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Risk Attitude, Beliefs, and Information in a Corruption Game – An Experimental Analysis

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Abstract

For our experiment on corruption, we designed a coordination game to model the influence of risk attitudes, beliefs, and information on behavioral choices and determined the equilibria. We observed that the participants' risk attitudes failed to explain their choices between corrupt and non-corrupt behavior. Instead, beliefs appeared to be a better predictor of whether or not they would opt for the corrupt alternative. Furthermore, varying the quantity of information available to players (modeled by changing the degree of uncertainty) provided additional insight into the players' propensity to engage in corrupt behavior. The experimental results show that a higher degree of uncertainty in the informational setting reduces corruption.

Keywords: Corruption; game theory; experiment; risk attitude; beliefs

JEL-classification: D73, K42, C91, C92

1 Introduction

The importance of understanding corruption as an area of social behavior is widely accepted. Nearly all studies on institutional corruption show that the structures of governmental institutions and political processes are important determinants for the level of corruption (Shleifer and Vishny, 1993).

Various models have been designed to analyze different aspects of corruption (Andvig and Moene, 1990; Groenendijk, 1997; Lui, 1986; Rose-Ackerman, 1975). Using the *principal-agent-theory*, the models provide insight into the relations between the participants in a corrupt act under different assumptions, such as asymmetric information and different kinds of costs. Andvig and Moene (1990) modeled corruption as a multiplayer coordination game in which public officials can choose between a corrupt or honest strategy. In this model, the number of other public officials choosing the same strategy affects each player's best response. For the briber, the expected profit of corrupt behavior depends on the number of dishonest public officials. The greater the number of dishonest public officials, the higher the payoff for the briber and the lower the probability of being caught in corrupt transactions will be.

In our study, we assumed a common situation of corruption in which several public officials were faced with the decision of whether or not to accept bribes. With our model, we follow the general definition of corruption. The common consensus typically says that "...corruption refers to acts in which the power of public office is used for personal gains in a manner that contravenes the rules of the game" (see A. Jain, 2001, p. 73). Guided by the theoretical explanations of Andvig and Moene (1990), we configured this situation as a coordination game in which the acceptance of bribes led to a higher payoff connected with the risk of being caught. To represent this risk, we introduced a government agency charged with uncovering corrupt public officials. However, due to the agency's assumed budget constraints, the number of corrupt public officials is inversely proportional to their individual probabilities of being caught. In other words, the more corrupt officials there are, the lower the chance of detection and vice versa. In this kind of scenario, it might be rational for a profit-maximizing public official or utility-maximizing agent to act corruptly (Tirole, 1996).

Typically, the probability of being caught after a corrupt act is unknown, hence the situation is not only risky, but also subject to uncertainty (see, e.g.,Lippman et al. (1981)). Cadot (1987) has shown that risk is a parameter of the decision to engage in corrupt acts; accordingly, we elicited the risk attitudes of the players in our experiment by using lottery choices. Then, assuming fixed government anti-corruption expenditures, we modeled risk as a dynamic parameter depending on the overall number of players choosing the same strategy, thereby introducing elements of strategic uncertainty. Having set this groundwork, we studied the relationship between risk and uncertainty by comparing the players' lottery choices with their strategic behavior in the coordination game. Neumann and Vogt (2009) have demonstrated that the players' beliefs seem to be a better predictor of their decisions in a coordination game than risk attitude alone. Therefore, we elicited our players' beliefs and analyzed whether they accurately predicted their behavior in the corruption game.

Increasing information about corruption has been shown to greatly reduce corrupt behavior (Reinikka and Svensson, 2004). In our experiment, we chose not to simply increase information about corruption but to vary the amount of information about the probability of individual corrupt behavior being uncovered, which refers to varying the degree of uncertainty.

Our analyses show that the players' decisions were not determined by their risk attitudes, meaning that a more risk-seeking player did not necessarily behave more corruptly. On the contrary, the elicited beliefs proved to be much better predictors of behavior. With respect to corruption, our players built subjective probabilities about the possibility of successfully accepting a bribe. Furthermore, we found that increasing uncertainty among the players by varying the information about the probabilities of successful acts of corruption served to reduce corruption. For that purpose, it was not necessary to provide information about the specific activities undertaken by the agency, but merely to convey the risk of getting caught. In our experiment, specific information about the number of convicted corrupt acts were not utilized by the players.

In the next section we present our game design, theoretical predictions, and in Section 3 we derive our research hypotheses. Section 4 explains our experimental design and in Section 5 we describe our results. Finally, Section 6 concludes the paper by discussing some strategic recommendations to reduce corruption.

2 Game Design

In the literature, games with multiple equilibria, especially coordination games, are often used to model corruption (Andvig and Moene, 1990; Cadot, 1987). Coordination games are typical examples of uncertain situations representing the tradeoff between uncertainty and the resulting outcome. In an attempt to resolve this tradeoff, Harsanyi and Selten (1988) introduced two selection criteria: risk dominance and payoff dominance. There appears to be no common consensus in the literature on which factor determines equilibrium selection in coordination games. Nevertheless, besides the payoff structure, three aspects are central to this discussion: (1) beliefs, (2) risk, and (3) uncertainty. Since it is well known that the equilibrium selection in coordination games requires knowledge about the other players' behavior, it is logical to assume that the players' beliefs might influence the outcome. In addition, uncertainty might influence behavior. In this case, two different kinds of uncertainty are involved (Knight, 1921): (1) exogenous uncertainty (risk) with given and known a priori probabilities for all possible states of the world and (2) endogenous uncertainty, which arises from the lack of such probabilities. In the remainder of this paper, uncertainty is meant to be understood as endogenous uncertainty.

To investigate the impact of risk on corruption, we used lottery choices to elicit the risk attitude of the players. We compared these results to a coordination game in which the players faced decisions between a sure payoff (riskless option) if they behaved honestly and a risky option if they engaged in corrupt behavior. We modeled the risky option as a binary lottery. The probability of receiving the higher payoff was a function of the overall number of players who decided to play the lottery. The sure payoff (riskless option) was referred to as the "salary per month". In the risky option, the higher payoff consisted of the salary per month plus a bribe amount.

