An Experimental Bribery Game

Klaus Abbink
University of Nottingham

Bernd Irlenbusch
Universität Erfurt

Elke Renner
Universität Erfurt

Essential characteristics of corruption are (1) reciprocity relationships between bribers and public officials, (2) negative welfare effects, and (3) high penalties when discovered. We separate the influences of these factors in an experiment. In a two-player game, reciprocation is economically inefficient through negative externalities. A control treatment without externalities is also conducted. In a third, so-called *sudden death* treatment, corrupt pairs face a low probability of exclusion from the experiment without payment. The results show that reciprocity can establish bribery relationships, where negative externalities have no apparent effect. The penalty threat significantly reduces corruption, although discovery probabilities are typically underestimated.

> Thou shalt not wrest judgement; thou shalt not respect persons, neither take a gift; for a gift doth blind the eyes of the wise, and pervert the words of the righteous.
>
> Deuteronomy 16.19.

1. Introduction

Though it is not at all new, the phenomenon of corruption has attracted growing attention during the 1990s. The breakdown of communist systems and the end of the cold war have induced several implications, which raised increasing awareness of the problem. Donor countries do not turn a blind eye to corrupt practices in receiver governments anymore just because the latter belong to the correct political camp. Liberalization of the media in many

The authors thank two anonymous referees, José Apesteguia, John Duffy, Heike Hennig-Schmidt, Andreas Ortmann, Robin Pope, Bettina Rockenbach, Abdolkarim Sadrieh, Reinhard Selten, and seminar participants in Barcelona, Bonn, Cologne, Erfurt, Grenoble, New York, Prague, Seattle, and Vallendar for helpful comments and suggestions. All errors remain our own. Financial support by the *Deutsche Forschungsgemeinschaft* through the *Sonderforschungsbereich 303,* the European Union through the TMR research network ENDEAR (FMRX-CT98-0238), and the *Land Nordrhein-Westfalen* is gratefully acknowledged.

countries has made the public much more sensitive and better informed than before. Moreover, due to globalization of the economy, politicians around the world have recognized that corruption is no longer an internal problem, hence governments showing a laissez-faire attitude have come under international pressure.[1] The growing alertness is reflected in an increasing number of international initiatives to combat bribery. Some of them have already had a practical impact: for example, the OECD Anti-Bribery Convention of 1997 ended the common practice to subsidize bribes to foreign officials by tax deductibility. In the 29 countries signing the convention corresponding laws have been released, with Germany as the latest country to prohibit tax deductibility of bribes.

Since corruption is widely recognized as a major economic problem around the world, there is also a growing interest in the empirical analysis of its causes and consequences. In recent years, significant progress has been made by the statistical analysis of field data. Mauro (1995) finds statistical evidence for the growth-reducing effect of corruption. Long and Rao (1995) show that the value of a firm decreases significantly after corrupt behavior of managers is discovered. Van Rijckeghem and Weder (2001) find corruption to be significantly lower when public officials' salaries are high relative to manufacturing wages. Gupta, Davoodi, and Alonso-Terme (1998) analyze the effect of corruption on income distribution in a society and find evidence that corruption increases poverty.

While the analysis of field data is helpful in identifying the socioeconomic determinants and consequences of corruption, it gets extremely difficult if we wish to study corrupt behavior itself. Naturally corruption is hard to observe in the field, since everyone engaged in it has good reasons to remain silent.[2] Therefore we introduce an alternative approach to the empirical analysis of corruption. In an interactive laboratory experiment, we can observe behavior in simulated bribery scenarios directly. Further, we can identify which variables influence corrupt behavior by changing the experimental environment. In this article we start by examining behavior in a very basic bribery scenario. Consider an entrepreneur who applies for a license to perform some environmentally harmful activity. Or think of a supplier selling products to the government. In such cases, the public official has some discretion, where her decision has crucial impact on the profits of the applicant. On the other hand, the public official receiving a flat salary has little or no personal benefit if she refuses permission to pollute the environment or if she purchases from

1. For a discussion of these and other arguments see Tanzi (1998).

2. Several authors express their doubts about the validity of empirical findings regarding the deterrence of criminal behavior. Leamer (1983) comes to the conclusion that inferences from field data about the deterrent effect of capital punishment are too fragile to believe. Ehrlich (1996) summarizes that there are numerous empirical studies that offer evidence consistent with the hypothesis that both negative and positive incentives have a deterrent effect on crime. However, he argues that it would be premature to view this evidence as conclusive. In his view, most econometric estimates suffer from incomplete, or even inconsistent, specification of the market model, which are exacerbated by the intrinsic limitations of crime statistics.

the cheapest supplier. Thus, by payment of bribes in return for favorable decisions, the interested party and the official can achieve mutual improvement at the cost of the public: In the first case, the population suffers from pollution, in the second case, the society of taxpayers bears the too-high prices charged by the bribe-giving supplier.

The examples show three essential characteristics of corruption. First, there is the *reciprocity* feature: both briber and official can exchange benefits with one another. However, since bribery is illegal, enforceable contracts on corrupt acts cannot be made. The exchange of favors must rely on trust and reciprocity between the briber and bribee. Second, corruption imposes serious *negative externalities* on the public. Third, bribe giving and bribe taking is liable to severe penalties in case of discovery. Thus corruption is inherently *risky*.

In this article we design an experiment to separate the influence of these three characteristics on the behavior of individuals who participate in a modeled corruption scenario. For this purpose we construct three variants of a simple sequential game. In all three variants, one player (representing the potential briber) can transfer money to a second player (representing the public official) in order to induce a decision advantageous to him. This option, however, is costly for the second mover. With these features alone, we obtain a very simple reciprocity game, which allows us to study the impact of trust and reciprocity in this situation separately. In a second treatment, the same game is played, with the extension that the option favorable to the first mover induces a negative externality to other individuals in a way that the efficiency losses exceed the mutual benefits of the two players directly involved. By comparing this treatment to the basic one, we separate the effect of social welfare considerations on the behavior of individuals. Finally, to investigate the effect of the danger of "being caught," we introduce a new feature that we call the "sudden death" treatment. When a transfer has been offered and accepted, a lottery is played out, and with very low probability the activity is "discovered." In that case, both players' accounts are cleared and they are excluded from any further play. By comparison to the other treatments, we can examine the effects of a penalty that is unlikely, but drastic, on socially undesirable reciprocity (as is corruption).[3] All three treatments were played in 30-round supergames between the same players. Thus we model a long-term relationship between a briber and a public official.

3. There is a huge theoretical literature on the optimal combination of the probability of detection and the magnitude of fines. Becker and Stigler (1974) argue that for a probability of catching less than one, the fine should be raised to a level such that the private gains from the illegal activity are slightly below the expected costs. Since it is normally costlier to catch a larger fraction of criminals, the probability should be as small as possible under the constraint that a criminal is able to pay the fine. Polinsky and Shavell (1979) show that the optimal fine may be less than maximal when individuals are risk averse. For a recent survey on this topic see Polinsky and Shavell (2000).

