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We conduct a prisoner's dilemma experiment with a punishment/reward stage, where punishments and rewards are risky. This is compared with a risk free treatment. We find that subjects do not change their behavior in the face of risky outcomes. Additionally, we measure risk attitude and the emotions of subjects. While we find a strong influence of emotions, individual risk aversion has no effect on the decision to punish or reward. This is good news for lab experiments who abstract from risky outcomes. From the perspective of social preferences, our results provide evidence for risk neutral inclusion of other player's payoffs in the decisionmaker's utility function.

Keywords: Prisoner's dilemma, risk, punishment, reward, emotions, experiment

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[§] We gratefully acknowledge productive comments and suggestions of Joerg Oechssler, Wendelin Schnedler, and the participants of the Universität Heidelberg departmental seminar. We thank Timo Goeschl for allowing us to run the experiment in his class and Adam Dominiak for research assistance. The research funds for this study were provided by SonderForschungBereich 504.

Imagine two researches working on a joint project. Both can work hard or free-ride on the work of the other researcher. For a certain set of outcomes, they are stuck in a prisoner's dilemma. The researchers are aware that their action will eventually be revealed to their co-author, so that the opportunity for punishment or reward arises. What could a reward look like? For example, one could reward the other by drafting an excellent letter of recommendation. Punishment could take the form of stopping all further cooperation. However, it is unclear what effect the reward and punishment will have on the co-author. If the punished researcher has plenty of other potential co-authors, losing one might not be so harsh, but if the number of potential co-authors is small, losing one will hurt a lot. Similarly, a letter of recommendation can be the decisive advantage in a close race for a job or to obtain tenure or be almost meaningless if other factors already decided the outcome. Since the person who punishes or rewards does not necessarily know the situation the other is in, the decision to punish or reward is made under risk. We conduct an experiment to test whether more risk in the punishment and reward outcomes influences the decision whether to punish/reward or not.

Social dilemma situations like the prisoner's dilemma have been extensively studied in the economics literature for a long time (see Roth (1988) for an overview). Fehr and Gächter (2000) show that the incentive to defect in a social dilemma can be counteracted by introducing a second stage which allows for a punishment. Despite the punishment being costly, many subjects use that opportunity to deter defection. Initially, the effect on cooperation is small, but the contributions to a public project increase over time in a repeated game. A considerable amount of literature follows this paper and extends the result to non-pecuniary sanctions (Masclet et al. (2003); Noussair and Tucker (2005), explore the effectiveness of punishment (Nikiforakis and Normann (2005)), and the price of punishment (Anderson and Putterman (2006), Carpenter (2005)). These experiments (and all other experiments that we are aware of) abstracts from reality by modeling the second stage without risk. Yet subjects are, in general, not risk-neutral (Cox et al. (1988), Holt and Laury (2002)). That is, the different risk structure present in the lab experiments could potentially lead to outcomes which are different from behavior in the real world.[1] Our treatments Risk and Baseline address this issue. We test the hypothesis that *more risk-averse subjects punish/reward less in the presence of more risky outcomes*. While the expected punishment and reward is the same in both cases, the result of punishment and reward is risky in the Risk treatment, whereas no risk is present in the Baseline. Baseline thus resembles previous experimental studies; Risk connects them to the outside-the-lab world. We find that the decisions to punish and reward are not statistically significantly different in the two treatments. We conclude that the added risk does not change subjects' behavior.

Subjects' risk attitude is elicited at an individual level, allowing us to test whether subjects who are more risk-averse use less punishment or reward in the Risk treatment compared to those subjects who are risk-loving. Again, we find no evidence for an influence of risk: the risk-averse subjects punish and reward just as much as the risk-loving ones do.

Our research contributes to the discussion on other-regarding behavior. In particular, the experiment sheds light on the way the payoff of other players enters one's own utility function. One of the earliest proposed theories of social preferences is Andreoni's (1990) warm glow. Our results on risk are in line with this theory where the utility from giving to others is derived from the act of giving itself. Risk that affects the payoff of the other player would be disregarded. For theories which incorporate the payoff of others directly (Levine (1998), Fehr and Schmidt (1999), Bolton and Ockenfels (2000)), our results say that risk for the other person is ignored by subjects, even if they are risk-averse. That is, the term

[1] Of course lab experiments are, by construction, simplifications of the real world. However it is important to keep in mind these differences and whenever possible test their influence, since despite being simplifications, lab experiments are often (directly or indirectly) used to draw inferences towards real world behavior.

describing the other's payoff enters risk-neutrally, even when the own payoff term is risk-averse.

