CeDEx

Centre for Decision Research and Experimental Economics

Discussion Paper Series

ISSN 1749-3293

Discussion Paper

CeDEx Discussion Paper No. 2006–13

The limits of self-governance in the presence of spite: Experimental evidence from urban and rural Russia

Simon Gächter and Benedikt Herrmann

July 2006

The University of Nottingham

The Centre for Decision Research and Experimental Economics was founded in 2000, and is based in the School of Economics at the University of Nottingham.

The focus for the Centre is research into individual and strategic decision-making using a combination of theoretical and experimental methods. On the theory side, members of the Centre investigate individual choice under uncertainty, cooperative and non-cooperative game theory, as well as theories of psychology, bounded rationality and evolutionary game theory. Members of the Centre have applied experimental methods in the fields of Public Economics, Individual Choice under Risk and Uncertainty, Strategic Interaction, and the performance of auctions, markets and other economic institutions. Much of the Centre's research involves collaborative projects with researchers from other departments in the UK and overseas.

Please visit http://www.nottingham.ac.uk/economics/cedex/ for more information about the Centre or contact

Karina Whitehead
Centre for Decision Research and Experimental Economics
School of Economics
University of Nottingham
University Park
Nottingham
NG7 2RD
Tel: +44 (0) 115 95 15620
Fax: +44 (0) 115 95 14159
karina.whitehead@nottingham.ac.uk

The full list of CeDEx Discussion Papers is available at

http://www.nottingham.ac.uk/economics/cedex/papers/index.html

The limits of self-governance in the presence of spite: Experimental evidence from urban and rural Russia[+]

Simon Gächter
University of Nottingham[*], CESifo & IZA

Benedikt Herrmann
University of Nottingham[*]

27 July 2006

Abstract

We report evidence from public goods experiments with and without punishment which we conducted in Russia with 566 urban and rural participants of young and mature age cohorts. Russia is interesting for studying voluntary cooperation because of its long history of collectivism, and a huge urban-rural gap. In contrast to previous experiments we find no cooperation-enhancing effect of punishment. An important reason is that there is substantial spiteful punishment of high contributors in all four subject pools. Thus, spite undermines the scope for self-governance in the sense of high levels of voluntary cooperation that are sustained by sanctioning free riders only.

JEL: H41; C91; D23; C72
Keywords: social norms, free riding, punishment, spite, experiments.

[+] This paper is part of the MacArthur Foundation Network on Economic Environments and the Evolution of Individual Preferences and Social Norms. Support from the EU-TMR Research Network ENDEAR (FMRX-CT98-0238) is gratefully acknowledged. We are also very grateful for the invaluable research assistance provided by Valerie Kovalenko, Sergiy Zorya, and Lena Gerasimenko. We also would like to thank the University of Agricultural Sciences, Samara (Ust-Kinel), the Kursk Academy of Agricultural Sciences, in particular Prof. Dr. Mucha and Prof. Dr. Schulga for supporting us with necessary infrastructures and for helping us organizing the experiments, the Kursk State University for the possibility to use their classrooms and Hans Kolb-Wellpappe Ltd., Memmingen, for the donation of cardboards used in the experiments. We are grateful for comments from Iris Bohnet, Sam Bowles, Steve Burks, Jeffrey Carpenter, Armin Falk, Urs Fischbacher, Ernst Fehr, Fiona Greig, Glenn Harrison, Karla Hoff, Charles Noussair, Arno Riedl, Martin Sefton, Tomomi Tanaka, Stephan von Cramon-Taubadel, and Richard Zeckhauser, as well as seminar, workshop and conference participants in Berlin, Erfurt, Harvard, London, Middlebury, Sapporo, Sheffield, Siena, Trento and Utrecht. Benedikt Herrmann is grateful for the support by the Department of Agricultural Economics at the University of Göttingen and for the hospitality of the Kennedy School of Government at Harvard University.

[*] School of Economics, The Sir Clive Granger Building, University Park, Nottingham NG7 2RD. E-mail: simon.gaechter@nottingham.ac.uk, benedikt.herrmann@nottingham.ac.uk.

I. Introduction

Since the seminal papers by Yamagishi [1986] and Ostrom, Walker and Gardner [1992] there is substantial experimental evidence that many people are willing to punish free riders at own costs. Punishment can mitigate the free rider problem and induce high cooperation levels.[1] Thus, a conclusion from these experiments is that pro-social motivations coupled with costly informal sanctions of free riders make "self-governance" in the sense of high levels of voluntary cooperation possible (Ostrom, Walker and Gardner [1992]; Ostrom [2000]).

In this paper we report evidence that informal punishment can have detrimental consequences that severely limit successful self-governance. We derive this conclusion from public goods experiments with and without punishment that we conducted using four different subject pools in Russia. The participants were 566 urban and rural residents from all walks of life and two distinctive age cohorts – young people with an average age of 20, and mature people aged 30 to 76, with an average age of 44. We observed substantial punishment not only of free riders, but also of people who contributed the same or more than the punishing subject (henceforth we refer to this sort of punishment as being "spiteful"). For instance, the ratio of expenditures on spiteful punishment relative to the expenditures on punishment of free riders was 78 percent among urban mature people. The ratio was 39 percent for the urban young people in our Russian sample. By contrast, the ratio was 23 percent in Fehr and Gächter [2002]), who conducted their experiments with undergraduates in Zurich (Switzerland).[2]

The presence of spiteful punishment influenced voluntary contributions. Among the urban mature participants cooperation in the presence of a punishment option was even lower than in its absence. In the other three subject pools contributions were the same in the presence as in the absence of punishment. In experiments where participants played a public goods game with punishment after playing one without punishment, we observed that contributions decayed in all four subject pools – despite the presence of a punishment option.

The detrimental effects of punishment are most visible when comparing earnings. The presence of a punishment option led to severe losses in earnings relative to the treatment without the possibility to punish others. This holds for all subject pools. Relative to the earnings in the treatment without punishment, the mean loss in earnings in the treatment with punishment ranges from 29.2 percent in the urban young subject pool to 44.6 percent in the

[1] See for instance Bowles, Carpenter and Gintis [2006]; Fehr and Gächter [2000], Fehr and Gächter [2002]; Sefton, Shupp and Walker [2002]; Masclet, Noussair, Tucker and Villeval [2003]; Egas and Riedl [2005]; Falk, Fehr and Fischbacher [2005]; Noussair and Tucker [2005]; Page, Putterman and Unel [2005]; Gürerk, Irlenbusch and Rockenbach [2006]; Sutter, Haigner and Kocher [2006]; Carpenter [forthcoming].

[2] Cinyabuguma, Page and Putterman [2005] and Falk, Fehr and Fischbacher [2005] report similar magnitudes of spiteful punishment to those observed by Fehr and Gächter [2002].

rural mature subject pool. To put this finding into perspective, the payoff loss among the Zurich undergraduates of Fehr and Gächter [2002] amounted to 13.7 percent only.

We conclude from these results that spite can limit successful self-governance. Spiteful punishment has been largely neglected in previous research on social preferences because it was negligible compared to the punishment of free riders.[3] Our results show that this neglect is not warranted because spite can be a very significant motivation in some subject pools. Moreover, our finding also has theoretical relevance, since in some widely applied models of social preferences spiteful preferences are excluded by assumption (see, e.g., Fehr and Schmidt [1999] and the discussion of this fact in Falk, Fehr and Fischbacher [2005]).[4]

Our results on the importance of spiteful punishment emerged from a research endeavor that investigates the extent to which societal background shapes pro-social behavior and its enforcement via altruistic punishment. This endeavor was inspired by theoretical arguments that social preferences are endogenous to the societal environment (Bowles [1998]) and can be studied by laboratory experiments (Camerer and Fehr [2004]). We conducted our experiments in urban and rural Russia and among young and old age cohorts because these subject pools differ starkly from one another on many sociological and economic dimensions. In particular, our 2×2 factorial subject pool design allows us to study systematically two social background characteristics that might be relevant with respect to norms of cooperation and punishment. The two factors we are interested in are socialization background and whether one is living in an anonymous urban or a close-knit rural area.

The socialization background is particularly interesting in Russia because people born before 1970 were already adults by the time of the breakdown of the Soviet Union in 1991 and were therefore socialized during communism. People who were 21 at the time of the experiment were only 10 years old when the Soviet Union collapsed. Thus, these subject pools differ in the experiences of their formative years, and there are psychological reasons to believe that socialization and experiences in early adulthood shape people's pro-social behaviors.[5] Our mature participants were socialized in their formative years into a collectivist ideology and economy.[6] The young urban and rural participants experienced their teenage

[3] The studies by Cinyabuguma, Page and Putterman [2005] and Falk, Fehr and Fischbacher [2005] are exceptions.

[4] Fehr and Schmidt [1999] assume that people dislike advantageous inequality (i.e., $\beta \geq 0$). However, given the parameters in our experiments, our observation that many people punish the cooperators implies that they *increase* rather than decrease the payoff differential. Such behavior is ruled out by assuming $\beta \geq 0$.

[5] See, e.g., Van Lange, De Bruin, Otten and Joireman [1997]; Eisenberg, Guthrie, Cumberland, Murphy, Shepard, Zhou and Carlo [2002].

[6] In addition to being a collectivist economy (e.g., Spulber [2003]; Gregory and Harrison [2005]), Russia was the longest-lived attempt to create a collectivist society where the individual, from the earliest childhood on, was supposed to pursue the interests of the group and to abandon the pursuit of self-interest (e.g., Clawson [1973]). The goal was to create a "homo sovieticus" (Heller [1988]). Scholars Herschel and Edith Alt, in their book "The New Soviet Man – His Upbringing and Character Development", write: "At the center of the communist dream is its unique vision of a society and its view of man in that society. The new social order will be cooperative rather than competitive, altruistic rather than selfish" (Alt and Alt [1964]).

years after the demise of the Soviet Union. Their experience has been shaped less by communist ideology and more by the rocky transition to a market economy and the accompanying sociological changes. Among the changes are widespread perceptions of ubiquitous unfairness in the economic process and a lack of trust in the rule of law.[7]

The second dimension of our investigation is whether norms of cooperation are different between urban and rural people. There are two reasons why this might be so. First, due to several developmental lags inherited from the past the gap between urban and rural areas is huge in Russia (Fitzpatrick [1994]; Spulber [2003]), and is particularly pronounced in the region of Kursk, where we conducted our experiments. In contrast, the urban-rural gap has largely vanished in western countries (e.g., Hofferth and Iceland [1998]). The rural areas were particularly strongly shaped by collectivism, because economic and social life was dominated by monopolist collective farms. Second, at a theoretical level, differences between groups can emerge easily due to an evolved psychology of "conformist transmission" (e.g., Henrich and Boyd [1998]). Moreover, norm enforcement is easier in close-knit parochial communities than in anonymous large groups with limited monitoring possibilities (see, e.g., Bowles and Gintis [2002] for theoretical arguments and Carpenter [forthcoming], for experimental evidence). Rural residents might be used to different levels of social control and may therefore have internalized different norms of cooperation to those of their urban counterparts.

