WILLINGNESS TO COOPERATE IN TURKISH CULTURE:
PUBLIC GOODS GAMES AND SOCIO-ECONOMIC CHARACTERISTICS

Abstract

While the public good experiment has been used to analyze cooperation among various groups in Western Europe and North America, it has not been extensively used in other contexts such as Turkey. By employing the public good experiment among a cohort of students attending universities in İzmir, Turkey and Adıyaman, Turkey, we hope to quantitatively analyze the factors which lead to willingness to cooperate, to altruistic punishment and to effectiveness of punishment in enhancing cooperation.

Key Words: Cooperation; Free Riding; Altruism; Punishment; Trust; Experimental Economics; Public Good Experiments

Benjamin Baranek
Department of Economics
İzmir University of Economics
İzmir, Turkey 35330
Email: benjamin.baranek@ieu.edu.tr

Alper Duman
Department of Economics
İzmir University of Economics
İzmir, Turkey 35330
Email: benjamin.baranek@ieu.edu.tr

1. Introduction

Experimental economics help us to explore the factors that foster or hinder willingness to cooperate in economic interactions. Cooperation is fundamental since contracts are incomplete or unenforceable in various settings. Multilateral cooperation problems can be modeled in public goods games in which participants individually make decisions about their level of cooperation independent of the choices of other participants. Experimental results have identified a variety of factors that enhance and discourage cooperation. The purpose of this thesis is to examine the socio-economic factors that hinder or foster willingness to cooperate among university students through the public goods game and to attempt to identify individual characteristics which distinguish cooperative participants from free loaders. In order to capture geographical and cultural variations in cooperation levels among Turkish university students, two different locations were selected (İzmir in the West and Adıyaman in the East). The fieldwork was completed during May-June of 2010.

We report (i) results of multi-period public goods games without punishment (PGNP) and public goods games with punishment (PGWP) in two very different social settings within the same country, (ii) describe the social-economic characteristics of the participants and (iii) we explore the effects of these individual characteristics on the willingness to cooperate and punish in the Public Goods games.

We make three contributions to the literature. First, this study is the first in which multiple-period Public Goods games with punishment and without punishment are analyzed in Turkey. Our second contribution is delineating the differential effects of socio-economic characteristics such as gender and ethnicity on the contribution and punishment behavior of participants in a multiple Public Goods game context. Gachter et. al. (2004) undertake a similar study in Russia, but their experimental design differ slightly from ours and their sample includes non-students. Our third contribution is our findings on the "wealth effect". We examine whether previously accumulated points (material rewards) matter for the next period punishment behavior.

We have five main results. First, Adıyaman students are less trusting. On average the contribution levels reflect this observation as students in İzmir contribute more in the Public Goods game without punishment than Adıyaman students. However, in contrast to Gachter et al.(2004) study of Russian students, individual Turkish participants' contributions are not significantly correlated with higher individual trust characteristics such as scores on the GSS Fair, GSS Help, GSS Index, or Trust Strangers measures.

Second, we find that females made higher contributions whereas Turks, only children, and participants from Adıyaman made lower contributions in the Public Goods game without punishment. Gachter et al. (2004) find no effect of socio-economic background on contributions in their study of Russian participants whereas we get significant effects for the Turkish participants.

Third, from the punishment perspective, higher Trustworthiness, Nationalism, and GSS Trust variables increase punishment across the board. Likewise, the higher the GSS Fair, Trust Strangers, Accumulated Earnings, Age, Only Child, and Urban Background variables the lower the punishment was across the board. Fourth, İzmir participants were significantly more sensitive to free riders than were Adıyaman participants. During the PGNP experiment, the contributions of İzmir participants decreased by 0.83 points per period whereas the contributions of Adıyaman participants decreased by less than half that amount (only 0.34 points per period). Fifth, in both İzmir and Adıyaman accumulated earnings have a significant and negative effect on the punishment levels. Relatively wealthier participants avoid punishment.

The structure of the paper is as follows. The second section discusses the related literature. The generality of public goods games, the contributions of experimental economics onto the analysis of public goods games, and the significance of punishment are some of the topics covered by the second section. In the third section the methodology, the background information and the

details of experiments conducted in İzmir and Adıyaman are explained. In the fourth section the empirical results are discussed. The last section concludes.

2. Related Literature

Simply, a public goods game involves a group of people each with his or her own endowment who decide simultaneously to contribute it, or a portion of it, into a group project. Whatever is invested in the group project is multiplied by a fixed growth factor and then returned in equal proportions to all the group members regardless of their initial contribution to the project and added to whatever remains of each member's original endowment. The growth factor is set such that the return from each unit invested in the group project to the individual is less than one, but the returns to the individual when all group members have invested together into the group project are greater than one. In this way, it is always in one's interest to not contribute to the group project. However, the growth unit is set such that if everyone were to invest into the group project then everyone would receive more than they had put in.

Gachter and Herrmann (2008) conducted an extensive review of the literature and identified the factors that most significantly affect contribution levels. Factors that increase contributions to the public goods games are reputation effects, repeated encounters, multiple periods of play with the same group members, communication, and a higher group project growth multiplier (although this change in multiplier does not alter the dominant strategy of non-contribution). Anonymity, one-shot play, perpetually changing group membership, and a lack of communication all tend to discourage contribution. It does not appear that group size has a significant impact on contribution behavior. Reputation effects occur when behavior is directly associated with the one who exhibits it. When play is anonymous and group members don't know with whom they are playing, contributions are lower. In contrast, when group member identities are common knowledge, contributions increase (Gachter and Fehr 1999). These reputation effects play out most when there is some degree of group identity which acts "like a 'lubricant' that makes social exchange effective." Reputation effects have also been seen in other research regarding cooperative behavior (even when reputation effect is implied) (Andreoni and Petrie 2004; Haley and Fessler 2005; Semmann et al. 2005; and Milinski et al. 2002).

The frequency of game play – whether the game is a one-shot encounter or a repeated series of encounters – also significantly affects the contribution levels of the participants. The benefits of repeated play are further enhanced when group members remain the same in consecutive rounds of play (Fehr and Gachter 2000; Sonnemens et al. 1999). However, even group composition randomization throughout the successive rounds of play did not entirely negate the positive effects gained by repeated interactions. A somewhat unexpected observation is that contributions are still present beyond a superficial level even in one-shot, non-repeated encounters where there is seemingly no reason for one to cooperate (Gachter and Herrman 2010). In spite of the anonymity of these interactions, reputation effects – even though reputation is only known to one's own self – are nonetheless strong enough to lead to increased contribution levels.

Finally, one of the factors that most significantly increases the level of contribution in public goods games is the ability for group members to communicate with one another during play (Ostrom et al. 1992; Brosig et al. 2003; and Charness and Dufwenberg 2006). As participants communicate with one another, they are able to coordinate their actions before the game begins and express appreciation (or disappointment) after the game concludes. The research implies that individuals in these games tend to prefer the avoidance of guilt to the receipt of praise.

Regardless of the factors that significantly impact contribution levels, research has shown that over additional rounds of anonymous play contributions to the group project often decrease sometimes entirely. This phenomenon has been explained by the theory that most people are conditional cooperators (Kelley and Stahelski 1970; Dufwenberg et al. 2006; and Gachter and Herrmann 2010). A conditional cooperator is a person who is willing to cooperate – in this case by contributing to a group project – so long as the other participants in the group are also cooperating. When everyone cooperates there is a positive feedback loop which can maintain high levels of contributions. However, when conditional cooperators are in the same group as free loaders, the free loaders lack of contribution (and equal share of the group project benefits) decreases the willingness of conditional cooperators to contribute to the group project.

Fischbacher et al. undertook a study in 2001 to determine what proportion of the population are conditional cooperators versus free riders. According to their study of 44 Swiss university students, the population was made up of roughly half conditional cooperators, a third free riders, and with the remaining classified as nontraditional participants. Whether these proportions are unique to Swiss students or are similar elsewhere is an interesting question for future research. Öneş and Putterman (2005) conducted a similar study in 2005 grouping participants by type – top cooperators in one group, free loaders in another, etc – and discovered that indeed group outcomes are predicated on group type and that when grouped together top cooperators achieve near ideal results.

In light of the prevalence of free riders is there then no hope for increasing (or even sustaining) levels of cooperation in public goods games? Research has shown us a potential solution: introducing a punishment treatment. Such a treatment enables group members to punish one another. In a typical punishment treatment, punishment is costly to both the punisher and the punished. The punisher pays a fee for each punishment unit, that is for every punishment unit a punisher gives the total number of his or her own units decrease by one unit. Meanwhile, for each punishment unit the punished person receives, his or her total units are reduced (often by a multiple of the punishment units received). When researchers introduce a punishment treatment to public goods games, they find that cooperation is prevented from deteriorating. Not only is the punishment treatment a stopgap which prevents the deterioration of contribution levels, in certain circumstances over time the punishment treatment even leads to increased levels of contribution (Yamagishi 1986; Ostrom et al. 1992; and Fehr and Gachter 2000).

As is expected, punishment is used across the board to punish free riders. When the punishment treatment is introduced in a common goods game conditional cooperators have an alternative response to free riders (Herrmann et al. 2008). Whereas previously, conditional cooperators could either endure unmerited rewarding of free riders by choosing to continue to contribute to the group project or alternatively they could choose retain more of their endowment by reducing their own contributions to the group project. As was explained above, conditional cooperators in groups containing free riders eventually reduce their contributions to zero. With the introduction of the punishment treatment, conditional cooperators have a new option of continuing to cooperate while at the same time being able to express their dissatisfaction with free riders through costly punishment, which negatively impacts the unmerited returns of free riders.

The punishment treatment increases and/or stabilizes cooperation at higher levels than would be expected in a treatment without punishment (Boyd et al. 2003). This is an especially interesting finding, because evolutionary theorists had previously theorized that such "altruistic punishment" would not be present in large groups of nonrelatives. Whereas one might incur a personal cost for the benefit of a group of one's kin, previous theories concluded that individuals would not choose to engage in similar costly activity when the primary beneficiaries were a large group of nonrelated people. That altruistic punishment exists even in large groups of nonrelatives indicates that something beyond evolutionary self-preservation is at play.

Altruistic punishment is able to create a framework whereby punishment of free riders leads to increased contributions over repeated interactions (Fehr and Gachter 2000; Masclet et al. 2003). Wondering whether it was just the adverse monetary consequences of punishment that led to increased contributions, Masclet et al. offered participants in another treatment the opportunity to assign a "non-monetary" punishment unit at no personal cost. They discovered that even a "non-monetary" punishment unit led to an increase in overall group contributions, although, not as significant or lasting an increase as monetary punishment did.

While altruistic punishment looks to be an ideal solution to the free rider problem in public goods games, the reality is more complicated. It is true that punishment treatments lead to stabilized and sometimes increased contributions. However, it is important to remember that punishment is costly, that is punishment comes at a price. Usually public goods games last for no more than ten periods and in that duration the monetary costs of punishments, both the costs incurred by assigning punishment and the punishment costs themselves to received by the punished, are greater than the increased contributions that punishment encourages (Fehr and Gachter 2000). Overall, punishment results in net losses, at least in games with limited numbers of periods, and therefore is not a very efficient way of increasing contributions. Herrmann et al. conducted public goods games in sixteen different countries in a study in 2008 and in thirteen of the sixteen countries participants

accumulated less points in the punishment treatment than in the non-punishment treatment. In order for punishment to be an efficient means of increasing group wealth, an important equilibrium needs to be realized between punishment's cooperation enhancing effects and wealth destroying costs.