Another potential answer to the apparent puzzle are emotions. Since punishment is costly, it is usually not rational to punish in one-shot experiments. A very plausible explanation why people still punish is that they are driven by emotions.[2] A number of recent experimental studies provide evidence that emotions influence the reciprocal decisions (e.g., Bosman and van Winden (2002), Ben-Shakhar et al. (2004), Bosman et al. (2005)). Coricelli (2005) reports on an experiment where emotions are related to the amount of punishment/reward done by subjects. Connecting to our research, Hsu et al. (2005) show that emotions are processed in the same area of the brain which is also activated when subjects are faced with uncertain or risky choices. This raises the question whether emotions and risk interact with each other and if so, how. LeDoux (1996) suggests that emotions act as a short cut to override the more lengthy rational decision process in situations where procrastination is harmful. We elicit the emotions of our subjects to test whether emotions are related to punishment and reward in the prisoner's dilemma and whether there is an influence from risk attitude to emotions. There are a number of theories where the anticipation of future feelings influences the behavior, such as anxiety (Caplin and Leahy (2001), Wu (1999)), disappointment (Bell (1985), Loomes and Sugden (1986)), and regret (Bell (1982), Loomes and Sugden (1982)). In our paper we do not measure the anticipated emotions, rather, we ask the subjects about the experienced emotions after the decision has been made.

The importance of emotions when making risky decisions has been explored by Bosman and van Winden (2005) and Hopfensitz and van Winden (2006). These papers focus on the influence of global risk on investment decisions and the timing of its resolution. Our study can be viewed as a bridge between this strand of literature and the literature on emotions-driven reciprocity.

Next we present the experimental setup and our results, followed by a short discussion. Instructions can be found in the appendix.

1. Experimental Setup

Our experiment was conducted as a classroom experiment at the University of Heidelberg in November 2006. It was run manually under single blind social distance protocol. All treatments took place during one session that lasted approximately an hour. It included the initial instructional period but not the payment of subjects. The subjects were paid their experimental earnings during the break after the lecture that followed the experiment. A total of 125 undergraduates, with economics as primary or secondary field, participated in our two treatments – Baseline and Risk. The students were in the first weeks of their studies, without previous exposure to experimental economics or game theory.

The experiment consists of four parts: In parts 1 and 2 the prisoner's dilemma with subsequent punishment/reward stage which includes the treatment difference is played; part 3 consists of an emotions elicitation questionnaire; part 4 elicits the risk attitude using Holt and Laury (2002) method. At the end subjects fill out a general questionnaire.

1.1 Prisoner's Dilemma with punishment and reward stage

Table 1: Prisoner's dilemma payoffs

	Left	Right
Top	8,8	0,10
Bottom	10,0	2,2

In parts 1 and 2 of the experiments, subjects are grouped in anonymous pairs and simultaneously play a one-shot prisoner's dilemma. The game payoffs are presented in Table 1. The row player chooses Top

[2] See Loewenstein (2005) for an overview of how emotions are related to decision making.

(cooperation) or Bottom (defection), while the column player chooses Left (cooperation) or Right (defection). Payoffs are denoted in euros. After being notified of the results of the prisoner's dilemma, subjects could engage in costly punishment or reward of their partner.

Subjects with a partner who cooperated (i.e., who chose Top, respectively Left) could only decide whether to reward, subjects with a partner who did not cooperate (i.e., who chose Bottom, respectively Right) could either reward or punish.[3] Subjects could punish/reward by spending between zero and five euros on assigning punishment or reward points. In our Baseline treatment, each assigned point decreases/increases the other player's payoff by one euro with certainty. In the Risk treatment, each assigned point decreases/increases the other player's payoff by two euros. However, the punishment/reward is only carried out with a probability of 0.5. Therefore, the *expected* punishment/reward are the same in both treatments. Note that the costs of assigning a point are incurred by the subject irrespective of the outcome of the probability draw.

In the classical solution for self-regarding preferences, no punishment/reward will ever be observed because it is costly, and players will always choose defect in both Baseline and Risk treatments.

1.2 Emotion elicitation

After completing the punishment/reward stage, subject's received the instructions for the further parts of the experiment. In the emotion elicitation questionnaire, subjects were asked to think back at the moment when they were notified of their partner's decision in the prisoner's dilemma and to report the level of 10 emotions (anger, appreciation, disappointment, envy, gratitude, happiness, hate, regret, shame, surprise) they felt on a scale from 0 to 5. One may wonder what is the link between what people really feel and what they report to be feeling and also whether such self reporting are appropriate to elicit emotions. Yet, self-reports according to Robinson and Clore (2002) are "the most common and potentially the best way to measure a person's emotional experience". Indeed, self-report measures have been used in numerous other studies dealing with emotions (Charness and Grosskopf (2001), van Winden (2001), Bosman and van Winden (2002), Bosman and Riedl (2004), Bosman et al. (2005), Hopfensitz and van Winden (2006) and others). Ben-Shakhar et al. (2004) found the self-reported measures of emotions to be highly correlated with physiological measures using skin conductance.