A further aspect of our four subject pools is that they share the same language, political system and the broader Russian background in general. Our factorial subject pool design allows us therefore to address the extent of differences between social groups that exist *within* a society – in our case between "young" and "mature" age cohorts and between urban and rural subject pools. While there are several studies by now that compare students and non-students or look at behavior of villagers (e.g., Barr [2001]), there is, to our knowledge, no study that investigates differences in social preferences between young and mature cohorts and urban and rural residents in a factorial design.[8]

Our most important results – in addition to the surprisingly high rate of spiteful punishment and its detrimental effect on cooperation – are as follows. We find that rural residents and mature participants are more cooperative than urban residents and young people, respectively. While overall punishment behavior is not affected by socio-

[7] See Shleifer and Treisman [2005] for a recent account on Russia's development, Brainerd [1998] on the rise of inequality, Fedotkin [2003] and Kluegel and Mason [2004] on fairness perceptions, and Hoff and Stiglitz [2004] on the rule of law.

[8] See, for instance, Fehr and List [2004]; Carpenter, Burks and Verhoogen [2005]; Carpenter and Seki [2005]; and Egas and Riedl [2005] for recent studies that compared students to non-students within a given society. List [2004] studies age effects in voluntary contributions. Sutter and Kocher [2005] observe trust and trustworthiness across six different age cohorts.

demographic variables, we find that highly educated people and people who are a member of at least one voluntary civic organization are more likely to punish spitefully.

II. Experimental design and procedures

A. *Subject pools and locations of experiments*

We devised a 2×2 factorial subject pool design, where we vary whether a subject is (i) at least 30 years, or younger than 30 years and (ii) a rural or an urban resident. We document all details about our four subject pools in Appendix A. Here we summarize the most important facts about our subject pools and the locations of our experiments.

We conducted our experiments with the urban participants in the city of Kursk and the neighboring city of Zheleznogorsk. Kursk has roughly 430'000 inhabitants and is located in the "heartland" of the former Soviet Union, the so-called "Central Black Earth Zone" 400 miles south of Moscow. The 185 urban "mature" participants (56 percent females) were between 30 and 68 years old, the average was 44.6 years and 25 percent were older than 50 years. Most of the urban mature participants had spent most of their lives in larger cities (see Appendix A for details). Sixty percent held white-collar jobs and 40 percent were blue-collar workers. Fifty percent held a university degree. The urban mature participants were strangers to one another. A participant only knew 3.4 percent of the other participants on average.

We conducted the experiments with the rural residents in small villages in the area of Kursk. Although the city of Kursk is only 40 to 50 miles away rural life in these villages is very insular for a lack of good roads, cars, and modern communication technologies. The 92 rural mature participants (50 percent females) were between 30 and 70 years old; the average age was 43.1 years and 17 percent were older than 50 years. Thus, the urban and rural mature participants were similar with respect to age and gender composition. Fifty-eight percent were blue-collar workers and 42 percent had a white-collar job. Slightly less than a third of the rural mature participants had a university degree. While the urban participants were strangers to one another, the rural participants knew each other well. The average participant knew 43 percent of the other participants. The differences in the number of people's acquaintances in the different subject pools fits well with the dense personal networks in rural areas and the anonymity of urban living conditions. Most of the rural residents had actually spent most of their lives in the countryside.

The 140 urban young participants were mostly undergraduates from various universities and polytechnic institutes in the city of Kursk; twelve percent were non-students who mostly held blue-collar jobs. We recruited the majority of the 149 rural young participants in Ust-

Kinel because we could only find 42 young rural volunteers in the area of Kursk.[9] In both young subject pools the average age was roughly 20 years; 95 percent were younger than 22 years. Among the urban (rural) young participants 21 (34) percent were females. On average, an urban (rural) young participant knew 9 (25) percent of the other participants.

B. *The decision situations*

In all subject pools the decision situation was a one-shot public good experiment with and without punishment opportunities. Participants were divided into groups of $n = 3$ participants and endowed with 20 tokens. Participants decided simultaneously how many of these tokens to contribute to a public good, called "project". All participants received a marginal per capita return of 0.5 from any contribution to the public good, which was just the sum of all individual contributions c_i to the project. We chose a marginal per capita return of 0.5 to make the calculations for the participants easy. The monetary payoff π_i^1 in the one-stage public goods game without punishment for each subject i in the group was therefore given by

$$\pi_i^1 = 20 - c_i + 0.5\sum_{j=1}^{3} c_j \cdot$$

This payoff function is widely used in public goods experiments. It offers the participants a monetary incentive to free ride completely (i.e., to choose $c_i = 0$), since the marginal per capita return of a contribution to the public good is less than 1. The social marginal return is 1.5, which implies that the social payoff is maximized if everyone contributes his or her whole endowment to the public good.

A second decision stage was added under punishment conditions. Participants were informed about the contribution of the other two members of their group after the simultaneous investment decision of the first stage. Participants then had the possibility to simultaneously punish their group members by assigning so-called "deduction points". The allocation of a deduction point p_{ij} by player i to player j reduced the first-stage payoff of player i by one token and that of player j by 3 tokens. If player i received p_{ji} deductions points from the other group members and assigned p_{ij} deduction points to member j, the final pecuniary payoff of subject i, π_i, was

$$\pi_i = \pi_i^1 - (3\sum_{j=1}^{3} p_{ji} + \sum_{j=1}^{3} p_{ij})$$

(see also Fehr and Gächter [2002], who used exactly the same punishment function). All participants played two one-shot games: one game without punishment (called N-experiment) and another game with the punishment option (called P-experiment). Participants interacted

[9] Ust-Kinel is a small village with roughly 5000 inhabitants, 400 miles east of Moscow. The participants all come from similar rural areas and share a similar socioeconomic background as our rural young participants of the Kursk region.

with the same group members in both games. We ran two sequences. In the N-P sequence participants first played the N-experiment and then the P-experiment. In the P-N sequence the order of experiments was reversed to control for sequence effects. Participants learned about the second experiment only after they had finished the first experiment to avoid anticipation effects. Group composition stayed the same and participants were aware of this.

C. *Discussion of the design*

Our design has three main purposes. First, we want to measure the participants' initial cooperative attitudes in a situation that is not confounded with strategic considerations coming from repeated play. Therefore, we deliberately had the participants play each treatment only once. Take the N-experiment of the N-P sequence. Since the game is one-shot, each player has a dominant strategy to free ride if he or she only cares about own payoff. Thus, under conditions of anonymity, this game measures the *extent of initial non-strategic cooperativeness* that is present among our subject pools. In the P-experiment of the P-N sequence we measure two things, (i) the participants' degree of cooperation in the presence of a punishment option and (ii) the participants' punishment behavior. A selfish and rational subject will not punish, since punishment is costly and the game is one-shot. Yet, we know from numerous experiments that many people are prepared to punish free riding (see footnote 1). Almost all previous experiments involved repeated play, however. Our one-shot experiment is therefore a particularly demanding environment for observing cooperation and punishment.[10]

Second, our design also allows measuring the effect of changed incentives. In the N-P sequence, for instance, we can measure how participants change their contribution from the observed level in the N-experiment, if we add the punishment option. In the P-N sequence we measure the effect of taking away the punishment option.

D. *Procedures*

We recruited the urban residents and villagers through announcements in factories, public places and in addition by approaching people on the streets and in public transport. Word-of-mouth also played a significant role and worked very well, in the sense that people from all walks of life participated in the experiments, in particular in Kursk. We recruited most of the young participants by announcements in universities. In the city of Kursk we conducted the experiments in lecture halls of the Academy of Agricultural Sciences. In

[10] In the Fehr and Gächter [2000] and Fehr and Gächter [2002] experiments participants played the games with and without punishment repeatedly either with random matching or stable groups in each period (in Fehr and Gächter [2000]) or with a "perfect stranger" matching (in Fehr and Gächter [2002]) that ensured that the same group members only interacted once. See also the one-shot experiments without punishment of List [2004] and the one-shot experiments with and without punishment of Walker and Halloran [2004].

Zheleznogorsk and the rural areas we ran the experiments in lecture halls of local schools. On average 33.5 people participated in a session.

Moving beyond university student subject pools creates some challenges for the experimenter (see also Henrich, Boyd, Bowles, Camerer, Fehr and Gintis [2004]; Ortmann [2005]). The experimenter demand effect is an important issue which we tried to minimize by several measures. First, we conducted all experiments according to a detailed script that contained (i) the exact rules how to conduct the experiment and (ii) a summary of the rules, payoffs, and procedures which we read to the participants. Second, the team of assistants who helped conducting the experiments was always the same in all experiments. They were all locals. We trained them well before the experiment. Third, one person, a Russian native and academic teacher at a university in Kursk, conducted all experiments to minimize the experimenter demand effect that may come from the German nationality of the principal investigator, Benedikt Herrmann. Fourth, all assistants and the lead experimenter received extensive training about the experimental procedures, and were supervised during the experiment by Benedikt Herrmann who speaks Russian fluently.

A further important challenge of any one-shot experiment is that participants understand the game. We took several steps to ensure this. First, we wrote the instructions in German and then had them translated into Russian and back into German (by another translator) to control for language-induced differences in meaning. Second, we used a neutral framing to control for possible framing effects that might also be different between our urban and rural subject pools. The instructions were very detailed and explained the calculation of rules and payoffs step by step. We also added several completed numerical examples to show how payoffs are calculated. Third, participants could read the instructions at their own pace. Participants could also ask questions at any time (in private). Fourth, participants had to answer a set of control questions that tested their understanding of payoff calculations. The huge majority of participants had no difficulty at all in understanding the rules of the experiment.[11] Fifth, the lead experimenter summarized the rules of the game and the payoff calculation (by reading a prepared script). Sixth, before the experiment actually started, there was a further possibility to ask questions. We document a sample copy of the instructions in Appendix B.

The experiments were hand-run. Cardboard partitions separated the participants to maximize the between-subject anonymity of decisions. We also took several steps to maximize subject-experimenter anonymity (see Hoffman, McCabe and Smith [1996]; Bohnet and Frey [1999]). First, given the country's past, we never asked for the names of our

[11] Our research assistants helped those who had problems, according to strictly determined rules how to answer questions. Some participants were nevertheless unable to answer all questions correctly. For the data analysis we discard all observations from these participants. In total, we had to discard the data from 40 participants. This leaves us with data from 566 participants (185 urban mature; 92 rural mature; 140 urban young; 149 rural young).

participants and made clear throughout that the sole purpose of this experiment is scientific. Second, participants had to submit their decision sheets in closed envelopes and received the results of the contribution decisions of their group in closed envelopes. The calculation of results and the preparation of information sheets were done in a separate room, by assistants other than those who collected the decision sheets. Finally, the participants received their payoffs anonymously and in sealed envelopes. The participants were fully aware of all these "almost double-blind" procedures.