To our knowledge, experimental corruption games have not emerged in the economic literature.[4] Most economic studies on corruption involve merely theoretical analyses of situations conducive to corruption.[5] The behavior of the agents is given by the assumption of profit or utility maximization. This assumption is useful and often plausible, but sometimes empirically problematic. Especially since corruption involves a reciprocity relationship, we have to consider the experimental evidence against self-interested payoff maximization in such situations. The tradition of experimental reciprocity games starts off with a study by Fehr, Kirchsteiger, and Riedl (1993), who analyze reciprocal fairness in labor markets. Firms can pay a wage to workers, who then can specify their effort level arbitrarily. The authors observe that experimental firms systematically overpay workers, compared to the competitive equilibrium wage. Workers reciprocate by an increased effort. As a result, mutual improvement of firm and worker is achieved at the price of underemployment.[6]

In the *investment game* by Berg, Dickhaut, and McCabe (1995), the first moving player can pass money to the second mover, which is tripled by the experimenter. The second mover can voluntarily return money to reward trust. The results clearly refute the hypothesis that individuals are motivated only by their own monetary gain and behave according to subgame perfect rationality. Rather, they support the impact of reciprocal fairness. Other experimental studies on similar games have followed these seminal articles. (see, e.g., Jacobsen and Sadrieh, 1996; Fehr, Gächter, and Kirchsteiger, 1997; Hoffman, McCabe, and Smith, 1998; Abbink, Irlenbusch, and Renner, 2000; Dufwenberg and Gneezy, 2000; and Fahr and Irlenbusch, 2000). All examining different questions, their common finding is a strong impact of trust and reciprocity even in one-shot situations in which completely anonymous players meet for playing the game only once. Repeated interaction in a reciprocity game, as we analyze in the present study, is examined in a study by Meidinger, Robin, and Ruffieux (1998). The subjects play a simplified version of the original investment game in a 25-round supergame. The authors find that trust and reciprocity are effective in the beginning of the experiment, but their effect decreases with time.

These studies already suggest that although bribery is built on trust in the absence of self-enforcing devices, reciprocity may establish stable bribery

4. A so-called *quasi-experiment* has been conducted by Lüdtke and Schweitzer (1993). In a questionnaire study, the authors elicit the subjects' tolerance toward corrupt activities. A (noninteractive) individual decision experiment has been conducted by Frank and Schulze (2000) to examine differences in the corruptibility of economists and students from other disciplines.

5. Standard references are Rose-Ackerman (1975, 1985), Klitgaard (1988), and Shleifer and Vishny (1993). All models in the theoretical literature known to us are essentially different from ours. The model most akin is probably the one by Manion (1996; see also Manion [1998] and Yavas [1998]), who analyzes a one-to-one relationship between a briber and a public official.

6. In their experiment the authors did not explicitly refer to a *labor* market, but rather presented it as a seller-buyer market. A discussion of such framing effects is given in Section 6.

relationships. However, reciprocity is only one aspect of corruption, therefore these findings cannot be transferred directly to corruption scenarios. In the existing experimental reciprocity games, reciprocal exchange is not only mutually beneficial, but also increases economic efficiency. This is fundamentally different in the exchange of benefits between briber and official. Further, corruption involves an exogenous risk through the possibility of getting caught, which is not modeled in typical reciprocity games. Thus a new experiment needs to be designed.

2. The Experimental Model

As the simplest bribery situation, we consider a public official who has only two options (e.g., accepting or rejecting a proposal), where it is within her discretion alone as to which one to implement.[7] A potential briber can transfer money to an official in the hope that this will influence her decision to his advantage. We model this situation as a two-player sequential game. The first mover represents the potential briber. This may be a firm owner whose profit is influenced by the official's decision, or a company's manager who expects career improvement if he enhances the firm's profits by inducing favorable government decisions.[8] The second mover represents a public official making a decision affecting the potential briber's utility.

We conducted the experiment in three treatments: the *pure reciprocity* (PR) treatment serves as a control treatment. Second, in the *negative externality* (NE) treatment damages to other players are introduced to separate the effect of social welfare considerations. Finally, in the *sudden death* (SD) treatment, an external risk is introduced. In all treatments, this situation is played 30 times subsequently.

2.1 The Pure Reciprocity Treatment

In the first stage, the first mover decides on whether or not to transfer an amount t of money to the second mover, and if yes, how much he wishes to transfer. If he transfers a positive amount, he must pay a small "transfer fee" of 2. The fee represents the initiation costs of the briber when he approaches the civil servant to establish a reciprocal relationship. These costs can be considered as being independent from the later course, that is, they must be paid also if the official should reject the bribe.

The second mover is then asked whether she accepts or rejects the transfer. If she rejects, the transfer is not performed; both accounts remain unchanged apart from the first mover paying the small transfer fee. If the official accepts, then she receives the tripled amount. The factor reflects a difference in

7. We use male pronouns for the firm and female pronouns for the public officials, for the purpose of distinction only.

8. If the decision maker is the manager of a company, then the goals of the decision maker and his principal may diverge. For example, the manager may wish to pay bribes in order to promote his career, but the company may aim at counteracting these incentives, since it does not want to undertake illegal activities.

marginal utility: the same amount of money means much less to the briber than to the public official, if we assume that income in the public service is lower than that generated in private business.[9] To keep things simple, only integers could be transferred. The maximum amount to be transferred also had to be restricted to ensure that the first mover could not get negative cumulative payoffs by transferring too much. Only transfers from the set $\{0, 1, \ldots, 9\}$ were feasible.

At the second stage, the second mover, representing the public official, has to make a binary decision between two alternatives, simply called X and Y. Y is much more favorable to the first mover, X is slightly better for the second mover. This constellation reflects that the briber's advantage from a manipulative decision is immense, but the public official has only a slight preference for the honest alternative arising from some effort necessary to justify a manipulative choice before her superiors. In the parameter constellation of the experiment, X induces utilities of 36 for both players; Y leads to utilities of 56 for the first and 30 for the second mover.

2.2 The Negative Externality Treatment

In this treatment, the second feature of a bribery scenario is introduced. Whereas in the pure reciprocity treatment, it is overall efficient to reciprocate (and hurts nobody else), we now introduce a negative externality to the public arising from reciprocal behavior. We do this by simply imposing a fixed monetary damage on each of the other subjects in the session whenever the second mover chooses Y. All other participants of the experiments therefore play the role of the public for each single pair.[10]

As our laboratory had 18 seats, there are nine pairs of subjects playing the game simultaneously. Thus if a pair chooses Y, 16 other subjects are damaged. The damage was set to 3, such that a choice of Y induced a total damage of 48. A single subject can be damaged by at maximum 24 per round, if in all eight other pairs in the session, the second mover chooses Y. By the damages, the Y alternative is—in terms of total payoff for all players—overall inefficient, since the total damages exceed the mutual gains realized by the two players of a pair.

As bribery is carried out secretly, we provided no feedback about the other players' decisions. No subject was ever informed about whether other subjects had cooperated, thus the subjects did not know to what extent other pairs damaged them. Consequently they were not informed about their exact current cumulative earnings during the play. Note that by withholding feedback about the other's behavior we can treat every single pair as an independent observation, since no one can be influenced by the other pairs' decisions.

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9. In the later treatments, the multiplier also ensures that no negative total payoffs can occur.

10. This feature emphasizes the public-good character of noncorrupt conduct. Everybody—including the two players themselves—would be better off if everybody were not corrupt, but for any given behavior of everybody else, it is profitable for the single pair to exchange benefits at the cost of others. For a survey on public good experiments, see Ledyard (1995).

2.3 The Sudden Death Treatment

In the third treatment of our experiment, the danger of being caught at corrupt activities is modeled. To keep things simple, we model discovery as an exogenous lottery.[11] The question arises how such a lottery should be designed. We decided for a new feature that we call the *sudden death* treatment.[12] Whenever a transfer of a positive amount is accepted (irrespective of whether the second mover's decision has been influenced by it), a lottery is played out determining whether the transfer is discovered. In case of discovery (which happens with very low probability), both players of the pair are disqualified from the experiment. This means that not only do both players lose all their earnings from previous rounds, they are moreover excluded from further play. Thus they also lose any chance to regain the money they lost in later rounds. The sudden death penalty reflects features that seem important to us for appropriate modeling of the real situation. First, not providing any payoff from play is supposed to be the most drastic penalty that is doable in an experiment, given there are legal and practical restrictions to impose negative total payoffs to subjects. Second, the sudden death treatment captures that real-life agents face the end of their current careers in case of discovery and lose a lot of what they have invested into developing them.