Over a long enough time frame punishment does become an effective. While punishment is not effective at enhancing cooperation in most public goods games which last for no more than ten periods, as the number of periods of play increase so does the effectiveness of punishment. When the number of periods was expanded to fifty, punishment was found to be an efficient way to enhance participant contributions and overall cooperation increased compared to a non-punishment treatment (Gachter et al 2008). A natural question to ask is what exactly that punishment is doing. How does altruistic punishment lead to increased contribution and cooperation? Masclet et al. (2003) propose that punishment is effective for two reasons: (1) participants realize that punishment can make free-riding unprofitable and therefore, seeking to maximize their individual payoffs, former free riders increase their contributions in an act of self-interest and/or (2) punishment is a way of communicating in an environment where otherwise communication is not allowed and this communication leads to increased contributions. Participants are able to express through their assignment of punishment points (or lack thereof) their feelings about other group members' levels of participation. This expression of feelings through the assignment of punishment points can in turn cause the recipient to feel of shame for being labeled as a free rider. Those who were shamed through the receipt of punishment points might then be motivated to make larger contributions in the following rounds in an effort to reduce one's shame and increase one's reputation. In a sense, peer pressure is activated through the punishment treatment and this motivates participants to behave more cooperatively (Kandel and Lazear 1992).

While punishment is primarily used altruistically as a tool to punish those who contribute less than average to the group project, group members are not restricted to using punishment in this way. It turns out that punishment is a double-edged sword. Sometimes punishment is used for reasons other than punishing free rider.

Herrmann et al.(2008) went on to econometrically analyze the punishment behavior (both altruistic and anti-social) on a societal level with criteria commonly used by social scientists in the classification of countries. They found that strong norms of civic cooperation in a country are associated with more stringent punishment of free riders Norms of civic cooperation and weakness of the rule of law explain the variations on a cross-cultural level, but variations of punishment behavior on an individual level are left unexplained.

On an individual level, Gachter et al. (2004) attempted to see whether these criteria explained contribution behavior in two one-shot public goods games (one with and one without a punishment treatment). They found that contribution behavior was not directly impacted by socio-economic background, but instead was significantly impacted by trust attitudes which were in turn influenced by socio-economic background. Furthermore, three trust attitude variables (*GSS Fair*, *GSS Trust*, and *Trust Strangers, to be explained in more detail later*) were shown to significantly impact contribution behavior.

3. Background, Methodology and Descriptive Analysis
3.1 Methodology

This study was designed as a conventional lab experiment. A total of 116 students participated from two universities (Adıyaman University and Izmir University of Economics). The experiment was conducted using Fischbacher's "z-Tree" software package (2007). In the spirit of cooperation, this study was conducted very similarly to Herrmann et al.'s 2008 study. One of the sixteen various locations that showed a fairly significant level of anti-social punishment in Herrmann et al.'s study was Boğaziçi University in Istanbul, Turkey. Seeking to complement their dataset for potential future collaborations and create a further profile of cooperative behavior in Turkey, this study adopted the standard research procedures used by Herrmann et al. in their 2008 study.

Participants in the experiment joined one of five 90-minute sessions made up of anywhere from 12 to 32 students (the average session contained 23.2 students). The sessions were conducted in computer labs where the desktop computer towers served as pseudo-separators between the flat panel computer monitors. The students were recruited by randomly approaching students at Izmir University of Economics and with the assistance of Asst. Prof. Dr. Bayram Erzurumluoğlu at

Adıyaman University. These students were randomly and anonymously assigned to groups of 4. Before, during, and after the experiment the identities of group members were not revealed to the participants.

Throughout the experiment, communication of any kind was not allowed. The participants played two 10-period public goods games, but during the first game the participants were not aware that there was a second game. In each period of the experiment participants received an endowment of 20 points. The total points contributed to the public good were multiplied by a growth factor of 0.4 and then distributed equally to all group members. The payoff for each group member is shown via the following equation:

$$p_i = 20 - c_i + 0.4\sum_{j=1}^{n} c_j$$

where c_i is equal to the group member's contribution to the public project, n is equal to the number of group members, and $\sum_{j=1}^{n} c_j$ is equal to the sum of all contributions to the public good.

In the first 10-period public goods game there was no punishment option available. The second 10-period public goods game included a punishment treatment. Following the contribution stage, participants were shown the contributions of their fellow group members and could assign between 0 and 10 punishment points to each. Each punishment point cost the punisher 1 point and reduced the punished group member's total by 3 points. Like all interactions in the experiment, the punishments were conducted simultaneously and anonymously. An interesting variation for future study would be to display the mean and variance of the previous period's contributions as well in addition to just the contributions.

All experiments were run under the supervision of the author who speaks Turkish fluently along with the support of Turkish assistants – Research Assistant Neriman Keske and Asst. Prof. Dr. Bayram Erzurumluoğlu. Each participant received a show-up fee of 8 TL (about $5 USD). Furthermore, each experimental point was equal to 0.03 TL (about $0.02 USD) and students were paid according to their performance in the public goods game. The average payout was approximately 19 TL ($12 USD) which is approximately equal to one day's wages at the Turkish minimum wage. Detailed experimental instructions written in Turkish were given to the students before each round of play and before each of the two rounds of play began all the students in every session had to individually and successfully complete a worksheet of control questions to ensure that they understood the experiment and the payout structure.

Beyond the public goods game experiment, participants also answered a questionnaire that consisted of three parts. The first part was a survey of socio-economic background, the second was a standard trust questionnaire developed and used by social scientists, and the third was an implicit association test measuring nationalism. Each of the three parts along with the results will be summarized in the following section.

3.2 Background

The differences in location are reflected in the socioeconomic profiles the participants in our subject pool. Table 1 lists these various socioeconomic details. As can be seen in Table 1, significant differences exist in the two cities of the study. The cohort in the Izmir study was made up of significantly more Turks, only children, and eldest children compared to the cohort of the Adıyaman study. Both Adıyaman and Izmir had more female participants than the reference Istanbul study. Surprisingly, most participants in both Adıyaman and Izmir were from urban background with only a minor difference between the two. A significantly higher percentage of the participants in Izmir were from the middle class compared with both Adıyaman and even Istanbul (90.38% in Izmir versus 34.38% in Adıyaman and 65.6% in Istanbul). This variation likely is explained by the fact that Izmir University of Economics is a private university where students pay tuition while both Adıyaman University and Boğaziçi University are public universities with subsidized tuition. The tuition costs of Izmir University of Economics preclude significant numbers of lower income students from attending. In Adıyaman, a much higher percentage of participants knew one another than in Istanbul and Izmir. This is likely the case because of the manner in which the university recruited the participants.

Table 1: Subject Pool Details

| City | Our Data | | | | Herrmann et al. (2008) |
| | Overall | | Adıyaman | Izmir | Istanbul |
University	(AU & IUE together)		Adıyaman University	Izmir University of Economics	Bogazici University
Exchange Rate	TRY 0.3		TRY 0.3	TRY 0.3	TRY 0.4
Total Number of Subjects	116		64	52	64
% Female	43.10		45.31	40.38	31.3
Mean Age	21.07		21.03	21.12	20.4
% Turk	70.69		56.25	88.46	--
% Only Child	9.48		4.69	15.38	10.9
% Eldest Child	31.90		15.63	51.92	--
% Urban Background	69.83		68.75	71.15	82.8
% Middle Class	59.48		34.38	90.38	65.6
% Religious Practice	38.58		44.27	31.57	--
% Membership	63.80		53.13	76.92	87.5
% Known Participants	46.14		60.78	28.13	11.4
% Nationalist	68.75		72.00	53.33	--
% Against Turban	52.29		31.25	78.85	--
% High Self-Described Religiosity	53.45		57.42	48.56	--

Notes: The dummy variables Female, Turk, Only Child, and Eldest Child indicate the percentage of cases that match the criteria. Urban background identifies the percentage of cases coming from a city with a population greater than 10,000 people. Middle Class indicates the percentage of cases that self-identified as at least middle class or higher. Religious practice identifies the percentage of religious obligations fulfilled. Membership indicates the percentage of cases involved in at least one voluntary association. Known Participants indicates the percentage of other participants known in the experiment. Nationalist indicates the percentage of cases that displayed a moderate to strong automatic preference of Turkey to America in an IAT test. Against Turban identifies the percentage of cases that are against lifting the ban of wearing of headscarves in public buildings. High Self-Described Religiosity identifies the percentage of cases who identify themselves as highly religious.

Interestingly, but not entirely surprising, self-described religiosity was significantly higher than the performance of religious obligations in both Adıyaman and Izmir, although the discrepancy was smaller in Adıyaman than in Izmir. Izmir participants were significantly more likely to be involved in at least one voluntary association (like participants in Istanbul). It is possible that differences in voluntary organization participation are attributable more to access rather than preference.

Nationalism was measured using the Countries Demo Test of the Turkish version of Harvard University and Project Implicit's Implicit Association Test. This test measures implicit association via the microseconds of hesitation in associating positive and negative words with words and images associated with both Turkey and the United States. From the variation between these microseconds of hesitation, the test is able to identify the degree of implicit preference one has for Turkey. For example, if one hesitates for 20 microseconds when associating the word "good" with an American flag, but only hesitates for 10 microseconds when associating it with a Turkish flag, then an implicit preference towards Turkey is shown. By the length of hesitation, or conversely the quickness of association, the test is able to tease out some implicit preferences. This measure of implicit association is likely a more accurate measure than self-assessment. Therefore, in this study implicit association measure is used as a measure of nationalism.

Surprisingly, the participants in Adıyaman were more nationalistic than the participants in Izmir. This is surprising given the ethnic make-up of the participants in Izmir. One would assume that ethnically Turkish participants would be more nationalistic than non-Turks, but these findings (and later analysis of these findings in Table 4) do not support this. An alternative explanation might be that due to the structure of the test, participants in Izmir who have more positive exposure to America through expatriate friends and travel abroad displayed not less preference for Turkey, but less hesitation in expressing positive associations with America.

Finally, the participants were asked about a current hot topic in Turkey – whether the ban on wearing headscarves in public places (such as universities and government buildings) should be continued. Not surprisingly only 31.25% of participants in Adıyaman supported the continuation of the ban compared with 78.85% of participants in Izmir.

The effects of socio-economic characteristics on self-described religiosity, the headscarf question, and nationalism will be analyzed below. First, however, the results of a trust questionnaire will be examined. We asked eight different standard questions used by social scientists to measure trust. These questions are summarized in Table 2 and the results are shown in Table 3.

Table 2: Eight Measures of Trust

Variable	Description	Response
GSS trust	Generally speaking, would you say that people can be trusted or that you can't be too careful in dealing with people?	1: Most people can be trusted; 2: You can't be too careful; 1.5: Depends; --: No answer/Don't know
GSS fair	How often do you think that people would try to take advantage of you if they got a chance, and how often would they try to be fair?	1: Would take advantage of you; 2: Would try to be fair; 1.5: Depends; --: No answer/Don't know
GSS help	Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?;	1: Try to be helpful; 2: Just look out for themselves; 1.5: Depends; --: No answer/Don't know
Trust strangers	Do you agree with the following statement: 'You can't count on strangers anymore.'?	0: More or less agree; 1: More or less disagree
Door unlocked	How often do you leave your door unlocked?	1: Very often; 2: Often; 3: Sometimes; 4: Rarely; 5: Never
Lend money	How often do you lend money to friends?	1: More than once a week; 2: Once a week; 3: Once a month; 4: Once a year or less
Lend possessions	How often do you lend personal possessions to friends?	1: More than once a week; 2: Once a week; 3: Once a month; 4: Once a year or less
Trust worthiness	Do you agree with the following statement: 'I am trustworthy.'?	1: Disagree strongly; 3: Disagree somewhat; 4: Agree somewhat; 6: Agree strongly

As is evident from Table 3, Turkish participants indicate higher trust on several trust measures than their Russian and American counterparts. In the GSS Trust measure, the GSS Help measure, and the Door Unlocked measure, Turkish participants had significantly lower scores than their counterparts indicating greater trust. Turkish participants seem to believe that generally people can be trusted. Furthermore, the difference in the GSS Help measure scores between Turks and their Russian and American counterparts was significant. Whereas most Russian and American students thought that people just look out for themselves, most Turkish participants thought that most of the time people try to be helpful. Anecdotally, the author in Turkey frequently observes this in instances when Turks are looking for directions.

