Investigating the Peer Effect of Corruption*

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Abstract

When an individual believes that the majority of peers behave in a corruptive manner, is he/she more likely to corrupt? And if so, then what motivates an individual to follow the behavior of others more: knowing that the majority behaves in a corruptive manner or the willingness to fulfill the expectations of one's peers? I use a one-shot reverse public goods experiment to provide answers to these questions. In the experiment, subjects have an opportunity to withdraw money from a Common Pool. Withdrawal of money benefits the subject but imposes small externalities on each member of the group. Before they make their withdrawal decision, I manipulate subjects' beliefs about the behavior of other participants. I also investigate which type of expectations, empirical or normative, influences the choice to adopt corruptive behavior more. The results suggest the existence of a peer effect of corruption. Empirical expectations are found to be the main source of anti-social behavior of subjects.

Keywords: social norms; expectation; corruption; illegal behavior; peer effect; public goods game
JEL classification: C91, D83, D84, K420

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1 Introduction

Corruption remains one of the most serious obstacles to the economic and social development of countries: Corruption contributes to high levels of poverty and low levels of investment, GDP, institutional quality, as well as low-level flows of capital, goods, and aid (see Treisman, 2000, among others). Although the determinants of corruption are increasingly understood, we continue to observe high levels of corruption in a majority of countries all over the world[1]. This could suggest that, apart from the political difficulties of implementing anti-corruption programs, there are determinates of corruption that are not yet well enough understood. As a result current anticorruption programs introduced in these countries are informed by studies that do not go far enough in investigating the causes and ways of fighting corruption.

Most studies on corruption tend to search for the determinants of corruption on a macro-level. Cross-country comparisons have led to the conclusion that the main determinants of corruption are, above all, the absence of democracy (Lambsdorff, 2006; Treisman, 2000), the presence of discretionary power and economic rents associated with that power (Tanzi, 1995; Ades and Di Tella, 1999), and the failure of the judicial system and institutions (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1999). Investigating the micro-level (individual-level) determinants of corruption, however, may provide a deeper understanding of the factors that prompt people to engage in corruption, and consequently, of its persistence (Gatti, Paternostro, and Rigolini, 2003; Dusek et al., 2005).

[1] http://www.transparency.org/cpi2014

In the present study I focus on the microeconomic causes of corruption and, in particular, on the peer (or social) effect of corruption. The peer effect can be defined as the tendency of individuals to behave in the same way as other members of a group to which they belong (Tirole, 1996). According to Gino, Ayal, and Ariely (2009), peers can influence other individuals' behavior in three ways: through a change in the expected probability of being caught and punished; through a change in perception of saliency of ethicality at the moment one is considering whether to corrupt or not; and through a change in one's understanding of social norm related to corruptibility. In the present paper I analyze the last source, namely whether the change in one's understanding of the social norms related to corruptibility, caused by exposure to other people's unethical or ethical behavior, influences individuals' decision to become corrupt.

While theories abound, and while various empirical studies have investigated corruption and corruptibility, convincing evidence of the importance of the peer effect of corruption are still missing. The difficulty to separate the pure effects of peers' behavior from the effects of confounding factors is the main obstacle faced by studies that use observational data (i.e. Gatti, Paternostro, and Rigolini, 2003; and Dong, Dulleck, and Torgler; 2012). Consequently, results of such studies are potentially afflicted by fixed-effects, self-selection and/or measurement error problems (Falk and Ichino, 2006; Falk and Fischbacher, 2002). Recently, however, economists have started using experiments to study the peer effect of corruption in order to improve upon the existing research. There are several compelling reasons to be interested in the experimental approach for this purpose. One of them is the possibility to create a proper environment and manipulate it to observe the subsequent changes in individuals' behavior. This addresses the endogeneity problem of studies using observational data (Dusek, Ortmann, and Lizal, 2005; Abbink, 2006). For the external validity of the results, it is desirable that the experimental design closely relates to the real-life version of the issue that it studies.

In this paper, I provide additional evidence on the existence of the peer effect of corruption and corruptibility, and its origin using an adapted version of the "take"- treatment of the public goods experiment (from now on the reverse public goods game) described by Dufwenberg, Gächter, and Henning-Schmidt (2011). In the experiment, participants have the opportunity to withdraw money from the Common Pool. The withdrawal of money benefits the subject but imposes small negative externalities on each member of the group. This mimics the mechanism which lies in the core of most types of real-life petty corruption experiences. Petty corruption involves the redistribution of small amounts of money or the granting of minor favors to those involved into corrupt act and significantly affects the wellbeing of ordinary citizens (below I refer to these effects as the negative externalities of corruption) (UN Anti-corruption Toolkit, 2002)[2]. For example, if a corrupt official accepts a bribe for not reporting the low quality of materials used for road construction, drivers will eventually suffer from the bad quality of the newly built road. Or if a corrupt official steals money from the funds

[2] Some may argue that corruption can also have positive effects as a mean of lessening the costs of unnecessary bureaucratic procedures such as jumping the queue or speeding up the process of getting the licenses etc. Pope (2000), however, argues that even these "grease payments" eventually impose negative externalities on the society, since they cause decisions to be weighed in terms of money, not human need. Also, any type of corruption leads to the decline in officials' morale "eroding the courage necessary to adhere to high standards of probity". Consequently, being once given a "grease payment", an official may tend to demand the same payment from other people. Thus, in Ukraine, for example, one can often observe that certain bureaucratic procedures (like getting a passport) are deliberately prolonged in order to receive bribes from those who cannot wait that long. Or in some public schools in Tajikistan a teacher would not check assignments of the pupils until their parents pay a bribe to her.

allocated to poverty in order to buy property or cars, less money is distributed among the poor[3]. Similarly, if the subject exhibits anti-social behavior when participating in the reverse public goods experiment, she gains from this but indirectly hurts other members of her group. Thus, the behavior of the subject in the game is driven by motives similar to those that make her decide whether to be corrupt or not.

