Framing and free riding: Moral judgments, emotional responses, and punishment in social dilemma games

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Abstract

This paper reports an experimental investigation of how people perceive and treat free riding in a one-shot linear public goods game under different frames. We study three dimensions: moral judgment, emotional response, and punishment. In the moral judgment study, subjects participate in an Internet experiment and are asked to act as impartial judges by expressing moral evaluations towards people involved in hypothetical scenarios; whereas, in the behavioural study, subjects participate in a lab experiment, and respond to the behaviour of others in their group by assigning punishment points and by reporting emotions towards them. Our main findings suggest that normative evaluations are frame-sensitive, *ceteris paribus*. In contrast, in the lab experiment, we find that neither punishment nor emotions depend on framing manipulations, *ceteris paribus*.

Keywords: framing effects, normative judgments, punishment, emotions, public goods experiments

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I. Introduction

This paper presents an experimental exploration of the effects of framing on attitudes to behaviour in public goods games. In particular, we study how subjects perceive free riding conditional on other group member's contributions across different framing manipulations. The frames we apply are "Give-some" *versus* "Take-some" framings, that is, subjects have to decide how much to contribute to the public good or how much to withdraw from it. We use three indicators of how people perceive free riding: normative judgments, self-reported emotional responses, and punishment as a behavioural expression of disapproval. All three forms of response are relative to behaviour in a one-shot voluntary contributions game, the framing (either Give or Take) of which we manipulate.[1] Normative judgments are elicited in one study; and punishment and emotional responses in another.

In the study on normative judgments, subjects respond to a questionnaire, in which they are confronted with hypothetical scenarios. In various endings of these scenarios, one person always free rides; while his partner is contributing different amounts to the public good (or, withdrawing from the public good, depending on the frame). Subjects are asked to express their positive or negative moral judgment towards the free rider without being involved in the decision situation. Thus, subjects merely act as impartial judges. In sum, this study informs us about people's moral judgments of free riding behaviour across various level of overall cooperation.

In another study, subjects take part in a laboratory experiment, where subjects' decisions have direct monetary impact on their and their counterparts' income. In the Give frame, subjects have to decide how much to contribute to the public good; whereas, in the Take frame, they have to decide how much to withdraw from the public good. As instruments for measuring the perception of free riding, we use punishment and self-reported emotions. The analysis of punishment behaviour provides a window on subjects' perception of contributions under the two frames that is different from that provided by judgment tasks, because contribution and punishment decisions have direct payoff consequences for both players. Evidence

[1] Given that we are interested in the role of framing effects for reactions to free riding, our study is related to investigations on the role of framing in previous public goods experiments, such as Andreoni, 1995; Sonnemans, Schram and Offerman, 1998; Willinger and Ziegelmeyer, 1999; Cookson, 2000; Park, 2000; and Dufwenberg, Gächter, and Hennig-Schmidt, 2006. For a conceptual discussion and classification of framing effects, see Levin, Schneider and Gaeth, 1998.

from public goods games with punishment indicates that co-operators are willing to spend their own resources in order to punish non-cooperators (Fehr and Gächter, 2000) and thus, punishment is a willingness-to-pay measure for expressing disapproval. As a complementary tool for identifying whether subjects evaluate non-contribution differently according to the frame, we also elicit self-reports of subjects' emotions. Recent research indicates that emotions generate and explain economic behaviour, with negative emotions being connected with negative concerns (Bosman and van Winden, 2002). Hence, as with punishment behaviour, negative emotions may be stronger when people evaluate a given situation as being worse than another. To shed more light and explain in depth subjects' decisions in the behavioural dimension, we also elicited beliefs both about contributions and punishment behaviour.

Our results suggest that, when we measure people's impartial normative evaluations as a function of how much the free rider deviated from his partner, subjects (on average) consider withdrawing tokens from the public good as being less bad than the objectively equivalent action of contributing tokens to the public good. However, in the laboratory voluntary contributions game, our findings suggest that, on average, punishment does not vary with framing of the contribution stage, when one controls for behaviour in that stage. We reach essentially the same conclusion when we examine positive and negative emotions. We conclude that, although subjects morally judge free riding differently, their behaviour provides no evidence that they consider it differently under different frames.

Our paper is organised as follows. Section II describes our research design both for the questionnaire study and the laboratory experiment. In section III we briefly discuss the procedures of our designs. Next, in section IV, we analyse the possible theoretical hypotheses for subjects' behaviour for the two different framing manipulations. Section V provides the results of both studies and section VI concludes.

II. Experimental designs

I. Voluntary contributions game under both frames

The basic building block of our study is a framing manipulation of a voluntary contributions game. Our framings follow a similar formulation of the payoff function

as in Dufwenberg *et al.* (2006). Regarding the Give frame, each player is endowed with 20 tokens and has to decide how many of these 20 tokens he keeps for himself and how many he contributes to the public good.[2] Each token kept for him increases his own monetary payoff by one Guilder (our experimental currency). Each token contributed to the public good increases the payoff of every group member by 0.5 Guilders. The payoff function is given by equation (1).

$$\pi_i^1 = 20 - g_i + 0.5 \cdot \sum_{j=1}^{3} g_j \qquad (1)$$

where π_i^1 denotes group member i's payoff from the first stage and g_i the number of tokens contributed to the public good by group member i.

In the Take frame, there are initially sixty tokens in the public good (described again as project to subjects) for each group. Each group member has to decide how many tokens (up to 20) he withdraws from the project and how many of them he leaves in the project. The payoff function for this framing treatment is now given by equation (2).

$$\pi_i^1 = t_i + 0.5 \cdot (60 - \sum_{j=1}^{3} t_j) \qquad (2)$$

In both framing cases, subjects are confronted with a strategically equivalent choice problem, regarding the allocation of tokens. Equations (1) and (2) are equivalent using, for each player i, the relationship $g_i = 20 - t_i$, where t_i indicates the number of tokens withdrawn from the public good by group member i.

II. Moral judgment study

In this study, subjects were presented with five hypothetical scenarios in a questionnaire. In one treatment, the scenarios employed the Give frame; in the other treatment, the employed the Take frame.

In each questionnaire, there were two fictitious players, named Person A and Person B, belonging to the same group.[3] They were described as interacting in one-shot voluntary contributions games, analogous to those described in the previous section in all respects, except that there only two players per group (so that, in the

[2] For neutrality reasons, both in the moral judgment and the lab experiment, public good was described to subjects as a project.

[3] We decided to give these names to our hypothetical players to avoid (either positive or negative) associations with real-world names.

Take frame, the initial public good contained 40 tokens). The questionnaires made clear to readers payoff consequences of the decisions made by Person A and Person B in each case. Each questionnaire had five possible endings (scenarios), in which we varied the contribution (withdrawal) level of one player, starting from 0 to 20 (in intervals of 5 tokens). The contribution of the other player was always constant and equal to 0. More specifically, in the Give frame, in scenario 1, both hypothetical players contributed 0 tokens to the public good; in scenario 2, one player contributed 5 and the other 0 tokens; in scenario 3, one player contributed 10 and the other 0 tokens; in scenario 4, one player contributed 15 and the other 0 tokens; and, in scenario 5, one player contributed 20 and the other 0 tokens. In the Take frame, in scenario 1, both hypothetical players withdrew 20 tokens from the public good; in scenario 2, one player withdrew 15 and the other 20 tokens; in scenario 3, one player withdrew 10 and the other 20 tokens; in scenario 4, one player withdrew 5 and the other 20 tokens; and, in scenario 5, one player withdrew 0 and the other 20 tokens. Payoff consequences are identical across frames, for each of scenarios 1, 2, 3, 4 and 5. Subjects were always asked to rate the morality of the free-rider, acting as impartial judges. We measured moral ratings in a scale ranging from -50 (extremely bad) to 50 (extremely good). Along with their moral judgments, subjects were asked to provide explanation of their decisions.

III. Laboratory experiment with punishment stage

The main part of the design is a game with two-stages. The first is a standard linear public goods game presented in two different framings, as described in Section II.I; and the second is a punishment stage. Emotions were also elicited in the second stage. Except insofar as second stage tasks refer back to the first stage, they are held constant. We refer to the two resulting treatments as Give-P (Give frame for contributions, with punishment opportunities) and Take-P (Take frame for contributions, with punishment opportunities).

During the lab experiment, subjects were randomly assigned to a group of three members and played a one-shot voluntary contributions game. The advantage of a one-shot game is that it eliminates confounding effects that might come from repeated interaction, allowing us to focus on pure framing effects on judgment. In contrast, in a repeated game, there is always the possibility that subjects think that other subjects' future behaviour may be influenced by their own current behaviour. This could

confound the investigation of framing effects in two ways. First, sufficient and strong repeated game effects could swamp framing effects that would otherwise be present. Alternatively, if subjects' views of the dependence of other subjects' behaviour on their own are frame-sensitive, repetition could create a framing effect that would not otherwise be present.

In the second stage of the voluntary contributions game, players are allowed to punish each other. Each subject can assign up to five punishment points to each of the other two group members. Punishment is costly both for the punishing and the punished parties. Adapting Fehr and Gächter (2002), we choose a punishment technology in which each punishment point assigned costs the punished player two Guilders and the punishing player one Guilder.

The material payoff function from the whole experiment for a given subject i is given by equation (3).

$$\pi_i = \pi_i^1 - \sum_{j=1}^{n} p_{ij} - 2 \cdot \sum_{j=1}^{n} p_{ji} \tag{3}$$

where p_{ij} denotes the punishment points group member i assigns to group member j. Conditional on each subject i being motivated to maximise equation (3), the unique subgame perfect equilibrium requires that subjects will free ride completely in the first stage and refrain from punishing at all in the second stage.

We asked subjects to state their beliefs about contributions of the other two group members after they had made their own contribution decisions (but before the punishment stage), since eliciting beliefs before the contribution decision task may affect behaviour (Gächter and Renner, 2006). Elicitation of beliefs was non-incentivised in order to exclude potential income effects in the punishment treatments. Also, we wanted to avoid punishment being motivated by disappointment about low payoffs from accuracy of beliefs. After the transfer of punishment points among subjects, beliefs were also elicited about their punishment behaviour.