Whereas an American would likely consult a map or call a friend when in need of directions, Turks often will approach complete strangers on the street and seek help from them trusting them for good advice. The final measure was the Door Unlocked measure. Turkish participants fairly often leave their doors unlocked whereas Russian participants sometimes and American participants rarely do the same.

Table 3: Comparison of Trust Measures with Other Studies

Variable [sign indicates direction of higher trust]	Data from Turkey			Gachter et al. (2004)	Glaeser et al. (2000)
	Overall	Adıyaman	Izmir	Rural and Urban Russia University Students	Harvard University Students
Observations	116	64	52	339	189
GSS Trust [-]	1.34 (0.29)	1.39 (0.28)	1.27 (0.29)	1.51 (0.35)	1.51 (0.50)
GSS Fair [+]	1.46 (0.31)	1.40 (0.32)	1.54 (0.29)	1.44 (0.33)	1.56 (0.49)
GSS Help [-]	1.24 (0.31)	1.25 (0.34)	1.23 (0.27)	1.58 (0.31)	1.61 (0.49)
Trust Strangers [+]	0.56 (0.50)	0.69 (0.47)	0.40 (0.50)	0.63 (0.48)	0.39 (0.50)
Door Unlocked [-]	2.68 (1.39)	2.81 (1.44)	2.52 (1.32)	3.45 (1.27)	4.26 (1.11)
Lend Money [-]	2.66 (0.98)	2.80 (0.95)	2.48 (1.00)	2.77 (0.86)	2.85 (1.15)
Lend Possessions [-]	2.58 (1.15)	2.67 (1.25)	2.46 (1.02)	2.98 (1.01)	2.44 (1.18)
Trustworthiness [+]	4.65 (1.19)	4.50 (1.27)	4.85 (1.08)	4.66 (1.33)	5.31 (0.93)

Notes: We report the average scores for the whole survey as well as a breakdown by city. These scores are compared with scores gathered by Gachter et al. among rural and urban Russian university students as well as Glaeser et al. among Harvard University students. The symbol inside the brackets indicates the scores which reflect higher trust. The symbol [+] indicates that higher scores reflect more trust. The symbol [-] indicates that lower scores indicate more trust.

Between the two Turkish cities we saw significant differences in trust measure scores for the GSS Fair measure, the Trust Strangers measure, the Lend Money measure, and the Lend Possessions measure. The participants in Adıyaman thought that people would more likely take advantage of them if given the chance than the participants in Izmir. In contrast, the participants in Adıyaman generally thought that strangers could be trusted or at least disagreed with its opposite to a greater extent than the participants in Izmir. Likewise when questions about the applications of these trust beliefs were asked it turns out that Adıyaman participants were more likely to lend their money and their possessions to their friends than those of Izmir. The participants from Adıyaman seemed to have a more communal based understanding of the world. They are more open to risky interactions, but were also tempered with the understanding the people in general look first to their own self interest. One interesting note is that both Adıyaman and Izmir participants like their American counterparts, but unlike their Russian counterparts were more likely to lend money to their friends compared with lending possessions.

Finally we analyzed the effects of socio-economic characteristics on these trust measures, nationalism, and self-described religiosity. Table 4 describes these relationships through estimations made using ordinary least squares.

As can be seen in Table 4, socio-economic characteristics seem to have some effects on certain measures of trust, nationalism, and self-described religiosity in this population. Being an only child reduced participants' trust in others. Females generally believed more so that people tend to look out for themselves. In contrast, Turks and eldest children believed more so that people generally try to be helpful. Religious practice seems to encourage trust in strangers while group membership has the opposite effect. Perhaps experience in groups increases one's awareness of the self interest in others leading to decreased trust whereas religious practice gives one the fortitude to take the risk in trusting strangers nonetheless. Men are more likely to loan money as are Turks. Another unexpected observation was females tended to be more nationalistic than males that according to our data.

Table 4: Effects of Socio-Economic Characteristics on Trust, Nationalism, and Religiosity

Notes: All trust variables are normalized and resigned such that higher coefficients indicate more trust. The estimations

	GSS Trust	GSS Fair	GSS Help	GSS Index	Trust Strangers	Lend Money	Trustworthiness	Nationalism	Against Turban	Self Described Religiosity
Dependent Variable										
Female	0.149 (0.193)	-0.013 (0.2)	-0.338 (0.197)*	-0.143 (0.211)	-0.207 (0.187)	-0.385 (0.192)**	0.223 (0.189)	0.389 (0.183)**	0.015 (0.082)	0.064 (0.121)
Age	-0.013 (0.071)	-0.116 (0.075)	-0.04 (0.071)	-0.098 (0.079)	-0.038 (0.068)	-0.003 (0.07)	-0.128 (0.07)*	-0.037 (0.067)	0.054 (0.03)*	-0.034 (0.045)
Ethnicity	0.044 (0.226)	0.113 (0.234)	0.369 (0.226)*	0.192 (0.245)	-0.038 (0.216)	0.409 (0.222)*	-0.542 (0.219)**	-0.144 (0.221)	0.12 (0.095)	0 (0.141)
Only Child	-0.899 (0.371)**	0.263 (0.394)	0.188 (0.374)	-0.364 (0.424)	-0.378 (0.349)	-0.54 (0.359)	-0.232 (0.354)	0.134 (0.325)	0.168 (0.153)	-0.416 (0.227)*
Eldest Child	0.126 (0.24)	0.005 (0.25)	0.406 (0.244)*	0.255 (0.259)	-0.229 (0.233)	-0.041 (0.24)	-0.257 (0.236)	-0.124 (0.233)	0.008 (0.102)	0.195 (0.152)
Urban Background	-0.145 (0.072)	0.117 (0.076)	0.005 (0.073)	-0.024 (0.081)	-0.064 (0.069)	0.006 (0.071)	-0.095 (0.07)	0.048 (0.075)	0.028 (0.03)	-0.05 (0.045)
Middle Class	-0.006 (0.106)	-0.002 (0.107)	0.044 (0.105)	0.014 (0.114)	0.009 (0.101)	-0.103 (0.104)	-0.043 (0.102)	-0.135 (0.116)	0.058 (0.044)	0.03 (0.066)
Religious Practice	-0.039 (0.038)	-0.047 (0.038)	0.025 (0.038)	-0.032 (0.041)	0.059 (0.036)*	0 (0.037)	0.024 (0.036)	0.045 (0.037)	-0.061 (0.016)***	0.187 (0.023)***
Memberhip Index	-0.02 (0.028)	0.00 (0.03)	-0.044 (0.029)	-0.025 (0.031)	-0.057 (0.027)**	0.009 (0.028)	-0.049 (0.027)*	-0.022 (0.033)	-0.003 (0.012)	-0.037 (0.018)**
Adiyaman	0.338 (0.274)	-0.264 (0.281)	0.375 (0.279)	0.126 (0.295)	0.298 (0.263)	0.273 (0.271)	-0.678 (0.267)***	-0.144 (0.267)	-0.228 (0.116)**	0.084 (0.171)
C	0.537 (0.625)	0.216 (0.638)	-0.474 (0.622)	0.369 (0.678)	0.249 (0.595)	0.036 (0.612)	1.615 (0.604)***	2.931 (0.61)***	0.416 (0.262)	1.465 (0.387)***
Observations	113	108	111	103	116	116	116	96	116	116
R²	0.14	0.12	0.12	0.06	0.17	0.12	0.15	0.11	0.36	0.47

were conducted using OLS. Robust standard errors are given in parenthesis. Female, Ethnicity, Only Child, and Eldest Child are dummies. Urban Background, Middle Class, Religious Pratice, and Membership Index are integar values. Adıyaman is a dummy for the corresponding city.
* Denotes significance at 10 percent.
** Denotes significance at 5 percent.
***Denotes significance at 1 percent.

Interestingly socio-economic characteristics substantially affect one's self-evaluation of being trustworthy. Being older, being a Turk, being involved in voluntary groups, and being from Adıyaman all significantly decreased the degree to which one agreed with the statement: "I am trustworthy." Perhaps participants learn their own personal failings as they age and are involved in voluntary groups. The reasons for the ethnic associations and differences in self-evaluation between the two cities are less clear.

Religious practice, in addition to being more prevalent in Adıyaman students, was strongly associated with opposition to the headscarf ban. This association between religious practice and opposing the headscarf ban seems self-explanatory. The difference of opinion between participants in Adıyaman and Izmir might be related to the religious make-up of the two cities. Because Adıyaman is a more traditional city, it is likely that the those from Adıyaman more often know someone adversely effected by the headscarf ban than participants from cosmopolitan Izmir and therefore more likely to oppose it.

Finally, self-described religiosity is common and positively associated with religious practice. It is negatively associated with group membership and being an only child. It is possible that group membership is an alternative way to meet spiritual needs. Likewise, only children are likely to come from families that follow proactive family planning rather than those associated with traditional values.

4. Analysis and Results

This results and analysis section will look at three specific behaviors: contribution behavior, response to punishment behavior, and punishment behavior. The contribution behavior will examine first period contributions, overall contributions in the N-experiment, the period effect in the N-experiment, the changes in contribution between N- and P-experiments, the period effect in the P-experiment, and average earnings in the N- and P-experiments.

The response to punishment behavior will examine the mean contributions per subject pool to the N- and P-experiments, the relative earnings in the P- and N-experiments over time, punishment's effect on next round contribution if the person who received the punishment's contribution was below group average, and likewise if the punished person's contribution was above group average. Finally, punishment behavior itself will be analyzed including the mean punishment expenditures, the punishment frequencies, the effects of game play on the punishment of free riding and on anti-social punishment, and the effects of trust measures, nationalism, and self-described religiosity on free riding punishment and on anti-social punishment.

4.1 Contribution Behavior

Participants had the option of contributing between 0 and 20 points to the group project. The cumulative distribution of actual contributions in the first period (N1) of PGNP experiment is

shown in Graph 1. The N1 period is the first period of play and so it serves as a base level of contribution. We observe very few people choosing the dominant strategy of no contributions (less than 10% overall). Contributions break along the expected boundaries of 0, 5, 10, 15, and 20. It's interesting to note that contributions in İzmir were significantly higher than contributions in Adıyaman. The participants in Adıyaman more fully were playing the dominant strategy. In contrast, the participants in İzmir exhibited more conditional cooperative behavior (that is, they were more trusting).

Graph 1: Cumulative Distribution of the Contributions in N1

Cumulative Distribution of the Contributions in N1
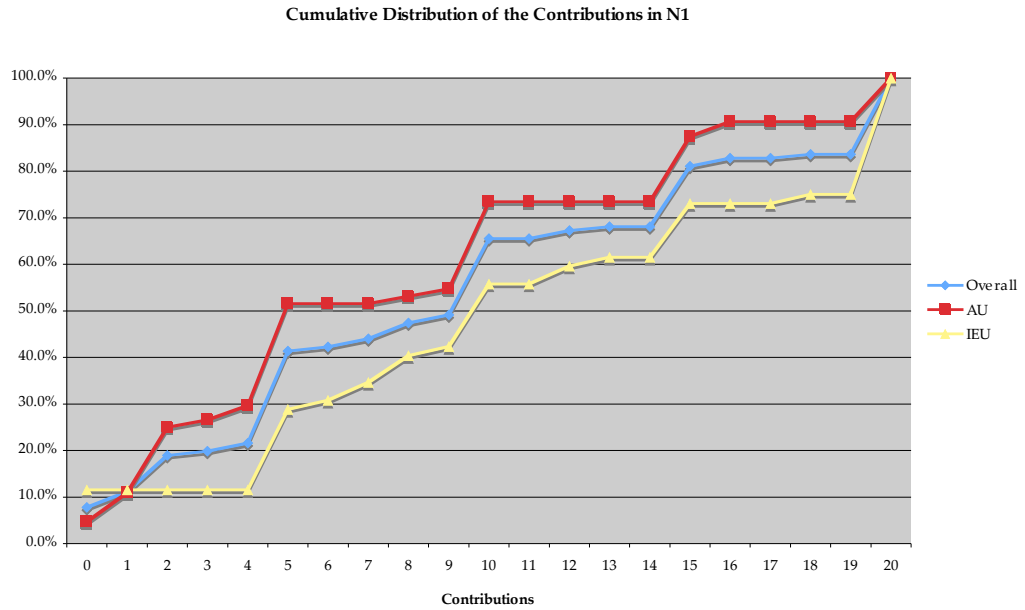
But to more fully understand the contribution behavior it would be helpful to compare N1 contribution to the trust attitudes discussed earlier. The results of this analysis are shown in Table 5 on the following page.