In the experiment, I manipulate the participants' beliefs about the behavior of other members of the group to which they belong and observe the effect of the provided information on subjects' decisions. Moreover, using the method of Bicchieri and Xiao (2009), I show which source is more likely to trigger peer effect: the beliefs about what most people choose when they decide on whether to become corrupt or not (empirical expectations); or the beliefs about which type of behavior, corrupt or non-corrupt, most people approve of in a particular situation (normative expectations). The relationship between these two kinds of expectations depends on the level of corruption in a country. In spite of existing social norm condemning corruption, frequent exposure to instances of corruption in countries with high level of corruption leads to inconsistency between normative and empirical expectations of their citizens. On the other hand, when the level of corruption in a country is low and the non-corruption social norm is largely followed the direction of the two types of expectations tends to coincide (Bicchieri and Xiao, 2009). In my experiment, in order to check for the empirical and normative expectations I asked subjects a set of questions answers to which revealed their personal attitude and their beliefs about peers' attitude to the fact of money withdrawal, as well as beliefs about choices made by their peers in the experiment.

[3] Pope (2000), when citing the report of the National Audit Bureau in China, claims that about one fifth of funds allocated to control poverty are diverted into private accounts by the government.

Overall, the findings suggest the existence of the peer effect of corruption. Empirical expectations are found to be the main source of peer effects in the experiment but normative expectations also appear to influence individuals' behavior.

In the following sections I describe the experiment and its results in details. Section 2 provides discussion regarding the potential relevance of the present paper and its contribution to the existing experimental literature; in Sections 3 and 4, I describe experimental design and in Sections 5 and 6, I demonstrate and discuss the empirical relevance of the study.

2 Related Literature

According to Fehr and Fischbacher (2002), studying peer effect and their origin is important for understanding individuals' behavior and conditions for successful collective actions. Many existing studies investigate the possibility that peer effect are moderate individuals' corrupt behavior. Gatti et al. (2003), for example, attempted a trial to investigate the social effect of corruption using micro-level data, which were collected using a questionnaire on individual attitudes towards corruption. The authors find evidence that the social environment significantly affects the individual's willingness to behave in a corruptive manner. While insightful, these findings, however, are not completely persuasive for several reasons. First, the fact that the social environment influences an individual's attitude towards corruption does not necessarily mean that it will lead to an actual increase/decrease in the level of corruption in a country. The individual's attitude towards corruption is only one of many other factors which determine one's decision to behave in a corruptive manner such as the probability of being caught and punished (Schulze and Frank, 2003), the amount of fair salaries (Abbink, 2005), profession (Frank and Schulze, 2000), and other cultural differences (Cameron, Chaudhuri, Erkal, and Gangadharan, 2006). Second, like other empirical papers on corruption, the study of Gatti et al. (2003) may suffer from the reverse causality/endogeneity and measurement error problems. Lambsdorff (2006) discusses the issue of reverse causality. He argues that some consequences of corruption are difficult to distinguish from its causes. Inequality, for example, can explain high levels of corruption, but econometric evidence also exists of the effect of high levels of corruption on inequality.

The measurement error problem was explained in Dusek, Ortmann, and Lizal (2005). They claim that empirical studies of corruption based on questionnaires and case studies may not be reliable enough due to the illegal and secretive nature of corruption. People tend to lie about their corruptive activity thus biasing the results. Hence, using experiments to study corruption may avoid the disadvantages of alternative sources of information (Dusek et al., 2005). Dusek et al. (2005) also assert that testing alternative institutional arrangements using experiments is cheaper and easier than doing empirical research.

Bicchieri and Xiao (2009) and Innes and Mitra (2013) take advantage of the experimental approach to address the problem of the peer effect of corruption indirectly. Both studies use similar approaches to manipulate the behavior of the participants: the subjects are given different information about the share of individuals in a previous experiment who behaved selfishly (in the dictator game of Bicchieri and Xiao, 2009) or dishonestly (in the deception game of Innes and Mitra, 2013). The change in the behavior evoked by this information is interpreted as a peer effect.

However, as discussed above, neither the deception nor the dictator games take the social loss created by corrupt behavior into account. The existence of such a loss may influence the decision of an individual to be involved in corrupt behavior (Andreoni, 1995; Barr and Serra, 2009). Thus, the peer effects of selfishness, honesty and corruptibility may be different. Consequently, the results of dictator and deception experiments should not be interpreted as peer effect of corruption. Apart from that selfishness (unfairness), which is the focus of the dictator game, dishonesty, which is studied in the deception game, and corruptibility are different concepts. According to Innes and Mitra (2013), one of the interpretations of selfishness is the willingness to compete and win. Selfishness is not always negative: It can promote innovations and development. Dishonesty, in turn, is perceived by church and society as wrongdoing and a violation of a social norm. In this respect, corruptibility is neither the same as selfishness nor as dishonesty, and the peer effect of corruption can be different from the one of dishonesty or selfishness. Cabelkova (2001) claims that if an individual lives in a highly corrupted society, he tends to perceive taking or giving bribes as the normal everyday behavior of making deals. In such a society being corrupt is not perceived in the same way as being dishonest or selfish. Therefore, the deception or the dictator games should not be used to investigate the social effect of corruption.

The present study attempted to overcome the disadvantages of the existing studies on the peer effect of corruption by employing the tools of experimental economics, and the existing experimental studies by using modified version of the reverse public good game. The modification involves introduction of the probability of being caught and punished and by using the reverse public goods game where the participants can take money from the Common pool.

3 Theoretical Background of the Experiment

The reverse public goods game described in Dufwenberg et al. (2011) is the point of departure for the experiment. In this game, a group of subjects is endowed with resources (T) and each member of the group is allowed to withdraw money from this Common Pool up to a certain amount. After all participants make a decision about whether to withdraw the money and how much, the money remaining in the account is multiplied by a constant μ and distributed equally between all members in the group. So the payoff function of participant i (π_i) is given by

$$\pi_i = t_i + [\mu \times (T - t_1 - t_2 \ldots - t_i - t_j - t_n)] \div n,$$

where $t_i \in \{0,1,\ldots,T/n\}$ is the amount of money each subject i can take from the public account, i= 1, 2, …n, and n is the total number of participants in a group.