1.3 Risk attitude elicitation

In part 4 of the experiments we use the Holt and Laury (2002) method to measure our subjects' risk attitudes. That is, subjects are repeatedly offered the choice between two lotteries, one involving higher risk than the other. From the subjects' choices between ten lottery pairs it is possible to calculate their individual risk aversion parameter. For further details, see Holt and Laury (2002).

1.4 General Questionnaire

Finally, our subjects completed a short questionnaire asking for their year of birth, gender, field of studies, semester at university, and place of birth. Answering these questions was not required for payment.

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[3] We choose to disallow punishment of cooperators to prevent subjects from making losses in the overall experiment.

The sequence of events in a session was the following. (i) Upon entering the lecture hall subjects were randomly seated in one of the four designated rows. Once these rows were filled up the additional subjects were seated into next four rows. Subjects of the same type for a given treatment (e.g. column player in the Risk treatment) were sitting in the same row. (ii) The neutrally framed instructions (in German) and decision forms for part 1 and 2 were handed out. All sheets indicated subjects' ID number. (iii) The subjects made their decisions for part 1. (iv) The experimenters collected the decisions forms, transferred the decision information to their counterparts' decision forms and returned them to subjects. This prevented the exchange of superfluous information and aided in maintaining the anonymity of individual decisions. (v) After learning the decision of the paired player the subjects made their decisions regarding rewards and punishment on the decision form 2. (vi) The experimenters collected the decision sheets for parts 1 and 2.

(vii) The instructions, decision forms for parts 3 and 4, and general questionnaires were handed out, filled out by subjects, and collected by the experimenters, one at a time. Subjects were informed beforehand that there would be additional individual tasks after the prisoner's dilemma game with reward/punishment, but not about the nature of these tasks. (vii) At the end of the session the experimenters randomly selected 20 subjects (10 prisoner's dilemma pairs) for payment for parts 1 through 3 and additional 20 subjects for part 4 (selected without replacement). (viii) Lecture continued. (ix) After the lecture the randomly selected subjects were paid privately in cash. Each subject selected for payment for the first two parts received the following amount: an endowment of 5 Euro plus the earnings in the prisoner's dilemma plus/minus the reward/punishment minus the reward/punishment costs plus a fixed sum of 8 Euro for completing the emotions elicitation part.[4] Each subject selected for payment for part 4 was paid for one randomly chosen lottery from the risk attitude questionnaire. All risky decisions and lotteries were resolved by flipping a coin/rolling a 10-sided die in front of the subjects at the time of payment.[5]

2. Results

Table 2: Prisoner's dilemma choices

PD choices	Cooperate	Defect
Baseline	32 (51.61%)	30 (48.39%)
Risk	39 (61.9%)	24 (38.1%)

In our Baseline treatment, almost half of the subjects chose to defect on their partner in the prisoner's dilemma situation. The fraction of subjects who defected is smaller when the subsequent punishment/reward stage involves risky outcomes (see Table 2). However, this difference is not statistically significant.[6] Similarly, we find no significant difference in the level of punishment or rewards between the two treatments when looking at aggregated levels.

[4] The subjects learned this only at the beginning of the part 3. Giving the fixed sum to the subjects was aimed to prevent them from making losses in the experiment. This could have been done by having a higher endowment up front. However, we wanted to keep the initial endowment relatively low in comparison to the payoffs decided by subjects' actions in the prisoners' dilemma and reward/punishment stages.

[5] A potential criticism is that because of random payment, all subjects are making decisions under risk, not just those in the Risk treatment. However, even with random payment, there is *more* risk in the Risk treatment compared to Baseline, thus Hypothesis 1 can be tested. An additional advantage of having random payments is that subject's answers in the risk aversion questionnaire are less likely to be influenced by their achievements in parts 1 and 2.

[6] We conduct a two-sample test of proportions (Sincich, 1987) yielding a p-value of 0.2455 for the two-sided test.