At the end of each treatment, subjects were asked to indicate the intensity of emotions they felt about the actual contribution behaviour for each member of their group. The procedure we used to elicit self-reports on perceived emotions is due to Bosman and van Winden (2002). In particular, subjects were given a list of thirteen emotions, and were then asked to indicate the intensity with which they felt each emotion when they saw the contribution of each other group member. The intensity

for each emotion was recorded on a 7-point scale (1 = "not at all", …, 7 = "very much"). Appendix I provides a screenshot of the interface we used for eliciting self-reports on emotions.

Finally, our design is completed by two treatments without punishment opportunities. In these treatments, the second stage consisted of the elicitation of beliefs and emotions. We refer to the non-punishment treatments as Give-N (Give frame for contributions, no punishment opportunities) and Take-N (Take frame for contributions, no punishment opportunities). The purpose for the non-punishment treatments is to check for two possibilities: (i) if it turns out that there are differences in emotions across frames, we want to be able to check whether emotions are responses to contributions themselves or *ex post* rationalisation of punishment behaviour; and (ii) if it turns out that there is no difference in emotions across frames, we want to be able to check whether this is because emotional response to contributions is the same or because the act of punishment expunges emotional response.

IV. Procedures

In the moral judgment study, 116 subjects participated in the Give-treatment and 120 in the Take-treatment. All subjects in this study participated in an Internet experiment and were recruited via ORSEE software (Greiner, 2004). Subjects were sent invitations informing them about the questionnaire study and could take part in the experiment online by logging in the corresponding website. Subjects could participate in the Internet experiment, after having received the invitation, up until one week, at their own pace and participation was voluntary. For methodological reasons, we equally divided the subject pool into the non-incentivised and incentivised one. In the former case, subjects participated without being given any reward at all; whereas, in the latter case, subjects were provided monetary incentives to answer the questionnaire.[4] All questionnaires asked for both numerical ratings and justifications.[5] Answers were submitted electronically and, on average, subjects needed 15 minutes to fill in a questionnaire.

[4] The monetary incentives comprised two prizes of 50 pounds, which will be given to two winners among those who participated in a public draw. The date and time of the public draw was common knowledge to all participants of the incentivised subject pool.
[5] Both types of questionnaires are provided in Appendix II.

In the behavioural experiment, 42 subjects took part in the Give-N treatment; 45 in the Take-N treatment; 42 in the Give-P treatment; and 39 in the Take-P treatment. The experiment was conducted in the Centre for Decision Research and Experimental Economics (CeDEx) lab. All treatments were computerised and programmed with the software z-Tree (Fischbacher, 1999). The non-punishment treatments lasted about 50 minutes and the punishment treatments about 70 minutes. Before subjects played the game, they received the instructions reproduced in Appendix III. As we wanted to ensure that subjects understand the decision situation and the mechanics of payoff calculations, all participants answered several computerised test questions, concerning what the payoffs would be for various hypothetical configurations of behaviour. The experiment did not proceed until every subject had answered these questions correctly.

All subjects, who took part in both studies, were recruited at the University of Nottingham. The vast majority were undergraduate students from different academic fields, including economics. We took great care so that those who participated in the normative study could not participate in the behavioural one.

III. Theoretical hypotheses

We analyse here our theoretical hypotheses about whether free-riding is perceived and treated differently, examining both normative and behavioural aspects of subjects' decision-making. For the analysis of normative evaluations, we use the tool of the 'moral judgment function'. This function measures the average moral rating that a subject assigns as a function of how much a person contributed (withdrew) with respect to the free-rider. We expect that the more (less) tokens the other person contributes (withdraws), the higher the negative ratings will be, leading to an increasing condemnation of the free-rider. In other words, the moral judgment function is anticipated to be negatively sloped (within frames). With respect to the framing manipulations, the null hypothesis is that there is no framing effect. We explore the rationale of this and alternative hypotheses in the context of explaining the corresponding hypotheses for the behavioural experiment.

Turning to the behavioural aspects of our lab experiment, we introduce the tools of the 'punishment function' and the 'emotions' function' in order to highlight possible differences on punishment attitudes or/and experienced emotions. The 'punishment function' gives the average punishment points assigned by the punisher,

as a function of the recipient's deviation from the punisher's contribution. Consistent with previous evidence (Fehr and Gächter, 2000), our expectation is that the punishment function will be downward sloping for the negative part of the deviation (horizontal) axis, implying that a subject punishes his co-player more, the more he negatively deviates from the punisher's contribution.

Having defined the punishment function, we can now state our derived hypotheses. The null hypothesis predicts that the punishment function does not depend on framing, *ceteris paribus*. This hypothesis is implied by any consequentialist theory,[6] even by those which allow subjects to contribute and punish to some extent. For instance, although the inequity aversion model of Fehr and Schmidt (1999) or the ERC model of Bolton and Ockenfels (2000) can explain contribution and punishment, these theories cannot account for any framing effect. Moreover, even if framing leads to different contribution levels (contrary to Fehr and Schmidt, and Bolton and Ockenfels), punishment may not be different *for a given deviation*. This prediction is suggested by Fehr and Gächter (2000), who find that even if subjects contribute significantly more under a Partners' matching protocol than under a Strangers' one, these treatment manipulations do not affect the level of punishment for given deviations from the average group contribution. Thus, the existence of different treatments on contribution levels need not imply an effect on punishment of a given deviation from the punisher's contribution.

In principle, the punishment function could be tilted either upwards or downwards by the Take frame relative to the Give frame. In the first case, the psychological mechanism that operates under this hypothesis is that the same deviation from the punisher's contribution hurts more in the Take frame, and a given subject will assign more punishment points for given behaviour, other things being equal. Hence, our second hypothesis predicts that the punishment function will be flatter in the Give than in the Take frame. To the extent that normative judgments feed into behaviour, given the normative judgments that we actually observe in the judgment study, the punishment function would be expected to be steeper in the Give frame, leading to our third hypothesis. Similar hypotheses can be derived using j's deviation from the

[6] Consequentialist theories suppose that subjects' actions are determined only by the final consequences of the actions. Almost all economic theories are consequentialist in this sense. However, psychological game theory (Geanakoplos, Pearce and Stacchetti, 1989) includes beliefs in the payoff function and can therefore explain framing effects (see Dufwenberg *et al.*, 2006).

punisher's beliefs about j's contributions in place of j's deviation from i's contribution.

The second behavioural tool we use to analyse subjects' perception of free-riding is the 'emotions' function', which gives positive and negative emotions as a function of deviations from individual's own contribution. Our expectation for the emotions function is to be negatively sloped in the negative deviation interval. As with the case of the punishment function, we can also derive hypotheses for the emotions' function with regard both to its slope and to its height. Since punishment and emotions are two closely related notions, we expect that any differences observed in the punishment function should be reflected and be in the same direction for the emotions' function as well.

V. Results

A. Moral judgment study

In this section, we analyse subjects' decisions in relation to their moral evaluations about free-riding. To do this, we use the so-called 'moral judgment' function, which measures the average moral ratings as a function of each of the five different scenarios. Recall that the judged person always contributes 0 tokens and contribution of the other player rises with the scenarios. We say that the moral judgment function is downward sloping if moral judgment decreases with the scenario.[7]

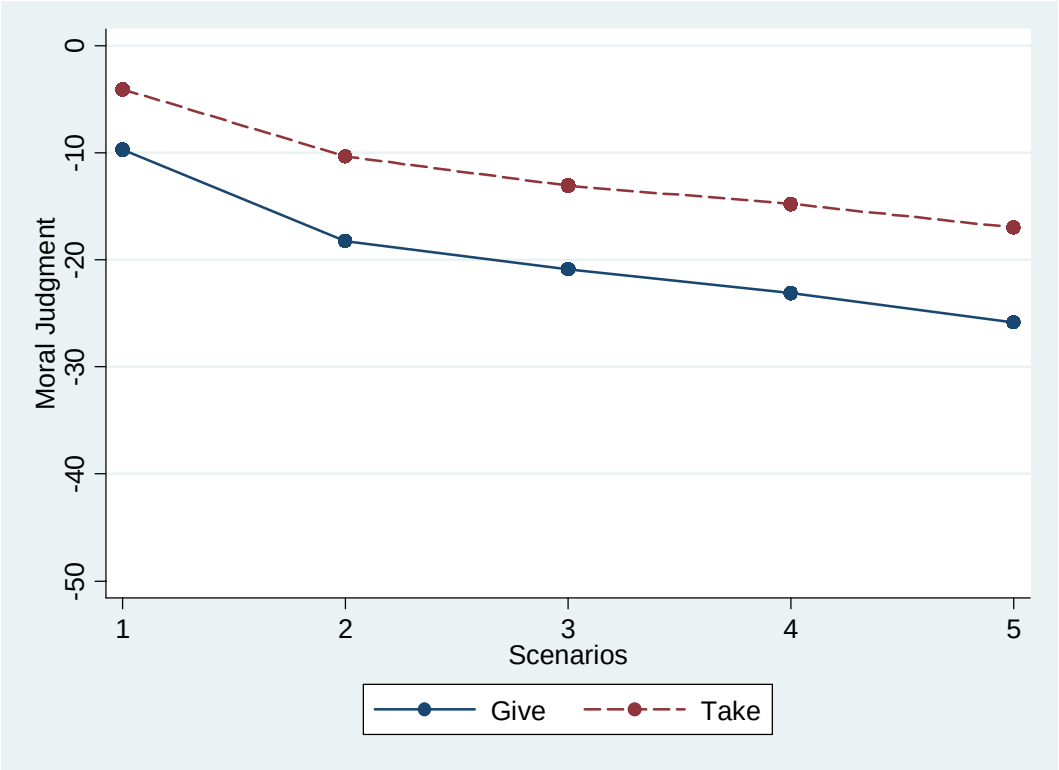
RESULT 1: The moral judgment function is downward sloping and depends on framing, ceteris paribus.

Support. As illustrated in Figure 1, the slope of the moral judgment function is negative under both frames, implying that the more a person free-rides compared to his partner, the worse this act is morally considered by subjects. This increasing condemnation within frames is expected to be present, and is also in line with experimental evidence on conditional cooperation (see, e.g. Fischbacher, Gächter,

[7] We excluded subjects from whom the judgment function is strictly negative in one range and strictly positive in another. We accept decreasing functions (with and without flat sections), increasing functions (with and without flat sections) and completely flat.