The probability for the sudden death event, θ, was set to $\theta = 0.003$ in each round in which a positive transfer was accepted. By this, it was ensured that only very risk-averse subjects would refrain from other damaging reciprocation because of their fear of being disqualified. Denote by r the number of rounds in which a positive offer is accepted. The probability of falling prey to the sudden death is $p = 1 - (1-\theta)^r$. At a maximum, for $r = 30$, we obtain an overall sudden death probability of $p = 0.086$ for $\theta = 0.003$. Denote by x the total payoff received by equilibrium play, and by y the additional payoff that a player can gain if the pair plays a reciprocation strategy. A risk-neutral individual would prefer reciprocation in every round if $(x+y)(1-p) > x$, hence $y/x > p/1-p$. For $p = 0.086$, a reciprocity gain of 9.4% would suffice to make reciprocation more attractive than equilibrium play, given it could be established. As an example, by a transfer of six talers every round and a following Y choice, both players would realize a gain between 33.3% and 100%, depending on the behavior of the other pairs.

Figure 1 depicts the game tree of the sudden death treatment stage game. "1" is the first mover representing the potential briber, "2" the second mover representing the public official. "C" denotes a chance move. The hangman

11. This simplification is common to many theoretical models of criminal behavior (early examples are Becker and Stigler [1974] and Rose-Ackerman [1975]). Only occasionally, the monitoring authorities are explicitly modeled as strategic players. Basu, Bhattacharya, and Mishra (1992) analyze a game in which officials can bribe the policemen who caught them, who in turn can pay bribes if their bribe taking was detected by other policemen, and so on. In equilibrium, no one ever gets punished for bribery (see also Marjit and Shi, 1998).

12. In the overtime of a tied ice hockey match, the team scoring the first goal wins the match. This rule is known as the *sudden death* rule because the losing team has no further chance to cure the loss. Of course, the analogy is only loose, given there is no winner in our sudden death.

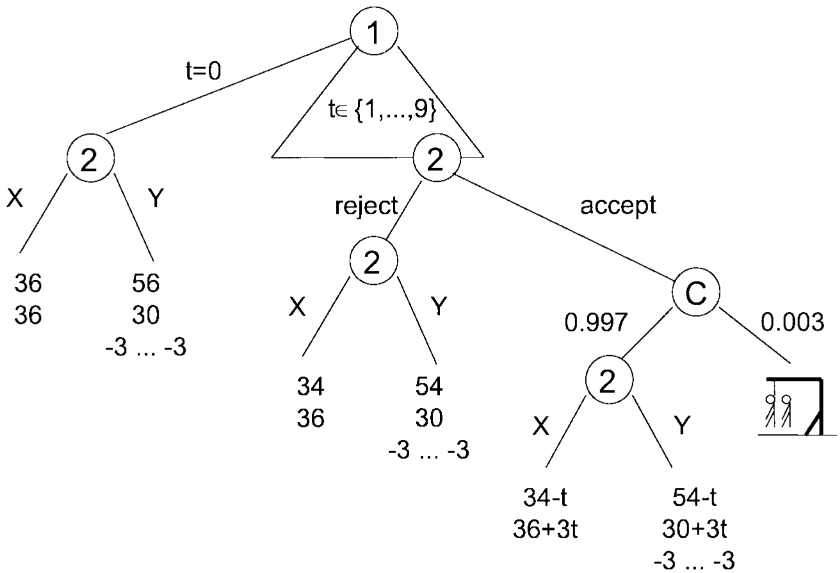

Figure 1. The (incomplete) game tree of the sudden death treatment.

pictogram illustrates the event of sudden death. The lines "$-3 \cdots -3$" mean that all other subjects are damaged by three talers. Note that the game tree is incomplete in the sense that the payoffs shown at the end nodes depict only the payoff consequences induced by the two players' moves. In addition, the final payoffs are influenced also by the decisions of all other pairs, which is not noted in the tree.

2.4 The Game Theoretic Prediction

For the PR treatment, it can easily be searched for the unique subgame perfect equilibrium by applying backward induction. Obviously the second mover in the stage game has no reason to choose Y, and foreseeing this, the first mover does not transfer a positive amount. In the other treatments, the negative externalities inflicted on others complicate things a little: Since the decisions of others are not made known, the supergame does not have proper subgames, hence subgame perfection does not select among all possible Nash equilibria. However, without applying any refinement concept, a similar (even stronger) result can be obtained by looking at equilibrium *paths*: In the stage game, it is still true that the second mover will never choose Y with positive probability, since this would reduce her payoff without any possible gain. Accordingly, it cannot be an equilibrium strategy for the first mover to transfer a positive amount with positive probability, given it will not be rewarded on an equilibrium path. This is independent from the behavior of the other pairs of players in the game.

It is simple, though formally a little tedious, to extend this analysis to the supergame that must be considered in the present experiment. In the last period, the stage game result applies immediately. By mathematical induction, it can be shown that the stage game result then holds for all rounds of the supergame (a detailed proof is available upon request). Through the unambiguous game theoretic property of the equilibrium path the game draws an idealized picture of a bribery situation in which corrupt relationships cannot be established by players' own payoff maximization alone. Rather, they require trust and reciprocation. Therefore the game allows us to study the impact of reciprocity in a corrupt relationship, since corruption out of trust and reciprocity is sharply contrasted to equilibrium behavior involving monetary payoffs only.

3. Experimental Procedure

The experiment was conducted in November 1998 at the *Laboratorium für experimentelle Wirtschaftsforschung* at the University of Bonn. The subjects were encouraged to participate through posters on the campus. Most of them were students from various disciplines, where law and economics students constituted the largest fractions.

The experiment was computerized with software developed using *RatImage* (Abbink and Sadrieh 1995). The game was presented in a way that all possible moves of both players of one pair were visible on one screen. Yellow triangles marked the way through the experiment. After a decision was made, the stages that could not be reached anymore were lowlighted. After all decisions of a round had been made, the subjects were informed about their payoffs resulting from their own pair's decisions, and (in the treatments with negative externalities) they were reminded that their payoffs would also be influenced by the decisions of all other pairs in the experiment. A screenshot of the display used for the sudden death treatment is reproduced in the appendix.

To minimize presentation effects, we designed our experiment in a completely context-free fashion. We presented the situation to the experimental subjects without connecting it to any story. The actors were just called player 1 and player 2, without mentioning their real-world counterparts of potential briber and public official, and without calling a transfer of money from player 1 to player 2 a "bribe." We decided for a neutral presentation to avoid the uncontrolled effects of possible connotations raised by hypothetical stories, and to ensure the best possible comparability with other experimental results. It is known that the presentation of a game can have a significant impact on subjects' behavior. A famous early example is provided by Pruitt (1970), who finds that the presentation of the prisoners' dilemma game has a significant impact on the likelihood of cooperation. Burnham, McCabe, and Smith (2000) find that cooperation in a two-player reciprocity game rises significantly when the other player is called "partner" rather than "opponent." Evidence from tax evasion experiments, however, is mixed. Baldry (1986) finds that subjects evade taxes much more when the tax-reporting task is presented as a gambling opportunity. Alm, McClelland, and Schulze (1992), on the other hand, do not find any significant differences induced by the use of neutral instead of loaded instructions. To investigate such framing effects in our bribery context Abbink and Hennig-Schmidt (2002) have conducted a follow-up experiment with *loaded* instructions, and fail to find significant differences (see the discussion in Section 6).

Of interest is that framing seems to play a role not only in some experiments, but also in real-life corruption cases. It is supposed to be important to avoid that an approach is perceived as bribery (Neckel 1995). This is often done by giving bribes in the form of nonmonetary gifts (this issue is discussed in Offer [1997]; for a practical "guide" see Davis [1997]).