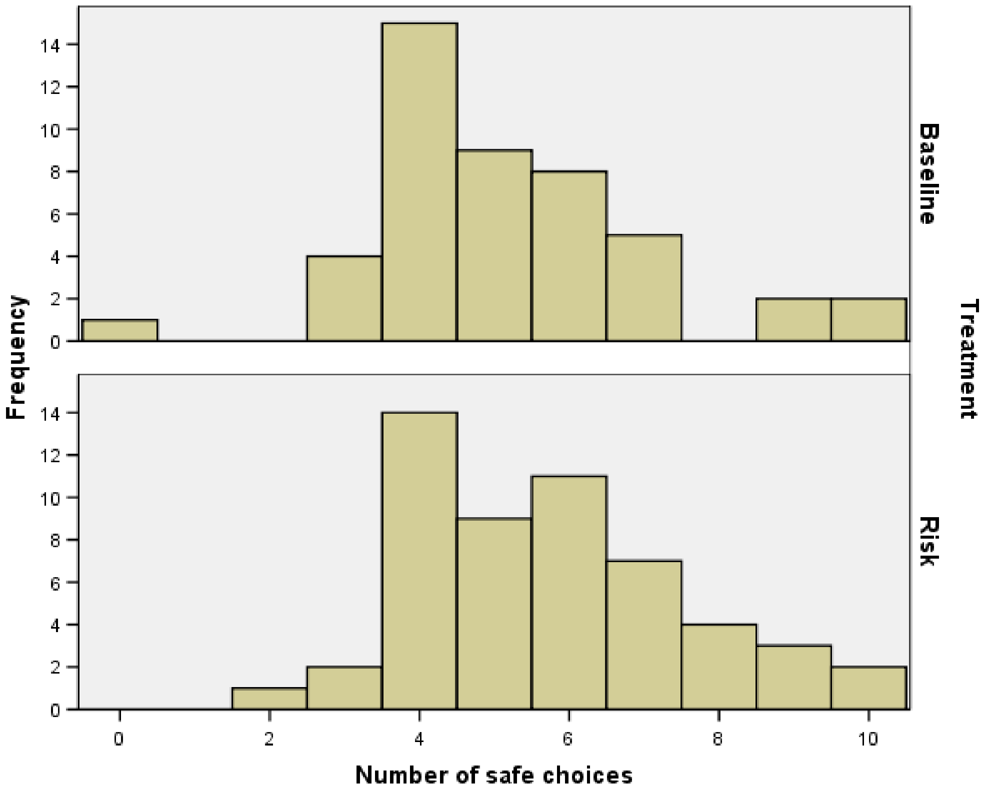
Table 3: Mean Punishment and Reward

Mean	Punishment	Reward
Baseline	-.4412 (1.35)	1.3258 (1.66)
Risk	-.5476 (1.29)	1.0118 (1.59)

At the same time, we think it is more informative to look at subjects who are found to be in the same *situation* in both treatments. When asked whether to punish a defector, subjects who cooperated might decide differently from those who defected themselves. To address this issue, we split the data according to all four possible situations: Having played cooperation while the partner cooperated as well (Cooperation vs. Cooperator), having played cooperation while the partner defected (Cooperation vs. Defector) and similarly for subjects who played defection against the partner who cooperated (Defection vs. Cooperator) or defected (Defection vs. Defector). Comparing subjects in the same situation across treatments shows no significant difference in the punishment/reward with a Mann-Whitney test at a 0.05 significance level.

Our hypothesis asserts that subjects with higher risk aversion should punish and reward less in the treatment where the outcomes of the punishment/reward decision are risky. We use the risk attitude as measured in the third part of our experiment. Using the Holt and Laury method, the risk attitude is determined by the number of safe choices made while choosing between the safe and risky lottery. Never choosing the safe lottery (zero safe choices) corresponds to extremely risk-loving subjects. The higher the number of safe choices, the more risk-averse the subject is. Risk neutrality corresponds to choosing the safe lottery exactly four times.[7]

Figure 1: Risk attitude



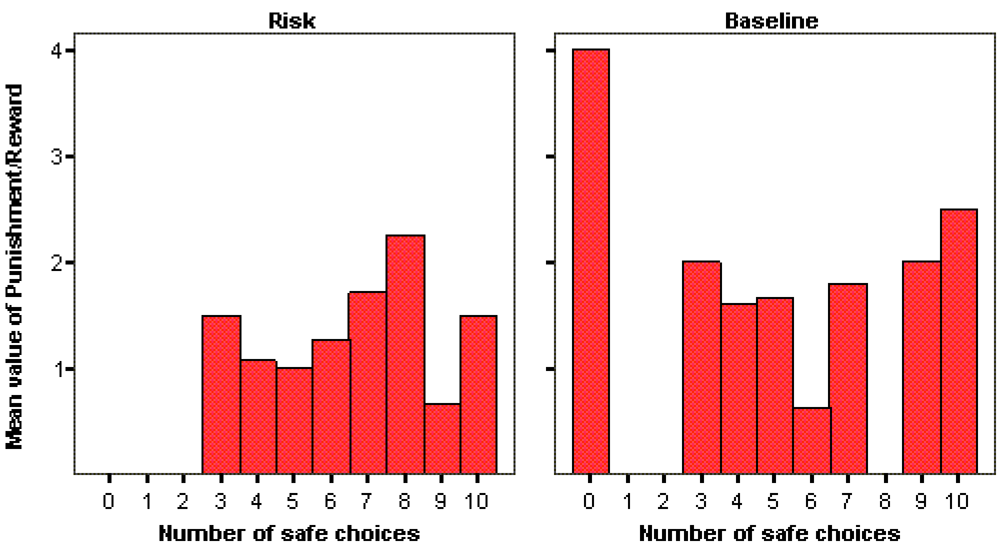
[7] Definite statements about the risk attitude are only possible if the choices are monotonously ordered, that is when there is one lottery such that the subject always chooses the safe lottery for lower ranked lottery pairs and the riskier lottery for higher ranked lottery pairs. 79.5% of our subject display such monotonous choice behavior, we only use these subjects when making statements about risk attitudes.