Table 5: The effects of trust attitudes, nationalism, and socio-economic characteristics on N1

Dependent Variable N1 Contribution	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 8	Model 11	Model 12	Model 13	Model 14
GSS Trust (Insignificant)		0.42 (0.825)									
GSS Fair (Insignificant)			1.072 (0.824)								
GSS Help (Insignificant)				0.436 (0.800)							
GSS Index (Insignificant)					0.792 (0.822)						
Trust Strangers (Insignificant)						-0.969 (0.804)					
Door unlocked (Insignificant)											
Lend Money							-1.308 (0.779)*				
Lend Possessions (Insignificant)											
Trust Index (Insignificant)											
Trustworthiness (Insignificant)								-0.058 (0.806)			
Nationalism (Insignificant)									-0.13 (1.022)		
Against Turban (Insignificant)										0.231 (1.825)	
Self Described Religiousity (Insignificant)											-1.088 (0.998)
Female	2.869 (1.568)*	2.645 (1.618)*	2.944 (1.654)*	2.675 (1.630)*	2.301 (1.709)	2.579 (1.569)*	2.423 (1.57)	2.878 (1.573)*	3.676 (1.783)**	2.859 (1.57)*	2.284 (1.266)*
Age	0.816 (0.564)	0.887 (0.578)	0.958 (0.62)	0.958 (0.572)*	1.051 (0.63)*	0.781 (0.559)	0.795 (0.557)	0.809 (0.572)	0.965 (0.627)	0.803 (0.573)	0.655 (0.459)
Ethnicity	-4.128 (1.796)**	-4.124 (1.86)**	-4.414 (1.928)**	-4.347 (1.846)**	-4.3 (1.955)**	-4.12 (1.778)**	-3.601 (1.801)**	-4.16 (1.849)**	-4.086 (2.113)**	-4.151 (1.805)*	-3.135 (1.438)**
Only Child	-4.705 (2.889)*	-4.368 (3.138)	-6.367 (3.254)**	-5.519 (3.000)*	-6.767 (3.416)**	-5.093 (2.879)*	-5.326 (2.88)*	-4.726 (2.904)*	-5.49 (3.134)*	-4.745 (2.905)*	-3.649 (2.373)
Eldest Child	-0.791 (1.94)	-0.613 (1.984)	-0.606 (2.055)	-0.890 (2.002)	-0.393 (2.079)	-0.955 (1.926)	-0.917 (1.918)	-0.805 (1.95)	1.031 (2.257)	-0.788 (1.939)	-0.25 (1.57)
Urban Background	-0.22 (0.569)	-0.242 (0.602)	-0.277 (0.63)	-0.063 (0.582)	-0.139 (0.645)	-0.285 (0.566)	-0.215 (0.563)	-0.226 (0.576)	0.058 (0.705)	-0.227 (0.572)	-0.139 (0.463)
Middle Class	-0.358 (0.819)	-0.26 (0.858)	-0.146 (0.86)	-0.337 (0.828)	-0.088 (0.884)	-0.35 (0.811)	-0.502 (0.814)	-0.361 (0.82)	-0.164 (1.093)	-0.372 (0.826)	-0.222 (0.671)
Religious Practice	0.17 (0.297)	0.237 (0.31)	0.278 (0.318)	0.046 (0.305)	0.236 (0.328)	0.229 (0.298)	0.173 (0.294)	0.172 (0.298)	0.454 (0.355)	0.184 (0.316)	0.256 (0.302)
Membership Index	-0.021 (0.223)	-0.011 (0.228)	-0.114 (0.242)	-0.065 (0.236)	-0.106 (0.244)	-0.068 (0.224)	-0.01 (0.221)	-0.023 (0.225)	-0.244 (0.308)	-0.02 (0.223)	-0.055 (0.186)
Adıyaman	-7.552 (2.472)***	-7.651 (2.561)***	-7.593 (2.654)***	-7.741 (2.516)***	-7.82 (2.614)***	-7.443 (2.447)***	-7.092 (2.457)***	-7.612 (2.61)***	-7.497 (3.312)**	-7.503 (2.501)***	-5.459 (1.984)***
Number Known	0.08 (0.078)	0.09 (0.08)	0.1 (0.084)	0.092 (0.079)	0.118 (0.083)	0.095 (0.078)	0.07 (0.077)	0.081 (0.08)	0.11 (0.107)	0.081 (0.078)	0.048 (0.064)
C	13.866 (4.865)***	12.984 (5.095)***	12.77 (5.159)***	13.669 (4.959)***	11.907 (5.341)**	13.974 (4.816)***	14.042 (4.812)***	13.956 (5.024)***	9.96 (6.404)	13.768 (4.925)***	13.89 (4.222)***
Observations	116	113	108	111	103	116	116	116	96	116	116
R²	0.15	0.15	0.18	0.16	0.18	0.17	0.17	0.16	0.16	0.15	0.16

Notes: All trust variables are normalized and resigned such that higher coefficients indicate more trust. The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Female, Ethnicity, Only Child, and Eldest Child are dummies. Urban Background, Middle Class, Religious Practice, and Membership Index are integer values. Adıyaman is a dummy for the corresponding city. Number known refers to the number of other participants in the session.
* Denotes significance at 10 percent.
*** Denotes significance at 5 percent.*
***Denotes significance at 1 percent.

As shown in Table 5, there are several socio-economic characteristics that effected N1 contribution, but only one trust attitude (all the trust attitudes previously discussed were tested but only selected ones were listed). The only socio-economic factor that increased one's N1 contribution was gender. Females made higher N1 contributions than males. They exhibited greater trust being more willing to take a risk than men were. Two socio-economic factors led to decreased N1 contributions. These were ethnicity and whether or not one was an only child. According to our results, Turks and only children made smaller N1 contributions than non-Turks and participants with siblings. Furthermore, there were significant differences in the N1 contribution levels between Adıyaman and İzmir. Participants in Adıyaman contributed some 7.5 less points in the N1 round to the public project than did their İzmir counterparts.

The one trust attitude which was significant was Lend Money. Participants who more frequently gave monetary loans to their friends *contributed 1.3 points less* than others in the N1 round. This finding had a significance level of 10%. This result seems a bit counter-intuitive, but the trust attitude question asked loaning money to friends and not about contributing anonymously to a group project with strangers. Obviously these participants viewed the group project differently than they viewed loans from friends.

Graph 2 shows the contributions to the N-experiment over time. From this graph one can easily see that contributions decreased across the board over time. The effect is especially pronounced in the İzmir group. The İzmir group began contributing an average of 11 points in the N1 period and finished the N10 period contributing about 6 points. The Adıyaman group began contributing less, around 8 points in the N1 period, and experienced a less steep decline in contributions ending up contributing around 6.5 points in the N10 period. The Adıyaman participants seem to be playing the game in a rather tempered way.

Graph 2: Contributions to the N-Experiment

Overall Contributions in the N-Experiment
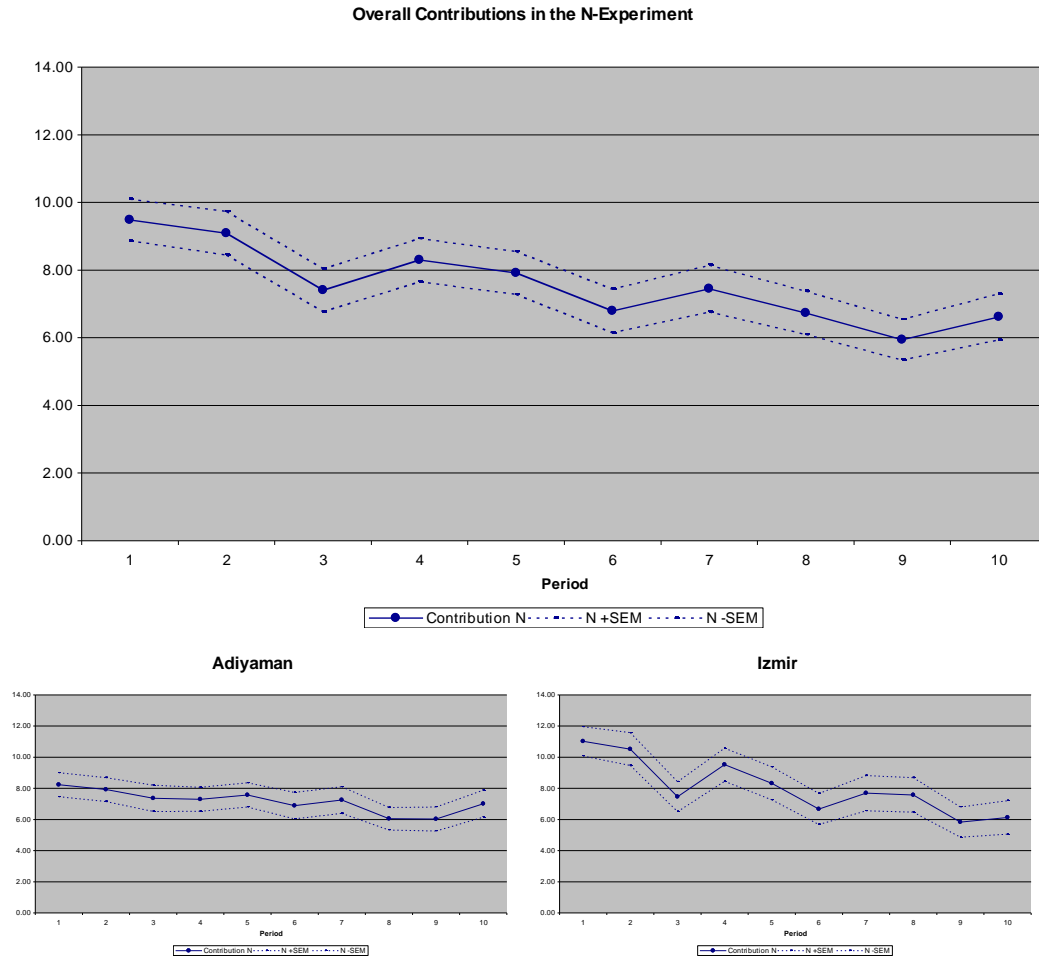
The performance of the Adıyaman group is unexpected. The participants in Adıyaman were not as significantly discouraged by the free rider effects as participants in İzmir or in other populations have been. This unique finding indicates that perhaps the conditional cooperators of Adıyaman have a higher tolerance for the inequity of free riding than participants elsewhere.

It is possible to see the average period effects in the N-experiment by performing a Tobit estimation. Using this test, the effects of each successive period on contribution levels can be teased out. Table 6 shows the results of this analysis.

Table 6: Period effects on contribution in the N-Experiment

	Dependent Variable Contribution		
	Overall	Adıyaman	İzmir
Period	-0.551 (0.119)***	-0.34 (0.128)***	-0.883 (0.237)***
Final Period	1.292 (1.148)	1.608 (1.233)	0.682 (2.3)
C	10 (0.667)***	8.55 (0.72)***	12.144 (1.324)***
Observations	1160	640	520
R²	0.02	0.01	0.03

Notes: The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Final Period is a dummy value.

* Denotes significance at 10 percent.
*** Denotes significance at 5 percent.*
***Denotes significance at 1 percent.