Each session began with an introductory talk. The written instructions and payoff tables that listed the payoffs for all possible strategy combinations were handed out to the subjects. Translations of both are provided in the appendix (original text in German is available on request). The instructions were read aloud and explained in detail. After the introduction, the subjects were seated in cubicles, visually separated from one another by curtains. The terminal numbers, which determined the role of that subject as being first or second mover, were attributed to the subjects by random draw. After the subjects were seated, the play started immediately. The 30 rounds of the experiment were played in slightly less than an hour, such that a whole session took about 1.5 hours including introduction.

In the sudden death treatment, subjects could possibly be disqualified from the experiment. Disqualified subjects were not allowed to leave the session. This would have been noticed by the other subjects and thus distorted the statistical independence of the pairs. Since we were worried that it might have been difficult to enforce this rule if disqualified subjects could not expect *any* payment, we gave every participant an additional lump sum fee of DM 5, paid at the end of the session. The disqualified subjects had to fill in an on-screen questionnaire during the time they were waiting. The questionnaire comprised a number of questions concerning the subject's attitude toward fairness, taken from Kahneman, Knetsch, and Thaler (1986a, b), and tasks of logical inference copied from Internet experiments by psychologists from the University of Bonn. The questionnaires were meant to keep disqualified subjects busy rather than to collect meaningful data.

Immediately after the session, the subjects were paid anonymously in cash. The exchange rate was set to 0.025 DM per taler in the pure reciprocity treatment, and 0.03 DM per taler in the other two treatments, for which, through possible damages, lower final payoffs had to be expected. The total earnings in the session ranged from DM 5.00 (one pair of subjects was unlucky in the sudden death treatment) to DM 47.77, with an average of DM 33.22 for 1.5 hours, which is considerably more than a student's regular per hour wage in Bonn. One DM is equivalent to EUR 0.51. At the time of the experiment, the exchange rate to the U.S. dollar was approximately $0.55/DM.

Two sessions with 18 subjects were conducted in each of the three treatments. Since no feedback from other pairs is given, every single pair can be considered as a statistically independent observation. Thus we gathered 18 observations in each of the three treatments.

4. Hypotheses

The three treatments of our experiment allow for testing several hypotheses by comparison of the treatments. In addition, we requested that the subjects fill in a questionnaire to test a hypothesis that was put forward in the literature.

It would be natural to start with posting the hypothesis of equilibrium play with subjects motivated by their own payoffs only. However, the literature on reciprocity games already suggests that exchange of benefits is observable also if it does not maximize the individual player's own payoffs. We therefore conjecture that this force is strong enough to establish cooperation, despite the absence of enforcement devices.

Hypothesis 1. First movers tend to transfer substantial positive amounts, which is reciprocated by the second movers' choice of Y. This effect is particularly strong in the PR treatment.

It is well known that an individual's behavior is often affected by social considerations. Thus we might expect that the damage done to others in the negative externality treatment would reduce the frequency of Y choices, and, as a reaction, also lower the transfers made by the first movers. We formulate our second hypothesis accordingly.

Hypothesis 2. In the negative externality treatment, second movers tend to choose Y less frequently, and first movers tend to transfer less than in the pure reciprocity treatment.

Although the sudden death probability was chosen very low, we might expect that its very existence deters other damaging cooperation, since the penalty is drastic. We therefore formulate the third hypothesis as follows.

Hypothesis 3. In the sudden death treatment, second movers tend to choose Y less frequently, and first movers tend to transfer less than in the negative externality treatment.

Kirchgässner (1997) hypothesizes that in real-life corruption cases, individuals might systematically underestimate the probability of being caught. He argues that the frequent occurrence of corruption cases in reality is most likely due to a wrong calibration of the discovery probability, since the negative consequences are so severe that they can hardly be compensated by the additional income realized by bribe taking, if the possibility of discovery would be sufficiently taken into account.

It may be conjectured that in their calibration of the discovery probability, individuals are tempted to anchor to the discovery probability in a *single* case, rather than considering the total probability of being caught at some point during the long-term relationship. In our experimental framework, such an effect could be due to an inappropriate consideration of the fact that the event of sudden death can happen in *every* round in which a bribe is accepted. This hypothesis is also suggested by the experimental findings of Gneezy (1996), who asked subjects to estimate the probabilities for hypothetical stock prices following a random walk. His results suggest that “people use the stage-by-stage probability as an anchor, and adjust insufficiently” (p. 60).

To test this hypothesis, we requested the subjects estimate the overall probability of disqualification for different parameter constellations. After the play of the sudden death treatment, all subjects who were not disqualified had to fill in a questionnaire with nine questions of the following kind: “Suppose player 1 always transfers a positive amount, and player 2 always accepts. How large do you estimate the probability to be that these players are disqualified during the whole session, if the experiment lasts n rounds and the probability of disqualification is $p\%$ in each round?”

We asked nine questions with the nine possible combinations of $n \in \{10, 50, 100\}$ and $p \in \{0.1\%, 1\%, 5\%\}$. If the answer was not farther away from the correct answer than 10 percentage points, the subject was rewarded with 10 talers, for an exactly right answer 20 talers were awarded. To exclude effects arising from the order in which the tasks are presented, we randomized the order for each subject independently.

Following Kirchgässner’s (1997) conjecture, we formulate the last hypothesis:[13]

Hypothesis 4. Subjects tend to underestimate the total probabilities of being disqualified in a whole session, for given single-round probabilities and round numbers.

Because answering the questionnaires was incentivized with money, the disqualified subjects did not do the probability estimation tasks. This would have spoiled the character of the sudden death, preventing them from any further chance to earn money in the session.

5. Results

The overall level of corruption in a society manifests itself in the extent to which public officials’ decisions are manipulated in exchange for bribes. In our experimental setting, this corresponds to the frequency of Y choices made by the second mover as an act of reciprocity to transfers offered by the first mover. In the following we will analyze the experimental results with respect to the four hypotheses formulated in the previous section. The raw data are available from the authors upon request.

5.1 The Impact of Reciprocity

Hypothesis 1 states that cooperative relationships can be established through trust and reciprocity, even if there is no means to enforce reciprocation. Tables 1 and 2 show that this hypothesis is clearly confirmed. Table 1 shows the average transfers per round made by the single first movers. Table 2

13. In this hypothesis we formulate our conjecture. What is tested *statistically* is the null hypothesis of unbiased probability assessments (see Section 5.4).

Table 1. Average Transfer Offer by Individual First Movers Over All Rounds

PR		NE		SD	
Pair	Avg. transfer	Pair	Avg. transfer	Pair	Avg. transfer
3	0.0	5	0.3	1	0.0
12	1.0	3	1.6	7	0.0
14	1.8	9	1.9	16	0.3
11	3.3	11	3.1	8	0.5
18	3.5	14	3.5	9	0.7
6	3.9	15	3.5	18	1.3
2	4.2	17	4.6	12	1.6
17	4.2	16	4.8	13	2.1
15	4.7	6	5.2	2	3.2
16	5.0	10	5.2	11	4.1
4	5.2	4	5.3	15	4.2
7	5.8	7	5.3	17	4.4
10	5.8	13	5.4	5	4.5
5	6.0	8	5.5	3	4.6
9	6.2	1	5.6	4	5.0
1	6.7	12	5.8	14	5.0
8	6.9	2	6.0	10	5.4
13	8.2	18	8.7	6	5.8
Avg.	4.58	Avg.	4.52	Avg.	2.93
St.dev.	2.12	St.dev.	1.94	St.dev.	2.08