Fehr, 2001, and Gächter, 2006). Looking at differences between frames, we can see that in each scenario normative judgment of the free-rider is worse in the Give frame than in the Take frame. This level difference appears to exist for all five possible scenarios.

Figure 1. Moral judgment function



To formally test whether this difference is statistically significant, we perform an OLS regression. As dependent variable, we include the moral judgment of subjects towards the free-riders of our five hypothetical scenarios. The independent variables comprise of the following variables: (i) the dummy variables 'Scenario 2', 'Scenario 3', 'Scenario 4', and 'Scenario 5', which are equal to 1 when scenario was 2, 3, 4, and 5, respectively (and 0 otherwise). Scenario 1 was chosen as the baseline group, (ii) the dummy variable 'Take', which equals to 1 for the Take frame, and 0 otherwise, and controls for possible framing effects, (iii) the dummy variable 'Payment', which equals to 1 for the payment condition, and 0 otherwise, and account for possible differences between the incentivised and the non-incentivised subject pool, and (v) the variable 'Male', which is equal to 1 for male subjects and 0 otherwise and tests for

possible gender differences in moral judgments. The results of this regression are presented in Table 1.

Table 1. The moral judgment function – Regression results

	Dependent variable: Moral judgment
Scenario 2	-7.411***
	(1.793)
Scenario 3	-10.093***
	(1.835)
Scenario 4	-12.042***
	(1.875)
Scenario 5	-14.533***
	(1.949)
Take	7.824***
	(1.170)
Payment	2.119
	(1.226)
Male	-1.878
	(1.207)
Constant	-11.122***
	(1.637)
Observations	1,180

*Notes: OLS estimates. Standard errors are presented in parentheses. Results are corrected for heteroskedasticity. ** denotes significance at the 5-percent level, and *** at the 1-percent level.*

The coefficients of the scenario dummy variables clearly suggest the corroboration of the increasing condemnation hypothesis (negatively sloped moral judgment function). The variable 'Take' is also highly statistically significant, implying that subjects morally judge scenarios in the Take treatment less bad than in the Give treatment. The dummy variable 'Payment' is weakly significant at 10% level and no differences were found between genders.

B. Behavioural experiment

Before we investigate possible differences on punishment attitudes or/and emotions, we firstly take a look at the absolute levels of contributions and beliefs about contributions. Table 2 shows the average contributions and beliefs about average contributions across all subjects in a given treatment. In absolute levels, the average contribution is largest in the Give-P treatment (i.e. 7.21 tokens) and smallest in the Take-N treatment (i.e. 4.46 tokens), as previous literature would suggest. A non-parametric Kruskal-Wallis test suggests significant differences among treatments

($\chi^2(3) = 10.089$, $p = 0.0178$). Using a Wilcoxon rank-sum test shows that the only significant differences at the 5% level is between the Give-P and Take-N treatments ($p = 0.0024$) and Take-N and Take-P treatments ($p = 0.0248$).

Examining subjects' beliefs about contributions, we find that a Kruskal-Wallis test suggests weakly significant differences between treatments ($\chi^2(3) = 6.626$, $p = 0.0848$). Using a Wilcoxon rank-sum test shows that the only significant differences at the 5% level is between the Give-P and Take-N treatments ($p = 0.0321$) and Give-P and Take-P treatments ($p = 0.0225$).

Table 2. Average absolute levels of contribution and beliefs about contributions

	Average contribution levels	Beliefs about average contributions
Give-N	5.88	7.08
	(6.23)	(5.26)
Give-P	7.21	7.70
	(5.02)	(4.32)
Take-N	4.46	6.23
	(6.04)	(5.93)
Take-P	6.41	5.30
	(5.11)	(3.78)

Note: Standard deviations are presented in parentheses.

However, our main concern is with punishment behaviour and emotions, as these are our vehicles to answer our research question. In the next two sections, we explore whether subjects treat free-riding differently by punishing differently or/and displaying different feelings across framing manipulations. For this purpose, we make use of the punishment function and the emotions' function as our behavioural tools. This allows us to proceed despite the absence of a framing difference in contributions.

B.1 The punishment function

We start our analysis for the behavioural experiment by examining subjects' punishment behaviour, for each framing context. Figure 2 below shows the punishment points assigned by the punisher to another player j as a function of j's deviation from the punisher's contribution.[8] The punishment function is given by the

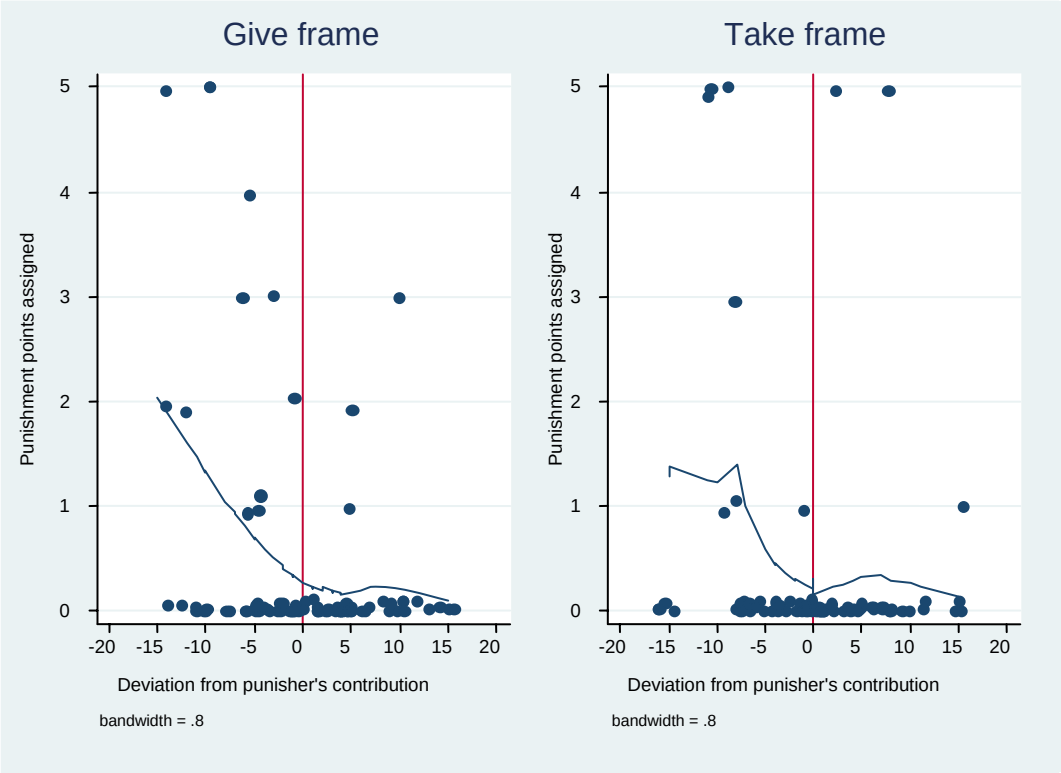
[8] We refer to the punisher as player i, the recipient of punishment as player j, and the third group member as player k.

solid line, which indicates the fitted line of the locally weighted regression of punishment assigned on the deviation from punisher's contribution.

RESULT 2: The punishment function does not depend on framing, ceteris paribus.

Support. In Figure 2, each dot represents a single observation. The punishment functions appear quite similar across frames, having the anticipated negative slope. However, these two graphs are simply the visual representations of the punishment function and do not control for any factors, other than *j*'s deviation from *i*'s contribution.

Figure 2. Punishment as a function of deviation from punisher's contribution



To test econometrically whether the slope of the punishment function differs across frames, we have estimated a Tobit regression model. In this regression, the dependent variable is the 'punishment assigned by player *i* to player *j*' and the independent variables comprise 'Player *k*'s contribution deviation', 'Player *j*'s absolute negative (contribution) deviation', 'Player *j*'s positive (contribution) deviation', and the dummy variable 'Take'. We have also included two interaction terms, which indicate whether the slope of the punishment function differs with

respect to negative and positive deviations across frames. Note that all deviations are calculated with respect to punisher's contribution. We include 'absolute negative deviation' and 'positive deviation' as separate regressors, since Figure 2 suggests that these two different sorts of deviation elicit different punishment responses. The variable 'absolute negative deviation' is the absolute value of the actual deviation of subject j's contribution from the punisher's contribution when subject j's contribution is below the punisher's contribution. This variable is zero otherwise. The variable 'positive deviation' is constructed similarly. The variable 'Player k's contribution deviation' is the actual deviation of player k's contribution from the punisher's contribution. The reason for including such a variable is that player i's attitude to player j may differ according to the behaviour of player k. The dummy variable 'Take' equals 0 for the Give frame, and 1 for the Take frame. The regression results are given in Table 3.

Table 3. The punishment function – Regression results

	Dependent variable: Punishment assigned by player i to player j
Player k's contribution deviation from punisher's contribution	0.083
	(0.096)
Player j's absolute negative deviation from punisher's contribution	0.789**
	(0.331)
Player j's positive deviation from punisher's contribution	-0.101
	(0.336)
Take	-1.699
	(2.739)
Take × absolute negative deviation from punisher's contribution	-0.007
	(0.497)
Take × positive deviation from punisher's contribution	0.377
	(0.396)
Constant	-9.024***
	(3.424)
Observations	162

*Notes: Tobit estimates. Standard errors are presented in parentheses (clustered on groups). Results are corrected for heteroskedasticity. ** denotes significance at the 5-percent level, and *** at the 1-percent level.*

The results from Table 3 indicate that the vertical intercept of the punishment function does not differ across treatments, since the coefficient of the dummy variable 'Take' is not statistically significant. The coefficients of the interaction terms are also insignificant, implying that the slope of the punishment function with regard both to negative and positive deviations is the same, irrespective of framing. These findings

fail to reject the null hypothesis that subjects consider (negative and positive) deviations from own contribution as being equally culpable. According to our findings, the only variable that has a significant effect on the assignment of punishment is the absolute negative deviation from the punisher's contributions: a subject punishes a co-player more, the more the co-player deviates negatively from the punisher's contribution.

RESULT 3: Punishment as a function of deviation from punisher's beliefs about contributions does not depend on framing, ceteris paribus.