We analyzed the impact of uncertainty by playing two versions of the coordination game with different degrees of uncertainty: (1) a Corruption Game and (2) a Modified Corruption Game. During the Corruption Game all players knew the functional relation of the number of players playing the lottery and the probability of receiving the higher payoff. The players did not know which lottery would be realized, but were aware of the probabilities for all possible lotteries. In the Modified Corruption Game, we increased the degree of uncertainty. In this case, we did not inform the players about the probabilities; we only told them that the probability of winning the risky option would increase with the number of players choosing this option.

Finally, we elicited the players' beliefs by means of direct belief elicitation in the Modified Corruption Game.

Notice, we did not analyze the impact of negative externalities, i.e. reducing the payoffs of bystanders in case of corruption. We expect negative externalities not to influence the treatment variables, risk and uncertainty, we analyzed. Participants will incorporate negative externalities into their beliefs. However, they will not vary uncertainty of the decision situation. Aside this, Barr and Serra (200) have shown that (only) high negative externalities reduce the amount of corruption, but they do not diminish it to zero. According to this work, we expect a quantitative and no qualitative change in the number of corrupt acts due to negative externalities.

2.1 Lottery choices – elicitation of risk attitudes

To analyze the influence of players' risk attitudes on decisions in a game, we had to identify their specific risk attitudes. For this purpose, we asked the players to choose between two alternatives, i.e. Alternative A, a secure payoff, and Alternative B, a lottery, in 13 different runs.

Table 1 shows the fixed payoff and probabilities for each of the 13 lottery runs. Alternative A shows the fixed payoff of 600 points. The first column of Alternative B shows the probabilities $(1-w)$ of obtaining 0 points, and the second column of Alternative B indicates the probabilities (w) of obtaining 1,000 points.

Table 1
Eliciting players' risk attitudes

No.	**Alternative A** (secure payoff)	**Alternative B** $[0,(1-w);1{,}000,w]$	
1	600 Points	.99	.01
2	600 Points	.95	.05
3	600 Points	.90	.10
4	600 Points	.80	.20
5	600 Points	.70	.30
6	600 Points	.60	.40
7	600 Points	.50	.50
8	600 Points	.40	.60
9	600 Points	.30	.70
10	600 Points	.20	.80
11	600 Points	.10	.90
12	600 Points	.05	.95
13	600 Points	.01	.99

We used this design to identify the point at which the players switched from the (sure) Alternative A to the (risky) Alternative B. This "multiple pricing list" design for measuring risk aversion was inspired by Holt and Laury (2002).

According to the findings of Heinemann et al. (2004), participants use threshold strategies, meaning that they should choose Alternative A for low probabilities of obtaining the high payoff in the risky option and switch to Alternative B only once and stay with Alternative B for the remaining runs. A risk-neutral agent, for example, would switch from Alternative A to Alternative B between Nos. 8 and 9 of Table 1. The later an agent switches from A to B the higher the degree of an agent's risk aversion. Playing a threshold strategy corresponds to the agent's risk attitude, meaning that players who use a threshold strategy have an explicit switching point. This switching point served as our indicator for the players' risk attitudes.

2.2 Corruption Game

Inspired by the model of corruption of Andvig and Moene (1990), we designed our game according to a common situation of corruption in which several public officials face a decision of whether to accept bribes (and thus receive an increased payoff), or to abstain from taking bribes and merely live on their "regular salary". This scenario includes a government agency that fights corruption by attempting to catch corrupt officials. The number of officials participating in our corruption game was $N = 6$. We assumed that the probability $w(m)$ of not being detected depended monotonically increasing the number m of officials accepting bribes ($N \geqq m \geqq 1$).

$$w(m) = \begin{cases} .5\ if\ m = 1 \\ .6\ if\ m = 2 \\ .7\ if\ m = 3 \\ .8\ if\ m = 4 \\ .9\ if\ m = 5 \\ 1\ if\ m = 6 \end{cases}$$

The monotonicity property of $w(\cdot)$ seems to be plausible and is also consistent with the literature on corruption. We modeled our corruption game as a non-cooperative game $G = \left(\sum_1, \dots, \sum_N;\ H_1(\cdot), \dots, H_N(\cdot)\right)$ with N players, where the strategy sets are defined by

$$\textstyle\sum_1 = \cdots = \sum_N = \{A, B\}.$$

A denotes the strategy "refusing bribes" and B denotes the strategy "accepting bribes". Strategy A generates a fixed and certain payoff of 600 points (the "monthly salary") independently of the strategy choice of the remaining players. Strategy B yields the expected value[1] of a lottery $\mathcal{L} = \{0, \left(1 - w(m)\right); 1{,}000, w(m)\}$, where 1,000 is the total monthly salary $(= 600)$ plus the amount of the bribes $(= 400)$ offered to an official that will be consumed with probability $w(m)$. If convicted (with probability $1 - w(m)$), the official has to return both the bribery money and his salary. In other words, the payoff functions $H_i : \sum_1 \times \dots \times \sum_N \longrightarrow \mathbb{R}$ are characterized as follows[2]:

$$H_i(\cdot, \sigma_i) = 600 \quad \text{for } \sigma_i = A$$
$$H_i(\sigma_{-i}, \sigma_i) = w(m)1{,}000 \quad \text{for } \sigma_i = B$$
$$\text{and } m := \left|\{j \in I \mid j \neq i, \sigma_j = B\}\right|.$$

One can easily show that there exist only two Nash equilibria in pure strategies.

[1] We assume risk-neutral decision-makers.
[2] Note that we use the well-known convention to abbreviate the strategy configuration $(\sigma_1, \dots, \sigma_{i-1}, \sigma_{i+1}, \dots, \sigma_N)$ by σ_{-i}.