Table 2. Frequency of *Y* Choices by Individual Second Movers Over All Rounds

PR		NE		SD	
Pair	Avg. *Y* freq.	Pair	Avg. *Y* freq.	Pair	Avg. *Y* freq.
3	0.00	5	0.13	1	0.00
12	0.03	3	0.17	16	0.00
14	0.20	9	0.20	7	0.03
18	0.43	15	0.40	8	0.03
6	0.47	17	0.40	9	0.07
11	0.47	11	0.47	12	0.07
7	0.67	14	0.50	13	0.23
17	0.67	6	0.73	18	0.33
2	0.70	4	0.80	2	0.47
15	0.73	8	0.80	15	0.50
9	0.77	16	0.80	3	0.70
13	0.87	10	0.83	5	0.70
16	0.87	7	0.87	10	0.70
1	0.90	13	0.87	17	0.70
4	0.90	1	0.90	11	0.73
10	0.93	18	0.90	4	0.77
5	1.00	2	0.97	14	0.83
8	1.00	12	0.97	6	0.93
Avg.	0.65	Avg.	0.65	Avg.	0.43
St.dev.	0.32	St.dev.	0.29	St.dev.	0.34

shows the average frequency of Y choices by the single second movers.[14] All numbers are ordered from the lowest to the highest value in a treatment. The strong impact of reciprocity can be identified through the strong correlation between average transfer offer and average Y choice frequency across the pairs. The higher the transfer in a pair, the higher tends to be the frequency of Y choices. The Spearman rank correlation coefficients are $r_s = 0.87$ in the PR treatment, $r_s = 0.94$ under the NE condition, and $r_s = 0.93$ in the SD treatment. All coefficients are significantly positive at less than $\alpha = 0.01$. Figure 2 shows the distribution of the amounts transferred by the first movers for the aggregate data of all pairs in the single treatments. Figure 3 shows the relative frequency of Y choices after a certain transfer has been offered. In the NE and PR treatment, the modal transfer is six talers,[15] which is a clear deviation from the own payoff maximization equilibrium, according to which no corruption would occur. Also in the SD treatment, deviations from equilibrium behavior are observed in more than half of the rounds.[16] It can clearly be seen that second movers tend to reciprocate by choosing Y after they received relatively high transfers, while they typically choose X after they received no or small transfer offers.

In the 30-round supergame, not only can the second mover reciprocate on the first mover's transfer offers, but also the first mover can condition his transfer decision on the observed choice made by the second mover in previous rounds. If such first-mover reciprocation was present in the data, we should observe higher transfers as a reward for previous Y choices, and low transfers as a punishment for experienced X choices. For every single first mover, we measure the impact of his level of reciprocation as the difference between the average transfer after a Y decision and the average amount sent after an X choice by the second mover in the preceding round. Formally, our measure of first-mover reciprocation is computed as

$$R = \frac{\sum t_Y}{\#Y} - \frac{\sum t_X}{\#X},$$

where t_Y denotes the transfer after a preceding Y choice, t_X is the transfer after an X choice, and $\#Y$ and $\#X$ denote the number of Y and X choices in rounds 1–29. A measure for R can only be computed if a first mover experiences at least one Y and one X choice during rounds 1–29. A high impact of first-mover reciprocation would show up in positive values of the R measure.

14. The tables already suggest that there are pronounced differences between *some* treatments. In fact, applying the Kruskal–Wallis test, we can reject the null hypothesis that there is no difference between the average transfer offers as well as between the average Y choice frequencies over treatments in favor of the hypothesis that the considered measures are different over treatments at $\alpha = 0.05$ (one-sided) for both measures.

15. The predominance of this offer value can be explained by the fact that with a transfer of six, both players' final payoffs are equal, given the second mover accepts and reciprocates by choosing Y. For a discussion of the equal payoff principle see Selten (1978).

16. The equilibrium outcome ($t = 0$; X) is observed in 44.8% of the rounds.

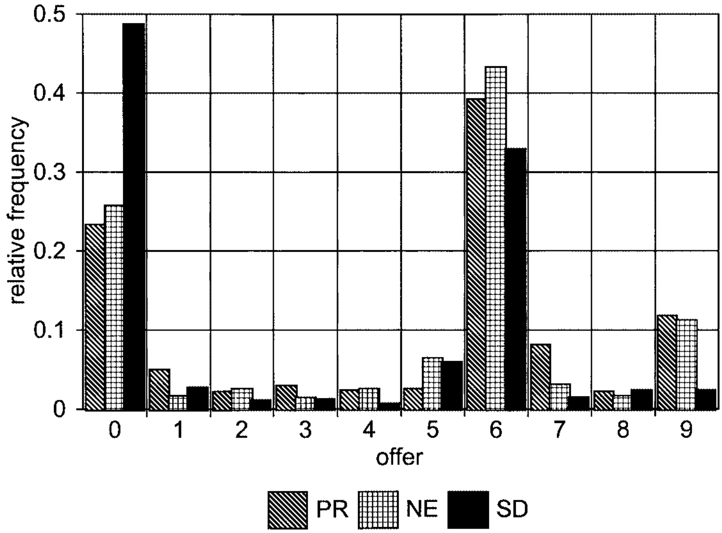

Figure 2. Distribution of offered transfers.

On average, we obtain R measures of +2.16 (PR treatment), +3.30 (NE), and +3.43 (SD). In all treatments, the average R value is clearly positive. The Wilcoxon matched pairs signed-rank test applied to the R values of the individual first movers rejects the null hypothesis of equal probability of positive and negative measure at a significance level of $\alpha = 0.001$ (one-sided) in all three treatments.

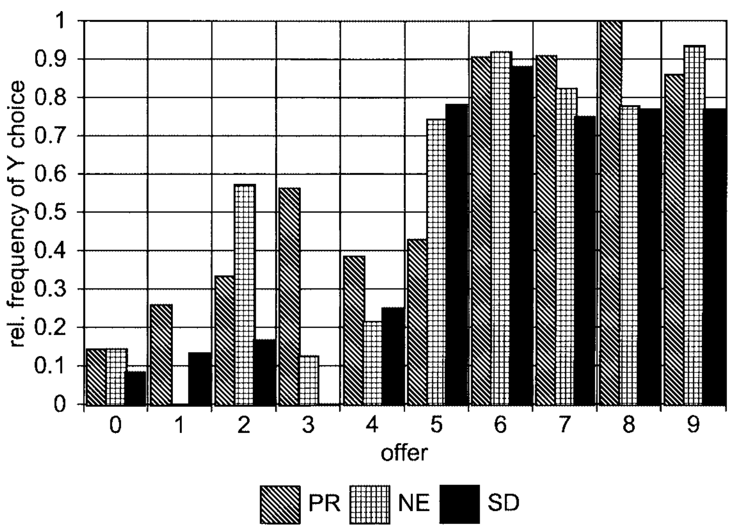

Figure 3. *Y* choices on offered transfers.

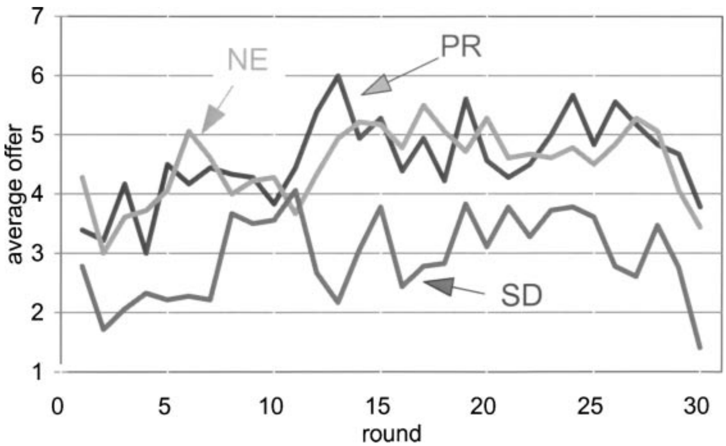

Figure 4. Evolution of offered transfers (aggregate numbers).