The negative externalities imposed by the participant *j* into participant *i*, E_{ji}, are calculated as a difference between the maximum possible payoff of the participant *i*[4], π_{i0}, and the payoff of the participant *i* when the participant j withdraw t_j from the Common pool (π_{ij}):

$$E_{ji} = \pi_{i0} - \pi_{ij} = t_i + [\mu \times (T - t_i)] \div n - [t_i + [\mu \times (T - t_i - t_j)] \div n] = \frac{\mu}{n} \times t_j .$$

In order to create the feeling that participants' anti-social behavior has negative consequences to other members of the group, probability of being caught and punished is introduced into the game: Once a participant decides to withdraw money she can lose all her payoff with positive probability $p<1$.

If all the participants are selfish money-maximizers, the sub-game perfect equilibrium of this game is the following: each participant will withdraw the maximum possible amount of money from the Common pool, so each 'other member of the group' will suffer the maximum possible negative externality of $\frac{\mu}{n} \times T$.

4 Experimental Design

In the experiment, subjects were randomly assigned to groups of six people. Each group was endowed with 1500 Talers (experimental units). The maximum amount of money that each

[4] The payoff of the participant *i* is maximized when *i* withdraw maximal possible t_i and *j* does not withdraw anything (t_j =0).

subject was allowed to withdraw was 250 Talers, the constant multiplier μ was equal to 3[5] and the probability of being caught and punished p was set to0.003[6]. Thus, the payoff function was given by $\pi_i = t_i + [3 \times (1500 - \sum_{j=1}^{6} t_j)] \div 6$,

The experiment consisted of the three main treatments: Control treatment (Contr), Positive information treatment (PosInfo) and Negative information treatment (NegInfo). The Positive- and Negative-information treatments were intended to find out the peer effect of money withdrawal. During these treatments, the participants were provided with the information about the choices of the participants in the Control treatment before having to make a decision about how much to withdraw.

4.1 Providing Information about Others' Behavior

Providing information about others' behavior differed from the methods used in the existing studies and thus required paying particular attention. The experimental literature suggests two main ways of providing the information aiming at manipulating subjects' beliefs. First, to provide information about a nonrandom sample of individuals. Innes and Mitra (2013), for example provide the information about the choices made by a selectively drawn group of participants in the previous sessions (a group of those who behaved in highly corrupt manner for negative-information treatment and a group of those who behaved in non-corrupt manner for positive-information treatment). Similarly, Bicchieri and Xiao (2009) in their dictator game

[5] The parameters repeat those used in Dufwenberg et al. (2011) but are changed with respect to the bigger number of members in the group and the exchange rate between the Czech Koruna and Euro (1 Euro= 25 Czk). With these parameters the marginal per capita return and the average payoff of the players are similar to those in the experiment of Dufwenberg et al. (2011)

[6] The probability of being caught and punished follows Abbink, Irlenbusch and Renner (2002).

inform about the behavior of all participants but select the session which satisfies the required criteria: either heavily fair or heavily unfair session. The participants in the treatment session, however, are not told that the sample of participants or the session was selected non-randomly and thus the statements used in these studies seem to suggest that the reported decisions represent a general pattern. Intentional provision of misinformation, however, is deception, and according to Hertwig and Ortmann (2008), it tends to “raise participants’ suspicions, prompt second-guessing of experimenters’ true intentions, and ultimately distorts behavior and endangers the [experimental] control it is meant to achieve” [p.59].

The second way to provide information about the behavior of “peers” is to use the strategy method of Selten (1967). The strategy method implies that subjects should state what they would do in hypothetical situations (in our case, if other withdraw a particular amount of money t_i from the Common Pool). This method avoids deception of participants and helps to collect data at a relatively low cost. Yet, due to its hypothetical nature the strategy method has been strongly criticized for being too psychologically cold to be realistic and externally valid (Brandts and Charness, 1998). Brandts and Charness (1998) suggest that some actions would “trigger stronger emotional responses in a hot direct-response environment” (when the second player responds to the first player’s observed action) than when the strategy method is used. Roth (1995) points out that this difference in behavior may occur due to the fact that for some decision-making processes the timing is an important aspect which can influence a subject’s decision. Since under the strategy method subjects have to specify their behavior in advance, the possibility of observing this timing effect is removed. Hence. in some experiments, there can be a difference in participants' behavior in the "hot" and "cold" conditions[7].

For the reasons stated above, I decided to avoid using both methods in the experiment and provided information about others' behavior as follows: The participants in the Positive-information treatment received information about the six (out of twenty-four) smallest withdrawals in the previous session and were told that much, while the subjects in the Negative-information treatment received information about the six highest withdrawals and were also told that much. This approach has two distinct advantages compared to the method of Innes and Mitra (2013) and the strategy method. First, unlike the former it provides true information about others' behavior without misrepresentation of the take-pattern of the whole group. Second, this method provides information to participants about real choices made by participants who are similar to them. This creates hot a direct-response environment which tends to trigger stronger emotional responses than when the strategy method is used.

In order to do the robustness check, however, an additional "cold" treatment was conducted where I elicit subjects' conditional willingness to withdraw the money from the Common Pool. Namely, the subjects were asked to specify how much they wanted to withdraw if they knew that the six largest withdrawals made by the participants in the previous session were $t_i \in \{250; 250; 250; 250; 250; 250\}$ (StatNeg treatment) and then if they knew that six

[7] The experimental evidence on whether the cold- and hot-response methods give different results is mixed (for a review see Brandts and Charness, 2011). A number of studies do find a difference between the treatment effects obtained while using the strategy and direct response methods. Brandts and Charness (2003), for example, find that in a modified version of a deception game with a possibility to punish the level of punishment doubles in the "hot" condition. Similarly, Brosing, Weimann and Yang (2003) discover that when the costs of punishment of unfavorable behavior of a partner are relatively low, the probability of being punished in direct response game is 42% while in the strategy method game is 0%. Also, Casari and Cason (2009) find significant difference in the behavior of participant in the "hot" and "cold" treatments in the trust game. These findings question the hypothesis that the strategy method always gives the same results as the direct response.

smallest withdrawals were $t_i \in \{0; 0; 0; 0; 0; 0\}$ (StratPos treatment), Tallers[8]. The results of the study suggest that the behavior of subjects differs in "hot" and "cold" treatments for the setting.