Result 1: ***The Nash equilibria in pure strategies of the corruption game G are given by***

$$\boldsymbol{\sigma^* = (\sigma_1^*, \dots, \sigma_N^*) = (A, \dots, A),}$$
$$\boldsymbol{\sigma^{**} = (\sigma_1^{**}, \dots, \sigma_N^{**}) = (B, \dots, B).}$$

Sketch of a proof: Suppose that all officials choose A, which results in a payoff equal to 600; then unilateral deviation to B would result in a payoff of 500 $(= w(1) \cdot 1{,}000)$.
Suppose that all officials choose B, which results in an individual payoff of 1,000. Unilateral deviation to A reduces the individual payoff to 600.
Consider any strategy configuration $\sigma \neq \sigma^*, \sigma^{**}$. Let σ be characterized by *m=1*. The unique B-player has a payoff of 500, but she can improve her payoff by switching to A. In the situation where the number of officials choosing B satisfies $1 < m < N$, all B-players obtain $w(m) \cdot 1{,}000$. Then at least one A-player would earn $w(m+1)1{,}000 > w(m)1{,}000 \geqq 600$. There is no other Nash equilibrium in pure strategies for game G.

q.e.d.

Moreover, there is a symmetric strictly mixed equilibrium $s^* = \big((q_A, 1 - q_A), \dots, (q_a, 1 - q_A)\big)$, where q_A denotes the probability of choosing strategy A.

Result 2: ***There exists a symmetric strictly mixed equilibrium with $\boldsymbol{q_A = 0.2}$.***

Proof: We have to show that each official is indifferent between A and B when all remaining players choose q_A, i.e.

$$\forall i : H_i(s_{-i}^*, A) = H_i(s_{-i}^*, B),$$

which is equivalent to $H_i(s_{-i}^*, B) = 600$.

Note that $H_i(s_{-i}^*, B)$ can be written as $\sum_{k=0}^{5} p_k w(k) 1{,}000$, where p_k denotes the probability that exactly k of the other officials choose B when all execute the same mixed strategy $s_i^* = (q_A, 1 - q_A)$. Since officials make their decisions independently of each other, we can calculate p_k via binomial distribution

$$p_k = \binom{N}{k} (1 - q_A)^k q_A^{N-k} \ .$$

For $q_A = 0.2$ we obtain

$$p = (p_0, \dots, p_5) = (0.3277, 0.4096, 0.2048, 0.0512, 0.0064, 0.0003),$$

which results in $\sum_{k=0}^{5} p_k w(k) 1{,}000 = 600$.

q.e.d.

2.3 Modified Corruption Game – direct belief elicitation

The Modified Corruption Game is a variation of the Corruption Game explained in Section 2.2. We varied the degree of uncertainty in this case by providing less information about the functional relation of the number of players choosing the risky alternative and the probability of receiving the higher payoff in this risky alternative. In this version the players only knew that the probability of obtaining the higher payoff in the risky alternative would increase with the number of players choosing this alternative. In the Modified Corruption Games, we extend the possible parameter space of the probability $w(m)$ to $0 \leq w(m) \leq 1$.

We felt that eliciting the players' beliefs might help to shed light on their decision-making processes. The literature basically provides two different elicitation procedures: direct or indirect.[3] In the Modified Corruption Game, we elicited the players' beliefs directly by asking them to estimate the probability of Alternative B leading to the higher payoff in every decision run. Following Nyarko and Schotter (2002), we rewarded the players according to a quadratic scoring rule that conforms to the axiomatic characterization as formulated by Selten (1998).

The rewarding function was designed as follows:

$$E = 150 \cdot \left[1 - \left(w(m) - \frac{b}{100}\right)^2\right]$$

with $w(m)$ = real probability of obtaining the higher payoff, and *b* = players' first-order belief. We asked the players to express their estimates as a number between 0 (Alternative B provides 0 points for sure) and 100 (Alternative B provides 1,000 points for sure). We designed this function such that it is optimal for a risk-neutral agent to report her true belief (see e.g., Gerber, 2006; Nyarko and Schotter, 2002). Due to different risk attitudes or probability weighting, players frequently misreport their true beliefs (Sonnemans and Offerman, 2001).

Let us present the differing degrees of information contained in the two treatments systematically in more technical terms as follows. In the Baseline Treatment each participant essentially has to choose out of a fixed set of 6 different probability distributions over the support {0,1000} that are, moreover, linearly ordered according to (first order) Stochastic Dominance symbolized by $\prec$ (illustrated in Figure 1 via probability distribution functions), i.e. $F_1 \prec F_2 \prec \cdots \prec F_6$.

(Insert Figure 1 here)

[Figure 1: Baseline Treatment: fixed choice set]

Let us denote this set by F^{base}. Uncertainty in this environment is represented by a probability distribution P on this particular set of distribution functions which can easily be transformed to a probability distribution on the set of natural numbers $\{1,2,3,4,5,6\}$, i.e. the set of agents potentially becoming corrupt. We conjecture that for many participants the measure P will be degenerate at a particular distribution function $F_m \in F^{base}$ $(m \in \{1,2,\ldots,6\})$. Such participants are characterized by a point estimation of the number of corrupt partners.

Given this framework, "less information" in the Uncertain Treatment can then be formalized as follows: The decision maker is confronted with a *set of different sets* of 6 probability

[3] For an overview on measuring expectations, see Manski, Charles F. (2004). Measuring Expectations. Econometrica, 72(5), 1329-1376.

distribution functions each ordered like in F^{base} but have varying distances from each other (illustrated in Figure 2 for one exemplary set of 6 distribution functions)

(Insert Figure 2 here)

[Figure 2: Uncertain Treatment: an exemplary set of distribution functions]

"Less information" in this environment is represented by a probability distribution Π on the *set of "sets of distribution functions"* of the required type.[4] Each set of distribution functions can again be equivalently transformed to the set of potential corrupt individuals $\{1,2,3,4,5,6\}$ for which the original probability distribution P holds.

In this way we introduce the effects of simple uncertainty (expressed by P) and less information (expressed by Π) as separate concepts. In particular, it follows from our framework that one cannot postulate that the range of probabilities should be the same in both treatments. More variation, i.e. less information implies a more flexible probability scale on the support $\{0,1000\}$.