Observation 1. Reciprocity establishes stable cooperative relationships. In all treatments, second movers reciprocate on higher transfers by choosing *Y*, first movers reciprocate on favorable choices by paying higher transfers in the next round.

5.2 The Impact of Negative Externalities

According to Hypothesis 2, subjects' considerations of social welfare should lead to lower cooperation levels in the NE than in the PR treatment. Figures 2 and 3 suggest that this is not evidently the case. The distribution of transfer offers as well as the responses by second movers on them are similar in the PR and NE treatments. On average, 4.58 talers are transferred in the PR treatment, compared to 4.52 talers under the NE condition. The second movers choose Y in 64.5% of all rounds in the PR condition and 65.0% in the NE condition. The differences are not significant. Thus we do not observe an apparent influence of the negative externalities on decision behavior.

Figures 4 and 5, which show the development of average transfer offers and the average frequency of *Y* choices, respectively, provide an even clearer picture. Not only the overall level of reciprocal cooperation, but also its development over time, look very similar in both treatments, according to both measures depicted in the figures. Both graphs show a tendency toward increasing cooperation levels in the beginning of the experiment, which are stable after approximately 10 rounds[17] until an apparent end effect forces both transfer offers and *Y* choice frequencies downward in the very last

17. If we compute the change in average transfer offers and average *Y* choice frequencies from the first to the second block of 10 rounds for the single pairs, we obtain positive changes for the majority of pairs in the PR and NE treatment. The Wilcoxon matched pairs signed-rank test rejects the null hypothesis of equal probability of positive and negative signs at a significance level of $\alpha = 0.05$ for both treatments and both measures. It is interesting that this

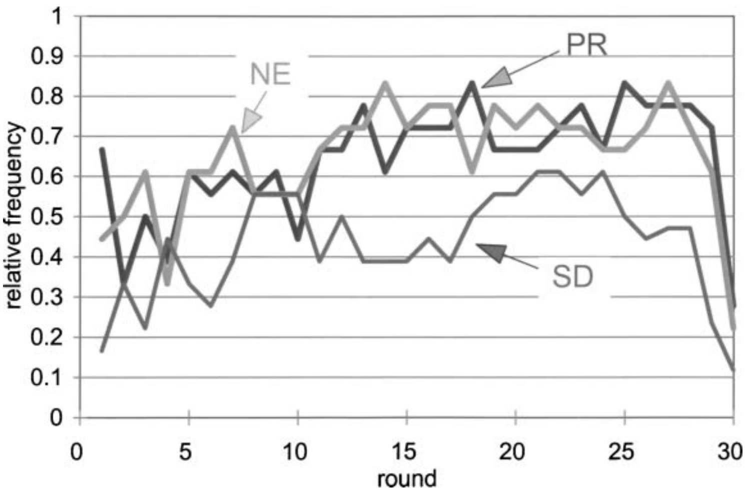

Figure 5. Evolution of Y choice frequencies.

rounds of play.[18] If we correlate the average transfer in a round in the PR treatment to the corresponding average transfer in the same round in the NE treatment, we obtain a Spearman rank correlation coefficient of $r_s = 0.59$, which is significant at $\alpha = 0.01$ (one-sided).[19]

Observation 2. The negative externality on other subjects has virtually no effect on the level of cooperation. The distribution of transfer offers and the frequency of Y choices are very similar in the treatments PR and NE, both in absolute terms and in their evolution over time.

This result is in line with previous experimental findings on variants of the ultimatum game. Güth and van Damme (1998) observe that a third-party's payoff is virtually neglected in a bilateral relationship. Okada and Riedl (1999) find that ultimatum game proposers typically prefer a two-person to a three-person ultimatum game, ignoring that in the two-player variant the third person receives nothing.

5.3 The Impact of Penalties

Hypothesis 3 states that we should observe lower levels of reciprocal cooperation in the SD treatment because subjects fear the penalty. In fact, this

increase is in contrast to the findings of Meidinger, Robin, and Ruffieux (1998), who observe decreasing cooperation in their repeated simplified investment game. However, though our PR treatment replicates existing reciprocity games to some extent, the parameterization is different. For example, the costs of reciprocation in the stage game are relatively moderate for the second mover, who foregoes only one-sixth of her payoff by choosing Y instead of X. This might explain why cooperation is easier to establish than in the investment game.

18. An end-game effect is characterized by a breakdown of cooperation toward the last rounds of the experiment. For a discussion see Selten and Stoecker (1986).

19. A weak, but significant correlation ($r_s = 0.33$, significant at $\alpha = 0.05$, one-tailed) can also be detected between the PR and SD treatments. The correlation between the NE and SD treatments is not significant.

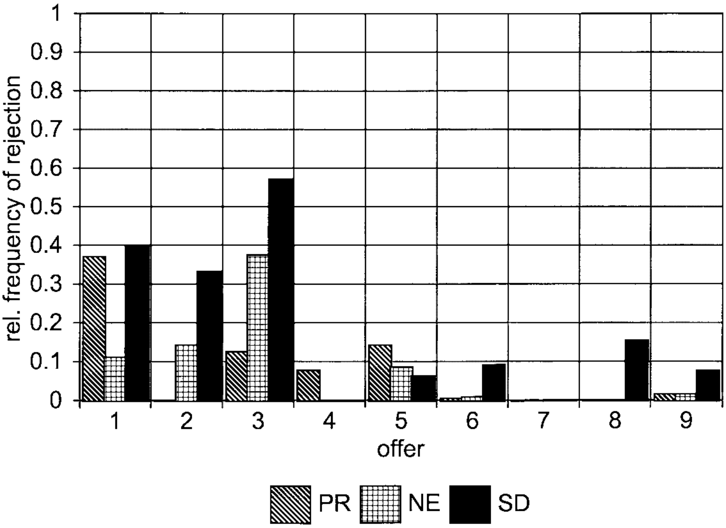

Figure 6. Rejections of offered transfers.

hypothesis is supported by the data. On average, 2.93 talers are offered under the SD condition, roughly 35% less than in each of the two treatments without sudden death. The average frequency of Y choices falls by about the same rate, down to 43.8%. The Mann–Whitney U test rejects the null hypothesis of equal transfers (Y choice frequencies, resp.) at a significance level of at least $\alpha = 0.05$ (one-sided) for both measures and both pairwise comparisons of the SD and one of the other treatments. Thus the fear of sudden death significantly reduces the tendency to pay transfers.

The difference in the average transfer offers is mainly due to the higher frequency of zero transfers. Conditional on being positive, no strong differences are apparent: we compute average transfers of 5.97 (PR), 6.07 (NE), and 5.68 talers (SD). Hence, *if* a positive transfer is made, the amount is similar.

The fear of getting penalized is also expressed in another aspect of our data. Figure 6 suggests that second movers in the SD treatment exhibit a higher tendency to reject offers than those in the other conditions. The absolute number of rejections is significantly higher than both in the PR treatment ($\alpha = 0.10$) and the NE treatment ($\alpha = 0.05$, one-tailed, according to the Mann–Whitney U test). More specifically, we can see that higher rejection frequencies can also be observed after relatively high transfer offers, which are most plausibly rejected to avoid the sudden death lottery.[20] Weakly

20. Small offers might also be rejected to signal that the second mover considers the amount offered as too low (if the second mover rejects the transfer, the first mover cannot be tempted to misunderstand the X choice as trust exploitation). This would explain why small offers are frequently rejected also in the PR and NE treatments, where rejecting means leaving money on the table.