4.2 Eliciting Empirical and Normative Expectations

In order to distinguish which kind of expectations, empirical or normative, influence the decision to withdraw the money, I followed Bicchieri and Xiao (2009) and asked the subjects to answer several questions. The answers to the first and second questions helped to elicit empirical expectations: "Please estimate how many members of your group including you have taken Talers from the Common Pool" and "Please estimate the average amount of Talers withdrawn from the Common Pool by all members of your group?" The answers to the third and fourth questions gave us information about one's personal attitude to corruption and normative expectations, respectively. The subjects were asked: "Do you think it is appropriate to withdraw money from the Common Pool?" and then "Please estimate how many members of your group including you answered positively to the previous question". Then during the analysis of the results, I checked if the answers to the first, second and the fourth questions influenced the amount withdrawn by the subject from the Common Pool. To ensure that the answers to the questions were thought through, subjects were paid a reward of 100 Talers if his/her answer matched the actual number[9]. All questions were asked after the subjects made

[8] This information was true because in each session at least six out of twenty four subjects either withdrew nothing or withdrew maximum possible amount.

[9] In case when the subjects were asked to estimate the average amount of Talers withdrawn from the Common Pool they were paid 100 Talers if their estimates were correct with toleration of 13 Talers.

their decisions about the withdrawal. Nobody was informed about the subsequent questions before making decisions.[10]

4.3 Model and Hypotheses

In the experiment, the level of corruption among the participants was measured by the amount of money withdrawn from the Common pool. This outcome variable was used to test the following research hypotheses.

Hypothesis 1: Providing information about peers' non-corrupt behavior reduces the level of corruption among individuals. Hypothesis 2: Providing information about peers' corrupt behavior reduces the level of corruption among individuals. Hypothesis 3: The peer effect of corruption is determined by empirical expectations. Hypothesis 4: The peer effect of corruption is determined by normative expectations. Hypothesis 5: There is no difference between subjects' corrupt behavior under "hot" and "cold" treatments.

4.4 Experimental Settings and Payoffs

The experiment used a between-subject design, with each subject participating in one treatment and one treatment only. This was to ensure that the choices were strictly independent. At the end of the experiment the payoffs from the game were transferred into Czech Koruna using the exchange rate 3Taler = 1 CZK. Apart from that, subjects were paid a show-up fee of 100 CZK.

[10] Dufwenberg et al.(2011) assert that the different timing of events could induce the participants to make a choice which they think would lead to the correct prediction.

All experimental sessions were run at the Laboratory of Experimental Economics (LEE) at the University of Economics in Prague using zTree software (Fischbacher 2007). Subjects were recruited through the Online Recruitment System for Economic Experiments (Greiner, 2004). Participation in the experiment were rewarded by cash payments at the end of the experiment and depended on performance. The study used 180 subjects for the data collection (15 sessions of 12 subjects). An average subject cash payoff was 290 CZK including the show-up fee. This was an average compensation for about one hour of net participation time.

5 Results

The analysis of the data consists of two parts. First, I examine how the information about peers' behavior affects subjects' decision to withdraw money from the Common pool (H_1, H_2 and H_5). Second, I analyze how the empirical and normative expectations affect the behavior of the participants (H_3 and H_4). During the analysis I separately study the effects of the treatment manipulations of subjects' beliefs about the peers' behavior on the level of withdrawal and on the number of subjects who decided to withdraw any positive amount from the Common Pool. In Section 6 I provide a possible explanation for the obtained results.

Result 1 and Result 2 concern the peer effect of money withdrawal. Result 3 concentrates on how the "hot" and "cold" treatment conditions affect subjects' behavior.

Result 1. Providing the information about others' low level of withdrawal reduces the amount of money withdrawn from the Common Pool. Providing the information about others' high level of withdrawal does not affect the level of withdrawal.

Result 2. Providing the information about others' non-corrupt behavior does not affect amount of people behaving in a corrupt manner. Providing the information about others' corrupt behavior induces more people to behave in a corrupt manner.

Result 3: There is a difference in subjects' levels of withdrawal in "hot" and "cold" treatments.

Support. Fig. 1 and Table 1 provide the main support for Result 1 and Result 3. The mean/median withdrawals are as follows. Control treatment: 140/200; Positive information treatment: 88/25; Negative Information treatment: 156/165; Strategy method positive information: 122/100; Strategy method negative information: 151/200. A non-parametric Kruskal-Wallis test suggests that withdrawals from four treatments stem from different distributions ($\chi^2(2) = 7.505$; $p = 0.0235$ for three main treatments and $\chi^2(4)= 7.935$; $p = 0.0940$ for all four treatments). Pair wise Wilcoxon rank sum tests for comparison of all four treatments, however, suggests that only withdrawals from Control and Positive information treatments stem from different distributions (p-values are documented in Table 1). This suggests that only the positive-information manipulation was effective enough in facilitating a change in the amount of money withdrawn by the subjects. As I expected a robust regression of withdrawals on dummies for treatments indicates that providing positive information decreases the amount withdrawn, while providing negative information increases it. The last effect, however, is indeed not statistically significant.

Thus, I can reject hypothesis H_1 and cannot reject hypothesis H_2.

Comparison of the ways of providing information on peers' behavior to subjects showed that using strategy method in the reverse public goods experiment tend to induce weaker responses from subjects' than the direct-response method. In particular, pair wise Wilcoxon rank sum tests cannot reject the hypothesis that the withdrawals from the Control treatment and Strategy method treatment come from the same distribution. Also, the results of a robust regression of withdrawal on dummies for treatments and a probit regression suggest that there is no significant effect of the treatment manipulations on the level of withdrawal and on the number of subject who decided to withdraw, respectively.