We administered an anonymous questionnaire at the end of the experiments. We asked for (i) socio-demographic information (described in Appendix A) and (ii) trust attitudes which we discuss in a separate paper (Gächter, Herrmann and Thoni [2004]).

We aimed at paying participants on average roughly the equivalent of two days income, net of show-up fees. Since an experiment lasted on average two hours, the hourly wage was rather high and our participants were fairly excited about the level of stakes. On average our participants (who were paid in Rubles) earned the equivalent of $8.3 including a show-up fee of $3.

III. Cooperation and punishment

We proceed in four steps in presenting the results. First, we will look at *contributions* in the N-experiments of the N-P sequence and the P-experiments of the P-N sequence. This will give us some hints about cooperative attitudes in the absence and presence of a punishment option. Second, we investigate the *dynamics of cooperation* under changed incentives, i.e., we look at the change in cooperation when we add punishment (as in the N-P sequence) or when we take the punishment option away (as in the P-N sequence). Third, we will investigate *punishment behavior*. Finally, we will analyze the impact of *socio-economic differences* on cooperation and punishment.

A. *Cooperation in the presence and absence of punishment opportunities*

Result 1: *All subject pools exhibited a remarkable degree of cooperativeness, despite strong free-rider incentives. Urban young participants were the least cooperative group. The presence of a punishment opportunity did not enhance cooperation. Among urban mature participants, cooperation in the P-experiment was even weakly significantly lower than in the N-experiment.*

Figure 1 contains the main support for Result 1. It depicts, separately for the subject pools, the histograms of contributions in the N- and P-experiments, respectively, when these

experiments were played as first experiments (i.e., we look at contributions in the N-experiments of the N-P sequence and the P-experiments of the P-N sequence).

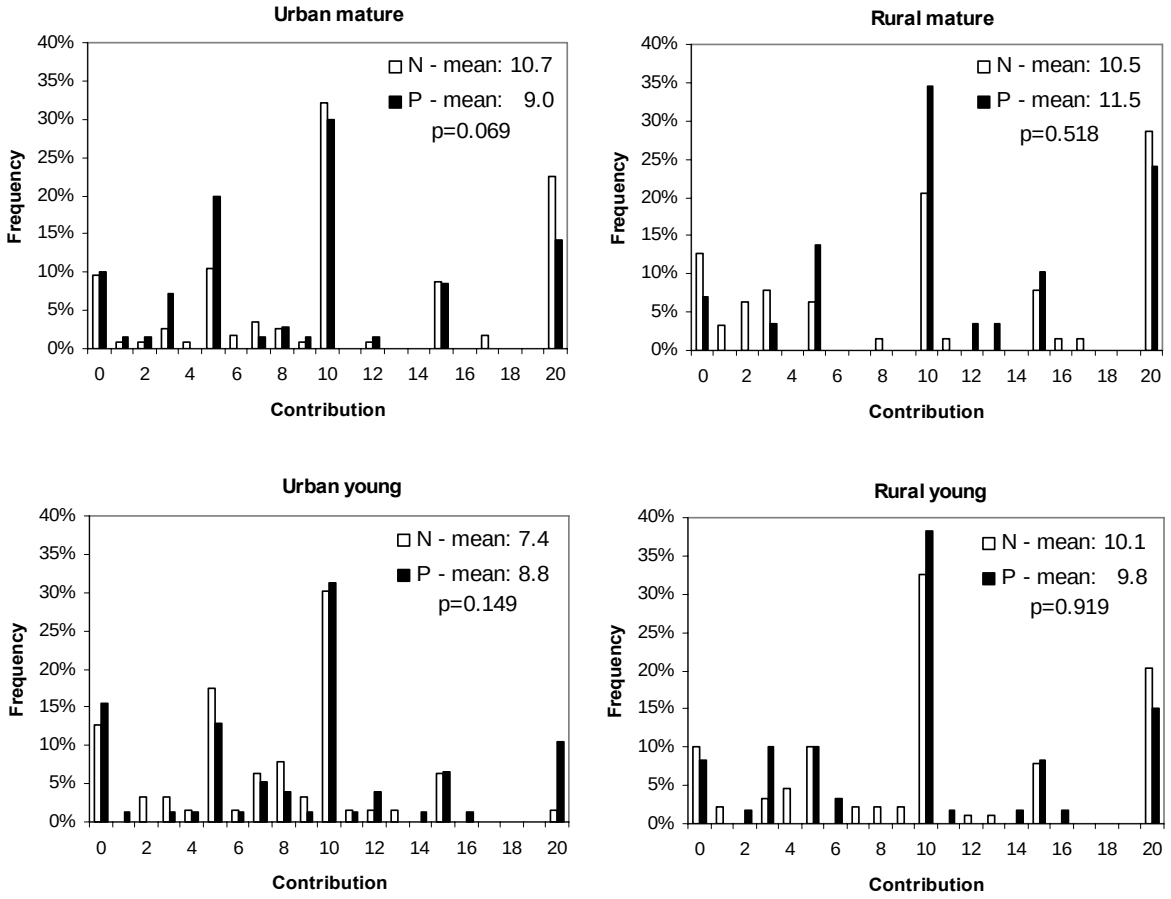

FIGURE 1: CONTRIBUTIONS IN THE FIRST EXPERIMENT IN THE NO-PUNISHMENT (N) AND THE PUNISHMENT EXPERIMENT (P)

Figure 1 conveys three observations. The first observation is that, on average, cooperation rates in the N-experiments were remarkably high, given that these were one-shot experiments. Contributions differed between subject pools. The urban and rural mature participants contributed on average 10.7 and 10.5 tokens (i.e., 53.7 and 52.5 percent, respectively, of their endowment). The rural young participants contributed 50.6 percent and the urban young participants contributed 37.1 percent of their endowment. A non-parametric Kruskal-Wallis test reveals that these differences are significant between subject pools (p=0.010). The significant differences are due to the urban young participants. Thus, the cooperation rate by the urban young participants provides a lower bound for the cooperativeness in our subject pools. The contribution rates of the other subject pools are not significantly different from one another (p=0.806, Kruskal-Wallis test).

Second, we find no significant differences in cooperation rates between subject pools in the presence of a punishment option (p=0.171, Kruskal-Wallis test). The third finding is that in all subject pools the presence of a punishment option in the P-experiment did not shift contribution rates to a statistically significantly higher level than in the N-experiment. Among the urban mature and the rural young participants contribution rates were on average even *lower* in the presence than in the absence of a sanctioning mechanism; this effect is weakly significant for the urban mature participants.

Figure 1 reveals some interesting similarities and differences between subject pools. In the N-experiments the fraction of zero contributions was remarkably similar across subject pools. The most frequent contribution was 10 tokens, except for the rural mature participants where the modal contribution was 20 tokens. By contrast, among the urban young participants virtually nobody contributed 20 tokens. In the P-experiments the modal contribution was 10 tokens in all subject pools. The frequency of full contributions was lower in all subject pools in the P-experiment than in the N-experiments; with the exception of urban young participants. A particularly noteworthy observation is that among urban mature participants the frequency of low contributions was *higher* and the frequency of high contribution was *lower* in the presence of a punishment option than in its absence.

B. *Reactions to changed incentives*

Our design allows us investigating how a change in incentives influenced cooperation. We added punishment in the second experiment in the N-P sequence and we removed the punishment opportunity in the second experiment in the P-N sequence. From previous experiments (e.g., Fehr and Gächter [2002]) we predict that contributions in the N-P sequence increase in the P-experiment relative to the N-experiment and fall in the P-N sequence. Result 2 records the evidence.

Result 2: *In the N-P sequence contributions decayed significantly in the second experiment despite the presence of a punishment option. This result, which holds in all subject pools except rural mature, is in contrast to existing evidence. The reason for the decay was that in all subject pools the high contributors in the N-experiment reduced their contributions substantially whereas the low contributors in the N-experiment did not increase their contributions in the P-experiment.*

Figures 2 and 3 provide support for Result 2. We start with Figure 2. The presence of a punishment opportunity is symbolized with a black diamond and the absence with a white circle. We also show the 95-percent confidence intervals of the mean contributions.

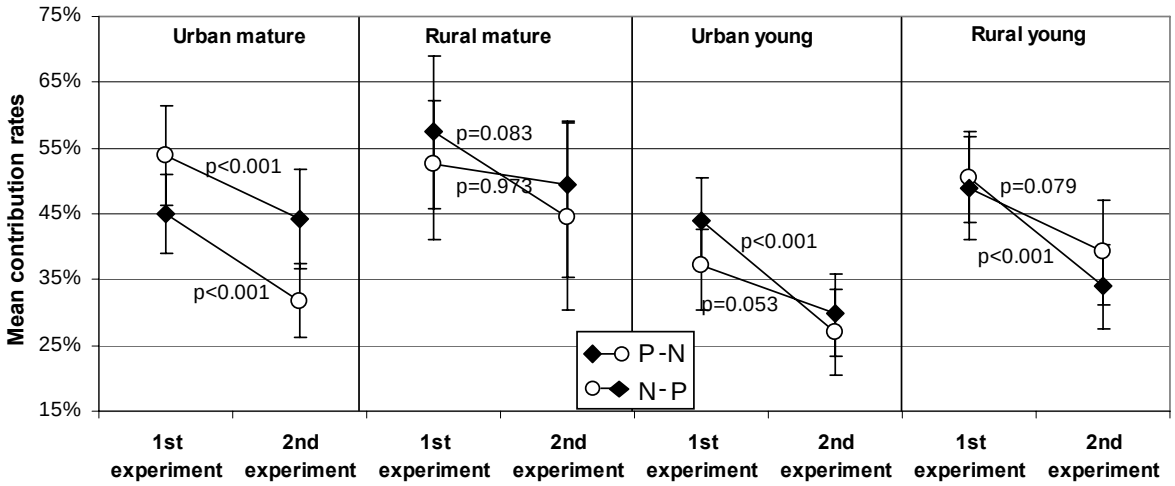

FIGURE 2: THE EFFECT OF CHANGING INCENTIVES IN THE N-P AND THE P-N EXPERIMENTS

Look at the P-N sequence first, where we took the punishment opportunity away in the second experiment. Contribution rates declined in the P-N sequence in line with our prediction and the literature. Among the urban participants this decline is significant at the 0.1-percent level (two-sided Wilcoxon signed-ranks tests), whereas among the rural participants the decline is only weakly significant.