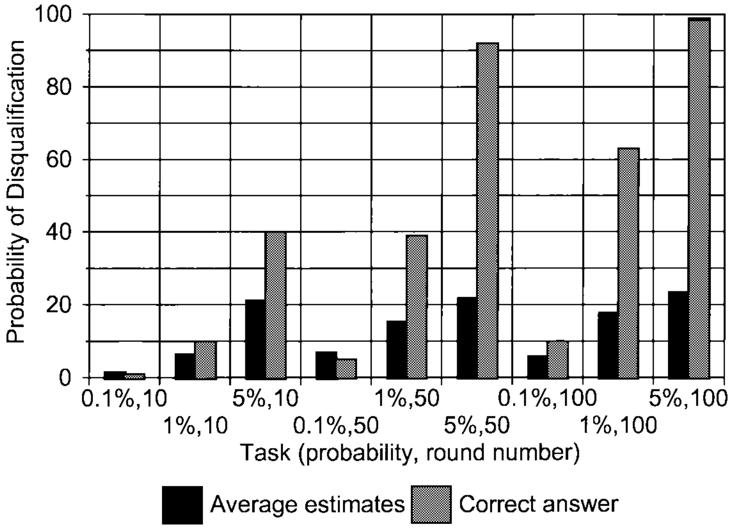

Figure 7. Average probability estimations.

significantly more transfers of at least six talers are rejected in the SD than in both the PR and NE treatments ($\alpha = 0.10$, one-tailed, according to Fisher's exact test applied to the number of pairs in which an offer of at least six talers was rejected at least once). Thus the threat of the sudden death penalty induces a higher tendency to reject transfer offers.

Observation 3. The threat of the drastic penalty significantly reduces the level of reciprocal cooperation. The average transfer offer and the frequency of Y choices are decreased by the penalty. Second movers exhibit a higher tendency to reject offers.

5.4 The Probability Estimations

Finally, we test whether Hypothesis 4, which claimed that subjects tend to underestimate the probability of being penalized, can be supported by the results of the final questionnaires on probability estimations. The answers of the questionnaire expose a very clear picture. Figure 7 shows the average estimates for the nine different tasks. It can be seen that, first, the average estimates are typically well below the correct answers, and second, subjects respond to the difference in the probabilities, but not very strongly to the difference in the round number.

Twenty four of the 27 questionnaires that were examined exhibit more under- than overestimations,[21] two show an equal number of both, and only

21. Since one pair was disqualified, only 34 of the 36 participants filled in the questionnaire. For security, we excluded seven sets of answers by subjects who were possibly confused about single round and overall probabilities, as they typed in the former as answers. Note that this outlier rejection is conservative to our findings.

one subject overestimated the overall probability of disqualification more often. In all 11 pairs for which usable estimates are available for both players, the sum of all estimates for both players was lower than the sum of the answers that would have been correct. The binomial test rejects the null hypothesis of equal probability of positive and negative differences between the sum of estimates and the sum of the correct answers in favor of the alternative hypothesis of more underestimations at a significance level of $\alpha = 0.001$ (one-tailed). This finding provides support for the hypothesis put forward by Kirchgässner (1997), and it is in line with related findings by Gneezy (1996).

It is interesting that although subjects tend to underestimate the probability of the sudden death over the whole experiment, the penalty still shows a strong effect toward lower transfers and other-damaging choices. This strengthens the result that the fear of a drastic penalty has a strong effect in reducing socially undesirable reciprocal behavior.

A correlation between the individual tendency to underestimate the disqualification probability and the tendency to pay or accept transfers cannot be detected. However, since there are two players needed to establish a cooperative relationship, possible effects in that sense might not show up in the data, since two players with different estimation patterns might be matched together.

Observation 4. Subjects significantly tend to underestimate the overall probability of disqualification.

6. Discussion: Neutral and Loaded Framing

As described in Section 3, the instructions of the present experiment used a neutral and abstract language. In a follow-up study, Abbink and Hennig-Schmidt (2002) compare the SD treatment of this experiment to a new treatment in which the same game is presented as an interaction between a firm and a public official. In the words of their instructions, the public official has to decide whether or not to give a firm permission to run an industry plant that causes negative effects to the public. The firm can make a “private payment” beforehand (the term “bribe” is not explicitly used, but self-suggesting from the story). Except for the wording of the instructions and the screen displays, all design parameters are the same.

Since corruption is heavily loaded with negative moral connotations, one might expect that the use of an explicit story would lead to less corruption. In fact, the average transfer offer decreases slightly (from 2.93 to 2.56) and the average frequency of Y choices decreases even somewhat more (from 43.2% to 32.4%), but statistical tests applied to the 18 independent observations in each treatment do not yield significance at any conventional level. Thus the authors cannot draw positive inference in favor of their hypothesis. Rather, they suggest that the present bribery game seems to be quite robust with respect to its presentation in the instructions.

7. Conclusion

We introduced an experimental bribery game to separate three major characteristics of a bribery relationship: the reciprocity character, the negative external effect to others, and the threat of severe penalties. We analyzed corruption as a long-term relationship in which the same briber meets the same public official again and again. Three treatments were conducted. In the basic treatment, a simple reciprocity game was played as a control experiment. We find that trust and reciprocation can establish a stable exchange of benefits, although this is off the own payoff maximization equilibrium. Reciprocal behavior is exhibited by both players: second movers, representing public officials, reciprocate on sufficiently high transfers, but also first movers, representing their clients, condition their transfers on the observed decisions by second movers in the previous round. In a second treatment, we introduced a negative externality that was imposed on all other subjects in case the reciprocal response was chosen. The results were strikingly similar to the basic treatment. Both the distribution of transfers and their evolution over time are not apparently different from those in the PR treatment. The occurrence of reciprocal cooperation is increasing in the beginning, and reaches a stable high level after a coordination period.

To examine the effect of severe penalties that are imposed with very low probability, we conducted a third treatment in which we introduce a new feature which we call the sudden death treatment. Whenever a transfer is accepted, a lottery is played out, and in the negative outcome, both players are excluded from the experiment without payment. We find that, although the discovery probability was very low and the expected value of reciprocation still greater than that of equilibrium play, the threat of the sudden death penalty induced significantly lower transfers and frequencies of other damaging choices. Further, the number of rejected offers increases. It is interesting that the sudden death penalty has a significant effect, although our questionnaires show that the overall probability of getting disqualified in the session is typically underestimated. The latter result supports a hypothesis posed by Kirchgässner (1997).

Although our study was designed to fundamentally examine behavior in a corruption situation, the results might be of practical relevance in combating bribery. When designing public relations campaigns against bribery, it is crucial to know which are the most important behavioral influences. Our results cast doubt on the effectiveness of campaigns appealing to the consciousness of officials of the negative welfare effects of bribery. On the other hand, our data suggest emphasizing the threat of getting caught, particularly at correcting the widespread misconception of discovery probabilities. Given the strong negative effect of drastic penalties on corruption levels, we can expect that individuals would then be even more reluctant to risk taking bribes.

Appendix A: The Instructions for the Sudden Death Treatment

(original text in German, other treatments analogous)

All in all **18 persons** participate in the decision making experiment. There are two types of participants: **Player 1** and **Player 2**. At the beginning of the experiment, the type of each participant is randomly drawn. **The type of a participant remains unchanged throughout the experiment.**

Pairs of players are matched also randomly: One player 1 and one player 2 are matched to one another. **The pairs remain unchanged throughout the experiment.**

The experiment consists of **30 rounds**. At the end of the experiment you will receive a **payoff** that depends on your success.

Decision Situation in a Round

Stage 1: Transfer or no Transfer. First, player 1 decides whether or not he wants to transfer an amount to player 2. If he does, then the credit of player 1 is reduced by **2 talers**, and the play is continued with stage 2. If player 1 does not want to transfer an amount, then both credits remain unchanged, and the play is continued with stage 4.