The period effect is obviously very significant (at a level of 1 %) in our data for both Adıyaman and İzmir. For every passing period, contributions decreased by 0.34 points in the Adıyaman group. An even more pronounced effect is seen in the İzmir group. For each passing period contributions decrease by 0.88 points (nearly a point a period) in the İzmir group. From this analysis the substantial deterioration of contribution levels over time in this the non-punishment treatment is seen.

What is the effect on contribution levels when punishment is introduced? As has been demonstrated elsewhere, punishment stabilizes the contribution levels in both Adıyaman and İzmir. In Adıyaman contribution levels in period P1 were just about 6 points. By period P10, contribution levels had increased to nearly 7 points. In İzmir we saw an even more pronounced effect. Contribution levels began around 7.5 points in period P1 for the İzmir group and finished period P10 at approximately 9 points.

Graph 3, below, illustrates the changes in contribution between the N- and the P-experiments overall and for both Adıyaman and İzmir individually.

Graph 3: Change in Contributions between N- and P- Experiments

Overall Change in Contributions between the N- and P-Experiments

Adiyaman
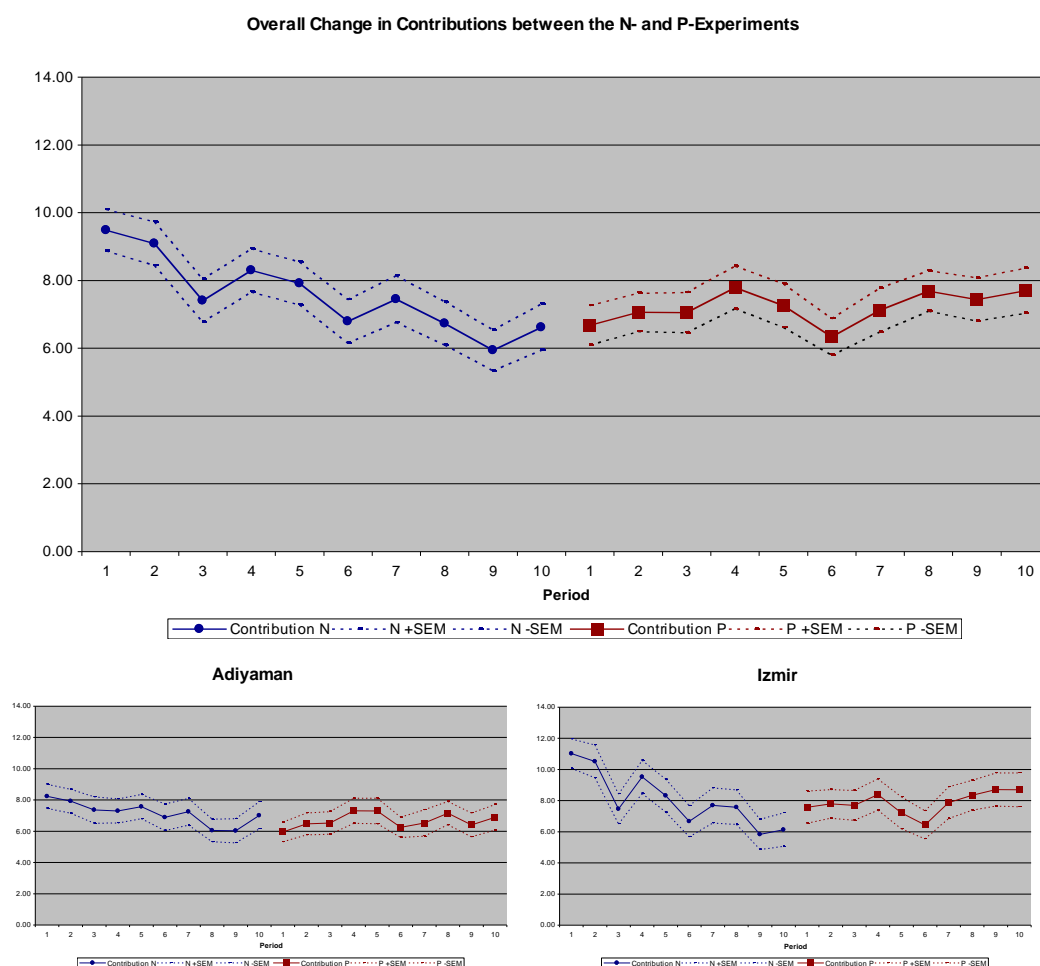
Izmir

Punishment appears to stabilize contribution levels and even slightly increase these levels in the İzmir population. However, significant increases in contribution levels are not seen. An area of interest for future study would be the longer-term effect of punishment. Perhaps over a long enough time frame punishment might induce increased overall contribution levels.

In a way similar to Table 6, what the period effects on contribution were in the P-experiment can be investigated. Remember that in each successive period in the N-experiment treatment the level of contributions significantly decline by 0.55 point on average. What effect does the introduction of punishment have on this deteriorating period effect in the P-experiment? The analysis is shown in Table 7.

Table 7: Period effects on contribution in the P-Experiment

	Dependent Variable Contribution		
	Overall	Adıyaman	İzmir
Period	0.058 (0.109)	0.05 (0.119)	0.059 (0.213)
Final Period	0.519 (1.049)	0.146 (1.138)	1.131 (2.046)
C	6.29 (0.615)***	5.979 (0.668)***	6.69 (1.197)***
Observations	1160	640	520
R²	0.00	0.00	0.00

Notes: The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Final Period is a dummy value.
 * Denotes significance at 10 percent.
 ** Denotes significance at 5 percent.
 ***Denotes significance at 1 percent.

As can be seen in Table 7, the period effect has disappeared. Whereas the overall loss of 0.55 points per period was significant at 10 percent, there is no significant period effect in the P-experiment. Introduction of punishment has completely eliminated the deteriorating period effect and solved, to some extent, the free rider problem. As noted above though, it does not appear that punishment significantly increases contribution level. Rather, punishment is more a stabilizer of contributions and means of preventing further contribution deterioration.

So if contribution level has been effectively stabilized, does that mean that the average earnings in the P-experiment increased? Average earnings are total points received at the end of each period, i.e. the sum of the points distributed from the group project and points retained from the initial endowment. Table 8 shows the answer to that question by comparing the average earnings in the N-experiment and the P-experiment.

Table 8: Average Earnings in the N- and P-Experiments

	Average earnings in		Percentage change relative to N-experiment
	N-experiment	P-experiment	
Overall	24.54	10.58	-56.88%
Adıyaman	24.30	12.45	-48.75%
İzmir	24.85	8.28	-66.66%

Average earnings in the P-experiment were much lower than average earnings in the N-experiment. Overall there was a 57% decrease in earnings in the P-experiment. The İzmir group experienced the largest percent decline seeing a 67% reduction in average earnings from nearly 25 points to nearly 8 points. As to why earnings were so much lower in the P-experiment than in the N-experiment, it is important to remember that punishment is costly. It consumes resources to punish someone while punishment itself is a destruction of resources. Although contribution levels have stabilized in the P-experiment, the costs of that stabilization through punishment are greater than the costs of the free-riding problem at least in the short term of this 10 period experiment.

Furthermore, at this point it is well worth remembering the dominant strategy in a public goods game. As elaborated above, the dominant strategy in a public good game is for each individual to not contribute any points from his or her endowment into the group project. When punishment is introduced, the dominant punishment strategy is never to exercise any punishment. Had the participants in the P-experiment strictly followed the dominant strategy, they would have earned nearly twice as many points as they actually did.

4.2 Response to Punishment
We've seen so far that punishment, at significant costs, prevents the deteriorating period effect and stabilizes contributions in this experiment. Let's look more deeply as to what it is that punishment is doing.

Table 9 summarizes the mean contributions in the N- and the P-experiments both in period 1 and over all the periods.

As can be see above, punishment leads to significant differences in contribution levels. The differences in period one contributions between the N- and the P-experiments are stark. There was a 30% decline in contributions from the N- to the P-experiment in period one. When this is compared with the mean contributions over all periods, we see that the negative percent change has decreased. The changes in contributions from the N- to the P-experiments in İzmir were the most dramatic. In period one, there was a 31% decrease in contributions between the N- and P-experiments; whereas, when all periods were considered the mean contribution saw only a 2.5% decrease. If the experiment would have run for a few more periods, it's quite possible that the percentage changes could have become positive indicating increased giving in the P-experiment.

Table 9: Mean contributions per subject pool in the N- and P-Experiments

	Contribution in period 1			
	N-Exp	P-Exp	Percentage Change	p-value
Overall	9.5	6.7	-29.55%	0.000
AU	8.2	6.0	-27.70%	0.009
IEU	11.0	7.6	-31.24%	0.000
	Contribution over all periods			
	N-Exp	P-Exp	Percentage change	p-value
Overall	7.6	7.2	-4.73%	0.002
AU	7.2	6.7	-6.74%	0.319
IEU	8.1	7.9	-2.52%	0.073

Notes: The p-values were determined by a Wilcoxon signed-rank test.

Graph 4 visually illustrates this idea comparing the relative earnings over time in both Adıyaman and İzmir. When this number is equal to zero then it means that the costs of the punishment treatment have been covered by the corresponding gains in efficiency.

Graph 4: Relative earnings in the P- and the N-experiment over time

Relative earnings in the P- and the N-experiment over time
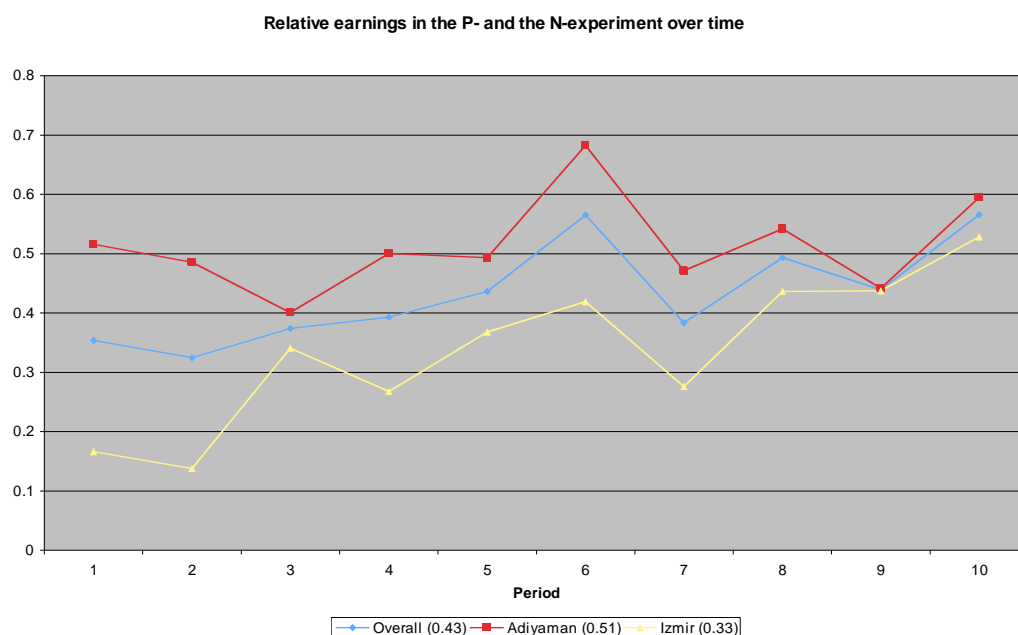
While the relative earnings in the P- and the N-experiment do not reach zero in the 10 periods of this experiment – they reach just under 0.6 – there is a definite positive trend that given enough time would likely reach the zero mark and potentially progress to positive efficiency.

So what effect does punishment have on various contributors? In any punishment circumstance the punished person could have contributed in one of two ways. They could have contributed bellow the group average or they could have contributed equal to or above the group average. The effects of punishment on both of these cases will now be investigated.