Contribution rates did not increase when punishment was added (i.e., in the N-P-sequence), which is contrary to our prediction and reported evidence.[12] Contribution rates even decayed on average. The decay is highly significant in the urban mature and the rural young pools; weakly significant among the urban young participants and insignificant among the rural mature participants (two-sided Wilcoxon signed ranks tests with group averages as independent observations).

We look at individual contribution rates and how they changed from the N- to the P-experiment in the N-P sequence to understand this unexpected result. Specifically, we take the N-experiments as the benchmark and define a contribution rate in the N-experiment as "below (above) median" if it is less (at least) the median contribution in a given subject pool (the median contribution rate is 50 percent in all subject pools, except urban young, where it is 40 percent).

[12] See the references in footnote 1. Cooperation is higher in the presence than the absence of punishment in all these experiments.

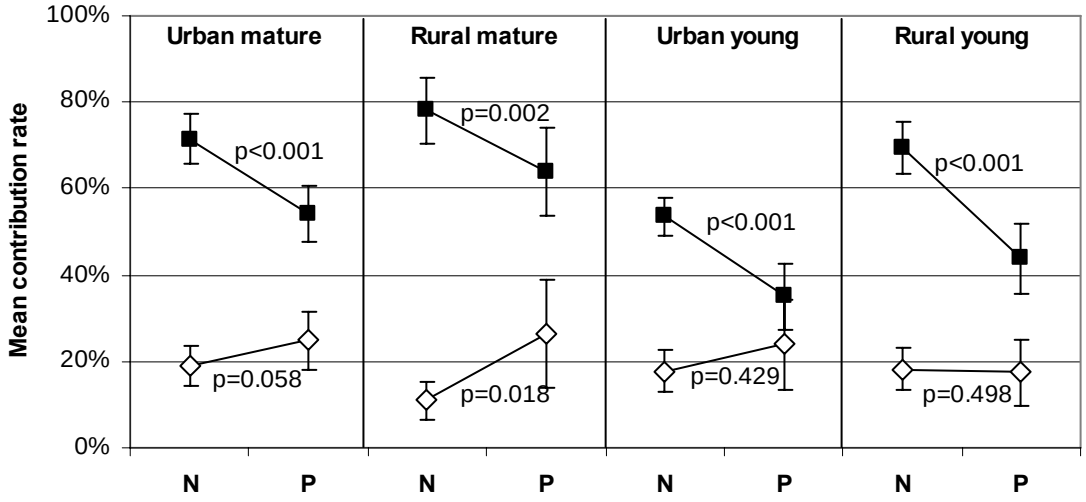

FIGURE 3: WITHIN-SUBJECT CHANGE IN CONTRIBUTION RATES FROM THE N- TO THE P-EXPERIMENT FOR "BELOW-MEDIAN" CONTRIBUTORS IN THE N-EXPERIMENT (WHITE DIAMONDS) AND "AT LEAST MEDIAN" CONTRIBUTORS IN THE N-EXPERIMENT (BLACK RECTANGLES).

Figure 3 depicts how contribution rates for these two subgroups changed from the N- to the P-experiment. We find that the drop in contribution rates that we observe in all four subject pools in the N-P sequence was predominantly due to the "at least median" contributors. They lowered their contribution rates in the P-experiment on average by 19.3 percent relative to the N-experiment. This change in behavior was remarkably similar in all subject pools. The "below median" contributors in the N-experiment only changed their contributions from the N- to the P-experiment (weakly) significantly in the mature subject pools. Apparently, the "below median" contributors in the young subject pools were not impressed very much by the addition of a punishment opportunity.

C. *Punishment behavior*

We pool the data from the N-P and the P-N sequences since punishment patterns are very similar. We record the following result.

Result 3: *We find in all subject pools substantial punishment of free riders but also of cooperators. The expenditures on spiteful punishment across subject pools ranged from 35 to 77 percent of the expenditures on punishment of free riders. The presence of a punishment option also led to substantial payoff losses relative to the payoffs in the N-experiments.*

Figure 4 and Table 2 provide the support for this result. Figure 4 shows the data from the perspective of a punishing subject. Figure 4 depicts for each subject pool the average

punishment expenditures of a punishing subject as a function of the punished subject's deviation from the punisher's contribution at the first stage of the P-experiment. A punished subject's contribution in the first stage of the P-experiment can deviate from the punisher's contribution by –20 to +20 tokens. For expositional ease we divide this range into five intervals. For instance, if the difference is –15, this means that the punished subject contributed 15 tokens less than the punishing subject and we categorize the corresponding punishment act into the deviation interval [-20,-11]. If the difference is positive, the punished subject contributed more than the punisher. If the difference is zero, the punisher and the punished subject contributed exactly the same amount to the public good at the first stage. The figure also shows the 95-percent confidence bounds. We also indicate the degree of spiteful punishment σ. σ denotes the ratio of mean expenditures on the punishment of non-negative deviations to the mean expenditures on punishment of negative deviations.

Figure 4 reveals a pattern of punishment that is quite different to that observed elsewhere, with the exception of the urban young participants. For instance, the mean pattern of punishment of urban mature participants is u-shaped. Strikingly, the urban mature participants also punished those who contributed the *same* (zero deviation) with more than one punishment point. Even more surprising is the observation that the urban mature participants also punished those who contributed *more* than they did. For instance, on average punishers expended almost two money units to punish those who contributed between 11 and 20 tokens more to the public good than they did. The urban mature participants also punished negative deviations, which is in line with the existing evidence. The more the punished subject's contribution fell *below* the punisher's contribution, the more strongly the deviator got punished. For rural mature participants the pattern was similar, although less pronounced.

We find that among the young participants the rural ones punished across the board. The punishment of urban young participants (which consists mostly of students) came closest to the punishment observed in western student subject pools (see the references in footnote 1). Yet, we find substantial punishment of contributors who contributed more than the punishing subject even among the urban young participants. For instance, the lowest average punishment of high contributors was 0.59 punishment points among the Kursk young participants whereas it was only 0.34 points among the Zurich students who participated in the one-shot experiments of Fehr and Gächter [2002]). Across subject pools the ratio of spiteful punishment, σ, varied between 35 percent among urban young participants and 78 percent among urban mature participants.[13] To put this result into perspective, among the Zurich undergraduates in Fehr and Gächter [2002], σ = 0.23. In other words, although less

[13] Recall that σ = (mean punishment of negative deviations)/(mean punishment of non-negative deviations). Then the detailed results are as follows: $\sigma_{\text{Urban mature}} = 1.192/1.537 = 0.78$; $\sigma_{\text{Rural mature}} = 0.787/2.263 = 0.35$; $\sigma_{\text{Urban young}} = 0.592/1.514 = 0.39$; $\sigma_{\text{Rural young}} = 1.079/1.533 = 0.70$.

important than punishment of free riders, spiteful punishment was very substantial in our subject pools.

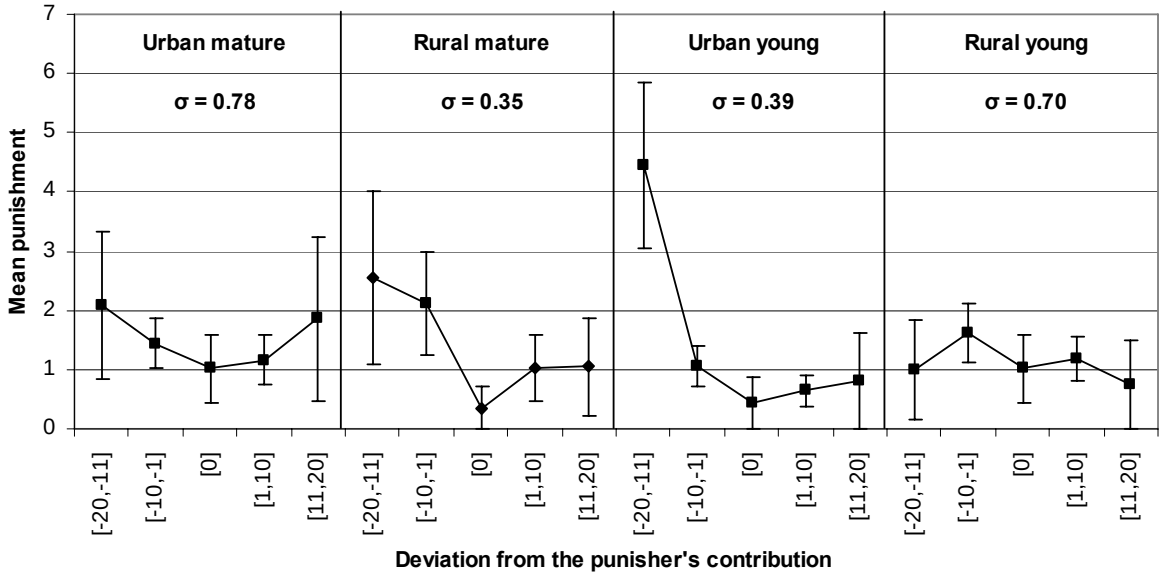

FIGURE 4: PUNISHMENT OF GROUP MEMBERS AS A FUNCTION OF THEIR DEVIATION FROM THE PUNISHER'S CONTRIBUTION. σ DENOTES THE RATIO OF SPITEFUL PUNISHMENT.

An econometric analysis of punishment behavior corroborates the findings of Figure 4. We take a separate look at the four subject pools. Since punishment for negative and positive deviations is different we introduce the interaction variables "Absolute negative deviation" and "Positive deviation". The variable "Absolute negative deviation" is the absolute value of the actual deviation of the punished subject's contribution from the contribution of the punishing subject in case the punished subject contributed strictly less than the punishing subject, and zero otherwise. We define the variable "Positive deviation" analogously. We also include the total group contribution (split up in own contribution and the sum of the other group members' contribution) to account for a possible impact of the absolute cooperation level on punishment. The variable "Second experiment" is a dummy for the P-experiment of the N-P sequence. The estimation method is Tobit, since punishment is censored between 0 and 10 (ordered probit estimations yield the same qualitative results). We calculate robust standard errors and cluster on the independent groups. Table 1 records the results.

Punishment was significantly correlated to free riding in all subject pools; the rural young participants were the exception. The more a subject's contribution deviated from the contribution of the punishing subject, the more this subject got punished. The coefficient of "Absolute negative deviation" is similar for urban and rural mature participants ($\chi^2(1) = 0.19$, $p=0.660$). The rural young participants punished free riders less harshly than all other subject pools ($p<0.063$, pair wise $\chi^2(1)$-tests). The young urban participants punished free riders

significantly more harshly than the young rural participants ($\chi^2(1) = 15.50$; p=0.0001); they also punished more harshly than the mature urban participants ($\chi^2(1) = 4.69$; p=0.030) and exhibited no significantly different punishment behavior of free riders than the rural mature participants ($\chi^2(1) = 2.45$; p=0.118). Punishment was not significantly related to positive deviations, again with the exception of rural young participants.