Stage 2: The Amount to Be Transferred. Player 1 decides on the amount to be transferred to player 2. Player 1 can choose between **1, 2, 3, 4, 5, 6, 7, 8 or 9 talers**. The play is continued with stage 3.

Stage 3: Acceptance or Rejection of the Transfer. Player 2 decides on whether he **accepts** or **rejects** the proposed transfer.

- If player 2 accepts the transfer, then the credit of player 1 is reduced by the amount he proposed. Player 2's credit is increased by the **tripled amount** that is transferred. In the following, a number out of the range from 0 to 999 is randomly drawn.

  ⇒ If the randomly drawn number is **0, 1, or 2**, then player 2 and the player 1 matched with him are **disqualified**. That means: **The play ends for these two players, and they do not receive any payment for the play, i.e. also the talers that have been earned in the past are cleared from their accounts.** (In the end of the experiment, both players receive only the show up fee, see below). The two disqualified participants fill in a questionnaire, until the experiment has ended. For the other participants, the play is continued normally.

  ⇒ If the randomly drawn number is **3, 4, . . . , 998, or 999**, then the play is continued with stage 4.

- If player 2 rejects the transfer, then the credits remain unchanged (The transfer fee from stage 1, however, is also paid in case of rejection). The play is continued with stage 4.

Round payoff if player 2 **accepts** a transfer

Transferred amount	1		2		3		4		5		6		7		8		9	
Player 2's decision	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Payoff ... Player 1	33	53	32	52	31	51	30	50	29	49	28	48	27	47	26	46	25	45
... Player 2	39	33	42	36	45	39	48	42	51	45	54	48	57	51	60	54	63	57
... each of the other 16 participants	0	−3	0	−3	0	−3	0	−3	0	−3	0	−3	0	−3	0	−3	0	−3

Round payoff if player 2 **rejects** a transfer

Transferred amount	1,...,9	
Player 2's decision	X	Y
Payoff... ... Player 1	34	54
... Player 2	36	30
... each of the 16 other participants.	0	−3

Round payoff if player 2 does **not** transfer an amount

Transferred amount	0	
Player 2's decision	X	Y
Payoff... ... Player 1	36	56
... Player 2	36	30
... each of the 16 other participants.	0	−3

Each of the 16 other pairs in which Y is chosen decreases the payoff for player 1 and player 2 by another 3 talers each.

Figure A1. The payoff tables.

Stage 4: Choice Between X and Y. Player 2 chooses one of the **alternatives *X* or *Y***.

- If player 2 selects alternative *X*, then his credit and the credit of the player 1 matched with him are increased by **36 talers** each. The credits of the 16 other participants is **not changed** by this decision.
- If player 2 selects alternative *Y*, then player 1's credit is increased by **56 talers,** whereas player 2's credit is increased by **30 talers**. The credit of each of the 16 other participants is **decreased** by **3 talers** by this decision.

Attention: by each of the eight other pairs, in which *Y* is chosen, the payoff for player 1 as well as for player 2 is decreased by 3 talers, i.e. at maximum eight times 3 and at minimum no talers are deducted from player 1's and player 2's credits each. The deductions by decisions of other pairs are not announced before the experiment has ended.

After stage 4, the round has ended. The round payoffs are the sum of all changes of credits during the four stages of the round.

The Payoffs

You receive your payoff at the end of the experiment, where the exchange rate is DM 3.00 for 100 talers. In addition, you receive a lump sum show up fee of DM 5.00.

Appendix B: The Game Representation on the Screen (Figure A2)

The screen shows the game from the point of view of player 1. Since all possible moves for both players are displayed on one screen, the screen design is exactly the same for both roles. Only the labels of the roles and the right to enter a decision are changed.

The game starts in the upper left window (stage 1) and proceeds clockwise (stage 2 on the upper right side, stage 3 corresponds with the boxes in the

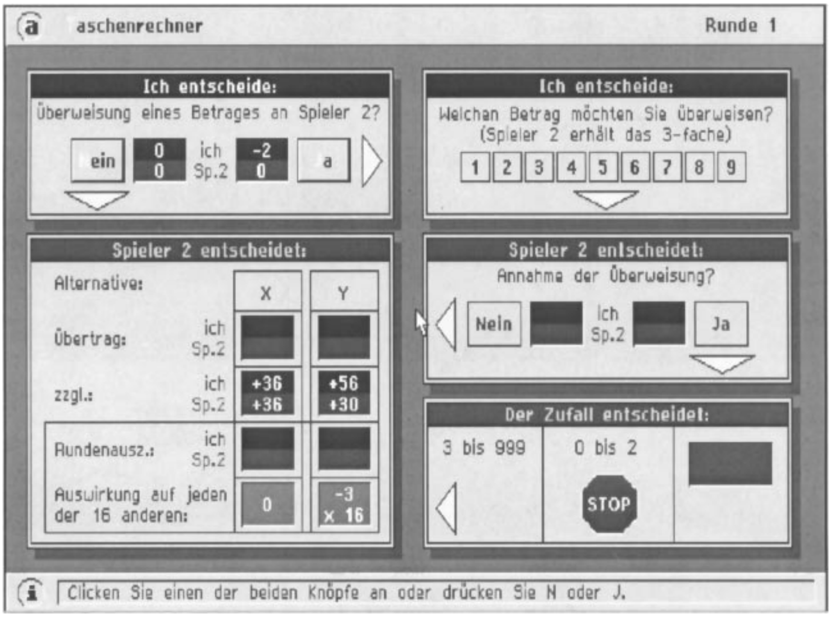

Figure A2. The main screen display of the sudden death treatment.

middle and on the bottom right, and stage 4 is on the bottom left). The arrows lead through the stages, indicating where the game is to be continued contingent on the decision in the current stage. In every stage, any effect on a player's credit is displayed in the boxes "ich" (for "effect on my credit") and "Sp.2" (for "effect on player 2's credit").

Stage 1: Transfer or no Transfer. Player 1 starts in the upper left box by deciding whether to transfer an amount to player 2 or not (translation of the German text: "My decision: transfer to player 2? Yes or No"). If player 1 clicks "No," stage 4 is reached immediately and the right half of the screen becomes lowlighted. Otherwise, if player 1 wants to transfer something to player 2, she clicks "Yes" and moves to stage 2.

Stage 2: The Amount to be Transferred. In stage 2, displayed on the top right of the screen, player 1 decides on the amount she wants to transfer via mouse click on the corresponding number (translation: "My decision: What is the amount you want to transfer?" (player 2 receives the tripled amount).

Stage 3: Acceptance or Rejection of the Transfer. After the transfer decision of player 1, it is the turn of player 2 to decide on acceptance or rejection of the offered transfer in the box below (translation: "Player 2 decides: Acceptance or Rejection? No or Yes"). If he accepts, the box on the bottom right is reached, where chance decides on disqualification or not (if the numbers 0, 1, or 2 appear, the game is over, otherwise the game continues to stage 4). If he does not accept, stage 4 is reached immediately.

Stage 4: Choice Between X and Y. In stage 4 (displayed in the box on the bottom left), player 2 decides on two alternatives (translation: "Player 2 decides: alternative X or Y"): if he chooses X, both credits remain unchanged and both players receive 36; if he chooses Y, player 1 and player 2 receive the (preliminary) payoffs of 56 and 30, respectively. A Y choice causes a negative externality of -3 for each of the 16 other participants. Moreover, all changes of a player's credits due to a transfer by player 1 are displayed ("Übertrag" for "Carry", which indicates that the consequences of player 1's transfer decision in stages 1 and 2 are taken into account and "zuzügl." for "plus" the amount that is added if X or Y is chosen by player 2). Finally, the (preliminary) round payoff ("Rundenausz.") is shown and the consequences of an X or Y choice for each of the 16 other players ("Auswirkung für jeden der 16 anderen") is indicated.

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