Support. Figure 3 provides a graphical illustration of the punishment assigned as a function of deviations from the punisher's beliefs about contributions. It turns out that the punishment function with respect to these deviations is very similar in both framing contexts.

Figure 3. Punishment as a function of deviation from punisher's beliefs about contributions

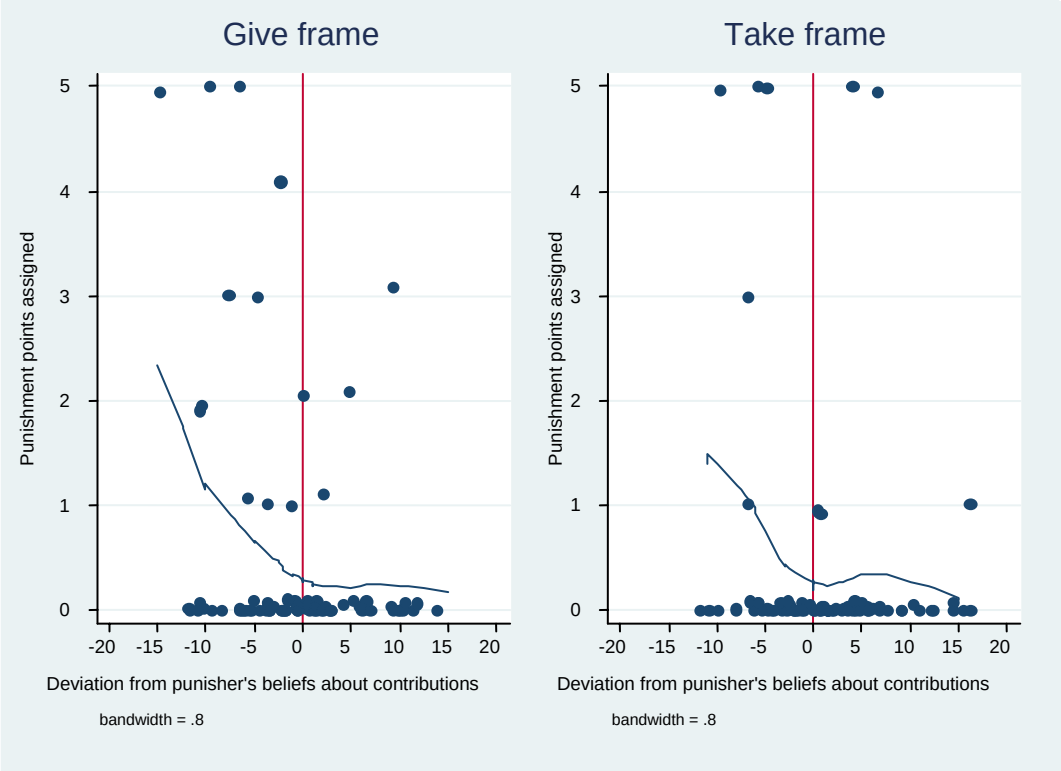


Table 4 provides econometric support for our second result. We have estimated a Tobit model, including the same independent variables as in Table 3, with the only difference that we now express deviations with respect to the punisher's beliefs about contributions. We find evidence that punishment again does not differ as a function of these deviations under both framing contexts, since the coefficients of the dummy variable 'Take' and the interaction terms are statistically insignificant. The significance of the absolute negative deviation indicates that subjects' decisions are shaped by their beliefs (see Dufwenberg *et al.*, 2006).

Table 4. Punishment as a function of punisher's beliefs about contributions – Regression results

	Dependent variable: Punishment assigned by player *i* to player *j*
Player *k* 's contribution deviation from punisher's beliefs	0.116
	(0.101)
Player *j* 's absolute negative deviation from punisher's beliefs	0.762**
	(0.370)
Player *j* 's positive deviation from punisher's beliefs	-0.092
	(0.261)
Take	-1.445
	(2.945)
Take × absolute negative deviation from punisher's beliefs	0.188
	(0.658)
Take × positive deviation from punisher's beliefs	0.250
	(0.356)
Constant	-8.866**
	(3.483)
Observations	162

*Notes: Tobit estimates. Standard errors are presented in parentheses (clustered on groups). Results are corrected for heteroskedasticity. ** at the 5-percent level, and *** at the 1-percent level.*

Thus far, we have found that subjects do not treat deviations from own behaviour differently, examining their punishment attitudes. In particular, they punish negative deviations by assigning similar amount of punishment points across frames. However, this observation could be attributed either to subjects judging deviations differently, but not being prepared to act differently on the basis of their perception; or to subjects not perceiving them as different. To clarify which of the two effects occur, we elicit subjects' emotions, examining whether they differ with respect to deviations from actual behaviour and beliefs about actual behaviour across frames.

B.2. The emotions' function

Emotions' elicitation will shed further light to examine whether subjects treat deviations differently. For this purpose, we use as tools the mean positive and mean negative emotions' functions, which are aggregate measures of positive and negative emotions, respectively, expressed as function of other variables. Put simply, we plot mean positive and mean negative emotions as a function of deviations from player *i* 's contribution. Note that any conclusion that holds for this aggregate measure holds also for each single emotion separately. Emotions are recorded on a 7-point numerical scale (1 = 'not at all', …, 7 = 'very much'). Recall that positive emotions comprise warmth, happiness and joy; whereas, negative emotions comprise anger, fear, envy, sadness, shame, irritation, contempt, guilt and jealousy. To control whether the presence of punishment opportunities has influenced emotions, we examine emotions for the non-punishment treatments. Our findings are recorded in Result 4.

RESULT 4. The (mean positive and mean negative) emotions' function does not depend on framing, ceteris paribus. The elicited emotions are not affected by the presence of punishment, ceteris paribus.

Support. Figures 4 and 5 provide a graphical illustration of the positive and negative emotions' function for each of the four treatments, respectively.

Figure 4. Mean positive emotions for each treatment

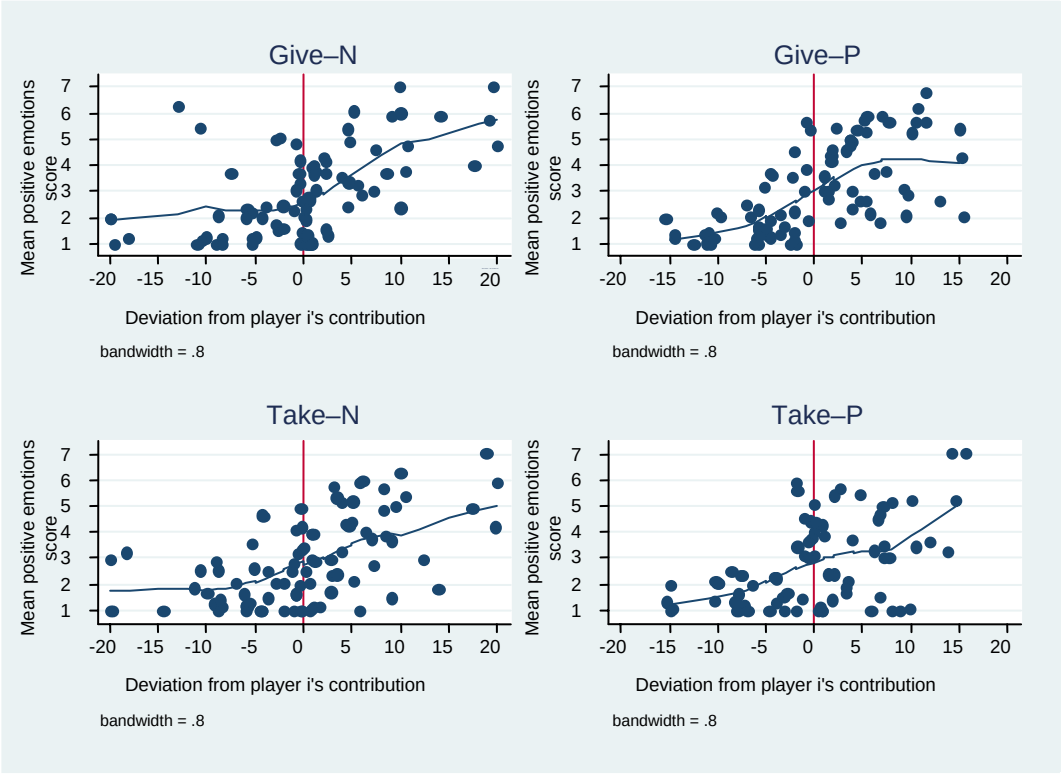
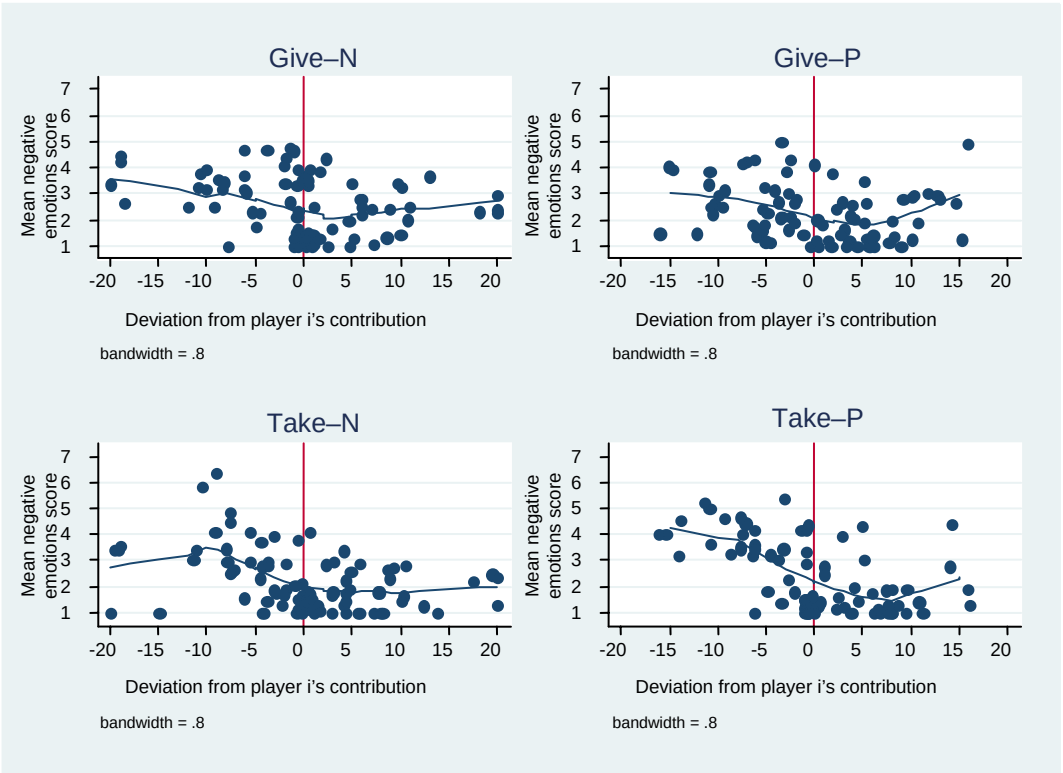


Figure 5. Mean negative emotions for each treatment



To test whether the emotions' function differs across Give and Take treatments, we estimated an ordered probit model for the average positive and negative emotions. In this model, all data are pooled. We also include a dummy variable called 'No-Punishment', which takes on the value '1' for the non-punishment treatments and '0' for the punishment treatments, to test for any difference between punishment and no-punishment treatments. The inclusion of other independent variables follows similar reasoning as for the case of the punishment function. Table 5 provides econometric evidence for Result 4.