TABLE 1: AN ECONOMETRIC ANALYSIS OF PUNISHMENT BEHAVIOR

	Urban mature	Rural mature	Urban young	Rural young
Absolute negative deviation	0.360	0.440	0.648	0.124
	(0.111)***	(0.182)**	(0.133)***	(0.127)
Positive deviation	-0.073	-0.091	-0.069	-0.264
	(0.116)	(0.112)	(0.071)	(0.085)***
Own contribution	-0.211	-0.158	-0.235	-0.267
	(0.119)*	(0.139)	(0.116)**	(0.098)***
Sum of contribution of other group members	0.120	0.015	0.159	0.021
	(0.063)*	(0.106)	(0.062)***	(0.060)
Second experiment	-0.517	3.742	0.118	-0.003
	(1.259)	(1.828)**	(0.861)	(0.992)
Constant	-4.095	-6.504	-3.987	0.560
	(1.356)***	(2.835)**	(1.372)***	(1.556)
Observations	370	184	280	298
Wald chi(5)	19.48***	23.51***	19.90***	16.63***

Robust standard errors in parentheses * significant at 5%; ** significant at 1%
Note: Tobit estimates.

The presence of a punishment option in the P-experiments led to substantial losses in earnings relative to the earnings in the N-experiments. This holds true in all subject pools. For instance, the average earning of an urban mature participant in the N-experiment was 24.7 money units. In the P-experiment the earnings dropped to 13.7 money units, which implies a relative loss in earnings of 44.5 percent. The average relative loss in earnings of a rural mature participant was 44.6 percent; urban young participants lost 29.2 percent and for the rural young participants the relative loss amounted to 39.7 percent. By contrast, the Zurich undergraduates who took part in the one-shot experiments of Fehr and Gächter [2002] experienced an average relative loss in earnings of 13.7 percent only.

D. *The impact of socio-demographic differences on cooperation and punishment*

Our final step is to look at the relevance of the socio-economic variables for cooperation and punishment. We pool the data of all four subject pools and of all N- and P-experiments, respectively, and set up a Tobit regression model that explains the contribution rates to the public good as a function of important socio-economic variables (for details see Appendix A).

We include gender; a dummy for mature participants ("mature", which equals 1 if age ≥ 30; 0 otherwise); a dummy whether one is a rural or an urban resident ("rural"); dummies for our non-students, who were either blue collar or white collar workers; two dummies for the highest education achieved ("secondary school" and "university degree"); a dummy whether one is a "member in any organization"; a dummy whether one is "religiously active" or not; the "number of known other participants" as a proxy for social proximity of participants; a dummy "city size > 2'000 inhabitants", which is 1 if the subject has spent most of his or her life in a city with more than 2'000 inhabitants, irrespective of a person's current situation as an urban or rural resident[14]; and finally a dummy ("second experiment") if the experiment was second in sequence. We have chosen these variables because their relevance has been suggested by previous literature[15] and/or because they follow directly from our research questions, like whether there is – ceteris paribus – a difference between urban and rural residents, or young and mature age cohorts. Result 4 collects our findings.

Result 4. *In both the N- and the P-experiment we find that – ceteris paribus – rural residents and mature participants contributed more to the public good than urban and young participants. Punishment is largely unrelated to socio-demographic factors.*

We document the support for this result in Tables 2 and 3. Our strategy is to estimate first a model where the two main explanatory variables relate to the variables which are our main interest – whether a subject is at least 30 years old (dummy variable "mature") and whether a subject is a rural or an urban resident (dummy variable "rural"). In a second step we control for other potentially important covariates. We document the estimation results on cooperation in the N- and P-experiments in Table 2. Table 3 will present the results on punishment.

We find in the *N-experiments* that both mature participants and rural participants contribute significantly more than their younger and urban counterparts, respectively.[16] When we control for covariates we find that none of the covariates is significant at conventional levels. The variable "mature" is no longer significant, while "rural" remains significant. We find it particularly noteworthy that the education variables are insignificant. This suggests that contributions are not due to confusion if we assume that better educated people are less easily confused. We conclude that the observation that rural participants contribute significantly more than urban residents is a robust finding, whereas the age effect seems to be fragile.

[14] This variable is a proxy for the dominant experience of the social background of one's life (see Appendix A).
[15] Many studies have found gender effects in social preferences (see Croson and Gneezy [2004] for a survey). List [2004] and Sutter and Kocher [2005] find a relationship between age and social preferences. Putnam [2000] and Glaeser, Laibson and Sacerdote [2002] argue for the relevance of memberships in civic organizations. Sosis and Ruffle [2003] have evidence for the relevance of religious activity for cooperation.
[16] List [2004] also found a positive effect of age on contributions.

TABLE 2: THE IMPACT OF SOCIO-DEMOGRAPHIC FACTORS ON COOPERATION

	Dependent variable			
	Cooperation rate in N		Cooperation rate in P	
	(1)	(2)	(1)	(2)
Mature (age ≥ 30)	0.083	0.050	0.122	0.134
	(0.033)**	-0.054	(0.031)***	(0.052)**
Rural resident	0.099	0.094	0.064	0.074
	(0.034)***	(0.043)**	(0.032)**	(0.043)*
Female		0.014		-0.020
		(0.036)		(0.033)
White-collar worker		0.063		-0.024
		(0.077)		(0.080)
Blue-collar worker		-0.018		-0.141
		(0.066)		(0.069)**
Secondary school		0.045		0.100
		(0.057)		(0.054)*
University degree		0.036		0.081
		(0.058)		(0.052)
Member in any organization (dummy)		-0.015		-0.048
		(0.036)		(0.033)
Religiously active		0.036		-0.017
		(0.040)		(0.035)
Share of known other participants		-0.053		-0.048
		(0.080)		(0.077)
City size > 2'000 inhabitants		-0.021		-0.011
		(0.017)		(0.017)
Second experiment	-0.179	-0.171		-0.117
	(0.034)***	(0.035)***		(0.031)***
Constant	0.385	0.405	0.379	0.458
	(0.030)***	(0.074)***	(0.031)***	(0.068)***
Observations	566	521	566	521
Wald χ^2	42.6***	57.0***	30.5***	53.3***

Tobit regressions with robust standard errors. Robust standard errors in parentheses;
* significant at 10%; ** significant at 5%; *** significant at 1%

We get slightly different results with respect to contribution rates in the *P-experiment*. First, we find again that mature participants and rural participants contributed significantly more than young and urban participants. Both effects remain (weakly) significant when we control for covariates. Among the covariates we find that blue-collar workers contributed significantly less than students (the benchmark) and people whose highest degree is from a secondary school contributed significantly more than students. All other variables are insignificant at conventional levels.

We turn next to punishment behavior and record the estimation results in Table 3. In our first models we do not distinguish whether the punished subject had deviated positively or negatively from the punisher's contribution. We also control for the same variables as in Table 1.

TABLE 3: THE IMPACT OF SOCIO-DEMOGRAPHIC FACTORS ON PUNISHMENT

	Dependent variable					
	All punishment		Punishment of negative deviations		Punishment of non-negative deviations	
	(1)	(2)	(3)	(4)	(5)	(6)
Mature (age ≥ 30)	0.087	0.306	0.214	2.279	-0.089	-0.587
	(0.581)	(0.975)	(0.761)	(1.420)	(0.777)	(1.265)
Rural resident	0.243	0.772	0.262	0.787	0.280	1.053
	(0.592)	(0.789)	(0.792)	(1.024)	(0.744)	(0.994)
Absolute negative deviation	-0.418	-0.410	-0.494	-0.455		
	(0.067)***	(0.067)***	(0.113)***	(0.108)***		
Non-negative deviation	-0.134	-0.139			-0.009	-0.023
	(0.050)***	(0.052)***			(0.062)	(0.063)
Own contribution	-0.254	-0.257	-0.443	-0.436	-0.102	-0.106
	(0.059)***	(0.060)***	(0.109)***	(0.108)***	(0.086)	(0..088)
Sum of others' contribution	0.089	0.084	0.142	0.115	0.039	0.048
	(0.034)***	(0.033)**	(0.058)**	(0.056)**	(0.050)	(0.049)
Second experiment	0.400	0.330	-0.295	-0.254	1.063	0.864
	(0.613)	(0.619)	(0.758)	(0.722)	(0.798)	(0.827)
Female		-0.446		-0.320		-0.725
		(0.592)		(0.707)		(0.871)
White-collar worker		-1.576		-2.509		-1.362
		(1.422)		(1.950)		(2.044)
Blue-collar worker		0.285		-2.065		1.564
		(1.055)		(1.694)		(1.383)
Secondary school		0.681		-0.444		1.294
		(0.981)		(1.186)		(1.459)
University degree		1.506		0.155		2.535
		(1.086)		(1.237)		(1.506)*
Member in any organization (dummy)		0.776		0.301		1.469
		(0.587)		(0.735)		(0.823)*
Religiously active		0.243		-0.354		0.878
		(0.626)		(0.928)		(0.795)
Share of known other participants		-0.556		-0.057		-1.278
		(1.289)		(1.943)		(1.614)
City size > 2'000 inhabitants		0.303		0.328		0.230
		(0.263)		(0.336)		(0.387)
Constant	-3.164	-4.188	-1.505	-1.195	-4.321	6.551
	(0.891)***	(1.432)***	(1.106)	(1.770)	(1.143)***	(2.002)***
Observations	1132	1042	469	433	663	609
Wald χ^2	66.9***	70.7***	22.1***	27.5**	4.9	22.5*

Tobit regressions with robust standard errors. Robust standard errors in parentheses;
* significant at 10%; ** significant at 5%; *** significant at 1%

We find that no socio-demographic variable, including the two variables of main interest, are significantly related to punishment. In models (3) and (4) we only look at punishment of negative deviations, i.e., situations where the punished subject had contributed *less* than the punishing subject. Again we detect no influence of socio-demographic variables

on punishment of free riders. Finally, when we confine our attention to spiteful punishment (i.e., punishment of non-negative deviations – models (5) and (6)), there is no difference between mature and young participants, and urban and rural participants. This also holds if we control for covariates. Here we get three noteworthy results. People who were a member in any voluntary organization punished weakly significantly more spitefully than people with no memberships. People with a university degree punished weakly significantly more than students and white-collar workers weakly significantly less than students. Thus, higher degrees of education did not lower spiteful punishment, which suggests that spiteful punishment was not due to confusion. All other variables are not related to spiteful punishment.