The distribution of safe choices is shown in Figure 1. A Kolmogorov-Smirnov Z-test confirms that the random allocation of subjects to treatments yielded two subject groups with similar distributions of risk attitude (Kolmogorov-Smirnov Z of 0.694, two-tailed). Overall, our subjects show considerable amount of risk aversion, while almost none are risk-loving.

To test the research hypothesis, we compare the mean value of punishment and reward points for each group of risk attitude. Zero points mean that neither a punishment nor a reward was chosen. Subjects could not reward and punish at the same time. Contrary to the hypothesis, we do not find a lower mean value of punishment and reward among the risk-averse subjects in the Risk treatment than in the Baseline. This is also shown in the correlation between the number of safe choices in the Risk treatment and the punishment and reward points, which is not significant (Spearman correlation coefficient of 0.084 with a one-tailed significance level of 0.275), where for the hypothesis to be true this correlation would have to be negative and significant.[8]

Furthermore, we find no significant difference between the overall mean value of punishment and reward points between our two treatments with a Mann-Whitney test (two-tailed significance level of 0.486). Thus we conclude that the hypothesis is rejected and that more risk does not lead to lower punishment and reward among risk-averse subjects.

Figure 2: Mean value of punishment/reward



The data show very clear results for the emotions part. In Table 4 the means for all emotions are listed, categorized by the action taken (if any). Anger, disappointment and regret are significantly higher for subjects who punished, while appreciation, happiness, gratitude and surprise[9] are significantly higher for subjects who rewarded.

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[8] We also conduct a regression (see Table 5 in the appendix) including the variables gathered by our questionnaires. Since several emotions are strongly correlated with each other, we have to exclude some emotions because of multicolliniarity. There is no significant influence of the number of safe choices unto subjects' punishment/reward decision. What has a strong influence is the fact whether cooperating subjects played against other cooperators or defectors.

[9] Unlike the other emotions, the effect of surprise on punishment and reward can be hypothesized in both directions: Subjects could either be positively or negatively surprised. Therefore we use a two-sided test for this emotion.

There is a clear relation between negative emotions felt at the moment of learning the partner's action and later punishment. A similar relation exists between positive emotions and later reward. Since both punishments and rewards are costly in our experiment and the game is not repeated, doing either is never profit-maximizing. Our results thus indicate that emotions and their expression go hand in hand with actions which can lower own monetary payoffs.

Furthermore, the level of emotions felt and their composition is not different for risk-averse, risk-neutral or risk-loving subjects (compare Figure 3 in the appendix).[10]

Table 4: Emotions

Mean emotion/ Std. dev.	Subjects who punished		Subjects who neither punished nor rewarded		Subjects who rewarded	
Regret*	2,58	(1,564)	1,59	(1,669)	1,55	(1,779)
Gratitude**	0,67	(1,155)	1,78	(1,689)	2,21	(1,515)
Disappointment**	2,25	(1,357)	1,44	(1,856)	0,89	(1,448)
Happiness**	0,50	(0,905)	1,82	(1,851)	2,33	(1,602)
Hate	0,58	(1,379)	0,46	(1,090)	0,21	(0,858)
Envy	0,42	(0,669)	0,60	(1,115)	0,34	(0,788)
Shame	0,09	(0,302)	0,32	(0,668)	0,57	(1,058)
Surprise*	1,75	(0,866)	2,53	(1,553)	2,81	(1,409)
Appreciation*	1,42	(1,379)	2,03	(1,849)	2,42	(1,318)
Anger*	0,75	(1,138)	0,51	(1,162)	0,34	(0,700)

*Difference between subjects who punished and subjects who rewarded significant at 0.05 level (one sided Mann-Whitney test, two-sided for surprise)

** Difference between subjects who punished and subjects who rewarded significant at 0.01 level (one sided Mann-Whitney test)

3. Discussion

We conduct an experiment to test the influence of emotions and risk on the punishment and reward behavior of subjects. We find a strong connection between the emotions felt and action taken by our subjects, but no evidence that risk is a factor in that decision. There are several potential explanations for our findings.

LeDoux (1996) and others[11] argue that emotions override the decision process as a mechanism to induce fast decisions in dangerous situations, where procrastination would lead to negative outcomes of high magnitude. In that case, the fact that our subjects feel emotions would mean that their normal decision process, along with their normal risk attitude, is not utilized when making the decision about punishment and rewards. Although it is hard to imagine that being defected upon in a prisonner's dilemma experiment is a life threatening situation, according to this explanation the presence of emotions eliminates the effects of risk attitude what is in line with our observations.