Table 5. The positive and negative emotions' function – Regression results

	Dependent variable: Mean positive emotions	**Dependent variable: Mean negative emotions**
Player *k*'s contribution deviation from player *i*'s contribution	-0.003	0.011
	(0.008)	(0.009)
Player *j*'s absolute negative deviation from player *i*'s contribution	-0.080**	0.095***
	(0.032)	(0.021)
Player *j*'s positive deviation from player *i*'s contribution	0.118***	0.018
	(0.024)	(0.018)
Take	0.012	-0.167
	(0.200)	(0.214)
Take × absolute negative deviation from player *i*'s contribution	0.0002	0.035
	(0.041)	(0.042)
Take × positive deviation from player *i*'s contribution	-0.026	-0.019
	(0.028)	(0.025)
No-Punishment	0.015	-0.0009
	(0.141)	(0.137)
Observations	336	336

*Notes: Ordered probit estimates. Standard errors are presented in parentheses (clustered on groups). Results are corrected for heteroskedasticity. ** denotes significance at the 5-percent level, and *** at the 1-percent level. All data are pooled.*

It is clear from Table 5 that the coefficients, which determine the slope and the intercept of the emotions' function, are not statistically significant, implying that the emotions' function is not frame-sensitive. This additionally strengthens our conclusion that subjects do not consider negative deviations from own contribution differently across frames.

To find out whether elicited emotions differ by the presence or not of a punishment option, we additionally estimated four ordered probit models. In particular, two of them are related with the non-punishment case (for the mean positive and mean negative emotions); and the other two with the punishment case (for the mean positive and mean negative emotions). The inclusion of the independent variables in these models follows similar reasoning as previously mentioned and their interpretation is given earlier in the text.

Our regression results indicate that the coefficients for the dummy variable 'Take' and its interaction terms are not statistically significant, and therefore, elicited emotions do not differ between Give and Take frames, for either no-punishment or the punishment treatments, separately. This corroborates the robustness of our previous results, since there is no evidence to support that the difference in emotions is because the act of punishment expunges emotional of a response.

Examining deviations from beliefs about actual behaviour with respect to emotions, we also find no frame-sensitivity of the emotions' function.

RESULT 5. Mean positive and mean negative emotions as a function of deviations from player i's beliefs about contributions do not depend on framing, ceteris paribus.

Support. A graphical representation of the emotions' function in relation to deviations from player i's beliefs about contributions is provided in Figures 6 and 7 below. Econometric evidence to test for any emotions' differences across frames for this result is given in Table 6.

Figure 6. Mean positive emotions as a function of deviations from beliefs for each treatment

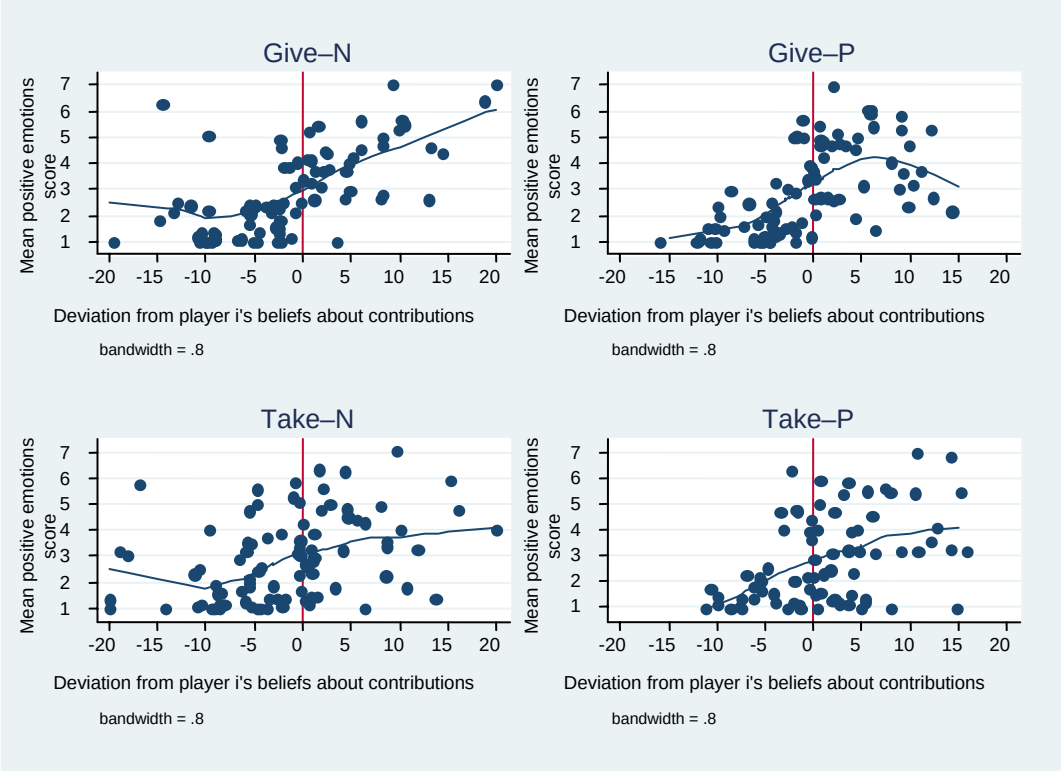


Figure 7. Mean negative emotions as a function of deviations from beliefs for each treatment

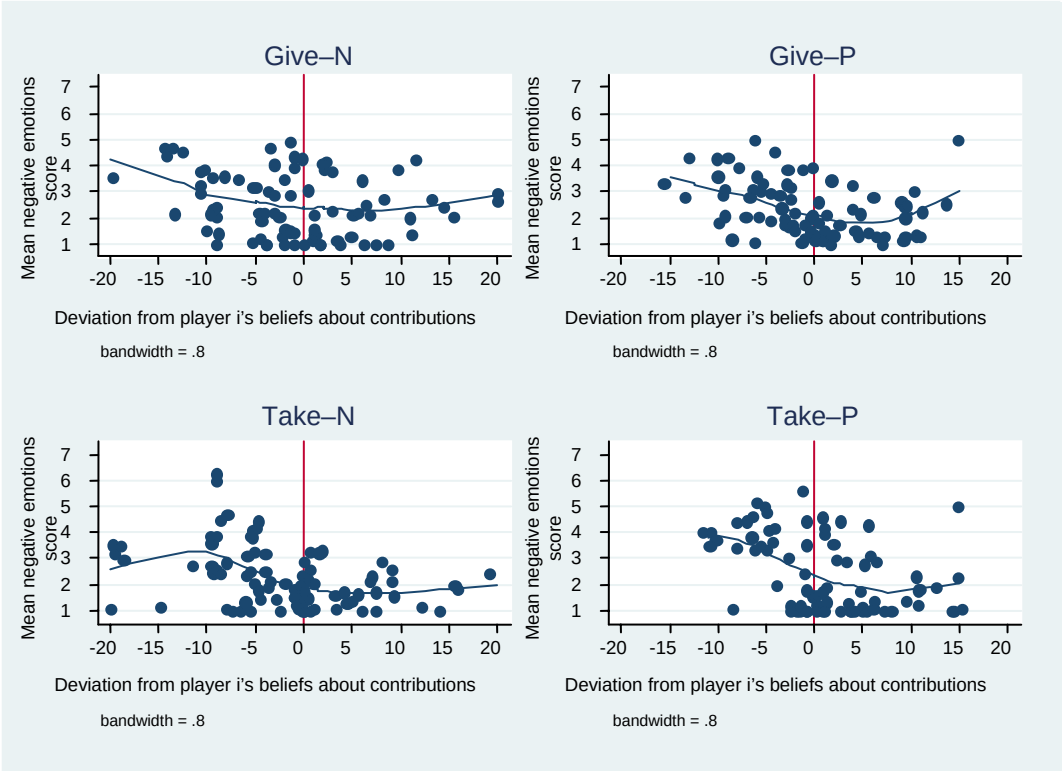


Table 6. Mean positive and negative emotions as a function of deviations from player i's beliefs about contributions – Regression results

	Dependent variable: Mean positive emotions	Dependent variable: Mean negative emotions
Player *k*'s contribution deviation from player i's beliefs about contributions	-0.009	0.005
	(0.007)	(0.010)
Player *j*'s absolute negative deviation from player *i*'s beliefs about contributions	-0.142***	0.094***
	(0.041)	(0.025)
Player *j*'s positive deviation from player *i*'s beliefs about contributions	0.087***	0.023
	(0.026)	(0.021)
Take	-0.169	0.039
	(0.228)	(0.216)
Take × absolute negative deviation from player *i*'s beliefs about contributions	0.052	-0.003
	(0.059)	(0.043)
Take × positive deviation from player *i*'s beliefs about contributions	-0.030	-0.043
	(0.033)	(0.027)
No-Punishment	0.150	-0.129
	(0.133)	(0.128)
Observations	336	336

*Notes: Ordered probit estimates. Standard errors are presented in parentheses (clustered on groups). Results are corrected for heteroskedasticity. ** denotes significance at the 5-percent level, and *** at the 1-percent level. All data are pooled.*

Here, we again find no framing differences for either positive neither negative emotions, whereas, the only significant variable is the absolute negative deviation from player *i*'s beliefs about contributions. These results are strikingly similar to those in Tables 5, indicating that subjects feel, on average, similar emotions across frames both with respect to deviations from player *i*'s contributions and player *i*'s beliefs about contributions.