3 Research Hypotheses

The relation between risk and behavior in games has been examined in many studies (see e.g., Goeree et al., 2003; Schmidt et al., 2003; Straub, 1995). Experiments show that players' risk attitudes often influence their behavior in games. According to Cadot (1987), corruption (or crime) is a lottery, and players who ask for (or offer) bribes face risks every time. Hence, we can conclude that players' risk attitudes determine their decisions in these kinds of situations. Our first hypothesis is therefore:

H1: The players' risk attitudes determine their decisions in the game.

In the context of the described game, this implies that risk-loving players should favor the risky alternative.

In coordination games such as ours, equilibrium behavior requires knowledge about the other players' behavior. In addition to analyzing the players' risk attitudes, we also investigated the influence of their beliefs on their behavior. Players' beliefs have been elicited in several studies (see e.g., Costa-Gomes and Weizsäcker, 2008; Nyarko and Schotter, 2002; or Palfrey and Wang, 2009). All of the studies show that beliefs concerning the behavior of others influence the outcome of a game. In context of our setting, the outcome of the game is influenced by players' beliefs of not being detected in case of corrupt behavior. In keeping with this finding, our corresponding hypothesis is:

H2: The players' beliefs of not being detected determine their decisions in the game.

[4] This is a formalization of our assumption that players only know that w(m) is monotonic non-decreasing in m but the precise functional dependence it is not exactly known.

In the game, we investigated the influence of the players' first-order beliefs and related these beliefs to their risk attitudes and to information provided to the players. Based on this relation, we figure out the evolution of beliefs as a function of these variables.

In economic theory, corruption can be modeled as a game and solved under assumptions on differing degrees of information (Cadot, 1987). Different studies have pointed out that information can be a powerful tool for reducing corruption (see e.g. Brunetti and Weder, 2003; Cadot, 1987; Reinikka and Svensson, 2004). In the game we used, different degrees of uncertainty corresponded to different information sets. Hence, we will analyze the following hypothesis:

H3: The degree of uncertainty does not affect players' decisions.

In our study we varied the degree of uncertainty by providing different information about the probability of obtaining the higher payoff in the risky (corrupt) alternative. By analyzing the behavior of players choosing the risky alternative in the different setups, we were able to determine the influence of the varied information sets.

4 The Experiment

Following the description given in Section 2, we ran a neutrally framed experiment. Given that Abbink and Henning-Schmidt (2006) found no significant differences in a bribery experiment run in both a loaded and unloaded frame, we used an unloaded frame to avoid framing effects.

The literature on framing effects in corrupt interactions provides evidence for a determining influence on decisions, but as far as we know, only on the briber's behavior and not on the agents' (see Barr and Serra, 2009; Lambsdorff and Frank, 2010). In our experiment, we did not model the bribers but concentrate on the agents and therefore use neutral language.

We conducted two treatments: (1) the Baseline Treatment, consisting of the Corruption Game and lottery choices, and (2) the Uncertain Treatment, consisting of the Modified Corruption Game and lottery choices.

The experiment was performed in the MaXLab, the experimental laboratory at the University of Magdeburg in September 2008. We ran six sessions for each treatment, with six participants in each session. The participants were recruited using ORSEE software (Greiner, 2004) from a pool consisting mostly of students from various faculties. For our computerized experiment, we used a program written in z-tree (Fischbacher, 2007). The participants received separate instructions for each part of the experiment. All instructions were provided in German. An English translation of the written instructions is shown in Appendix C.

No communication was allowed among the participants at any time during the experiment. In the Baseline Treatment, participants could earn a maximum of 7.33 euros and in the Uncertain Treatment a maximum of 8.33 euros. The experiment provided a riskless payoff of 4.40 euros in the Baseline Treatment and of 5.15 euros in the Uncertain Treatment. The payoffs in the experiment were given in points and were converted into euros at the end of the experiment. The exchange rate we used was 1 euro cent for every 15 points.

4.1 Lottery choices – elicitation of risk attitudes

To elicit the players' risk attitudes, we commenced both treatments, i.e. the Baseline Treatment and the Uncertain Treatment, with the lottery choices.

In this part, for 13 lotteries, participants were asked to compare these lotteries with a riskless payoff of 600 points. The lotteries $[G_1, (1-w); G_2, w]$ provided a payoff $[G_1]$ of 0 points with probability $[(1-w)]$ and with probability $[w]$ a payoff $[G_2]$ of 1,000 points. For these 13 runs, the participants had to decide between the lottery, the sure payoff or an indifferent position.

At the end of the experiment, one of the 13 decision scenarios was randomly chosen and actualized. The particular scenario was determined by drawing a ball from a bingo cage containing 13 balls numbered from 1 to 13. For each participant, his or her preferred alternative was realized (i.e. either the lottery or the sure payoff). In the case of the lottery, a ball was drawn from a bingo cage containing a specified number of red and blue balls corresponding to the probabilities of the determined lottery (the number of red balls reflected the probability $[(1-w)]$ of payoff $[G_1]$ and the number of blue balls reflected the probability $[w]$ of the payoff $[G_2]$). In the case of indifference, a coin toss determined which alternative was realized.

4.2 Corruption Game

In the Baseline Treatment, we played the Corruption Game after the lottery choice. In this game, the participants were informed that they would be playing in a group of six participants. Each player was presented with two different alternatives: Alternative A, carrying a certain payoff of 600 points, and Alternative B, carrying a risky payoff of 1,000 points with probability $[w(m)]$ or 0 points with probability $[1-w(m)]$ depending on the number of participants choosing Alternative B. Subjects were shown a table containing the resulting probability outcomes according to the number of participants choosing Alternative B.

The participants were asked to choose one of the alternatives or to indicate indifference between the two. In the case of indifference, one alternative was randomly selected (with a probability of 0.5 for each alternative). This part was repeated 10 times.

Losing the lottery was equivalent to being convicted of bribery by the government agency. In our game, the way in which the agency went about uncovering corruption was irrelevant; the important aspect was that the participants knew there was a possibility of being caught. Therefore, after each period, we informed all participants about the number of convicted players.

4.3 Modified Corruption Game

In the Uncertain Treatment, the lottery choice was followed by the Modified Corruption Game, in which the probabilities of receiving the higher payoff in the risky alternative (B) were unknown to the players. The players only knew that the probabilities $[w(m)]$ would increase along with the number of participants who chose Alternative B.

