a circle):

- A: 250, B: 100
- A: 200, B: 150

Independently of your previous choice, we kindly ask you to make a series of estimations (your answers here will not affect your final payoff):

- What is the percentage of participants B that will pay the 5 points if A chooses (250, 100)? ________ (this must be a number between 0 and 100, both included)
- In the previous case, how many points (in average) will these B-participants assign to the A-participant? ________ (this must be a number between -100 and 100, both included)
- What is the percentage of participants B that will pay the 5 points if A chooses (200, 150)? ________ (this must be a number between 0 and 100, both included)
- In the previous case, how many points (in average) will these B-participants assign to the A-participant? ________ (this must be a number between -100 and 100, both included)

Instructions for Participant A (Non-Monetary Treatment)

Welcome to this experiment on decision making. At the end of the experiment, you will be paid some money; the precise amount will depend on your decisions and the decisions of another participant. During the experiment we always speak of points; note that

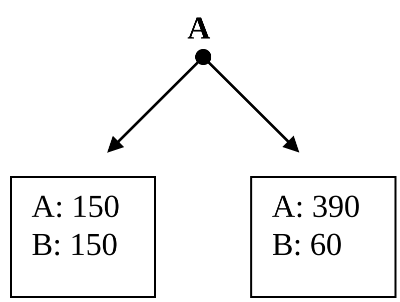
10 points = 1 Euro

Please, do not talk to any other participant during the experiment. If you do not follow this rule we will have to exclude you from the experiment and you will not earn any money. If you have questions, please raise your hand and we will attend you.

There are two types of participants in this experiment: A and B. There is the same number of participants of each type. Previously, the instructor has distributed in a random manner the same number of instructions for each type across the room. Given your seat choice, **you are a type A participant. Further, you will be anonymously matched with a type B participant** (in what follows, we call him/her B**).** You will never know the type of any other participant, nor will any other participant get to know your type. The decisions in this experiment are anonymous, that is, no participant will ever know which participant made which choice.

Description of the Experiment

You, as player A, and B will take decisions in four scenarios, all of them with a two-stage structure. In the first stage of each scenario, you have to decide between two allocations of points for you and B. In the hypothetical example of the figure, the left-hand allocation gives 150 points to you and 150 points to B. The right-hand allocation gives 390 points to you and 60 points to B.



Remember: 10 points = 1 Euro.

In the second stage of each scenario, B cannot affect your balance, but can approve or disapprove your prior choice. For this, B must pay 5 points. If B pays the 5 points, B can then assign an evaluation score between -100 and +100 to you. A negative score indicates that B disapproves your choice (-100 is maximum disapproval), while a positive score indicates that B approves your choice (+100 is maximum approval). We note again that, whatever its sign, this score will not affect your balance. If B chooses not to pay the 5 points, B cannot assign a score to you

Example 1: Suppose that you choose the left-hand allocation in the previously illustrated scenario and that B then decides to spend the 5 points and assign a score of +60 to you. That means that B approve your choice with intensity equal to 60 out of 100. Note also that your balance is unchanged (you get 150 points), whereas B would get 150 – 5 = 145 points.

Example 2: Suppose that you choose the right-hand allocation in the previously illustrated scenario and that B then decides to spend the 5 points and assign a score of -30 to you. That means that B disapproves your choice with intensity equal to 30 out of 100. Note also that your balance is unchanged (you get 390 points), whereas B would get 60 – 5 = 55 points.

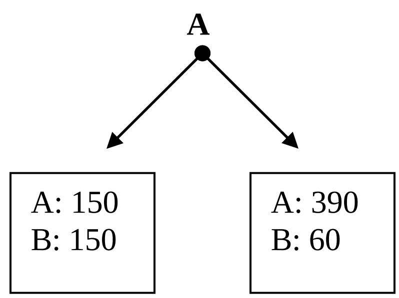
Important: When deciding, B will not know the allocation actually chosen by you in any scenario. For this reason, B will indicate her decision for any possible choice by you at any scenario. Following with the example of the figure, B should answer four questions: (1) Would you pay the 5 points if A had chosen (150, 150)?, (2) in case you pay the 5 points, what score (between -100 and +100) would you assign then to A?, (3) and (4) the same questions if A had chosen (390, 60).

After all participants have taken their decisions in the four scenarios and answered a brief questionnaire, the instructor will collect your form. Afterwards, one scenario will be chosen randomly (with the roll of a die). This is important because any participant will be paid only for her/his final point score in that scenario (the instructor will divide that score by 10). To finish, note that everyone will be paid in private and that we will inform you in that moment about the evaluation score that B assigned to you in the payment-relevant game (without, of course, revealing B’s identity).

<u>Before we proceed with the experiment, please answer the following control questions. Raise your hand after that so that we can verify that the answers are correct.</u>

In the hypothetical example of the figure, suppose that A chooses allocation (A: 150, B: 150) and that B decides to pay the 5 points, and assigns then a score +100 to A. In this case:

- What would be A's final balance? _______
- Does B approve or disapprove A's choice? ___________



Suppose now that A chooses allocation (A: 390, B: 60) and that B decides not to pay the 5 points.

- What would be A's final balance then? ________
- What would be B's final balance then? ____________

In addition:

- Will you know any of the decisions taken by B before you have made your decision in all four scenarios? Yes No
- Will B know any of your decisions before she/he has made her/his decision in all four scenarios? Yes No
- How many scenarios has this experiment? __________ How many scenarios will be relevant for your payment? __________
- Can B ever affect your balance? Yes No