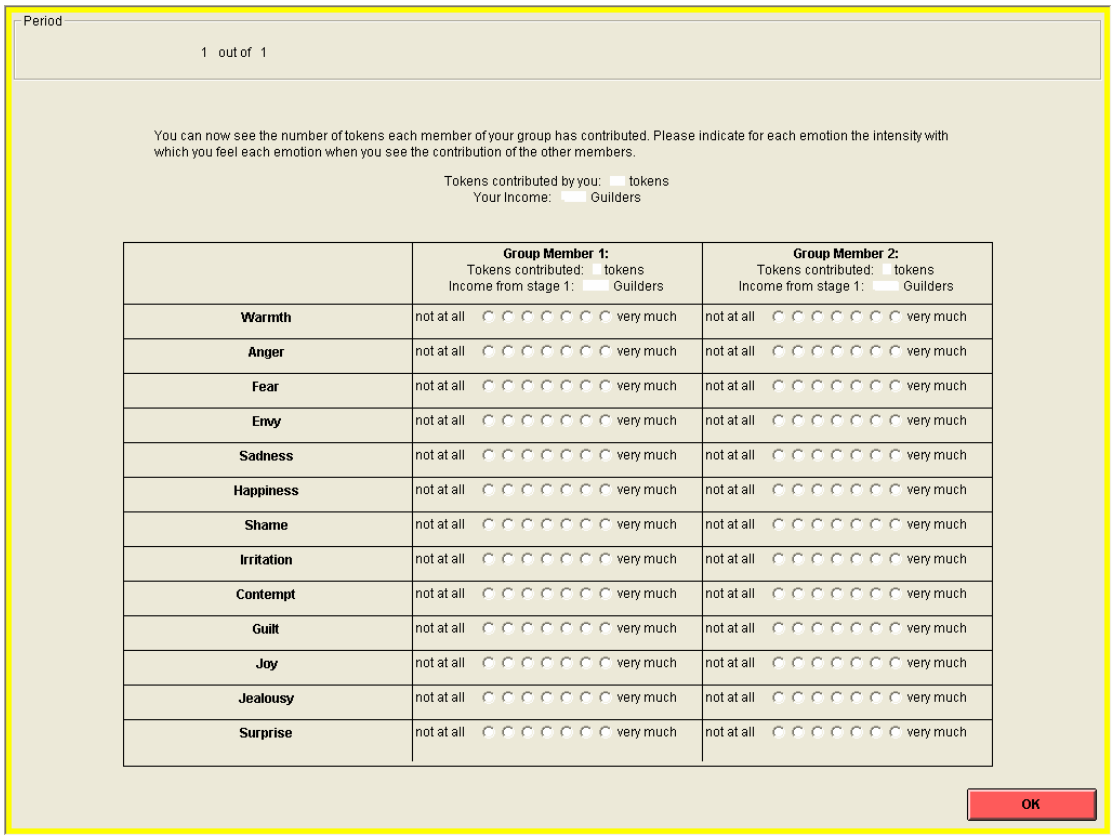
VI. General Conclusions

This paper reports an experiment investigating how economic agents perceive non-contribution to a public good under different framings of the contribution stage. To examine this question subjects' normative evaluations on hypothetical scenarios and actual behavioural decisions were elicited. We find that impartial moral judgments are frame-sensitive, with subjects considering less bad withdrawing tokens than failing to contribute them to the public pot, even though the payoff consequences

were the same. In contrast, in the voluntary contributions game with punishment, subjects appear to treat non-contribution conditional on other subjects' decisions as being equally culpable under positive and negative frames, when they take part in a lab experiment where their decisions have a direct monetary impact on their and their counterparts' income.

Appendix I – Screenshot for emotions

[Note: The screenshot for eliciting self-reports on emotions is presented below. The order of emotions was exactly the same in all four treatments.]



Period

1 out of 1

You can now see the number of tokens each member of your group has contributed. Please indicate for each emotion the intensity with which you feel each emotion when you see the contribution of the other members.

Tokens contributed by you: tokens
Your Income: Guilders

	Group Member 1: Tokens contributed: tokens Income from stage 1: Guilders	**Group Member 2:** Tokens contributed: tokens Income from stage 1: Guilders
Warmth	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Anger	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Fear	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Envy	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Sadness	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Happiness	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Shame	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Irritation	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Contempt	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Guilt	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Joy	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Jealousy	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much
Surprise	not at all ○ ○ ○ ○ ○ ○ ○ very much	not at all ○ ○ ○ ○ ○ ○ ○ very much

OK

Appendix II – Instructions for the normative experiment

[Note: Questionnaire for the Give treatment]

Imagine a group that consists of two group members, Person A and Person B. Each group member receives an endowment of 20 tokens and has to decide how many tokens to keep for himself and how many to contribute to a group project. Each token he keeps for himself has a value of one pound for him. Each token contributed to the group project has a value of 1.50 pounds to the project. The total value of the project is divided equally between the two group members. So, each token contributed to the project earns both group members 0.75 pounds each. The total income of a group member is the sum earned from tokens kept for himself and his share of the earnings of the group project. Each group member decides simultaneously, that is, without knowing what the other one has done.

A) Assume that Person A contributes 0 tokens to the group project and Person B contributes 0 tokens to the group project. Therefore, the value of the group project is 0 pounds and, thus, as a result of their contributions, Person A's total income is 20 pounds and Person B's total income is 20 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

B) Assume that Person A contributes 5 tokens to the group project and Person B contributes 0 tokens to the group project. Therefore, the value of the group project is 7.5 pounds and, thus, as a result of their contributions, Person A's total income is 18.75 pounds and Person B's total income is 23.75 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

C) Assume that Person A contributes 10 tokens to the group project and Person B contributes 0 tokens to the group project. Therefore, the value of the group project is 15 pounds and, thus, as a result of their contributions, Person A's total income is 17.5 pounds and Person B's total income is 27.5 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

D) Assume that Person A contributes 15 tokens to the group project and Person B contributes 0 tokens to the group project. Therefore, the value of the group project is 22.5 pounds and, thus, as a result of their contributions, Person A's total income is 16.25 pounds and Person B's total income is 31.25 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

E) Assume that Person A contributes 20 tokens to the group project and Person B contributes 0 tokens to the group project. Therefore, the value of the group project is 30 pounds and, thus, as a result of their contributions, Person A's total income is 15 pounds and Person B's total income is 35 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

Is there a difference among the five cases described above? Please explain why, or why not, in just a few sentences.

[Note: Questionnaire for the Take treatment]
Imagine a group that consists of two group members, Person A and Person B. There are 40 tokens in a group project. Each group member has to decide how many, up to a maximum of 20, of these tokens to withdraw for himself and how many to leave in the group project. Each token he withdraws for himself has a value of one pound for him. Each token left in the group project has a value of 1.50 pounds to the project. The total value of the project is divided equally between the two group members. So, each token left in the project earns both group members 0.75 pounds each. The total income of a group member is the sum earned from tokens withdrawn by himself and his share of the earnings of the group project. Each group member decides simultaneously, that is, without knowing what the other one has done.

A) Assume that Person A withdraws 20 tokens from the group project and Person B withdraws 20 tokens from the group project. Therefore, the value of the group project is 0 pounds and, thus, as a result of their withdrawals, Person A's total income is 20 pounds and Person B's total income is 20 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

B) Assume that Person A withdraws 15 tokens from the group project and Person B withdraws 20 tokens from the group project. Therefore, the value of the group project is 7.5 pounds and, thus as a result of their withdrawals, Person A's total income is 18.75 pounds and Person B's total income is 23.75 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

C) Assume that Person A withdraws 10 tokens from the group project and Person B withdraws 20 tokens from the group project. Therefore, the value of the group project is 15 pounds and, thus as a result of their withdrawals, Person A's total income is 17.5 pounds and Person B's total income is 27.5 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

D) Assume that Person A withdraws 5 tokens from the group project and Person B withdraws 20 tokens from the group project. Therefore, the value of the group project is 22.5 pounds and, thus as a result of their withdrawals, Person A's total income is 16.25 pounds and Person B's total income is 31.25 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

E) Assume that Person A withdraws 0 tokens from the group project and Person B withdraws 20 tokens from the group project. Therefore, the value of the project is 30 pounds and, thus as a result of their contributions, Person A's total income is 15 pounds and Person B's total income is 35 pounds. How do you rate **Person B's** morality? (Please select –50:'extremely bad' to 50:'extremely good' by moving the slider; Clicking on a slider activates it):

Is there a difference among the five cases described above? Please explain why, or why not, in just a few sentences.

Appendix III – Instructions for the behavioural experiment

[Note: These are the instructions used both for no-punishment (Stage 1) and punishment treatments (Stage 2). The changes made for the Take treatments are given in square brackets. The punishment stage remains the same for both framing conditions. Regarding the computer screens presented in the subjects, the word 'contribute' was replaced by the word 'withdraw' for the Take frame.]

Instructions

You are now taking part in an economic experiment financed by the University of Nottingham. You can earn a considerable amount of money depending on the decisions made by you and other participants. It is therefore very important that you read these instructions with care.

These instructions are solely for your private use. **It is prohibited to communicate with other participants during the experiment.** If you have any questions, please ask me. If you violate this rule, you will be dismissed from the experiment and forfeit all payments.

During the experiment we will not speak in terms of Pounds, but in Guilders. During the experiment your entire earnings will be calculated in Guilders. At the end of the experiment the total amount of Guilders you have earned will be converted to Pounds at the following rate:

1 Guilder = 0.40 Pounds

At the end of the experiment your entire earnings from the experiment will be paid to you **in cash**.

During the experiment, you will be asked to fill in a few questionnaires. The answers you provide in these questionnaires are completely anonymous. They will not be revealed to anyone either during the experiment or after it. Furthermore, your answers to these questionnaires will not affect your earnings during the experiment.