Additionally, the players were asked to estimate the probability of obtaining the higher payoff from Alternative B (1,000 points) on a scale from 0 to 100. Players were then rewarded according to a quadratic scoring function as explained in Section 2. This part was repeated 10 times.

5 Results

In the remainder of the paper, we will first analyze the lottery choices in order to relate the players' risk attitudes to their observed behavior in our Corruption Game as well as to that observed in our Modified Corruption Game. Afterwards, we examine the players' expectations about each other's behavior.

5.1 Lottery choices – elicitation of risk attitudes

In the lottery choices, the participants had to decide between a sure payoff (Alternative A) and a risky payoff (Alternative B). In line with the findings of Heinemann et al. (2004) and Heinemann et al. (2009), the majority of the participants in our study (64 out of 72 ≈ 89%) chose a threshold strategy. The switching point of the threshold strategy is given by the probability of obtaining the higher payoff in Alternative B for the lottery number at which point the players switched from Alternative A to Alternative B. In Table 2, we present the switching points of the 64 players who utilized a threshold strategy.

Table 2
Switching points of the 64 players who employed a threshold strategy

No.	Alternative A	Alternative B $[0,(1-w);1{,}000,w]$		No. of players who switched from Alternative A to Alternative B	No. of players who switched from Alternative B to Alternative A
1	600 Points	.99	.01	0	0
2	600 Points	.95	.05	0	0
3	600 Points	.90	.10	0	0
4	600 Points	.80	.20	0	0
5	600 Points	.70	.30	1	0
6	600 Points	.60	.40	1	0
7	600 Points	.50	.50	13	0
8	600 Points	.40	.60	13	0
9	600 Points	.30	.70	20	0
10	600 Points	.20	.80	8	0
11	600 Points	.10	.90	6	0
12	600 Points	.05	.95	2	0
13	600 Points	.01	.99	0	0

For the other 8 players, we were not able to identify a "clear" strategy. These players' decisions and their switches within the 13 lottery choices are shown in Appendix A.3.

The lottery choices and the switching points for all participants are presented in Table 3. In Decision No. 8, the expected payoff of Alternative B was equal to the sure payoff of Alternative A. Thus, a risk-neutral player would have been indifferent between the two alternatives. Switching earlier represents risk-seeking behavior and switching later reflects risk aversion.

One can see, all participants showed similar risk attitudes. In Decisions Nos. 1 to 7, the majority of players chose Alternative A, in Decisions Nos. 11 to 13, the majority chose Alternative B. That means, within the range of Decisions Nos. 8 to 10, the majority of players switched from Alternative A to B. Thus, we conclude that the majority of players in our study were risk averse. Appendix B contains separate tables for each treatment. In Table 3, we present the risk attitudes of the participants by their given switching points.

Table 3
Chosen alternative and switching point

No.	Alternative A	Alternative B $[0, (1-w); 1{,}000, w]$		No. of players who chose A	No. of players who chose B	No. of indifferent players
1	600 Points	.99	.01	63	5	4
2	600 Points	.95	.05	67	3	2
3	600 Points	.90	.10	68	3	1
4	600 Points	.80	.20	70	1	1
5	600 Points	.70	.30	68	2	2
6	600 Points	.60	.40	68	4	0
7	600 Points	.50	.50	52	12	8
8	600 Points	.40	.60	42	12	18
9	600 Points	.30	.70	18	42	12
10	600 Points	.20	.80	9	55	8
11	600 Points	.10	.90	3	68	1
12	600 Points	.05	.95	1	70	1
13	600 Points	.01	.99	0	72	0

5.2 Chosen Alternatives over time

In the Corruption Game, players were asked to decide between two alternatives: Alternative A, which led to a sure payoff, and Alternative B, which led to an uncertain payoff.

As described in Section 2.2, Alternative B in the Corruption Game was reflected by a lottery. The probability $w(m)$ of not being detected (obtaining the higher payoff) depended on the number m of subjects choosing Alternative B. Therefore, the participants knew of all 6 possible occurrences of the lotteries but were uncertain about which one reflected Alternative B. Table 4 represents the players' decisions. As the table shows, in each period, the majority of players chose Alternative B.

Table 4
Chosen alternative in the Corruption Game

Period No.	No. of players who chose A	No. of players who chose B	No. of indifferent players
1	9	27	0
2	10	26	0
3	5	31	0
4	7	29	0
5	8	28	0
6	4	32	0
7	5	31	0
8	8	28	0
9	4	32	0

10	8	28	0

In the modified version of our Corruption Game (see Section 2.2) players do not know the detection probability. Therefore, they have no direct indicator for the number of other players choosing Alternative A (Alternative B). However, we investigate whether temporal changes occur in the Modified Corruption Game. Table 5 shows the players' decisions. As for the Corruption Game, we cannot observe a trend towards Alternative A or Alternative B. The same holds for the data on group level.

Table 5
Chosen alternative in the Modified Corruption Game

Period No.	No. of players who chose A	No. of players who chose B	No. of indifferent players
1	14	22	0
2	12	24	0
3	18	18	0
4	16	20	0
5	16	20	0
6	12	24	0
7	14	22	0
8	16	20	0
9	14	22	0
10	18	17	1

In each of the 10 rounds, we asked the players to estimate the probability of obtaining the higher payoff. Table 6 shows the players' beliefs (as probabilities) sorted according to their chosen alternative. The beliefs also show no trend over time.

Table 6
Means of the elicited beliefs of obtaining the higher payoff (Modified Corruption Game)

Period No.	Means of the beliefs of players who chose A	Means of the beliefs of players who chose B
1	.28	.67
2	.28	.71
3	.25	.75
4	.21	.71
5	.26	.67
6	.15	.73
7	.17	.69
8	.31	.76
9	.26	.76
10	.25	.84
Mean of all rounds	**.24**	**.72**

5.5 Determinants of the players' decisions – running regressions

We use regression models (see Table 7) to evaluate what influences decisions in the game, i.e. to evaluate the hypothesis introduced in Section 3. As explanatory variables we used the risk attitude characterized by the switching points of the players,[5] the beliefs elicited in the Uncertain Treatment,[6] the number of players who were convicted in period T-1, whether the deciding player was convicted in period T-1,[7] and the treatment of play.[8]

Table 7
Regression coefficients to predict decisions based on risk attitudes and beliefs and to predict beliefs in T + 1 based on risk attitudes and beliefs in T.