IV. Summary and concluding remarks

We conducted experiments with 566 adult participants in urban and rural Russia. We employed a 2×2-factorial subject pool design to investigate potential differences in cooperation and punishment behavior between (i) "mature" and "young" participants and between (ii) residents of urban and rural areas, which still differ sharply with respect to living conditions. Our mature participants were socialized during communism, whereas the young participants spent their adolescent years in the turbulent transition period after the breakdown of the Soviet Union. Thus, these subject pools differ starkly from the western undergraduate subject pools used in most experiments on voluntary cooperation. Our experiments therefore provide (i) a "robustness check" of previous findings in sociologically different subject pools, and (ii) allow us to uncover the potential impact of socio-demographic factors on cooperation and punishment.

We observe in all subject pools substantial levels of voluntary cooperation and punishment of free riders. This finding supports previous conclusions about the importance of altruistic cooperation and punishment, and reciprocity in general (e.g., Fehr and Fischbacher [2003], Dohmen, Falk, Huffman and Sunde [2006]). We have the following main new results:

1. *The sociological background matters for voluntary cooperation. In particular, we found higher levels of voluntary cooperation among rural residents than among urban residents; the student–non-student distinction does not matter in our data.* This result highlights that probably the student–non-student distinction is less important than previously suggested (e.g., Carpenter, Burks and Verhoogen [2005]) if we take the broader sociological environment, like the urban-rural distinction, into perspective.

2. *We found in all subject pools very high levels of spiteful punishment of people who contributed the same or even more than the punishing subject.* This result suggests that spite is an important motivation that should be "added" to the list of important social preferences. Although spiteful punishment has been observed in previous experiments on cooperation and punishment, it was substantially lower than in the present experiment. This explains why hitherto spiteful punishment has been rather neglected.

3. *In no subject pool did punishment lead to a significant increase in cooperation. Instead, the presence of a punishment option resulted in substantial payoff losses.* Thus, spiteful punishment can undermine the positive impact of punishment for cooperation and thereby limit the success of "self-governance". Our results show that it does not take "counter-punishment" (i.e., multiple rounds of retaliatory punishment for having got punished) to limit successful self-governance (Nikiforakis [2006]; Cinyabuguma, Page and Putterman [2005]; Denant-Boemont, Masclet and Noussair [2005]); sufficiently spiteful preferences are enough already.

Appendix A: Socio-economic background of our subject pools

In total, 606 people divided into 202 independent groups participated in our study. The experiments took place in the city of Kursk; in the neighboring city of Zheleznogorsk, in eight different villages of the Kursk region (Ivanovka, Kazanka, Kosorzha, Nizhniy Daymon, Sedmikhovka, Nikolaevka, and Matveevka, all around 40 miles north of Kursk), and in Ust-Kinel, 400 miles east of Moscow. Forty participants were not able to solve the control questions of the experiment, so we cannot be sure whether they understood the decision situation properly. We drop them from the data set, which leaves us with valid data from 566 urban and rural participants.

An anonymous post-experimental questionnaire provides us with the socio-demographic details of our subject pools. In addition to obvious socio-demographic variables (age, gender, education and profession), we asked them about the size of the city were they had spent most of their lives, to get a proxy for the formative background of our participants. This variable contains four categories: (1) city size is up to 2'000 inhabitants; (2) between 2'000-10'000 inhabitants; (3) between 10'000-100'000 inhabitants and (4) more than 100'000 inhabitants. This city size variable gives us some information about the background of the participants that is not captured by the place were we ran the experiments. Put differently, this variable gives us some validation for our assumption that the classification of participants as urban or rural is substantially correct. A further proxy for a rural vs. urban background is the actually observed social distance between our participants. To get information on this, we asked them, at the end of the experiment, how many other participants (out of roughly 30 in each session) they knew.

A further piece of background information relates to the social activities of our participants. We have two indicators. One measure is whether a subject is religiously active or not (*Religious activity,* a dummy variable). The second indicator of social activity, the *Membership* variable (a dummy variable), records whether the subject is a member of any civic voluntary associations (political, interest groups, sports, culture, nonprofits, others).

A. *Mature urban and rural participants* (*age* $\geq$ 30)

Table A1 contains the results for the urban and rural mature participants. Urban and rural mature participants were about equally old (44.6 and 43.0 years, respectively). The share of females between the pools was very balanced and with 55.0 and 53.3 percent the same in both pools. There are no statistically significant differences between urban and rural subject pools with respect to age and gender composition.

The rural mature participants had indeed spent most of their lives in small places: The mean city size category for them is 1.46. By contrast, the urban mature participants reported an average city size category of 3.4, which means that most of them had spent most of their lives in a rather large city. A χ^2-test confirms that our city size variable is significantly differently distributed between the two subject pools. Thus, our categorization of subject pools as urban and rural has substantive content. The urban mature participants knew on average only 3.4 percent of the other participants. By contrast, the villagers knew each other well. On average one participant knew 43.1 percent of the others participants. This difference, which is significant at any conventional level, reflects the different levels of social distance in the urban and rural areas, respectively.

The rural mature participants were significantly less religiously active than the urban mature participants. Both subject pools revealed similarly low levels of societal engagement. This low rate of membership is consistent with observations from other studies that Russians generally have a very low engagement in any civic voluntary association (e.g., Rose [2000]);. For instance, based on interviews conducted in 1998, Rose [2000], reports that 80 to 90 percent of the Russians do not belong to any voluntary association. In our subject pools this was true for 71 percent.

Table A1 also contains information about the jobs our participants held. The urban and rural subject pools differed significantly with respect to professional composition. We distinguish between white-collar and blue-collar workers. Our definition of white-collars comprises all jobs that consist of non-manual work (civil servants, clerks, executives, entrepreneurs); blue-collar workers do manual work (workers, farmers, homemakers). Roughly 63 of the urban mature participants were white-collar workers; in the rural areas their fraction was 46 percent. A fair number of our participants were blue-collar workers. Workers from the villages were predominantly engaged in agricultural production (for example as tractor drivers). In the cities 43.5 percent of the participants were clerks, while in the villages we only had 27.1 percent clerks. In the rural context these participants were mainly teachers at the local schools or local hospital employees. Farmers occurred only among the villagers and accounted for 2.2 percent of the participants. 5.4 percent of the urban and 0 percent of the rural participants considered themselves as entrepreneurs. The share of executives and civil servants was low in both pools.

Finally, we turn to the educational background of our participants, which is also significantly different between subject pools. The urban participants were more highly educated on average than the rural participants.

Fewer urban than rural mature participants had only compulsory education. Among the urban mature participants almost half of our participants had a completed university degree. Among the rural mature participants this was true for a third of our participants.

TABLE A1: KEY FIGURES ABOUT THE MATURE SUBJECT POOLS (AGE ≥ 30)

	Urban mature (n=185)	Rural mature (n=92)	Statistical comparisons (p-value; test)
General background data			
Mean age in years	44.6 (8.6)	43.0 (9.7)	0.164 (t-test)
Percent Female	55.0	53.3	0.337 (χ^2-test)
Mean of city size category	3.5 (0.8)	1.5 (0.8)	0.000 (χ^2-test)
Share of known participants (in percent)	3.5 (6.4)	43.1 (37.8)	0.000 (t-test)
Indicators of social activity			
Religiously active (in percent)	83.2 (37.4)	56.5 (49.8)	0.000 (χ^2-test)
At least one membership (in percent)	30.3 (46.1)	26.1 (44.2)	0.406 (χ^2-test)
Professions of participants (in percent)			0.001 (χ^2-test)
White collar	62.7	45.7	
Clerks	43.5	27.1	
Executives	9.8	9.8	
Entrepreneurs	5.4	0.0	
Civil servants	4.3	8.7	
Blue collar	37.3	58.1	
Workers	26.1	33.7	
Farmers	0.0	2.2	
Homemakers	10.9	18.5	
Education (highest level attained, in percent)			0.001 (χ^2-test)
Compulsory education	22.3	27.2	
Secondary school degree	19.0	39.1	
University degree	50.0	32.6	
No data	8.7	1.1	

Note: Numbers in parentheses are standard deviations.

B. *Young urban and rural subject pools*

The 289 young participants were on average 20 years old; the rural young participants were slightly older than their urban counterparts. Between 21 and 32 percent were females. The urban students mostly came from medium-sized and big cities, whereas the rural students were mostly from small and medium-sized cities. This difference is highly significant. The rural students had a significantly higher rate of acquaintance with other participants than the urban students (9.9 percent vs. 24.9 percent). Urban and rural students are about equally religiously active. Yet, when it comes to memberships in civic voluntary organizations, we find a strong difference between subject pools. Among the urban participants, 63 percent reported a membership in at least one civic voluntary organization, whereas only 46 percent the rural participants were members in any civic organization. The majority of our young participants were students, but significantly fewer among the rural participants. A2 we summarize key background figures of our young subject pools.

TABLE A2: KEY FIGURES ABOUT THE YOUNG SUBJECT POOLS (AGE < 30)

	Urban young (n=140)	Rural young (n=149)	Statistical comparisons (p-value; test)
General background data			
Mean age in years	20.5 (2.2)	21.0 (2.5)	0.053 (t-test)
Percent Female	21.4	32.4	0.016 (χ^2-test)
Mean of city size category	2.8 (1.1)	1.9 (1.0)	0.000 (χ^2-test)
Share of known participants (in percent)	9.9 (9.8)	24.9 (24.2)	0.000 (t-test)
Indicators of social activity			
Religiously active (in percent)	84.3 (36.5)	81.9 (38.6)	0.517 (χ^2-test)
At least one membership (in percent)	62.9 (48.5)	45.6 (50.0)	0.001 (χ^2-test)
Professions of participants (in percent)			
Students (in percent of participants)	89.3 (31.0)	74.5 (43.7)	0.001 (χ^2-test)
White collar (in percent of participants)	3.6 (18.6)	6.0 (23.9)	0.334 (χ^2-test)
Blue collar (in percent of participants)	7.1 (25.8)	19.5 (39.7)	0.003 (χ^2-test)

Note: Numbers in parentheses are standard deviations.

Appendix B: Instructions

The following instructions were originally written in Russian. We document the instructions from the N-P sequence.

General Explanations for Participants

You are now taking part in an economics experiment, financed by several research foundations. If you read the following instructions carefully, then you will be able to earn – according to your decisions – a considerable amount of money.

The instructions are solely for your private information. During the experiment conversation is strictly prohibited. If you have any questions, please ask us. A violation of this rule will lead to the exclusion from the experiment and all payments. If you have questions, please raise your hand. A member of the research team will come to you and answer your question personally.

During the experiment we will not speak of Rubles but rather of Guilders. So first your whole income will be calculated in Guilders. At the end of the experiment, the whole amount of points you have earned will be converted to Rubles at the following rate and paid out in cash:

1 Guilder = 1 Ruble.

All participants will be divided in groups of three members. Except us, the experimenters, nobody knows who is in which group. Neither before, nor after the experiment, will you learn which people are/were in your group.

On the following pages the experiment will be described in detail.