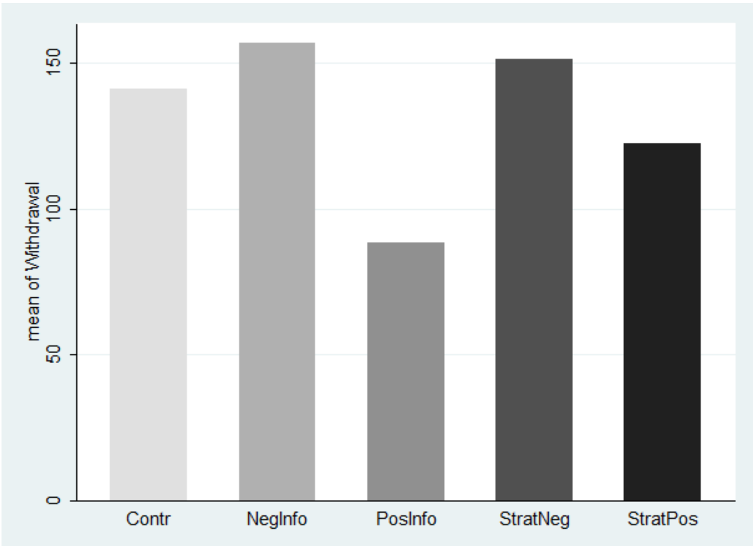


Fig.1. Mean withdrawals over treatments.

Table 1
p-values of pair wise Wilcoxon rank sum tests comparing mean withdrawals over treatments.

	Contr	NegInfo	PosInfo	StrNeg	StrPos
Contr		0.6377	0.0755	0.5079	0.7250
Observations	96	96	96	84	84

Table 2 provides the main support for Result 2. In the table, I present the results of a probit regression with the binary dependent variable being equal to one if a subject's withdrawal is positive and zero otherwise. The independent variables include dummies for treatments and personal characteristics. The results show that providing negative information about peers' behavior induces more subjects to withdraw a positive amount from the Common Pool. Providing positive information, on the other hand, has no effect on the number of subjects who decide to behave in anti-social manner.

Table 2

Results of the probit regression: dependent variable – number of subjects who withdrew positive amount from the Common Pool

	Dependent variable Corrupt
VARIABLES	Probit
PosInfo	-0.0948
	(0.324)
NegInfo	0.665*
	(0.349)
StratPos	-0.106
	(0.358)
StratNeg	0.146
	(0.364)
age	0.0800**
	(0.0405)
religion	0.0882**
	(0.0431)
major	-0.0265
	(0.0201)
gender	0.115
	(0.216)
Constant	-2.001*
	(1.054)
Observations	192

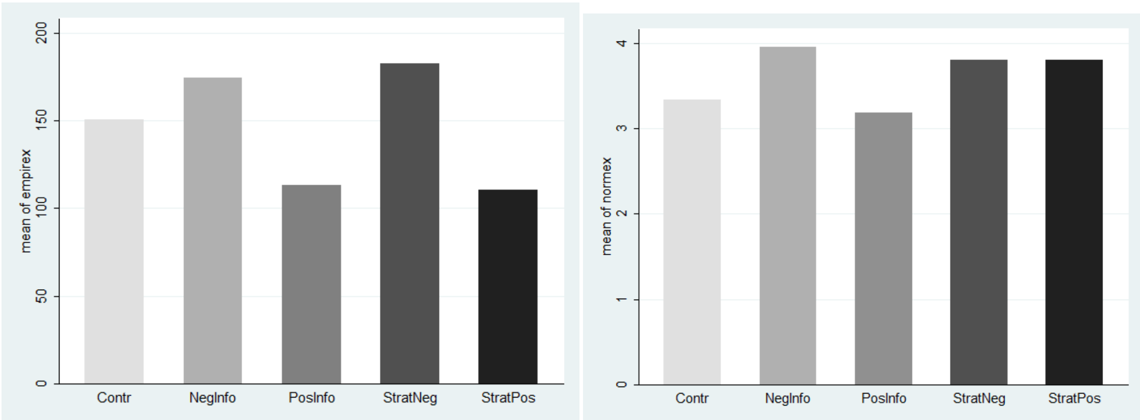
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.

The second part of the analysis, in particular Result 4, focuses on empirical and normative expectations.

Result 4. Empirical expectations are the main source of peer effect.

Support. Fig. 2 and Tables 3, Table 4 and Table 5 provide the main support for Result 4. A non-parametric Kruskal-Wallis test strongly suggests that empirical expectations from four treatments stem from different distributions ($\chi^2(2)= 20.122$; $p = 0.0001$ for three main treatments and $\chi^2(4)= 38.574$; $p = 0.0001$ for all four treatments). This result is confirmed by pair wise Wilcoxon rank sum tests for comparison of all four treatments (p-values are provided in Table 4). Normative expectations from four treatments, however, are found to stem from the same distribution: Kruskal-Wallis test cannot reject the null hypothesis ($\chi^2(2)= 3.809$; $p = 0.1489$ for three main treatments and $\chi^2(4)= 5.349$; $p = 0.2385$ for all four treatments). Wilcoxon rank sum tests imply that only normative expectations from Negative information treatment stem from different distributions. Hence, I conclude that empirical expectations drive subjects' decision on the level of withdrawal. A regression of amount withdrawn on empirical (Table 6) and normative (Table 7) expectations provide additional support for this conclusion. The effect of empirical expectations on withdrawals is positive and highly significant (p-values < 0.01). The effect of normative expectations, on the other hand, is significant only in Positive information treatment. In order to see what their relative effects are I run a regression of withdrawals on empirical and normative expectations simultaneously. It appears that when both expectations are included, normative expectations lose their significance while empirical expectations stay highly significant in all treatments[11]. In conclusion, I can reject hypothesis H3 and cannot reject hypothesis H4.

[11] I do not provide the results of the regressions because due to the correlation between empirical and normative expectations in some treatments the estimates should be taken with caution.



(a)

(b)

Fig.2. (a) Mean of empirical expectations over treatments. (b) Mean of normative expectations over treatments.

Table 3

Mean and median empirical expectations over treatments.