Explanatory variables	**Logit regression on *decision*** **Risk attitude**		**Beliefs**		**Regression on *belief* in T + 1 (regression)**	
Risk Attitude	-1.89	(.51)	-	-	0.12	(.22)
Belief	-	-	6.17	(.00)	0.70	(.00)
Players convicted in T-1	-1.89	(.99)	0.27	(.28)	-0.00	(.90)
Self not convicted in T-1	-0.00	(.00)	2.61	(.00)	0.12	(.00)
Treatment	-2.62	(.00)	-	-	-	-
Constant	6.23	(.02)	-3.92	(.00)	0.02	(.79)
Wald overall χ^2	33.62		59.25		-	
R^2	-		-		0.12	
Observations n	566.00		323.00		306.00	

Notes: p-values in parentheses

To investigate the impact of risk attitudes (Hypothesis H1) and beliefs (Hypothesis H2), we conduct two logit regressions with the players' decision in the corruption game, namely Alternative A or Alternative B, as dependent variable. The results of this regression are summarized in columns "Risk attitude" and "Beliefs" of Table 7. Both the regression concerning risk attitudes and concerning beliefs are highly significant ($\chi^2(4) = 33.62$, p<0.0001; $\chi^2(4) = 59.25$, p<0.0001). Notice, the number of observations in the model concerning beliefs is about half as high as for the model of risk attitudes. This results from the fact, that we only collected beliefs in Uncertain Treatment.

From the results of the regression, we can clearly derive that risk attitudes do not influence the decisions of players, while the beliefs have a major influence. Hence, we can reject hypothesis H1 and confirm hypothesis H2.

In a second step, we investigate whether any of the explanatory variables influences the belief in the subsequent period and thereby indirectly influences the decisions of the player. We do so with an additional regression analysis with the belief in the subsequent period as dependent variable (see Table 7, last column). This analysis shows that players build their beliefs based on the beliefs in the previous period and the fact whether they were convicted or not. However, they do not integrate their risk attitudes nor the information they gather about others into their beliefs. This further confirms hypotheses H1 and H2.

[5] Only decisions of 64 players who specified a threshold strategy were included. "risk attitude" is the probability of receiving the high payoff in Alternative B at the switching point
[6] Estimation of the player for the probability of obtaining the higher payoff from Alternative B
[7] Dummy variable: Equals 0 if player was convicted in T-1 or not corrupt and equals 1 if player was corrupt but not convicted
[8] Dummy variable: Equals 0 for Baseline Treatment and 1 for Uncertain Treatment

In hypothesis H3 we postulated that uncertainty does not influence the decisions made. To investigate this hypothesis, we inspect the *Regression concerning risk attitudes* again. According to this analysis the only aspect influencing decisions is the variable treatment. The sign of the regression coefficient implies that in the Uncertain Treatment less players choose the risky Alternative B than in the Baseline Treatment. Hence, we conclude that uncertainty (having a higher degree in the Uncertain Treatment) influences decision and reject hypothesis H3.

6 Conclusion

This study was motivated by the desire to investigate the effect of different degrees of uncertainty on players' decisions in an environment of corruption. At the same time, we also wanted to find out whether the players' risk attitudes or beliefs determined their decisions in a game.

Using the common definition of the two kinds of uncertainty, we were able to compare our players' decisions in risky situations with their decisions in situations with different degrees of uncertainty. We designed the decision problem as a coordination game, where the "corrupt outcome" was modeled as a binary lottery representing various assumptions (such as e.g. being caught or having one's bribes refused). In addition, we elicited the players' risk attitudes and beliefs.

Using lottery choices to identify the players' risk attitudes, we found that the average player was risk averse and used a threshold strategy. In relating the players' risk attitudes to their decisions in the game, we did not find evidence of a determining influence. In contrast, the elicited beliefs seem to be a much better predictor for the players' behavior. In the context of corruption, the players built subjective probabilities about the odds of concealing their corrupt behavior, a practice which is necessary for successfully engaging in corrupt acts.

The comparison between the treatments with different degrees of uncertainty lends support to the hypothesis that increasing uncertainty reduces corruption. In other words, to effectively fight against corruption, an agency should publicize information about convictions as a signal to affect the beliefs of the officials. With this information, the agency should increase the uncertainty about the probability of a successful act of corruption for public officials.

Acknowledgement

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Appendix

A Tables

A.1 Table: Chosen alternative – Lottery choices in the Baseline Treatment

Chosen Alternative (Lottery Choices, Baseline Treatment) **– No. of players**						
No.	**Alternative A**	**Alternative B** $[0,(1-w);1{,}000,w]$		**No. of players who chose A**	**No. of players who chose B**	**No. of indifferent players**
1	600 Points	.99	.01	**33**	3	0
2	600 Points	.95	.05	**33**	3	0
3	600 Points	.90	.10	**33**	3	0
4	600 Points	.80	.20	**34**	1	1
5	600 Points	.70	.30	**34**	0	2
6	600 Points	.60	.40	**34**	2	0
7	600 Points	.50	.50	**28**	5	3
8	600 Points	.40	.60	**23**	**4**	**9**
9	600 Points	.30	.70	**12**	**20**	**4**
10	600 Points	.20	.80	5	**27**	4
11	600 Points	.10	.90	1	**35**	0
12	600 Points	.05	.95	1	**35**	0
13	600 Points	.01	.99	0	**36**	0