The decision situation

You will learn later how the experiment will be conducted. We first introduce you to the basic decision situation. At the end of the description you will find exercises that help you gain an understanding.

You will be a member of a group consisting of 3 people. Each member of this group has to decide on the allocation of 20 Guilders. You can put these 20 Guilders into your private account or you can invest them fully or partially into a project. Each point you do not invest into the project, will automatically stay in your private account.

The experimenter will add an amount equal to 50% to the total sum of Guilders contributed to the project. This sum will be divided equally between the three group members. For example, if you contribute one Guilder to the project, the experimenter will add half a Guilder. So the amount of 1.5 Guilders will be distributed among all the three members of the group in equal parts. Therefore, each group member receives 0.5 Guilders. For every Guilder you put into the project you will earn 0.5 Guilder. At the same time the income of each other group member will increase by 0.5 Guilders, since every group member receives the same amount of money from the project. So with your contribution of one Guilder to the project, the income of the group rises by 1.5 Guilders; on the other hand, the contribution of one Guilder to the project by another group member will raise your income by 0.5 Guilders.

After all three group members have decided on their contributions to the project, the income of every participant is determined.

Calculation of your income:

The income of each group member will be calculated in the same way, consisting of two parts:

(1) Guilders from the private account ("Income from Guilders kept")
(2) Guilders contributed to the project ("Income from the Project")

The income from the project will be determined as follows:
0.5 x (total sum of contributions to project)

Your total income is the sum of your income of your private account and the income from the project. Therefore:

Total income = Income from the private account + Income from the project =
(20 – Your contribution to the project) + 0.5 (Sum of all contributions to project).

If you decide to contribute nothing to the project, your "income from the private account" is 20. If you decide to contribute 10 Guilders to the project, your "income from the private account" is 10.

The following examples will help you gain some understanding about the calculation of your income:

1. If all three group members contribute 0 Guilders to the project, their income will be "income from the private account" of 20. Nobody receives anything from the project, since nobody contributed. The total income of each member is therefore 20 Guilders.

Calculation of total income for each participant: (20 – 0) + 0.5(0) = 20*

2. If all three group members contribute 20 Guilders to the project, the total contribution is 60 Guilders; the "income from the private account" is 0; but each member gets an income from the project of 0.5*60 = 30 Guilders.

Calculation of total income for each participant: (20 – 20) + 0.5(60) = 30*

3. If you contribute 20 Guilders to the project, the second member 10 Guilders, and the third member 0 Guilders, the following incomes will result. Since you and the second member contributed a total of 30 Guilders, each of you will get 0.5*30 = 15 Guilders from the project.

Since you contributed all 20 Guilders to the project, you receive a total of 15 Guilders.

The second member of the group gets the 15 Guilders from the project as well. Since he contributed 10 Guilders to the project, he kept 10 Guilders for himself, this way he receives 10 + 15 = 25 Guilders, in total.

The third member of the group, who contributed nothing to the project, also gets the 15 Guilders from the project and additionally the 20 Guilders "from the private account", therefore 20 + 0.5*(30) = 35 Guilders.

Calculation of your total income: (20 – 20) + 0.5(30) = 15*
Calculation of second member's income: (20 – 10) + 0.5(30) = 25*
Calculation of third member's income: (20 – 0) + 0.5(30) = 35*

4. The other two members contribute 20 Guilders to the project, you decide to contribute nothing. In this case the incomes are calculated as follows:

Calculation of total income for the 2nd and 3rd member (contribution of 20):
(20 – 20) + 0.5(40) = 20.*

Calculation of total income for you: (20 – 0) + 0.5(40) = 40*

For your decision, you will receive the following sheet: (shown here only as an example):

1. Decision sheet:

Please fill in the box how many Guilders you want to contribute to the project:

(Maximum 20 Guilders)

On a decision sheet, like the one above, you will fill into the box how many Guilders you would like to contribute to the project.

After you have made your decision, please put your decision sheet in the provided envelope, seal the envelope and give it to a research assistant. The decision that you have made will only be seen by the leader of the experiment. He will then calculate your income. You will then get, in a sealed envelope, an information sheet, which will tell you what the other participants in your group invested into the project and what income you and the other members of your group have achieved.

The experiment will be conducted only **once.**

Control questions:
Please answer all the questions and write down your calculation. The examples are hypothetical and serve only to help you understanding the calculation of your income, which varies with your decision about how you distribute your 20 Guilders.

1. Each group member has 20 Guilders. Nobody (including you) contributes to the project.
What will your total income be? ……
What will the total income of the other group members be? ……

2. Each member has 20 Guilders. You contribute 20 Guilders to the project. The other group members also contribute 20 Guilders to the project.
What will your total income be? ……
What will the total income of the other group members be?

3. Each member has 20 Guilders. You contribute 3 Guilders; the second member contributes 10 Guilders and the third member contributes 17 Guilders.
What will your total income be? ……
What will the total income of the second member be? ……
What will the total income of the third member be? ……

4. Each member has 20 Guilders. You and the second member contribute 20 Guilders to the project; the third member contributes 0 Guilders.
What will your total income be? ……
What will the total income of the second member be? ……
What will the total income of the third member be? ……

Do you have any questions?

General Explanations for the Participants

We will conduct one more experiment. As in the previous experiment, you have an endowment of 20 Guilders available. However, this time you must make two decisions. The **first decision** is identical to the decision that you made in the experiment that you have already completed. In the first decision you must make a decision about how many of the 20 Guilders from your endowment you want to contribute to a project (and also how many you will keep for yourself). The income in the first step will be calculated in the same way as it was calculated in the previous experiment. For each Guilder that you choose to keep, you will earn one Guilder. For each Guilder that you contribute to the project you, and all other members of the group, will earn 0.5 Guilders. Each Guilder that another member contributes to the project, raises your income by 0.5 Guilders.

The composition of the groups is the same as in the first experiment. You will not find out who is in the group with you. This experiment will also be conducted only once.

What is different in the new experiment?

New is a **second stage**, which takes place immediately after you have received the information sheet about the contribution and the income of the other participants.

The second stage:

At the second stage you will find out how much the other members of the group have contributed to the project. At this stage, you may, through **assigning deduction points**, **reduce** the income of **each** other group member. You can also leave the income of the other members **untouched**. The other members of the group may also reduce **your** income if they wish so. The exact procedure will be described below in greater detail. Next we will describe the income consequences that will follow from the assigning of deduction points.

How is your income calculated at the second stage?

If you assign deduction points to another group member the income of this group member will be reduced by three times the amount of assigned deduction points. That means that if you assign one deduction point to another group member, the leader of the experiment will reduce his income by 3 Guilders. If you assign 2 deduction points to a group member, his income will be reduced by 6 Guilders. If you assign 9 deduction points his income will be reduced by 27 Guilders deduction points, etc.. If you choose decide to assign no deduction points to a particular group member his income will not be affected.

You may assign a maximum amount of 10 deduction points to each other member.

If you assign deduction points, you will also face **costs**. For each assigned deduction point, you will face a cost of one Guilder. For example, if you assign 5 deduction points, you will face costs of 5 Guilders, if you assign 10 deduction points, you will face costs of 10 Guilders, etc. If you assign no deduction points, you will, of course, face no costs.

Your total income in Guilders from both stages will be calculated according to the following formula:

Total income in Guilders from the 2nd stage =

= (Income from the 1st stage)

***minus* 3 times (the amount of deduction points received from other group members)**

***minus* (the amount of deduction points you assigned to other group members)**

In case the income reduction resulting from the received deduction points exceeds the income from the 1st stage, the income after the 2nd stage will be ZERO. From this the cost of deduction points that you have assigned to the other participants have to be deducted.

Your total income in Guilders at the end of the second stage thus has three components: (1) your income from the first stage. (2) The tripled amount of deduction points received from other participants. (3) The costs that you have incurred through assigning deduction points.

Please notice the following: If the amount of deduction points received by a member is greater than his income from the first stage, the deduction points of the affected member will be deducted by the experiment leader only by the amount of the income from the first stage. The leader of the experiment will waive the remaining amount of deduction points. This means that income minus the deduction points from the other members will be set to zero. Independent of this, one must completely bear the costs of deduction points that one assigns to other members. Please note that you can, with *certainty*, exclude losses through your own decisions.

How do you make your decisions at the second stage?

As in the first experiment, all participants will, at the beginning, determine their contributions to the project. These decision sheets will be collected. Next, you will get the decision sheet for the second step. On the decision sheet for the second stage you will be informed about how many Guilders the other participants have contributed to the project and which Guilder income you and the other group members have achieved. Now, in an additional row, you must decide, whether and, if yes, how many deduction points you will assign to the other members of your group.

Below you will see an example of the decision sheet, which you will receive with the relevant information for the second decision.

Decision sheet for the second stage:

	You	Second Member	Third Member
Contributions to the project in the first stage:	Your contribution	Contribution of the second group member	Contribution of the third group member
Income from the first stage:	Your income	Income of the second group member	Income of the third group member
Your deduction points:			

Please decide whether, and if so, how many deduction points you would like to assign to the others. If you would not like to assign any deduction points, please enter a zero. You can give each group member a maximum of 10 deduction points. You must, in any case, make an entry into the boxes.

The second decision sheet is designed in the following way:

- In the first row you will see the "Contribution to the project" that the three group members made at the first stage. Your contribution at the first stage is listed in the first column.
- In the second row ("Income from the first stage") you will see, which income each group member received from their decision in the first stage. Under the heading "You", you will see *your* income, in the second and third columns you will see the incomes of the other group members.
- In the third row ("Your deduction points") you have to make your decisions for the second stage: You now have to decide how many deduction points you would like to assign to **each of the other** group members. Enter in the respective box a number between 0 and 10. You have to make an entry into each box. If you would not like to change the income of a certain group member, enter a 0. **You can give each of the other group members a maximum of 10 deduction points.**

After you have entered your decisions on the decision sheet regarding the assigning of deduction points in the second step, put your decision sheet in the envelope and give it to the assistant. The leader of the experiment will calculate your income and the income of the other group members. At the end of the experiment, the assistants will hand out your payoff in an envelope. Only the leader of the experiment will know your decisions.

The experiment will be finished after you have made your decisions about assigning deduction points and the experimenter has collected the envelopes. There will be no further experiment. You have then to answer some questions and then you will receive your payment.

Do you have any questions?

Exercises:

All questions must be answered. Please show all your calculations. If you have questions, ask the experimenters! The examples are hypothetical and serve only to help your understanding of the calculations of your incomes.