In the first case, the punished person contributed less than the group average, that is the person was a free-rider. We looked to see what the effect of altruistic punishment would be on a free riders' contribution in the next round. In this analysis a positive change in contribution means that the punished person increased their contributions in the next round, while a negative change in contribution means that the punished person decreased their contribution. Table 10 summarizes our findings.

Table 10: Punishment's effect on next round contribution if present contribution was below average

	Dependent Variable Change in Contribution		
	Overall	Adıyaman	İzmir
Reduction	-0.077 (0.016)***	-0.082 (0.021)***	-0.064 (0.026)***
Period	-0.079 (0.096)	-0.151 (0.12)	0.015 (0.158)
Final Period	0.344 (0.781)	1.735 (0.986)*	-1.442 (1.259)
C	1.35 (0.538)***	1.433 (0.649)**	1.394 (0.931)
Observations	542	307	235
R^2	0.04	0.06	0.04

Notes: The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Final Period is a dummy value.
  * Denotes significance at 10 percent.
  ** Denotes significance at 5 percent.
  ***Denotes significance at 1 percent.

As can be seen in Table 10, altruistic punishment overall increased contributions in the next round. The constant term indicates that those who contributed less than average would increase their contributions by 1.35 on average following punishment (with significance at 1 percent for the overall group and significance at 5 percent for the Adıyaman group). Interestingly, the greater the amount of altruistic punishment (represented as reduction in the table) was, the smaller the increase in contribution. This trend was significant at 1 percent across the board. It's as if the punished party while recognizing his or her need to increase contributions did not respond particularly well to receiving punishment, especially punishment of significant size.

Table 11: Punishment's effect on next round contribution if present contribution was above average

	Dependent Variable Change in Contribution		
	Overall	Adıyaman	İzmir
Reduction	0.075 (0.021)***	-0.028 (0.038)	0.126 (0.026)***
Period	0.099 (0.119)	-0.033 (0.166)	0.253 (0.168)
Final Period	0.003 (0.988)	-0.137 (1.359)	0.122 (1.411)
C	-1.767 (0.656)***	-1.866 (0.898)**	-1.925 (0.95)**
Observations	502	269	233
R^2	0.03	0.00	0.11

Notes: The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Final Period is a dummy value.
  * Denotes significance at 10 percent.
 *** Denotes significance at 5 percent.*
  ***Denotes significance at 1 percent.

Apparently, punishment – both altruistic and anti-social – has significant effects on next round contribution behavior in of this population. One further area to investigate is that of punishment behavior.

4.3 Punishment Behavior

The mean punishment expenditures are show in Graph 5. The left side of this graph represents altruistic punishment or the punishment of free riders. The right side of this graph in contrast represents anti-social punishment or the punishment of participants who are contributing more than the punishers. The various colors represent the size of deviation between the punisher and the punished party.

Graph 5: Mean Punishment Expenditures
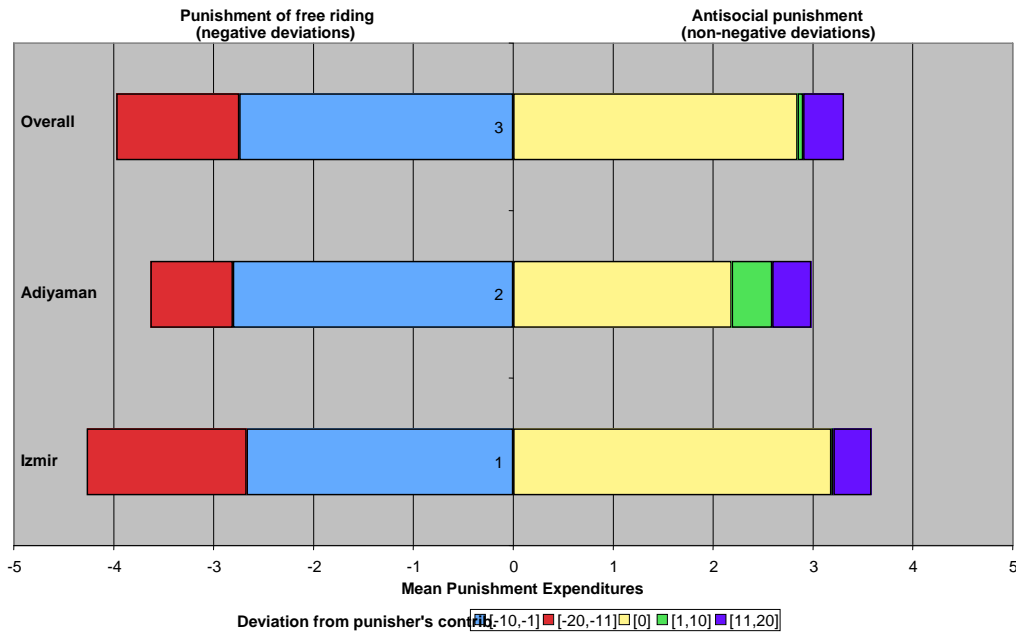
Notes: Participants in the P-experiment had the option of punishing their other group members. This is a graph of mean punishment expenditures for those who exercised that option and it excludes those who chose not to exercise punishment in order to emphasize the amount of punishment exercised.

It can be seen here that altruistic punishment was generally more severe than anti-social punishment. However, anti-social punishment was very present. These results are very similar to those reached by Herrmann et al. in their experiment in their experiments at Boğaziçi University in Istanbul, Turkey (2008). One observation to note is that in Adıyaman there was less of both altruistic punishment and anti-social punishment (just as there were less contributions overall). If these are the mean punishments when punishment was exercised, then at what frequency was punishment exercised? Graph 6 shows the punishment frequencies.

Graph 6: Punishment Frequencies

Overall Punishment Frequency

Adiyaman
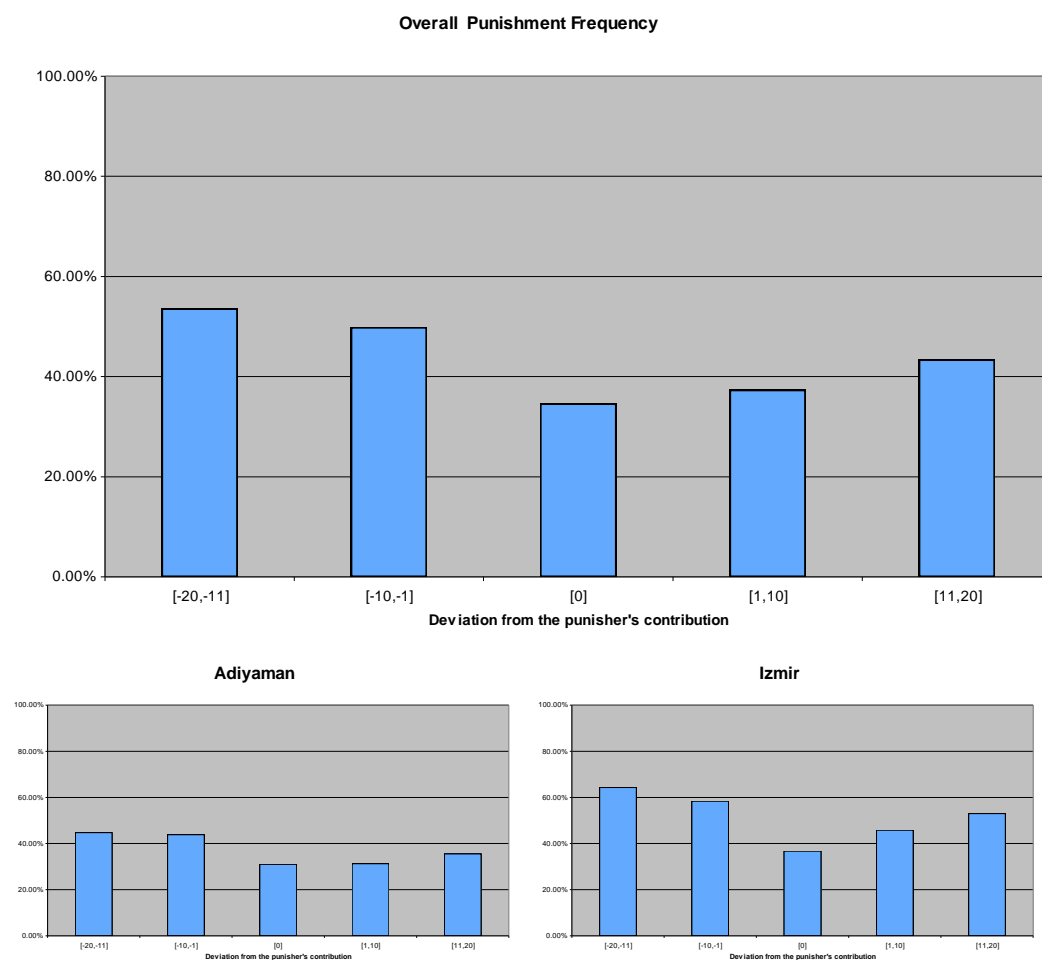
İzmir

Overall altruistic punishment was exercise more often than anti-social punishment. In İzmir, altruistic punishment was exercised approximately 60% of the time. In contrast, altruistic punishment was only exercised approximately 45% of the time in Adıyaman. In both İzmir and Adıyaman, anti-social punishment was exercised less frequently than altruistic punishment, but it was still significantly present. Interestingly punishment on the extremes of maximum variation was practiced more frequently than in cases of less variation. This would be expected for altruistic punishment, but is somewhat surprising for anti-social punishment.

Table 12: Free Riding Punishment Explained by Game Play

	Overall Pooled		Overall		Adiyaman	Izmir
Dependent Variable Punishment						
Punished Contribution	-0.079 (0.03)***	-0.078 (0.03)***	-0.138 (0.032)***	-0.061 (0.03)**	-0.195 (0.05)***	0.022 (0.039)
Punishers' Contribution	0.024 (0.02)	0.025 (0.02)	0.084 (0.022)***	-0.009 (0.022)	-0.041 (0.033)	0.021 (0.03)
Other Group Members Contrib.	0.104 (0.022)***	0.107 (0.022)***	0.048 (0.024)**	0.09 (0.023)***	0.132 (0.035)***	0.029 (0.029)
Received Punishment T-1		0.017 (0.028)	-0.131 (0.027)***	0.038 (0.029)	0.043 (0.044)	0.041 (0.036)
Period	0.245 (0.043)***	0.257 (0.048)***	-0.101 (0.046)**	0.208 (0.05)***	0.481 (0.081)***	0.036 (0.063)
Final Period	-0.665 (0.419)	-0.681 (0.42)	-0.336 (0.445)	-0.396 (0.423)	-0.472 (0.612)	-0.253 (0.575)
Accumulated Earnings	-0.029 (0.002)***	-0.029 (0.003)***		-0.032 (0.003)***	-0.049 (0.005)***	-0.024 (0.003)***
Adiyaman	-0.015 (0.216)	-0.005 (0.217)				
C			-0.634 (0.347)*	1.061 (0.347)***	1.236 (0.501)***	1.568 (0.486)***
Observations	1490	1490	1490	1490	865	625
Log Likelihood	-2491.92	-2491.74				
R²			0.05	0.15	0.14	0.18

Notes: The pooled estimates were conducted using OLS estimation. The remaining estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Final Period is a dummy value. Adıyaman is a dummy value for the corresponding city.
*   * Denotes significance at 10 percent.*
*   ** Denotes significance at 5 percent.*
*   ***Denotes significance at 1 percent.*

19

Table 12 illustrates punishment in light of game play. Table 12 shows that free riding punishment is consistently and highly significantly related to the contribution of the punished participant. The more the punished participant contributed, the lower the free riding punishment they received. The contributions of the other two group members, the period, and the accumulated earnings of the punisher were also significant factors. Interestingly, one of the most significant factors across the board was the amount of accumulated earnings. The greater one's total profit from all the previous rounds, the less one was likely to punish free riders. The wealthy were less likely to engage in the refereeing and disciplining of free riders and instead either ignored free riding or relied on others to carry out the job of policing the group.