Another explanation is given by Andreoni's (1990) theory of warm glow (and a possible theory of "cold glow" for punishment). His theory states that the utility of the rewarding person (punisher) from influencing her partner's payoff is solely derived from the fact that she gives up some of her own assets and not from the fact that something arrives at (is taken away

[10] This is confirmed by performing the Kruskal-Wallis test, which finds no significant difference at a 0.793 significance level.

[11] See Elster (1998) for a discussion.

from) her partner's assets. Recall that in our setup, the risk influences the arrival, but not what is given up by the decision maker, to see that the warm glow is supported by the experimental data.

On a different note, our subjects might derive their utility from influencing the *utility* of the other person and might see the risk as being incorporated into the partner's utility. Combined with a belief of risk neutrality about the other person, this would also take away any difference between our treatments. Lastly, punishing and rewarding demands the complex capability of being able to empathize with the other person, to guess what the other person will feel in different situations. To be able to do so is a non-trivial accomplishment for the human brain. If the brain is only able to perform a certain number of tasks at a time, the use of this complex mechanism might crowd out other mechanisms, like the one used to assess risk. Subjects might only take the simple, risk neutral, average outcome into account because their brain is busy empathizing.

The fact that we find no influence of risk on punishment and reward decisions increases the external validity of the experiments which are using certain punishment or reward. The risk structure of real world decisions often differs in that aspect, but our findings suggest that this might not be of importance when drawing conclusions from those experiments towards other settings.

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Appendix

Table 5: Tobit Regression

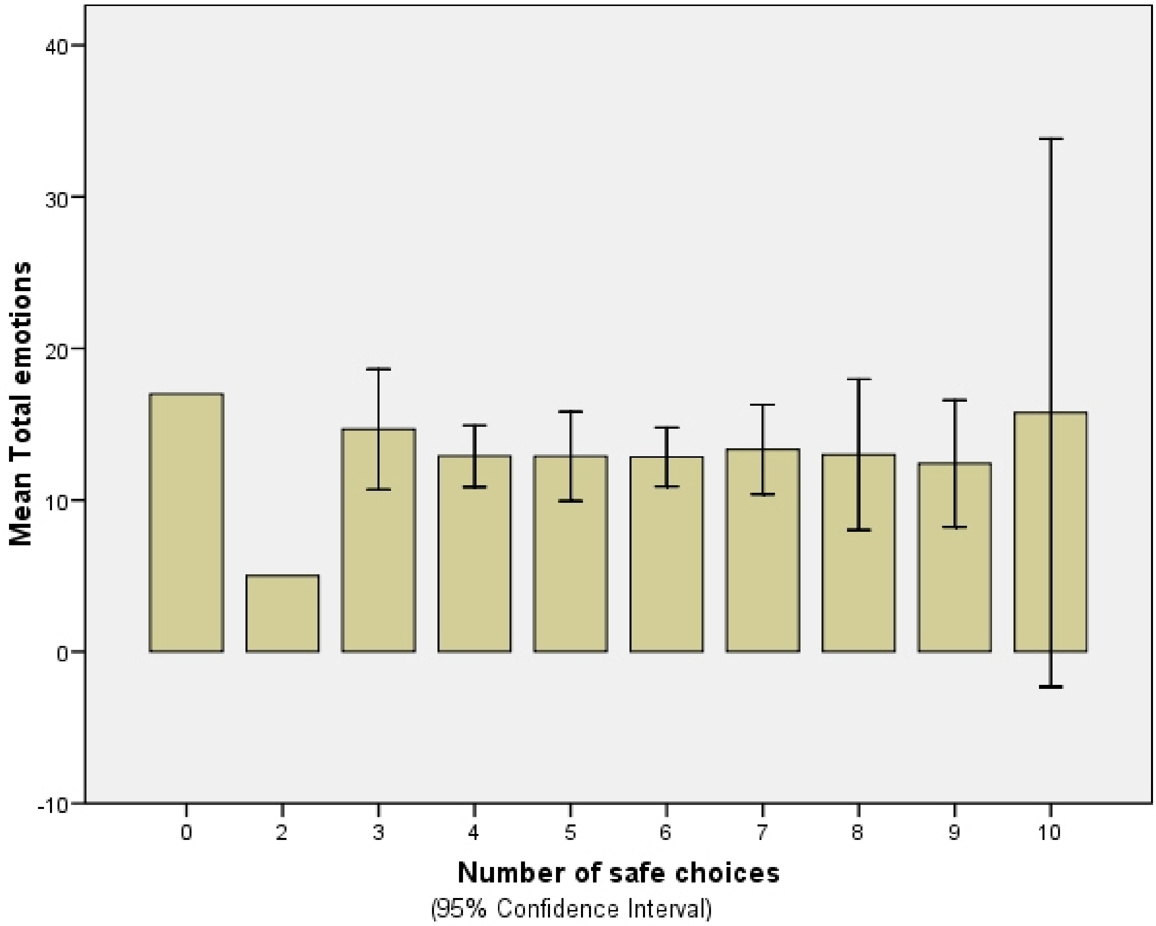
Number of obs = 95
LR chi2(9) = 19.08
Prob > chi2 = 0.0246
Pseudo R2 = 0.0453
Log likelihood = -201.06248