A.2 Table: Chosen alternative – Lottery choices in the Uncertain Treatment

Chosen Alternative (Lottery Choices, Uncertain Treatment) **– No. of players**						
No.	**Alternative A**	**Alternative B** $[0,(1-w);1{,}000,w]$		**No. of players who chose A**	**No. of players who chose B**	**No. of indifferent players**
1	600 Points	.99	.01	**30**	2	4
2	600 Points	.95	.05	**34**	0	2
3	600 Points	.90	.10	**35**	0	1
4	600 Points	.80	.20	**36**	0	0
5	600 Points	.70	.30	**34**	2	0
6	600 Points	.60	.40	**34**	2	0
7	600 Points	.50	.50	**24**	7	5
8	600 Points	.40	.60	**19**	**8**	**9**
9	600 Points	.30	.70	6	**22**	8
10	600 Points	.20	.80	4	**28**	4
11	600 Points	.10	.90	2	**33**	1
12	600 Points	.05	.95	0	**35**	1
13	600 Points	.01	.99	0	**36**	0

A.3 Table: Switching points of the 8 players who did not play a threshold strategy

Player	**No. of decision pairs in the lottery choices**												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1	A	B	B	A	A	A	A	A	ind.	ind.	B	B	B
2	A	A	A	A	A	A	B	A	B	B	B	B	B
3	B	B	B	ind.	ind.	A	ind.	ind.	A	B	B	B	B
4	B	B	B	B	ind.	A	A	A	ind.	B	B	B	B
5	A	A	A	A	A	B	A	A	B	B	B	B	B
6	A	A	A	A	A	A	B	A	B	A	B	A	B
7	A	A	ind.	A	B	B	A	B	B	A	A	B	B
8	A	A	A	A	B	B	B	A	B	B	B	B	B

Table 1: A = Alternative A, B = Alternative B, and ind. = indifferent

B Written Instructions (Translations)

B.1 Baseline Treatment (Lottery choices and Corruption Game)

Welcome to the MaXLab!

Instructions

You are about to take part in an experiment that investigates behavior in uncertain situations. The experiment consists of two parts.

In the first part you will be asked to decide between a sure payoff (Alternative A) and a lottery (Alternative B). For each decision scenario, the payoffs and probabilities are as follows:

	Alternative A	Alternative B		Your decision		
				A	B	Indifferent
Payoff in points	600	1,000	0			
Probability	100% (sure)	90%	10%			

In the above example, if you choose Alternative A, you will receive a sure payoff of 600 points. If you choose Alternative B, you have a 90% probability of winning 1,000 points and a 10% probability of winning 0 points.

Generally, your decisions are as follows:

	Alternative A	Alternative B		Your decision		
				A	B	Indifferent
Payoff in points	600	G_1	G_2			
Probability	100% (sure)	w	$100 - w$			

If you choose the lottery, it will be played by drawing a ball from a bingo cage containing a specified number of red and blue balls, reflecting the probabilities shown above (the number of red balls corresponds to the probability of payoff one (G1) and the number of blue balls corresponds to the probability of payoff two (G2)).

Your decisions will be realized at the very end of the experiment.

For every 15 points you accrue during the experiment, you will receive 1 euro cent.

Part 1 (Lottery choices – elicitation of risk attitudes)

For each of the following 13 queries, please choose either Alternative A or Alternative B; if you have no preference, click the middle box ("I am indifferent between these two alternatives").

As an example, the screenshot below (Figure 3) shows the design of the decisions:

(Insert Figure 3 here)

[Figure 3: Screenshot of the decision-screen shown to each subject]

At the end of the entire experiment, one of your 13 decisions will be realized according to a random drawing from a bingo cage containing 13 balls numbered from 1 to 13. If you chose Alternative A in this decision, you will obtain the sure payoff of 600 points. If you chose Alternative B, the lottery will be played by drawing a ball from a bingo cage containing (w) red and $(100 - w)$ blue balls. If a red ball is drawn, you will receive 1,000 points; if a blue ball is drawn, you will receive 0 points. In the case of indifference, a coin toss determines which alternative will be realized (tails = Alternative A, heads = Alternative B).

Part II (Corruption Game)

You are in a group with five other participants. In each case, you will be asked to decide between two alternatives: Alternative A provides a sure payoff of 600 points, while Alternative B provides a payoff of 1,000 points with probability $[w(m)]$ and 0 points with probability $[100 - w(m)]$. The probabilities depend on the number of players choosing Alternative B.

Your decision:

Alternative A:	600 points (sure payoff)
Alternative B:	1,000 points with probability $\mathrm{w(m)}$ 0 points with probability $100 - \mathrm{w(m)}$

The table below displays the resulting probabilities for Alternative B according to the percentage of players choosing Alternative B.

Number of players choosing Alternative B	Probability $\boldsymbol{w(m)}$	Probability $\mathbf{100} - \boldsymbol{w(m)}$
1	50%	50%
2	60%	40%
3	70%	30%
4	80%	20%
5	90%	10%
6	100%	0%

Please use the computer to indicate which alternative you prefer. If you are indifferent between the two alternatives, please check the box labeled “indifferent”.

Your decision:	**Alternative A**	**Alternative B**	**Indifferent**

In the case of indifference, one alternative will be randomly selected, with a probability of 50 percent for each alternative. This random result will be shown to you.

After all participants have made their decisions, those who chose Alternative A will obtain a payoff of 600 points. For the remaining participants, depending on the number of participants who chose Alternative B, the corresponding payoff will be awarded. After each round, all participants are informed of how many players received 0 points in the last round played.

This part is played 10 times, and you can choose between Alternative A, Alternative B, or indifference between the two in each round.

Thanks for participating in our experiment!

B.2 Uncertain Treatment (Lottery choices and Modified Corruption Game)

Welcome to the MaXLab!

Instructions

You are about to take part in an experiment that investigates behavior in uncertain situations. The experiment consists of two parts.

In the first part you will be asked to decide between a sure payoff (Alternative A) and a lottery (Alternative B). For each decision scenario, the payoffs and probabilities are as follows:

	Alternative A	Alternative B		Your decision		
				A	B	Indifferent
Payoff in points	600	1,000	0			
Probability	100% (sure)	90%	10%			

In the above example, if you choose Alternative A, you will receive a sure payoff of 600 points. If you choose Alternative B, you have a 90% probability of winning 1,000 points and a 10% probability of winning 0 points.