Tables 13 shows the effects of socio-economic characteristics, trust attitudes, nationalism, and self-described religiosity altruistic punishment and through Tobit estimations.

According to our analysis certain socio-economic traits influence the punishment of free riders. The following effects were observed at a high level of statistical significance (significance at 1 percent). Older participants assigned free riders fewer punishment points, as did only children. People from larger cities punish free riders less severely, as did those who had higher levels of religious practice. Participants knew more people in the experiment assigned fewer punishment points to free riders. Also, female participants and members of civic groups punished free riders with fewer punishment points than did male participants (at a significance level of 5%).

Several factors from our trust survey effected the punishment of free riders. Participants who scored highly on the GSS Fair, GSS Help, GSS Index, and/or Trust Strangers, categories punished free riders less stringently. In contrast, participants who scored high on the GSS Trust and/or Trustworthiness categories assigned free riders more punishment points. All of these relationships are significant at 1 percent. Participants who scored highly on the IAT country test, that is more nationalistic participants, were also more likely to assign free riders more punishment points than others (at a level of 10 percent). In contrast, participants who supported the law banning headscarves in public places were less likely to assign punishment points to free riders (at a level of 10 percent) as were participants with a high self-described level of religiosity (at a level of 1 percent).

Table 13: The effects of trust attitudes, nationalism, and self-described religiosity as well as socio-economic characteristics on free riding punishment

Dependent Variable Free-Riding Punishment

	Model 1	Model 1.5	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 11	Model 12	Model 13
GSS Trust			0.289 (0.119)**									
GSS Fair				-0.507 (0.119)***								
GSS Help					-0.39 (0.118)***							
GSS Index						-0.393 (0.12)***						
Trust Strangers							-0.25 (0.116)**					
Door unlocked (Insignificant)								0.086 (0.121)				
Lend Money (Insignificant)												
Lend Possessions (Insignificant)												
Trust Index (Insignificant)									0.166 (0.113)			
Trustworthiness										0.427 (0.117)***		
Nationalism											0.287 (0.156)*	
Against Turban												-0.664 (0.265)***
Self Described Religiosity (Insignificant)												
Punished Contribution		-0.078 (0.03)***	-0.065 (0.031)**	-0.079 (0.031)***	-0.078 (0.03)***	-0.065 (0.031)**	-0.077 (0.03)***	-0.079 (0.03)***	-0.08 (0.03)***	-0.086 (0.03)***	-0.094 (0.032)***	-0.08 (0.03)***
Punisher Contribution		0.022 (0.022)	0.021 (0.023)	0.04 (0.023)*	0.028 (0.022)	0.036 (0.024)	0.019 (0.023)	0.021 (0.022)	0.024 (0.023)	0.019 (0.022)	0.041 (0.024)*	0.016 (0.023)
Others Average Contribution		0.072 (0.023)***	0.08 (0.023)***	0.079 (0.023)***	0.074 (0.023)***	0.081 (0.023)***	0.072 (0.023)***	0.07 (0.023)***	0.071 (0.023)***	0.064 (0.023)***	0.089 (0.025)***	0.071 (0.023)***
Received Punishment T-1		0.041 (0.028)	0.06 (0.029)*	0.051 (0.03)*	0.027 (0.028)	0.045 (0.03)	0.036 (0.028)	0.04 (0.028)	0.042 (0.028)	0.035 (0.028)	0.067 (0.03)**	0.04 (0.028)
Period		0.166 (0.049)***	0.186 (0.05)***	0.173 (0.05)***	0.161 (0.049)***	0.197 (0.051)***	0.161 (0.049)***	0.167 (0.049)***	0.166 (0.049)***	0.157 (0.049)***	0.196 (0.055)***	0.171 (0.049)***
Final Period		-0.309 (0.416)	-0.29 (0.418)	-0.334 (0.435)	-0.484 (0.415)	-0.502 (0.44)	-0.299 (0.416)	-0.299 (0.416)	-0.29 (0.416)	-0.27 (0.415)	-0.178 (0.435)	-0.311 (0.415)
Accumulated Earnings		-0.028 (0.003)***	-0.028 (0.003)***	-0.028 (0.003)***	-0.025 (0.003)***	-0.027 (0.003)***	-0.027 (0.003)***	-0.027 (0.003)***	-0.028 (0.003)***	-0.027 (0.003)***	-0.028 (0.003)***	-0.028 (0.003)***
Female	-0.534 (0.246)**	-0.455 (0.233)**	-0.569 (0.234)**	-0.584 (0.24)**	-0.598 (0.241)**	-0.591 (0.245)**	-0.515 (0.235)**	-0.429 (0.236)*	-0.402 (0.236)*	-0.555 (0.234)**	-0.728 (0.265)***	-0.509 (0.233)**
Age	-0.414 (0.093)***	-0.426 (0.087)***	-0.417 (0.088)***	-0.501 (0.091)***	-0.449 (0.085)***	-0.501 (0.091)***	-0.445 (0.088)***	-0.418 (0.087)***	-0.424 (0.087)***	-0.379 (0.087)***	-0.479 (0.088)***	-0.391 (0.088)***
Ethnicity	-0.356 (0.277)	-0.385 (0.258)	-0.683 (0.266)**	-0.472 (0.274)*	-0.259 (0.258)	-0.623 (0.273)**	-0.391 (0.258)	-0.396 (0.258)	-0.476 (0.266)*	-0.173 (0.263)	-0.54 (0.286)*	-0.268 (0.261)
Only Child	-2.979 (0.517)***	-2.299 (0.484)***	-1.146 (0.533)**	-1.129 (0.581)**	-2.147 (0.48)***	-1.202 (0.577)**	-2.326 (0.487)***	-2.297 (0.483)***	-2.243 (0.485)***	-2.021 (0.486)***	-2.618 (0.478)***	-2.132 (0.488)***
Eldest Child	-0.08 (0.307)	-0.004 (0.285)	0.034 (0.283)	-0.106 (0.287)	0.098 (0.284)	-0.002 (0.284)	-0.054 (0.286)	0.026 (0.287)	0.003 (0.284)	-0.007 (0.283)	0.459 (0.313)	-0.025 (0.284)
Urban Background	-0.42 (0.087)***	-0.303 (0.082)***	-0.202 (0.086)**	-0.213 (0.087)**	-0.344 (0.082)***	-0.284 (0.089)***	-0.323 (0.083)***	-0.299 (0.082)***	-0.312 (0.082)***	-0.258 (0.083)***	-0.423 (0.098)***	-0.289 (0.082)***
Middle Class	0.095 (0.124)	0.001 (0.116)	-0.124 (0.122)	-0.09 (0.121)	-0.012 (0.113)	-0.112 (0.122)	0.02 (0.116)	0.027 (0.122)	0.023 (0.117)	-0.022 (0.116)	0.109 (0.144)	0.048 (0.117)
Religious Practice	-0.174 (0.047)***	-0.146 (0.044)***	-0.158 (0.046)***	-0.16 (0.045)***	-0.097 (0.045)**	-0.143 (0.047)***	-0.138 (0.044)***	-0.142 (0.045)***	-0.146 (0.044)***	-0.162 (0.044)***	-0.176 (0.05)***	-0.186 (0.047)***
Membership Index	-0.048 (0.034)	-0.065 (0.032)**	-0.061 (0.032)*	-0.055 (0.034)*	-0.049 (0.033)	-0.041 (0.033)	-0.08 (0.033)**	-0.071 (0.033)**	-0.064 (0.032)**	-0.046 (0.033)	-0.031 (0.043)	-0.068 (0.032)**
Adiyaman	-1.075 (0.376)***	-0.256 (0.356)	-0.451 (0.356)	-0.522 (0.359)	-0.308 (0.355)	-0.353 (0.358)	-0.176 (0.358)	-0.22 (0.359)	-0.353 (0.362)	0.013 (0.361)	0.038 (0.471)	-0.376 (0.359)
Number Known	-0.031 (0.012)***	-0.028 (0.011)**	-0.029 (0.011)***	-0.027 (0.012)**	-0.029 (0.011)***	-0.032 (0.012)***	-0.025 (0.011)**	-0.03 (0.012)***	-0.027 (0.011)**	-0.037 (0.012)***	-0.023 (0.015)	-0.028 (0.011)**
C	5.117 (0.787)***	5.214 (0.799)***	5.433 (0.82)***	5.495 (0.816)***	4.891 (0.789)***	5.55 (0.823)***	5.255 (0.8)***	5.116 (0.809)***	5.235 (0.799)***	4.925 (0.799)***	4.473 (0.962)***	5.547 (0.809)***
Observations	1490	1490	1424	1398	1420	1304	1490	1490	1490	1490	1198	1490
R²	0.06	0.17	0.17	0.19	0.19	0.18	0.17	0.17	0.17	0.18	0.15	0.18

Notes: All trust variables are normalized and resigned such that higher coefficients indicate more trust. The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Female, Ethnicity, Only Child, and Eldest Child are dummies. Urban Background, Middle Class, Religious Practice, and Membership Index are integer values. Adiyaman is a dummy for the corresponding city. Number known refers to the number of other participants in the session.
* Denotes significance at 10 percent.
** Denotes significance at 5 percent.
***Denotes significance at 1 percent.

Table 14: The effects of trust attitudes, nationalism, and self-described religiosity as well as socio-economic characteristics on participant behavior

1. N1 Contribution Behavior (C = 13.866***)	
Increased Contributions (Positive)	*Decrease Contributions (Negative)*
o Female (2.869*)	o Turk (4.128**) o Only Child (4.705*) o Adıyaman (7.552***) o *Lend Money (1.308***)*

2. Free Riding Punishment (C = 5.214***)	
Increased Punishment (Positive)	*Decreased Punishment (Negative)*
o Others' Contribution (0.072***) o Period (0.166***) o *GSS Trust (0.289***)* o *Trustworthiness (0.427***)* o *Nationalism (0.287*)*	o Punished Contribution (0.078***) o Accumulated Earnings (0.028***) o Female (0.455**) o Age (0.4276***) o Only Child (2.299***) o Urban Background (0.303***) o Religious Practice (0.146***) o Membership (0.065**) o Number Known (0.028***) o *GSS Fair (0.507***)* o *GSS Help (0.390***)* o *GSS Index (0.393***)* o *Trust Strangers (0.250***)* o *Against Turban (0.664*)*

Notes: All trust variables are normalized and resigned such that higher coefficients indicate more trust. The estimations were conducted using censored Tobit estimation. Robust standard errors are given in parenthesis. Female, Ethnicity, Only Child, and Eldest Child are dummies. Urban Background, Middle Class, Religious Practice, and Membership Index are integer values. Adıyaman is a dummy for the corresponding city. Number known refers to the number of other participants in the session. Italicized results are trust attitudes, nationalism, and self-described religiosity variables which are not associated with the C terms or socio-economic terms given in Table 16. For the relevant terms, see Tables 5, 14, and 15.
   * Denotes significance at 10 percent.
   ** Denotes significance at 5 percent.
***Denotes significance at 1 percent.

5. Conclusion

The first aim of this study was to compare the similarities and differences between the performance of public goods games in the West and in a country of the Muslim world. In contrast to Gachter et al's 2004 study of Russian students, Turkish participants' contributions were not significantly increased in response to higher scores on the GSS Fair, GSS Help, GSS Index, or Trust Strangers measures. In fact, higher scores on the Trust Strangers measure was insignificantly associated with *lower* contributions. One trust measure that was significant in the Turkish population, but not the Russian population was the Loan Money measure. Counter intuitively the greater the frequency Turkish participants loaned money to their friends, the lower their N1 contributions.

An additional area of contrast was the effect of socio-economic background on contributions. Gachter et al. (2004) found no effect of socio-economic background on contributions in their study of Russian participants whereas we found significant effects in this study of Turkish participants. According to the results of our study, females made higher N1 contributions whereas Turks, only children, and participants from Adıyaman made lower N1 contributions. Overall, N1 contribution levels were higher in Turkey than in Russia (13.866 points and 8.308, respectively). However, higher N1 contributions have been observed in other countries as well (Herrmann et al. 2008). A second aim of this study was to analyze both contribution behavior and also punishment behavior in light of socio-economic and various trust measures. The results of this analysis are shown below in Table 16.