Action	Coef.	Std. Err.	t	P> | t |	[95% Conf. Interval]	
Treatment	.5508497	.4966894	1.11	0.271	-.4365362	1.538.236
Hate	-.2082991	.2445986	-0.85	0.397	-.6945451	.2779468
Shame	.5708588	.3014588	1.89	0.062	-.0284215	1.170.139
Surprise	.2712518	.1727736	1.57	0.120	-.0722108	.6147143
Semester	-.1381347	.1607481	-0.86	0.393	-.4576913	.1814219
Sex	-.3288138	.5563687	-0.59	0.556	-1.434.838	.7772105
RA	.0723561	.5581814	0.13	0.897	-1.037.272	1.181.984
RAsq	-.0061798	.0462163	-0.13	0.894	-.0980548	.0856953
S12	-1.274.786	.5214375	-2.44	0.017	-231.137	-.238203
_cons	.9642168	2.393.923	0.40	0.688	-3.794.745	5.723.178
/sigma	2.251812	.182467			1.88908	2.614544

Obs. summary: 4 left-censored observations at Action<=-5
83 uncensored observations
8 right-censored observations at Action>=5

Dependent Variable: Punishment/Reward (from –5 for maximal punishment to +5 for maximal reward)
Treatment: 0 if Risk, 1 if Baseline; S12: 1 if subject cooperated against a defector, else 0.

Figure 3: Emotions and Risk



Total emotions: Sum of anger, appreciation, disappointment, envy, gratitude, happiness, hate, regret, shame, surprise

Instructions

Instructions for Baseline treatment column players

Instructions for the Risk treatment/row players and German versions are available from the authors upon request. Part 3 and 4 were handed out after part 1 and 2 where completed.

INSTRUCTIONS – Part 1

No talking: Now that the experiment has begun, we ask that you do not talk or communicate any longer with each other. If you have a question after we finish reading the instructions, please raise your hand and the experimenter will approach you and answer your question in private.

Monetary payments: You may receive monetary payments for participating in this experiment. The amount you make will depend on the choices made (as described below). We will randomly select four pairs from the class to receive their experiment earnings in Euro. Your earnings will be paid to you in cash individually and privately.

Pairing: During parts 1 and 2 of the experiment, you will be paired with one and only one other person. However, no participant will ever know the identity of the person he or she is paired with. Parts 3 and 4 will be done individually.

Roles: In each pair of people, one person will be randomly selected as the "row" player and the other will be the "column" player. You will be a **column player**.

Endowment: At the start of the experiment, you will receive an endowment of $5.

Decision 1: On the DECISION FORM 1 you will see a table of payoffs. The row player will decide between Top and Bottom rows, and the column player will decide between the Left and Right columns. The intersection of the designated row and column will determine the earnings for each person.

As a column player, you will **circle** either the **Left** or the **Right** column. The row player will circle Top or Bottom row. These decisions determine which part of the payoff matrix is relevant (Top Left, Top Right, Bottom Left, Bottom Right). In each cell, the row player's payoff is shown first and your payoff is shown second (in bold).

After you have made the decision, we will collect the decision forms and inform you about the decision of your paired row player.

DECISION FORM 1

	Left	**Right**
Top	$8, **$8**	$0, **$10**
Bottom	$10, **$0**	$2, **$2**

Please circle the Left or Right column.

INSTRUCTIONS – Part 2

Decisions 2: After learning the other player's decision 1, you can **increase** or **decrease** the payoff of the other player by assigning points. You can also decide not to change his/her payoff by not assigning any points.

If you decide to **increase** the other player's payoff, each point you assign, increases his/her payoff by \$1. Similarly, if you decide to **decrease** the other player's payoff, each point you assign, decreases his/her payoff by \$1. *You can decrease the other player's payoff only if his/her decision was Bottom.*

The assignment of each point will cost you \$1. You can assign at most 5 points. The following table illustrates the relation between assigned points and the costs of doing so.

points	0	1	2	3	4	5
costs of these points	\$0	\$1	\$2	\$3	\$4	\$5

The other player can also increase, decrease or leave equal your payoff if they wish to.

DECISION FORM 2

Please indicate how many points you want to assign (mark one of the three choices and circle the number of points where appropriate).

☐ I want to increase the other player's payoff by assigning

1 2 3 4 5 points.

☐ I want to decrease the other player's payoff by assigning

1 2 3 4 5 points.