	Contr	NegInfo	PosInfo	StrNeg	StrPos
Mean	150	175	113	180	104
Median	15	170	100	200	100
Observations	48	48	48	36	36

Table 4

Mean and median normative expectations over treatments.

	Contr	NegInfo	PosInfo	StrNeg	StrPos
Mean	3	4	3	4	4
Median	3	4	4	4	4
Observations	48	48	48	36	36

Table 5

p-values of pair wise Wilcoxon rank sum tests comparing mean empirical and normative expectations over treatments.

VARIABLE		NegInfo	PosInfo	StrNeg	StrPos
empirex	Contr	0.0687	0.0043	0.0106	0.0028
normex	Contr	0.0861	0.9733	0.1940	0.1940
Observations		96	96	84	84

Table 6
Testing the empirical expectations hypothesis.

	Dependent variable Withdrawal			
	(1)	(2)	(3)	(4)
VARIABLES	PosInfo	NegInfo	StratPos	StratNeg
emex2	0.991***	1.100***	1.393***	1.034***
	(0.156)	(0.180)	(0.156)	(0.183)
gender	37.46*	22.64	19.85	27.21
	(22.13)	(21.83)	(35.76)	(26.05)
age	12.71**	-1.766	1.514	3.101
	(6.112)	(3.331)	(5.007)	(4.523)
relig	2.427	7.335	-0.134	14.38**
	(4.376)	(6.070)	(5.696)	(5.424)
major	3.141	2.180	3.337	-2.599
	(1.884)	(1.712)	(5.644)	(3.908)
Constant	-380.5***	-62.65	-101.6	-194.5*
	(132.3)	(98.90)	(150.8)	(113.4)
Observations	48	48	36	36
R-squared	0.558	0.518	0.611	0.616

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7
Testing the normative expectations hypothesis.

	Dependent variable Withdrawal			
	(1)	(2)	(3)	(4)
VARIABLES	PosInfo	NegInfo	StratPos	StratNeg
noex2	11.91*	9.423	11.07	8.884
	(6.292)	(7.987)	(10.42)	(8.580)
gender	2.644	42.06	35.66	34.20
	(28.33)	(28.45)	(41.78)	(39.15)
age	21.42***	-2.034	3.866	9.199
	(7.161)	(4.812)	(5.829)	(5.533)
relig	-3.368	2.457	-1.967	9.200
	(6.091)	(6.859)	(8.023)	(6.907)
major	3.299	0.164	-2.639	-8.147*
	(2.563)	(2.495)	(7.613)	(4.247)
Constant	-456.1**	132.8	-18.11	-139.6
	(173.7)	(129.7)	(158.4)	(145.9)
Observations	48	48	36	36
R-squared	0.264	0.115	0.107	0.288

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The investigation of the number of subjects who decided to withdraw money from the Common Pool is conducted using a probit model with binary dependent variable being equal to one if subject i withdrew a positive amount of money and zero otherwise. The independent variables include empirical or normative expectations and personal characteristics. The outcomes of the regressions are presented in Table 8 and Table 9. The results show that in all treatments except for the Negative-information treatment subjects' decision to withdraw is driven solely by empirical expectations. In the Negative-information treatment normative expectations become important but when empirical and normative expectations are studied simultaneously the significance disappears.

Table 8
Testing empirical expectations: Probit model.

	Dependent variable Corrupt			
	(1)	(2)	(3)	(4)
VARIABLES	PosInfo	NegInfo	StratPos	StratNeg
emex2	0.0136***	0.0144**	0.0496**	0.0225**
	(0.00425)	(0.00641)	(0.0222)	(0.00934)
gender	0.419	0.0288	0.0868	-0.232
	(0.477)	(0.556)	(0.665)	(0.804)
age	0.157	-0.0844	0.233	0.140
	(0.113)	(0.0948)	(0.159)	(0.127)
relig	0.140	0.240*	0.272	0.473**
	(0.106)	(0.129)	(0.173)	(0.225)
major	0.0182	0.0475	0.00430	-0.0135
	(0.0410)	(0.0695)	(0.0768)	(0.0766)
Constant	-6.090**	-0.907	-11.72*	-8.811**
	(2.740)	(2.786)	(6.101)	(3.897)
Observations	48	48	36	36

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The sign of the effects are very intuitive: the higher empirical expectations are associated with the larger number of withdrawals by different subjects and the higher normative expectations are linked to the smaller number of independent withdrawals.

Table 9
Testing normative expectations: Probit model.

	Dependent variable Corrupt			
	(1)	(2)	(4)	(3)
VARIABLES	PosInfo	NegInfo	StratPos	StratNeg
noex2	0.130	0.254*	0.101	0.0365
	(0.0978)	(0.137)	(0.114)	(0.126)
gender	-0.120	0.00305	-0.0658	0.127
	(0.399)	(0.517)	(0.544)	(0.610)
age	0.209**	-0.0885	0.100	0.213*
	(0.104)	(0.0920)	(0.0942)	(0.122)
relig	0.0425	0.0939	0.0524	0.144
	(0.0905)	(0.110)	(0.0946)	(0.103)
major	0.0242	-0.0114	-0.0763	-0.0997
	(0.0358)	(0.0500)	(0.0641)	(0.0681)
Constant	-5.450**	1.765	-2.368	-5.075*
	(2.508)	(2.413)	(2.261)	(2.778)
Observations	48	48	36	36

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

7 Discussion and Concluding Remarks

In general, the results of the reverse public goods experiment confirm the existence of the peer effect of unethical behavior. The design of the experiment makes it possible to conduct a separate analysis for the amount of money withdrawn from the Common Pool and for the decision to withdraw any positive amount. Statistical evidence differ in both cases. I find that when the amount of money withdrawn from the Common Pool is considered, the effect goes only in positive direction: knowledge about others' pro-social behavior leads to decrease in the amount withdrawn from the Common Pool. This effect originates in both empirical and normative expectations of the subjects. The effect of the latter implies that information on pro-social choices made by peers force individuals to think also about morality of the act of money withdrawal which impels them to withdraw less. The peer effect of providing negative information also exists but it appears to be statistically insignificant.