Certain trends are observed in this table. From the N1 contributions perspective, a higher Female variable increases contributions while higher Turk, Only Child, Adıyaman, and Lend Money variables decrease contributions. From the punishment perspective, higher Trustworthiness, Nationalism, and GSS Trust variables increase punishment across the board. Likewise, the higher the GSS Fair, Trust Strangers, Accumulated Earnings, Age, Only Child, and Urban Background variables the lower the punishment was across the board.

High scores on the Female, Membership, and Against Turban variables were the worst variables from the punishment perspective because they each decreased altruistic punishment and increased anti-social punishment. Higher GSS Help, GSS Index, Religious Practice, and Number Known variables all decreased altruistic punishment. Higher Lend Money, Middle Class, and Adıyaman variables all decreased anti-social punishment wheras higher Door Unlocked and Turk variables increased it.

The third aim of this study was to compare the effects of development on the cooperative behavior of Turkish students. Using the natural laboratory provided by the differing levels of development in Adıyaman and İzmir, we were able to examine the effects development had on both N1 contributions as well as altruistic and anti-social punishment. Several trends were identified in both contribution behavior and punishment behavior.

In regards to contribution behavior, the participants in İzmir contributed significantly more in the N1 period (12.144*** in İzmir versus 8.55*** in Adıyaman). These differences are more striking when you compare the frequencies of certain N1 contributions. In the N1 period, 50% of Adıyaman students contributed 5 points or less compared with only 29% of İzmir students. Likewise, 25% of İzmir students contributed a full 20 points in the N1 period compared with only 10% of Adıyaman students.

İzmir participants were significantly more sensitive to free riders than were Adıyaman participants. During the N-experiment, the contributions of İzmir participants decreased by 0.833*** points per period whereas the contributions of Adıyaman participants decreased by less than half that amount (only 0.34*** points per period).

In regards to punishment, several observations can be made. Altruistic punishment led to greater next round contributions for both Adıyaman and İzmir. Interestingly, the greater the punishment received was, the smaller the next round increased contribution. . Both altruistic punishment and anti-social punishment were of greater frequency in İzmir compared to Adıyaman. While there weren't significant differences in the magnitude of altruistic punishment between Adıyaman and İzmir, anti-social punishment was 0.667*** points lower in Adıyaman compared to İzmir. Finally, comparing the average earnings change from N- to P-experiments, Adıyaman's average earnings decrease is less than İzmir's average earnings decrease (48.75% and 66.67% respectively) reflecting lower levels of resource destruction through anti-social punishment.

These observations paint a picture of Adıyaman as a more temperate place than İzmir. Both contributions and punishment were less frequent and less severe (at least anti-social punishments were) in Adıyaman than they were in İzmir. These findings contrast with the previous observations that more Western, developed places are associated with lower incidence of ant-social punishment. Within Turkey, in this study, the opposite was found: mainly, that more Western and developed İzmir exhibited greater amounts of anti-social punishment.

When people take a risk for the benefit of the community, whether in contributions to a public goods game or in discussions with authorities regarding elephant problems, a certain level of reciprocity is expected. A lack of this reciprocity often leads to decreased risk taking in the group and/or self-regulation. However, self-regulation in the form of punishment contains the risks of a double-edged sword. While it can be used for good to punish free riders, it can also be used anti-socially to punish the cooperators as well. This study has confirmed both of these phenomena to be present in Turkey.

REFERENCES

Akerlef, George and Robert Shiller. Animal Spirits: How Human Psychology Drives the Economy and Why it Matters for Global Capitalism. Oxfordshire, UK: Princeton University Press, 2009.

Akın, Zafer and U. Barış Urhan. "Is Economics Becoming an Experimental Science." Iktisat Isletme ve Finans. 25.288 (2010): 9-28.

Andreoni, James and Ragan Petrie. "Public Goods Experiments without Confidentiality: A Glimpse into Fundraising." Journal of Public Economics. 88 (2004): 1605-1623.

Ashraf, Nava, Iris Bohnet, and Nikita Piankov. "Decomposing Trust and Trustworthiness." Experimental Economics. 9 (2006): 193-208.

Bowles, Samuel. "Policies Designed for Self-Interested Citizens May Undermine 'The Moral Sentiments': Evidence from Economic Experiments." Science. 320 (2008): 1605-1609.

Boyd, Robert, Herbert Gintis, Samuel Bowles, and Peter Richardson. "The Evolution of Altruistic Punishment." Proceedings of the National Academy of Sciences. 100 (2003): 3531-3535.

Brosig, Jeannette, Joachim Weimann, and Axel Ockenfels. "The Effect of Communication Media on Coperation." German Economic Review. 4.2 (2003): 217-241.

Case, Karl, and Ray Fair. Principles of Economics. Upper Saddle River, NJ: Pearson, 2007.

Charness, Gary and Martin Dufwenberg. "Promises and Partnership." Econometrica. 74.6 (2006): 1579-1601.

Davis, Douglas D. and Charles A. Holt. Experimental Economics. Princeton: Princeton University Press, 1993.

Denant-Boemont, Laurent, David Masclet, and Charles Noussair. "Punishment, Counterpunishment and Sanction Enforcement in a Social Dilemma Experiment." Economic Theory. 33 (2007): 145-167.

Dufwenberg, Martin, Simon Gachter, and Heike Hennig-Schmidt. "The Framing of Games and the Psychology of Strategic Choice." CeDEx discussion paper no. 2006-20, University of Nottingham.

Ensminger, Jean. "Transaction Costs and Islam: Explaining Conversion in Africa." Journal of Institutional and Theoretical Economics. 153 (1997): 4-29.

Ertaç, Seda. "A Brief Introduction to the Methodology of Experimental Economics." Summer School on Experimental Economics. Koç University. Istanbul, Turkey. 3 August 2009. Lecture.

Eskicioğlu, Lale. "Elephant." Nasreddin Hodja Stories: Compiled and Retold in English. ReadLiterature.com. n.p. n.d. Web. 30 May 2010. <http://www.readliterature.com/ h010622.htm>.

Fehr, Ernst and Simon Gachter. "Altruistic punishment in humans." Nature. 415 (2002): 137-140.

Fehr, Ernst and Simon Gachter. "Cooperation and Punishment in Public Goods Experiments." The American Economic Review. 90 (2000): 980-994.

Fischbacher, Urs. "z-Tree: Zurich Toolbox for Ready-Made Economic Experiments." Experimental Economics. 10 (2007): 171-178.

Fischbacher, Urs, Simon Gachter, and Ernst Fehr. "Are People Conditionally Cooperative? Evidence from a Public Goods Experiment." Economics Letters. 71 (2001): 397-404.

Gachter, Simon and Benedikt Herrmann. "Reciprocity, culture and human cooperation: previous insights and a new cross-cultural experiment." Philosophical Transactions of the Royal Society B: Biological Sciences. 364 (2009): 791-806.

Gachter, Simon, Benedikt Herrmann, and Christian Thoni. "Trust, voluntary cooperation, and social-economic background: survey and experimental evidence." Journal of Economic Behavior and Organization. 55 (2004): 505-531.

Gachter, Simon and Ernst Fehr. "Collection Action as a Social Exchange." Journal of Economic Behavior and Organization. 39 (1999): 341-369.

Gachter, Simon, Elke Renner, and Martin Sefton. "The Long-Run Benefits of Punishment." Science. 322 (2008): 1510.

Gachter, Simon and Benedikt Herrmann. "The Limits of Self-Governance When Cooperators Get Punished – Experimental Evidence from Urban and Rural Russia." CeDEx discussion paper no. 2010-5, University of Nottingham.

Glaeser, Edward L. et al. "Measuring Trust." The Quarterly Journal of Economics. 115 (2000): 811-846.

Haley, Kevin and Daniel Fessler. "Nobody's Watching? Subtle Cues Affect Generosity in an Anonymous Economic Game." Evolution and Human Behavior. 36 (2005): 245-256.

Holt, Charles. Y2K Bibliography of Experimental Economics and Social Sciences. University of Virginia, 29 December 1999. Web. 30 May 2010.

Henrich, Joseph, et al. "Costly Punishment Across Human Societies." Science. 312 (2006): 1767-70.

Herrmann, Benedikt, Christian Thöni, and Simon Gachter. "Antisocial Punishment Across Societies." Science. 319 (2008): 1362-7.

Holt, Charles A. Markets, Games, and Strategic Behavior. Addison Wesley Longman, 2007.

Kagel, John H. and Alvin E. Roth, ed. The Handbook of Experimental Economics. Princeton: Princeton University Press, 1995.

Kandel, Eugene and Edward Lazear. "Peer Pressure and Partnerships." The Journal of Political Economy. 100 (1992): 801-817.

Kelley, Harold and Anthony Stahelski. "Social Interaction Basis of Coperators' and Competitors' Beliefs about Others." Journal of Personality and Social Psychology. 16 (1970): 66-91.

Ledyard, John. "Public Goods: A Survey of Experimental Research." In John Kagel and Alvin Roth (eds.): Handbook of Experimental Economics. Princeton: Princeton University Press, 1995.

Marlowe, Frank W., et al. "More 'altruistic' punishment in larger societies." Proceedings of the Royal Society: Bio Sci. 275 (2008): 587-591.

Masclet, David, Charles Nussair, Steven Tucker, and Marie-Claire Villeval. "Monetary and Nonmonetary Punishment in the Voluntary Contributions Mechanism." American Economic Review. 93 (2003): 366-380.

Milinski, Manfred, Dirk Semmann, and Hans-Jurgen Krambeck. "Reputation Helps Solve the 'Tragedy of the Commons.'" Nature. 415 (2002): 424-426.

Nikiforakis, Nikos. "Punishment and Counter-Punishment in Public Goods Games: Can We Really Govern Ourselves?" Journal of Public Economics. 92 (2008): 91-112.

Norenzayan, Ara and Azim F. Shariff. "The Origin and Evolution of Religious Prosociality." Science. 322 (2008): 58-62.

O'Gorman, Rick, Joseph Henrich, and Mark Van Vugt. "Constraining free riding in public goods games: designated solitary punishers can sustain human cooperation." Proceedings of the Royal Society: Bio Sci. 276 (2009): 323-9.

Öneş, Umut and Louis Putterman. "The Ecology of Collective Action: A Public Goods and Sanctions Experiment with Controlled Group Formation." Journal of Economic Behavior and Organization. 62 (2007): 495-521.

Ostrom, Elinor, James Walker, and Roy Gardner. "Covenants With and Without a Sword: Self-Governance is Possible." American Political Science Review. 86 (1992): 404-417.

Reiley, David H. and John A. List. "Field Experiments in Economics." May 2007. Working Paper on the Web. 30 May 2010. <http://econ.arizona.edu/downloads/ working_papers/Econ-WP-07-15.pdf>.

"Religion, Secularism, and the Veil in Daily Life." 9 December 2007. Report on the Web. Konda Araştırma ve Danışmanlık. 30 May 2010. <http://www.konda.com.tr/html/ dosyalar/ghdl&t_en.pdf>.

Semmann, Dirk, Hans-Jurgen Krambeck, and Manfred Milinski. "Reputation is Valuable Within and Outside One's Own Social Group." Behavorial Ecology and Sociobiology. 57 (2005): 611-616.

Sonnemans, Joep, Arthur Schram, and Theo Offerman. "Strategic Behavior in Public Good Games: When Partners Drift Apart." Economic Letters. 62 (1999): 35-41.

"Turkish Stastical Institute Regional Stastics 2001 Report." Turkish Statistical Institute. 30 May 2010. <http://tuikapp.tuik.gov.tr/Bolgesel/>.

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