At the beginning of the experiment, all participants will be randomly divided into groups of three. Apart from you, there will be two more members in your group. **You will not learn who the other people in your group are at any point.**

The experiment consists of (two) one stage(s). In the following pages we describe the experiment in detail. At the end of this introductory information we ask you to do several computerised control exercises, which are designed to check that you have understood the decision situation.

Detailed Information on the Experiment

Stage 1

Each participant receives an endowment of **20 tokens** [There are **60 tokens** in a project for your group]. At stage 1, you have to decide how many of these 20 tokens you contribute to a group project and how many you keep for yourself. [At stage 1, you have to decide how many of these 60 tokens you withdraw from the project for yourself and how many of them you leave in the project]. The two other members of your group have to make the same decision. They can also either contribute tokens to a project or keep tokens for themselves. [They can also either withdraw tokens from the project for themselves or leave tokens in the project]. You and the other members of the group can each choose any amount between 0 and 20 tokens to contribute [withdraw].

Every token that you do not contribute to [withdraw from] the project automatically belongs to you and earns you one Guilder.

For the tokens contributed to [that are not withdrawn from] the project the following happens: **the project's value will be multiplied by 1.5 and this amount will be divided equally among all three members of the group.** For example, if 1 token is contributed to [is not withdrawn from] the project, the project's value increases to 1.5 Guilders. This amount is divided equally among all three members of the group. Thus every group member receives 0.5 Guilders.

Your income from the project rises by 0.5 Guilders if you contribute [withdraw] one token more to [less from] the project. At the same time, the income of the other two members of the group also rises by 0.5 tokens, because they receive the same income from the project as you do. Therefore, if you contribute [withdraw] one token more to [less from] the project, the income from the project received by the whole group together increases by 1.5 Guilders. It is also true that your income rises by 0.5 Guilders if another group member contributes [withdraws] one token more to [less from] the project.

After all three members of the group have made their decisions about the amounts of tokens they contribute to [withdraw from] the project the total income achieved by each participant is determined.

How is your income calculated from your decision?

The income of every member of the group is calculated in the same way. As you can see, your **income** consists of two parts:

(1) The tokens which you have kept [withdrawn] for yourself ('income from tokens kept') ['income from tokens withdrawn'] whereby **1 token = 1 Guilder**.
(2) The 'income from the project' calculated as follows: **Your income from the project = 0.5 *times* sum of all tokens contributed to the project by members of your group [0.5 *times* (60 – sum of all tokens withdrawn from the project by members of your group)].**

Your **total income in Guilders at stage 1 of the experiment** is therefore:

(20 – tokens contributed to the project by you) + 0.5*(sum of all tokens contributed to the project by members of your group)
[(Tokens withdrawn from the project by you) + 0.5*(60 – sum of all tokens withdrawn from the project by members of your group)]

If you do not contribute anything to [withdraw all 20 tokens from] the project the income from tokens kept [withdrawn] is 20. If you contribute [leave] for instance 7 tokens to the project your income from tokens kept [withdrawn] is 13. At the same time, the total sum of tokens contributed to [left in] the project increases and so does your 'income from the project'.

In order to explain the income calculation we give some examples. Please read them carefully:

Example 1:
If each of the three members of the group contributes 0 tokens to [withdraws 20 tokens from] the project, all three will receive an 'income from tokens kept [withdrawn]' of 20. Nobody receives anything from the project, because no one contributed [left] anything. Therefore the total income of every member of the group is 20 tokens.
*Calculation of the income from stage 1 for every participant: (20-0) + 0.5 * (0) = 20*
[*Calculation of the income from stage 1 for every participant: (20) + 0.5 * (60-60) = 20*]

Example 2:
If each of the three members of the group contributes 20 [withdraws 0] tokens, there will be a total of 60 tokens contributed to [left in] the project. The 'income from tokens kept [withdrawn]' is 0 for everyone, but each member receives an income from the project of 0.5 * 60 = 30 tokens.
*Calculation of the income from stage 1 for every participant: (20-20) + 0.5 * (60) = 30*
[*Calculation of the income from stage 1 for every participant: (0) + 0.5 * (60-0) = 30*]

Example 3:
If you contribute 20 [withdraw 0] tokens, the second member 10 tokens and the third 0 [20] tokens, the following incomes are calculated.

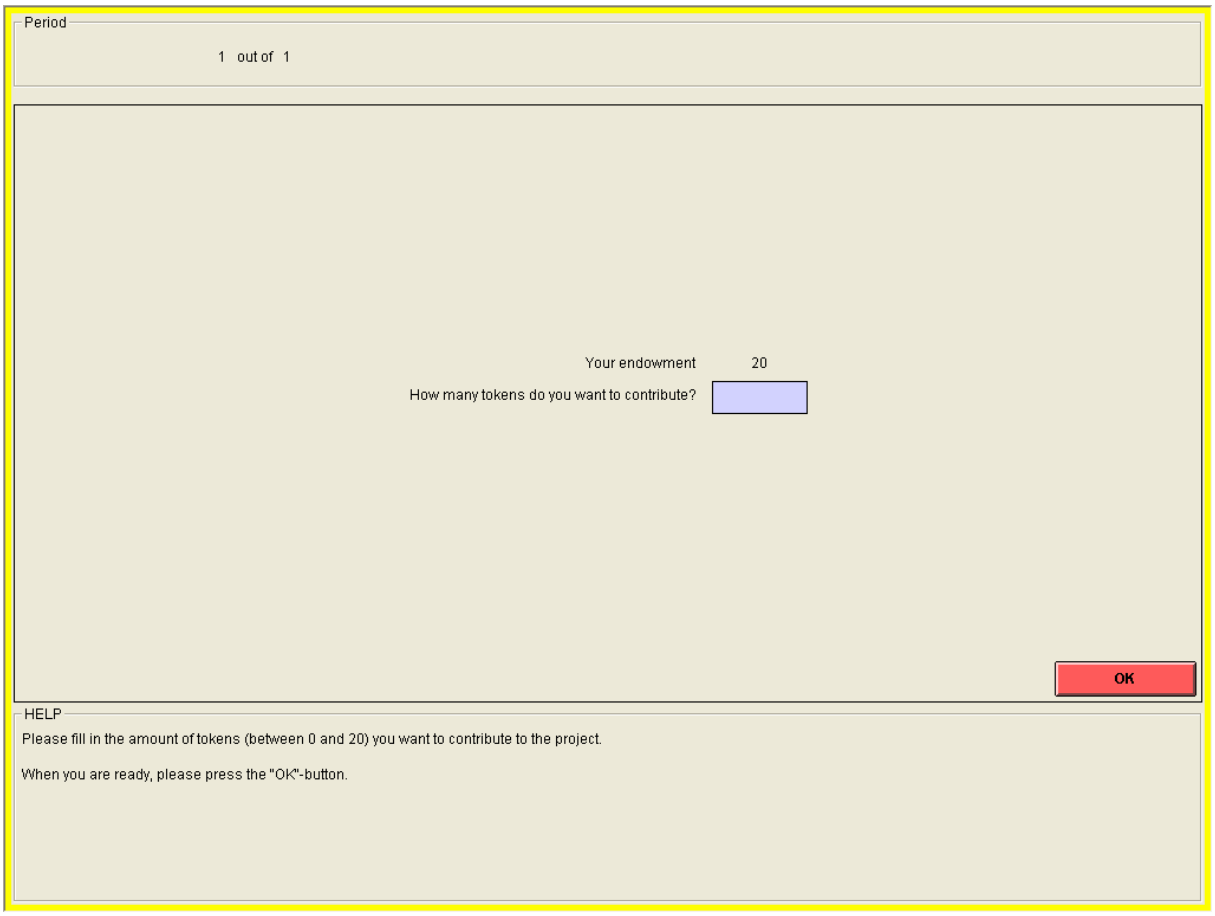
- Because you and the second member of the group have together contributed [withdrawn] 30 tokens, everyone will receive 0.5 * 30 = 15 Guilders from the project.
- You contributed all your 20 tokens to [withdrew 0 tokens from] the project. You will therefore receive 15 Guilders in total from the project.
- The second member of the group also receives 15 Guilders from the project. In addition, he receives 10 Guilders as the 'income from tokens kept [withdrawn]', because he contributed [withdrew] 10 tokens to [from] the project. Thus, he receives 15 + 10 = 25 Guilders altogether.

- The third member of the group, who did not contribute anything [withdrew all tokens], also receives the 15 Guilders from the project and additionally the 20 Guilders from the 'income from tokens kept [withdrawn]', which means 20 + 15 = 35.

*Calculation of your income from stage 1: (20-20) + 0.5 * (30) = 15*
*Calculation of the income from stage 1 for the 2nd group member: (20-10) + 0.5 * (30) = 25*
*Calculation of the income from stage 1 for the 3rd group member: (20-0) + 0.5 * (30) = 35*
[*Calculation of your income from stage 1: (0) + 0.5 * (60-30) = 15*
*Calculation of the income from stage 1 for the 2nd group member: (10) + 0.5 * (60-30) = 25*
*Calculation of the income from stage 1 for the 3rd group member: (20) + 0.5 * (60-30) = 35*]

Example 4:
The two other members of your group contribute 20 [withdraw 0] tokens each to [from] the project. You do not contribute anything [withdraw all tokens]. In this case the income will be calculated as follows:
*Calculation of your income from stage 1: (20-0) + 0.5 * (40) = 40*
*Calculation of the income from stage 1 for the 2nd group member: (20-20) + 0.5 * (40) = 20*
*Calculation of the income from stage 1 for the 3rd group member: (20-20) + 0.5 * (40) = 20*
[*Calculation of your income from stage 1: (20) + 0.5 * (60-20) = 40*
*Calculation of the income from stage 1 for the 2nd group member: (0) + 0.5 * (60-20) = 20*
*Calculation of the income from stage 1 for the 3rd group member: (0) + 0.5 * (60-20) = 20*]

When making your decision, the following input-screen will appear:



As mentioned above, your **endowment in the experiment is 20 tokens** [there are **60 tokens** in a project for your group]. You have to decide how many tokens you contribute to the project by typing a number between 0 and 20 in the input field [You have to decide how many of these 60 tokens you withdraw from the project by typing a number between 0 and 20 in the input field]. This field can be reached by clicking it with the mouse. By deciding how many tokens to contribute to [withdraw from] the project, you automatically decide how many tokens you keep for yourself [you leave in the project]. After entering the amount of tokens you contribute [withdraw] you must press the O.K. button using the mouse. Once you have done this, your decision can no longer be revised.