On the other hand, when the number of people who withdrew a positive amount is considered, the direction of the peer effect is opposite: subjects tend to withdraw some positive amount of money more often when they get the information about others' large withdrawals. When faced with the information that peers behave pro-socially fewer individuals decided to withdraw the money but this effect is not statistically significant. This result is in line with Innes and Mitra (2013). Their interpretation of the phenomenon is that those who tend to behave anti-socially, thus disobeying social norm, are less prone to change their behavior when exposed to social opinion. The results of my experiment contradict this suggestion: when faced with social information that their peers did not withdraw the money from the Common Pool subjects do not cardinally change their behavior to pro-social but significantly lower the amount of money they withdraw. This result inspires optimism that when exposed to prevailing pro-social behavior of their peers individuals may tend to refuse being involved in corrupt behavior which entails large negative consequences for other people and in some time possibly stop being corrupt at all.

Both empirical and normative[12] expectations seem to induce people to start withdrawing money from the Common Pool when they learn about others' large withdrawals. The effect of normative expectations is explained by Gino (2015). He asserts that people behave unethically more often when they can justify their behavior. Knowledge of unethical behavior of others helps to find justification for starting behaving in a corrupt manner and induces individuals to do so more often.

In general, when empirical and normative expectations are considered the former tend to be the main source of the peer effect of corruption. This provides the following policy recommendation. In order to reduce the level of corruption in a country a policy-maker should first of all concentrate on the formation of people's perceptions about the level of corruption in the country. This measure will help to do both: reduce the level of corruption among those who are already involved into corrupt activities and prevent "the innocent" ones from starting to corrupt. Combining this with efforts towards shaping people's negative attitude towards corruption may further reduce the level of corruption by preventing "the innocent" individuals from starting behaving in a corrupt manner.

[12] The effect of normative expectations, however, disappears when they are studied simultaneously with empirical expectations. I do not provide the results of simultaneous regression since the possible correlation between the two kinds of expectations undermines the reliability of its results.

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Appendix A

Instructions

Welcome to theexperiment!

General information on the experiment

You are going toparticipate in an experiment on decision making. If you read the following instructions carefully, you'll be able to earn a considerable amount of money. How much you will earn, will depend on your and others' decisions. It is therefore very important that you understand the following instructions.

- **Anonymity**

All participants decide anonymously, i.e. the other participants will not learn the decision you made during the experiment. To ensure anonymity it is imperative that all participants observe the following rule: During the experiment all communication is prohibited, i.e. you are not allowed to speak or otherwise express yourself.If you have a question, please raise your hand and an experimenter will come to you and answer it. **If you violate this rule, you will be dismissed from the experiment and forfeit all payments.**

- **Payments**

The currency used in this experiment is Talers. Your total earnings will first be calculated in Talers. The total amount of Talersthat you have earned during the experiment will be converted into CZK at the end of the experiment at an exchange rate of

3Talers = 1 CZK.

You will also receive a **show-up fee of 100 CZK**. You will be paid your earnings in cash, and privately, upon leaving the room.

The experiment consists of two stages.**Onlyone stage**, however, **is payoff relevant**. This means that at the end of the experiment the computer will randomly, and with equal probability, decide whether your earnings will be determined by your choices in Stage 1 or Stage 2.

In the following pages the experiment is described in detail. Once you have read the instructions carefully, we will ask you to answer several comprehension questions.

Stage 1: The Experimental Procedure

In the experiment, you will be a member of a group of 6 participants. There will be **five other members** in your group. The group will be endowed with money which will be called the Common Pool.

The experiment consists of only one task. You will have to decide **how many Talers you want to take from the Common Pool and how many Talers you want to leave in the Common Pool.**

- **The decision in the experiment**

At the beginning of the first stage, there are **1500 Talers**in the Common Pool of your group. Each participant**can take up to250 Talers**from the Common Pool. You will have to decide **how many of these 250 Talers you want to take** for yourself (and hence how many you want to leave in the Common Pool). The five other members of your group have to make the same decision. Every Taler that you take from the Common Pool for yourself will be paid to you, converted by the exchange rate given above, at the end of the experiment.

Talers that are left in The Common Pool will be **multiplied by 3**, The resultant number of Talers will be **divided equally among all six members of the group**. If for instance 100 Talers were left in the Common Pool, the number of Talers would increase to 300 Talers. This amount would then be divided equally among all six members of the group. Thus every group member would get 300/6 = 50 Talers in addition to what they took for themselves. After all six members of the group have made their decisions about the amounts they take from the Common Pool the total earnings obtained by each participant are determined.

- **The possibility of losing money earned in Stage 1**

If you decide to withdraw the money from the Common Pool, a number out of the range from 0 to 999 is randomly drawn. If the number is 0, 1 or 2, then you are **disqualified** (the probability of being disqualified is 0.003). That means that the experiment ends for you and all your previous earnings are canceled (at the end of the experiment, you will receive only the show-up fee.). If the randomly drawn number is 3, 4, ..., 998, or 999 (which happens with probability 0.997), the experiment is continued.

- **The calculation of your earnings:**

The earnings of every member of the group are calculated in the same way. If you are not disqualified, your earnings consist of two parts:

(1) the **earnings from Talers taken**: the Talers that you take from the Common Pool for yourself;

(2) the **earnings from the Common Pool**. The earnings from the Common Pool are calculated as follows:

3 × (1500 - sum of all Talers taken from the Common Pool)/6 =

= (3/6) × (1500 - sum of all Talers taken from the Common Pool).

That is each not disqualified group member receives the same earnings from the Common Pool.

Therefore your total earnings will be earnings from Talers taken + earnings from the Common Pool:

Total earnings = (earnings from Talers taken) + (3/6) × (1500 - sum of all Talers taken from Common Pool)

The income of each group member from the project is calculated in the same way.

Example:

If you take all 250 Talers from the Common Pool, your “earnings from Talers taken” is 250. At the same time, the total sum of Talers left in the Common Pool decreases by 250 Talers and **each member’s** “earnings from the Common Pool” **decreases** by (3/6)×250=125 Taler.