1. You want to assign 6 deduction points to the first member and 8 deduction points to the second group member.
Which costs will you incur? ……
By how much will the income of the first group member be reduced? ……
By how much will the income of the second group member be reduced? ……

2. You want to assign 10 deduction points to the first group member. You want assign no deduction points to the second group member.
Which costs will you incur? ……
By how much will the income of the first group member be reduced? ……
By how much will the income of the second group member be reduced? ……

3. You do not assign any deduction points.
Which costs will you incur? ……
By how much will the income of the first group member be reduced? ……
By how much will the income of the second group member be reduced? ……

4. The second member of the group earned 10 Guilders in the 1st stage. From you he receives 5 deduction points; from the third member he receives 6 deduction points.
By how much will the income of the second group member be reduced? ……

REFERENCES

Alt, Hershel , and Edith Alt, *The New Soviet Man. His Upbringing and Character Development* Bookman Associates, Inc., 1964).

Barr, Abigail, "Social dilemmas and shame-based sanctions: experimental results from rural Zimbabwe," *The Centre for the Study of African Economies Working Paper Series. Working Paper 149* (2001).

Bohnet, Iris, and Bruno S. Frey, "Social distance and other-regarding behavior in dictator games: Comment," *American Economic Review*, 89 (1999), 335-339.

Bowles, Samuel, "Endogenous preferences: The cultural consequences of markets and other economic institutions," *Journal of Economic Literature*, 36 (1998), 75-111.

Bowles, Samuel, Jeffrey P. Carpenter, and Herbert Gintis, " Mutual Monitoring in Teams: Theory and Experimental Evidence on the Importance of Reciprocity," *IZA Discussion Paper Series 2106*, (2006).

Bowles, Samuel, and Herbert Gintis, "Social Capital and Community Governance," *The Economic Journal*, 112 (2002), 419-436.

Brainerd, Elizabeth, "Winners and Losers in Russia's Economic Transition " *American Economic Review*, 88 (1998), 1094-1116.

Camerer, Colin F., and Ernst Fehr, "Measuring Social Norms Using Experimental Games: A Guide for Social Scientists," in Joseph Henrich, Robert Boyd, Samuel Bowles, Colin F. Camerer, Ernst Fehr, and Herbert Gintis, eds., *Foundations of Human Sociality: Experimental and Ethnographic Evidence from 15 Small-scale Societies* (New York: Oxford University Press, 2004), pp. 55-95.

Carpenter, Jeffrey P., "Punishing free-riders: how group size affects mutual monitoring and the provision of public goods," *Games and Economic Behavior*, (forthcoming).

Carpenter, Jeffrey P., Stephen Burks, and Eric Verhoogen, "Comparing Students to Workers: The Effect of Stakes, Social Framing, and Demographics on Bargaining Outcomes," in Jeffrey P. Carpenter, Glenn Harrison, and John List, eds., *Field Experiments in Economics. Research in Experimental Economics* (Amsterdam: Elsevier JAI, 2005).

Carpenter, Jeffrey P., and Erika Seki, "Do Social Preferences Increase Productivity? Field Experimental Evidence from Fishermen in Toyama Bay," *IZA Discussion Paper No. 1697*, (2005).

Cinyabuguma, Matthias, Talbot Page, and Louis Putterman, "On Perverse and Second-Order Punishment in Public Goods Experiments with Decentralized Sanctioning," *Mimeo, Brown University*, (2005).

Clawson, Robert W., "Political Socialization of Children in the USSR," *Political Science Quarterly*, 88 (1973), 684-712.

Croson, Rachel, and Uri Gneezy, "Gender Differences in Preferences," *Mimeo, Chicago Business School and Wharton Business School*, (2004).

Denant-Boemont, David Masclet, and Charles Noussair, "Punishment, Counterpunishment and Sanction Enforcement in a Social Dilemma Experiment," *mimeo, University of Rennes*, (2005).

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde, "Homo Reciprocans: Survey Evidence on Prevalence, Behavior and Success," *IZA Discussion Paper Series 2205*, (2006).

Egas, Martijn, and Arno Riedl, "The Economics of Altruistic Punishment and the Demise of Cooperation," *Tinbergen Institute Discussion Paper No. 2005-065/1*, (2005).

Eisenberg, Nancy, Ivanna K. Guthrie, Amanda Cumberland, Bridget C. Murphy, Stephanie A. Shepard, Qing Zhou, and Gustavo Carlo, "Prosocial development in early

adulthood: A longitudinal study," *Journal of Personality and Social Psychology*, 82 (2002), 993-1006.
Falk, Armin, Ernst Fehr, and Urs Fischbacher, "Driving Forces behind Informal Sanctions," *Econometrica*, 73 (2005), 2017-2030.
Fedotkin, Igor, "Confiscate and Divide. Expectations of the people have not changed in the last 86 years," *Vedomosti*, #3 - JRL 7255 (2003).
Fehr, Ernst, and Urs Fischbacher, "The nature of human altruism," *Nature*, 425 (2003), 785-791.
Fehr, Ernst, and Simon Gächter, "Altruistic punishment in humans," *Nature*, 415 (2002), 137-140.
Fehr, Ernst, and Simon Gächter, "Cooperation and punishment in public goods experiments," *American Economic Review*, 90 (2000), 980-994.
Fehr, Ernst, and John A. List, "The hidden costs of incentives – trust and trustworthiness among CEOs," *Journal of the European Economic Association*, 2 (2004), 743-727.
Fehr, Ernst, and Klaus M. Schmidt, "A Theory of Fairness, Competition, and Cooperation," *Quarterly Journal of Economics*, 114 3 (1999), 817-868.
Fitzpatrick, Sheila, *Stalin's Peasants: Resistance and Survival in the Russian Village after Collectivization* (New York: Oxford University Press, 1994).
Gächter, Simon, Benedikt Herrmann, and Christian Thoni, "Trust, voluntary cooperation, and socio-economic background: survey and experimental evidence," *Journal of Economic Behavior & Organization*, 55 (2004), 505-531.
Glaeser, Edward L., David Laibson, and Bruce Sacerdote, "An economic approach to social capital," *Economic Journal*, 112 (2002), F437-F458.
Gregory, Paul , and Mark Harrison, "Allocation under Dictatorship: Research in Stalin's Archives," *Journal of Economic Literature*, 43 (2005), 721-761.
Gürerk, Özgür, Bernd Irlenbusch, and Bettina Rockenbach, "The Competitive Advantage of Sanctioning Institutions," *Science*, 312 (2006), 108-111.
Heller, Mikhail, *Cogs in the Soviet Wheel – The Formation of Soviet Man* (London: Collins Harvill, 1988).
Henrich, Joseph, and Robert Boyd, "The Evolution of Conformist Transmission and the Emergence of Between-Group Differences," *Evolution and Human Behavior*, 19 (1998), 215-241.
Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin F. Camerer, Ernst Fehr, and Herbert Gintis, *Foundations of Human Sociality. Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies* (Oxford: Oxford University Press, 2004).
Hoff, Karla, and Joseph E. Stiglitz, "After the big bang? Obstacles to the emergence of the rule of law in post-communist societies," *American Economic Review*, 94 (2004), 753-763.
Hofferth, Sandra L. , and John Iceland, "Social Capital in Rural and Urban Communities," *Rural Sociology*, 63 (1998), 574-598.
Hoffman, Elizabeth, Kevin McCabe, and Vernon L. Smith, "Social Distance and Other-Regarding Behavior in Dictator Games," *American Economic Review*, 86 (1996), 653-660.
Kluegel, James R., and David S. Mason, "Fairness matters: Social justice and political legitimacy in post-communist Europe," *Europe-Asia Studies*, 56 (2004), 813-834.
List, John A., "Young, selfish and male: Field evidence of social preferences," *Economic Journal*, 114 (2004), 121-149.

Masclet, David, Charles Noussair, Steven Tucker, and Marie-Claire Villeval, "Monetary and nonmonetary punishment in the voluntary contributions mechanism," *American Economic Review*, 93 (2003), 366-380.

Nikiforakis, Nikos, "Punishment and Counter-Punishment in Public Good Games: Can We Really Govern Ourselves?," *mimeo, Royal Holloway*, (2006).

Noussair, Charles, and Steven Tucker, "Combining monetary and social sanctions to promote cooperation," *Economic Inquiry*, 43 (2005), 649-660.

Ortmann, Andreas, "Field Experiments in Economics: Some Methodological Caveats," in Jeffrey P. Carpenter, Glenn Harrison, and John A. List, eds., *Field Experiments in Economics* (Amsterdam: Elsevier JAI, 2005), pp. 51-70.

Ostrom, Elinor, "Collective action and the evolution of social norms," *Journal of Economic Perspectives*, 14 (2000), 137-158.

Ostrom, Elinor, James M. Walker, and Roy Gardner, "Covenants with and without a Sword - Self-Governance Is Possible," *American Political Science Review*, 86 (1992), 404-417.

Page, Talbot, Louis Putterman, and Bulent Unel, "Voluntary Association in Public Goods Experiments: Reciprocity, Mimicry, and Efficiency," *Economic Journal*, 115 (2005), 1032-1052.

Putnam, Robert, *Bowling Alone. The Collapse and Revival of American Community* (New York: Simon & Schuster, 2000).

Rose, Richard, "Getting things done in an antimodern society: social capital networks in Russia," in Partha Dasgupta, and Ismail Serageldin, eds., *Social capital. A multifaceted perspective* (Washington, D.C.: The World Bank, 2000).

Sefton, Martin, Robert Shupp, and James M. Walker, "The Effect of Rewards and Sanctions in Provision of Public Goods," *CeDEx Working Paper 2002-2, University of Nottingham*, (2002).

Shleifer, Andrei, and Daniel Treisman, "A Normal Country: Russia After Communism," *Journal of Economic Perspectives*, 19 (2005), 151-174.

Sosis, Richard, and Bradley J. Ruffle, "Religious Ritual and Cooperation: Testing for a Relationship on Israeli Religious and Secular Kibbutzim," *Current Anthropology*, 44 (2003), 713-722.

Spulber, Nicolas, *Russia's Economic Transitions. From Late Tsarism to the New Millennium* (Cambridge Cambridge University Press, 2003).

Sutter, Matthias, Stefan Haigner, and Martin Kocher, "Choosing the stick or the carrot? Endogenous institutional choice in social dilemma situations," *CEPR Discussion Papers 5497*, (2006).

Sutter, Matthias, and Martin Kocher, "Trust and Reciprocity Across Different Age Groups," *Mimeo, University of Innsbruck*, (2005).

Van Lange, Paul A.M., Ellen M. N. De Bruin, Wilma Otten, and Jeffrey A Joireman, "Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence," *Journal of Personality and Social Psychology*, 73 (1997), 733-746.

Walker, James M., and Matthew A. Halloran, "Rewards and sanctions and the provision of public goods in one-shot settings," *Experimental Economics*, 7 (2004), 235-247.

Yamagishi, Toshio, "The Provision of a Sanctioning System as a Public Good," *Journal of Personality and Social Psychology*, 51 (1986), 110-116.