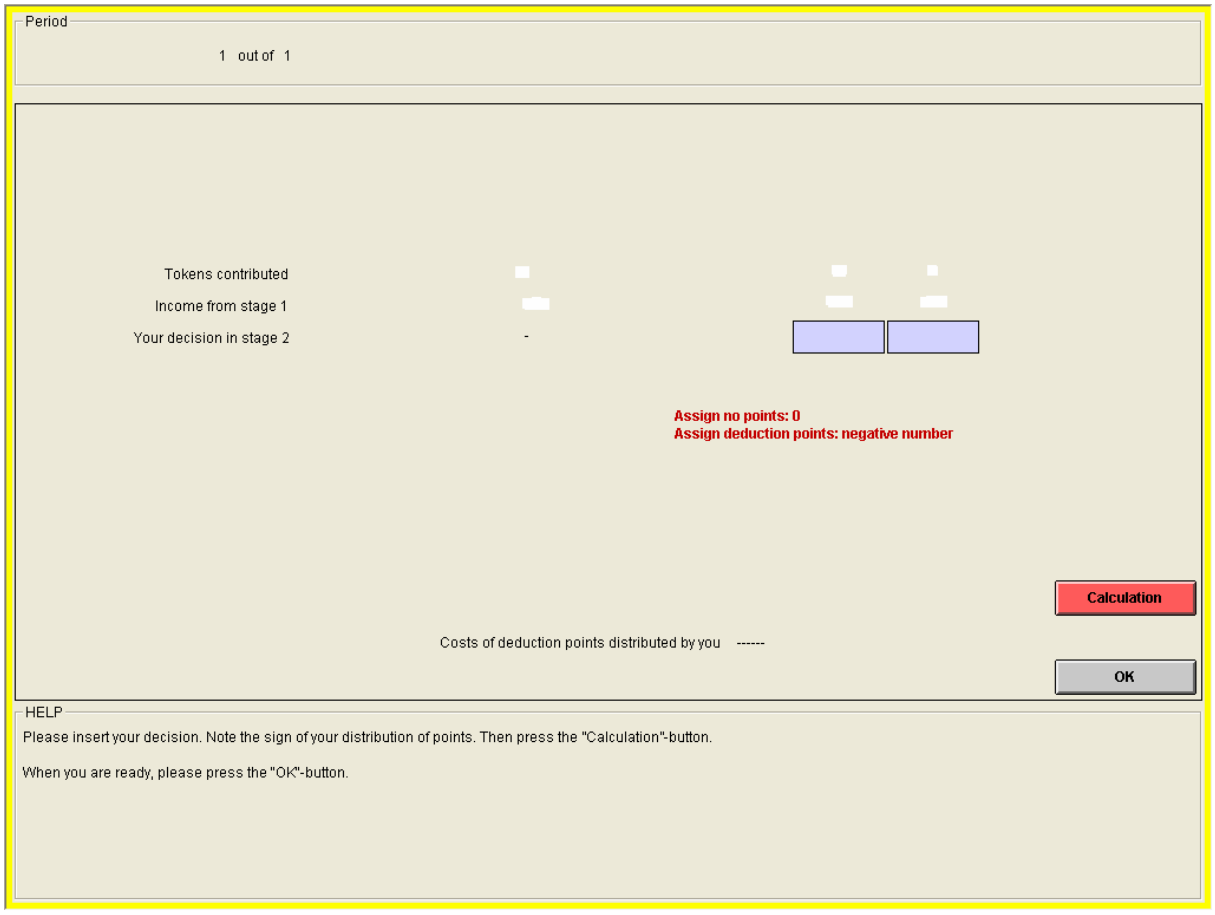
After that, you will be informed about the amount of tokens contributed to [withdrawn from] the project by you, the sum of tokens contributed to [withdrawn from] the project and your total income in this stage.

Stage 1 is now over and stage 2 commences.

Stage 2

At this stage, you will see how many tokens each of the other two group members has contributed to [withdrawn from] the project and his or her corresponding income from stage 1. Moreover, you can either **decrease** or **leave unchanged** the income of each other group member by assigning **deduction points** to them. The other group members can also decrease **your** income, by assigning deduction points to you, if they wish to do so.

You will see the following input screen at stage 2:



You must now decide how many deduction points to assign to each of the other two group members. In the first column you can see your contribution [withdrawal] and your income from stage 1. In the other two columns, you can see the same information for each of the two other members of the group.

If you do not wish to change the income of a specific group member then enter 0 in the large box for that group member. If you do wish to reduce a group member's income, enter instead the number of deduction points that you wish to assign to them, preceded by minus sign (without spaces between them). For example, to assign 2 deduction points to a group member, type -2 in the relevant box. You can move from one input field to the other by pressing the tab -key ($\rightarrow|$) or by using the mouse. You must enter a response in each large box.

You can assign **between 0 and 5 deduction points to each other group member**.

For each deduction point that you assign, there is a cost to you of one Guilder. Thus, the total cost to you in Guilders of assigning deduction points to other group members is given by the total number of deduction points that you assign. You can check the total cost on the computer, by pressing the '**Calculation**' button after you have assigned deduction points. Until you press the **OK-button**, you can still change your decision. To recalculate the costs after making a change, simply press the cost calculation button again.

The effects of assigning deduction points to other group members are as follows: If you give 0 points to a particular group member, you will not have any effect on his or her income. However, **for each deduction point that you assign to a particular group member, you will decrease their income by 2 Guilders** (unless their income is already exhausted). For example, if you give a group member 2 deduction points (i.e., enter –2), you will decrease their income by 4 Guilders. And so on.

Your own income will be reduced by 2 Guilders for each deduction point that is assigned to you by the other two group members, except that, if all of your income from the first stage is exhausted as a result of deduction points, your income cannot be reduced any further by other group members. Therefore, your total income from the two stages is calculated as follows:

Total income (in Guilders) after stage 2

= income from stage 1 (1)
– 2*(sum of deduction points assigned to you) (2)
– costs of deduction points assigned by you

if (1) + (2) is greater than or equal to 0;

= **0** – costs of deduction points assigned by you

if (1) + (2) is less than 0

Please note that your income in Guilders after stage 2 can be negative, if the cost of deduction points assigned by you exceeds your income from stage 1 less any reduction in your income caused by deduction points assigned to you by other group members.

However, at the end of the experiment and in addition to the calculation just given, you and the other members of your group will each receive a lump sum payment of **10 Guilders.** This payment is enough to cover any losses that you could incur**.**

Do you have any questions?

References

Andreoni, J., (1995), 'Warm-Glow versus Cold-Prickle: The Effects of Positive and Negative Framing on Cooperation in Experiments', *Quarterly Journal of Economics*, vol. 110, pp. 1-21

Bolton, G., and Ockenfels, A, (2000), 'ERC: A theory of Equity, Reciprocity, and Competition', *American Economic Review*, vol. 90, pp. 166-193

Bosman, R., and van Winden, F., (2002), 'Emotional Hazard in a Power-to-Take Experiment', *Economic Journal*, vol. 112, pp. 147-169

Cookson, R., (2000), 'Framing effects in Public Goods Experiments', *Experimental Economics*, vol. 3, pp. 55-79

Dufwenberg, M., Gächter, S., and Hennig-Schmidt, H., (2006), 'The Framing of Games and the Psychology of Strategic Choice', *CeDEx Discussion Paper No. 2006-20*

Fehr, E., and Gächter, S., (2000), 'Cooperation and Punishment in Public Goods Experiments', *American Economic Review*, vol. 90, pp. 980-994

Fehr, E., and Gächter, S., (2002), 'Altruistic Punishment in Humans', *Nature*, vol. 415, pp. 137-140

Fehr, E., and Schmidt, K., (1999), 'A Theory of Fairness, Competition and Cooperation, *Quarterly Journal of Economics*, vol. 114, pp. 817-868

Fischbacher, U., (1999), 'Zurich toolbox for readymade economic experiments, experimenter's manual', *Working Paper No. 21*, Institute for Empirical Research in Economics, University of Zurich

Fischbacher, U, Gächter, S., and Fehr, E., (2001), "Are people conditionally cooperative? Evidence from a public goods experiment", *Economics Letters*, vol. 71, pp. 397-404

Gächter, S., (2006), 'Conditional cooperation: Behavioural regularities from the lab and the field and their policy implications', *CeDEx Working Paper 2006-03*

Gächter, S., and Renner, E., (2006), 'The Effects of (Incentivised) Belief Elicitation in Public Good Experiments', *CeDEx Discussion Paper No. 2006-16*

Geanakoplos, J., Pearce, D., and Stacchetti, E., (1989), 'Psychological Games and Sequential Rationality', *Games and Economic Behavior*, vol. 1, pp. 60-79

Greiner, B., (2004), 'An Online Recruitment System for Economic Experiments', In: Kurt Kremer and Volker Macho (Eds.): Forschung und wissenschaftliches Rechnen

2003, GWDG Bericht 63. Göttingen: Gesellschaft für Wissenschaftliche Datenverarbeitung, pp. 79-93

Ledyard, J., (1995), 'Public Goods: A Survey of Experimental Research', in John H. Kagel and Alvin E. Roth, eds., *Handbook of experimental economics*. Princeton, NJ: Princeton University Press, pp. 111-194

Levin, I., Schneider, S., and Gaeth G., (1998), 'All Frames are Not Created Equal: A Typology and Critical Analysis of Framing Effects', *Organizational Behavior and Human Decision Processes*, vol. 76, pp. 149-188

Park, E. S., (2000), 'Warm-Glow versus Cold Prickle: a further experimental study of framing effects on free-riding', *Journal of Economic Behavior and Organization*, vol. 43, pp. 405-421

Sonnemans, J., Schram, A., and Offerman, T., (1998), 'Public Good Provision and Public Bad Prevention: The Effect of Framing', *Journal of Economic Behaviour and Organization*, vol. 34, pp. 143-161

Willinger, M., and Ziegelmeyer, A., (1999), 'Framing and cooperation in public good games: an experiment with an interior solution', *Economics Letters*, vol. 65 (3), pp. 323-328