If you take 100 Talers from the Common Pool, your “earnings from Talers taken” is 100. At the same time, the total sum of Talers left in the Common Pool decreases by 100 Talers and each group member’s “earnings from the Common Pool” decreases by (3/6)×100 = 50 Taler.

- **How to take your decision**

The experiment consists of one period. The input screen that will prompt you for your decision looks as follows:

In the middle of the screen you will find the information that your group consists of 6 members, that there are 1500 Talers in the Common Pool and that you can withdraw any amount from 0 to 250 Talers. The formula for calculating your Total earnings is in the bottom of the screen in the Help box. You will find a Calculator button above the Help box. You can use the calculator, which appears after pressing this button, to make the calculations if needed.

You make your decision by typing a number between 0 and 250 in the input field. This field can be reached by clicking it with the mouse. After entering your withdrawal you must press the CONTINUE button. Once you have done this, your decision can no longer be revised.

Stage 2

The instructions for Stage 2 will appear on the screen after you finish Stage 1 of the experiment.

Questionnaire

After you finish Stage 2, you will be asked to fill in a questionnaire. The answers you provide in these questionnaires are completely anonymous.

At the end of the experiment you will see an income screen that informs you about your earnings from your decisions made in Stage1 and 2, the information on which stage will be paid for and your Final earnings in CZK.

If you have any questions please ask them now.

Appendix B

Comprehension questions

Please answer the following:

If each of the six members of the group takes 250 Talers from the Common Pool, what will be the total earnings of every member of the group?

If each of the six members of the group takes 0 Talers from the Common Pool, what will be the total earnings of every member of the group?

If you take 250 Talers from the Common Pool and the rest of the members of the group takes 0 Talers from the Common Pool, what will be the total earnings of every member of the group?

If you take 100 Talers from the Common Pool and the rest of the members of the group takes 0 Talers from the Common Pool, what will be the total earnings of every member of the group?

If one of the members of the group takes 250 Talers from the Common Pool and the rest of the members including you take 0 Talers from the Common Pool, what will be the total earnings of every member of the group?

If you take 0 Talers from the Common Pool and the rest of the members take 250 Talers from the Common Pool, what will be the total earnings of every member of the group?

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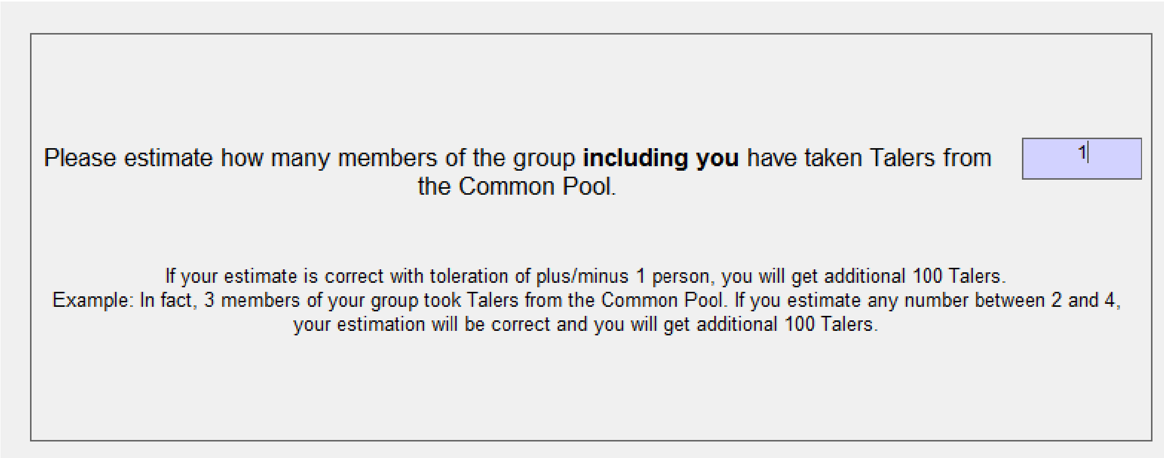
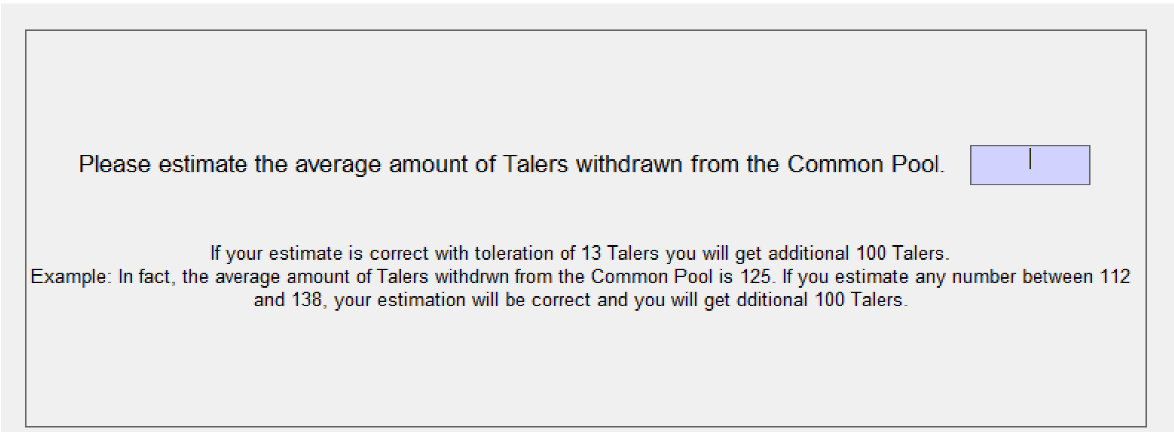
Appendix C

Eliciting the empirical and normative expectations

Empirical expectations





Normative expectations

Please answer the following question:

Do you think it is appropriate to withdraw money from the Common Pool? ◉ yes ○ no

Please estimate how many memers of your group **including you** answered positively to the previous question?

If your estimate is correct with toleration of plus/minus 1 person you will get additional 100 Talers.
Example: In fact, 3 members of your group answered positivly to the previous question. If you estimate any number between 2 and 4, your estimation will be correct and you will get additional 100 Talers.