☐ I do not want to change the other player's payoff.

EMOTIONS – Part 3

You will now fill out the emotions questionnaire **individually.** Those pairs randomly selected for payment will receive $8 for filling it out.

Think back at the moment when you learned about your paired player's decision 1. On a scale 0 to 5 (with 0 being the least and 5 being the most) mark the following emotions you felt then:

(Please circle one number for each emotion)

• Anger	0	1	2	3	4	5
• Appreciation	0	1	2	3	4	5
• Disappointment	0	1	2	3	4	5
• Envy	0	1	2	3	4	5
• Gratitude	0	1	2	3	4	5
• Happiness	0	1	2	3	4	5
• Hate	0	1	2	3	4	5
• Regret	0	1	2	3	4	5
• Shame	0	1	2	3	4	5
• Surprise	0	1	2	3	4	5

INSTRUCTIONS – Part 4

We will randomly select 4 another people to be paid for Part 4. The people selected for payment for this part will be different than the people selected for the earlier tasks. This is the last task and there will be no further tasks after Part 4.

The next page shows ten decision questions. Each decision is a paired choice between "Option A" and "Option B."

You will make ten choices and record these in the box to the left of the option. That is, if you prefer option A to option B, you will mark an X by option A. Only one of the ten decisions will be used in the end to determine your earnings for this part of the experiment.

A ten-sided die will be used to determine payoffs; the faces are numbered from 1 to 10 (the "0" face of the die will serve as 10.) After you have made all of your choices, we will throw this die twice, once to select one of the ten decisions to be used, and a second time to determine what your payoff is for the option you chose, A or B, for the particular decision selected. Even though you will make ten decisions, only one of these will end up affecting your earnings, but you will not know in advance which decision will be used. Obviously, each decision has an equal chance of being used in the end.

Now, please look at Decision 1 at the top. Option A pays $2.00 if the throw of the ten sided die is 1, and it pays $1.60 if the throw is 2-10. Option B yields $3.85 if the throw of the die is 1, and it pays $0.10 if the throw is 2-10. The other Decisions are similar, except that as you move down the table, the chances of the higher payoff for each option increase. In fact, for Decision 10 in the bottom row, the die will not be needed since each option pays the highest payoff for sure, so your choice here is between $2.00 or $3.85.

To summarize, you will make ten choices: for each decision row you will have to choose between Option A and Option B. You may choose A for some decision rows and B for other rows, and you may change your decisions and make them in any order.

To determine the payoffs from this task we will throw the ten-sided die to select which of the ten Decisions will be used. Then we will throw the die again to determine the money earnings for the Option you chose for that Decision.

So now please look at the empty boxes on the record sheet. You will have to mark an X in one and only one of the boxes in each row, depending whether you prefer option A or option B. Then the die throw will determine which of the ten decisions is going to count. We will look at the decision that you made for the one that counts, and circle it, before throwing the die again to determine your earnings for this part.

DECISION FORM 4

Option A		Option B
☐ $2.00 with probability of 1/10, $1.60 with probability of 9/10	*OR*	☐ $3.85 with probability of 1/10, $0.10 with probability of 9/10
☐ $2.00 with probability of 2/10, $1.60 with probability of 8/10	*OR*	☐ $3.85 with probability of 2/10, $0.10 with probability of 8/10
☐ $2.00 with probability of 3/10, $1.60 with probability of 7/10	*OR*	☐ $3.85 with probability of 3/10, $0.10 with probability of 7/10
☐ $2.00 with probability of 4/10, $1.60 with probability of 6/10	*OR*	☐ $3.85 with probability of 4/10, $0.10 with probability of 6/10
☐ $2.00 with probability of 5/10, $1.60 with probability of 5/10	*OR*	☐ $3.85 with probability of 5/10, $0.10 with probability of 5/10
☐ $2.00 with probability of 6/10, $1.60 with probability of 4/10	*OR*	☐ $3.85 with probability of 6/10, $0.10 with probability of 4/10
☐ $2.00 with probability of 7/10, $1.60 with probability of 3/10	*OR*	☐ $3.85 with probability of 7/10, $0.10 with probability of 3/10
☐ $2.00 with probability of 8/10, $1.60 with probability of 2/10	*OR*	☐ $3.85 with probability of 8/10, $0.10 with probability of 2/10
☐ $2.00 with probability of 9/10, $1.60 with probability of 1/10	*OR*	☐ $3.85 with probability of 9/10, $0.10 with probability of 1/10
☐ $2.00 with probability of 10/10, $1.60 with probability of 0/10	*OR*	☐ $3.85 with probability of 10/10, $0.10 with probability of 0/10

QUESTIONS

1.) In what year were you born?

____

2.) What is your gender (M/F)?

____

3.) Major: What is your major?

____

4.) Which semester are you currently in?

____

5.) Please state the state and country where you were raised.

____

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