In this example: If you prefer Alternative A, you receive a sure payoff of 600 points. If you prefer Alternative B, you win 1,000 points with probability 90% and 0 points with probability 10%.

Generally, your decisions are as follows:

	Alternative A	Alternative B		Your decision		
				A	B	Indifferent
Payoff in points	600	G_1	G_2			
Probability	100% (sure)	w	$100 - w$			

If you choose the lottery, it will be played by drawing a ball from a bingo cage containing a specified number of red and blue balls, reflecting the probabilities shown above (the number of red balls corresponds to the probability of payoff one (G1) and the number of blue balls corresponds to the probability of payoff two (G2)).

Your decisions will be realized at the very end of the experiment.

For every 15 points you accrue during the experiment, you will receive 1 euro cent.

Part I (Lottery choices – elicitation of risk attitudes)

For each of the following 13 queries, please choose either Alternative A or Alternative B; if you have no preference, click the middle box ("I am indifferent between these two alternatives").

As an example, the screenshot below shows the design of the decisions:

(Insert Figure 3 here)

[Figure 3: Screenshot of the decision-screen shown to each subject]

At the end of the entire experiment, one of your 13 decisions will be realized according to a random drawing from a bingo cage containing 13 balls numbered from 1 to 13. If you chose Alternative A in this decision, you will obtain the sure payoff of 600 points. If you chose Alternative B, the lottery will be played by drawing a ball from a bingo cage containing (w) red and $(100 - w)$ blue balls. If a red ball is drawn, you will receive 1,000 points; if a blue ball is drawn, you will receive 0 points. In the case of indifference, a coin toss determines which alternative will be realized (tails = Alternative A, heads = Alternative B).

Part II (Modified Corruption Game – direct belief elicitation)

You are in a group with five other participants. You will be asked to decide between two alternatives: Alternative A provides a sure payoff of 600 points, while Alternative B provides a payoff of 1,000 points with probability $w(m)$ and 0 points with probability $100 - w(m)$.The probabilities are unknown to all participants.

The probabilities depend on the number of players in your group choosing Alternative B. The more players who choose Alternative B, the higher the probability $\boldsymbol{w(m)}$ (the probability of getting 1,000 points) will be.

Your decision:

Alternative A: 600 points (sure payoff)

Alternative B: 1,000 points with probability $\boldsymbol{w(m)}$
0 points with probability $\mathbf{100} - \boldsymbol{w(m)}$

Please use the computer to indicate which alternative you prefer. If you are indifferent between both alternatives, please check the box labeled "indifferent".

Your decision:	**Alternative A**	**Alternative B**	**Indifferent**

In the case of indifference, one alternative will be randomly selected, with a probability of 50 percent for each alternative. This random result will be shown to you.

In addition, you will be asked to estimate the probability of Alternative B providing 1,000 points.

Please indicate your estimate with a number between 0 (Alternative B will definitely provide 0 points) and 100 (Alternative B will definitely provide 1,000 points).

For this estimate you will be rewarded according to the following function:

$$E = 150 \cdot \left[1 - \left(w(m) - \frac{b}{100}\right)^2\right], \text{with w(m)} = \text{real probability of obtaining 1,000 points.}$$

The table below shows some randomly selected combinations of $w(m)$ and the resulting payoffs (b).

		Real probability $w(m)$										
		0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Your indicated b	**0**	150	148.5	144	136.5	126	112.5	96	76.5	54	28.5	0
	10	148.5	150	148.5	144	136.5	126	112.5	96	76.5	54	28.5
	20	144	148.5	150	148.5	144	136.5	126	112.5	96	76.5	54
	30	136.5	144	148.5	150	148.5	144	136.5	126	112.5	96	76.5
	40	126	136.5	144	148.5	150	148.5	144	136.5	126	112.5	96
	50	112.5	126	136.5	144	148.5	150	148.5	144	136.5	126	112.5
	60	96	112.5	126	136.5	144	148.5	150	148.5	144	136.5	126
	70	76.5	96	112.5	126	136.5	144	148.5	150	148.5	144	136.5
	80	54	76.5	96	112.5	126	136.5	144	148.5	150	148.5	144
	90	28.5	54	76.5	96	112.5	126	136.5	144	148.5	150	148.5
	100	0	28.5	54	76.5	96	112.5	126	136.5	144	148.5	150

After all participants have made their decisions, those who chose Alternative A will obtain a payoff of 600 points. For the remaining participants, depending on the number of participants who chose Alternative B, the corresponding payoff will be awarded. After each round, all participants are informed of how many players received 0 points in the last round played.

This part is played 10 times, and you can choose between Alternative A, Alternative B, or indifference between the two in each round.

Thanks for participating in our experiment!

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Figures

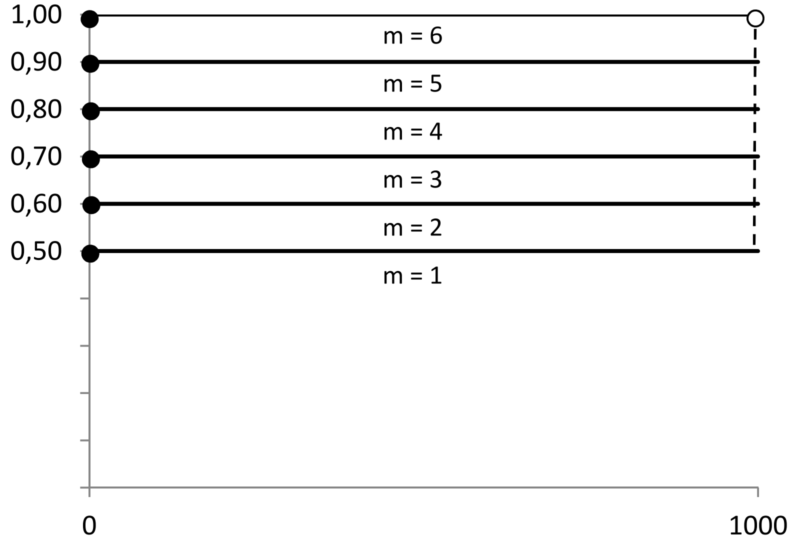

Figure 1 Baseline Treatment: fixed choice set

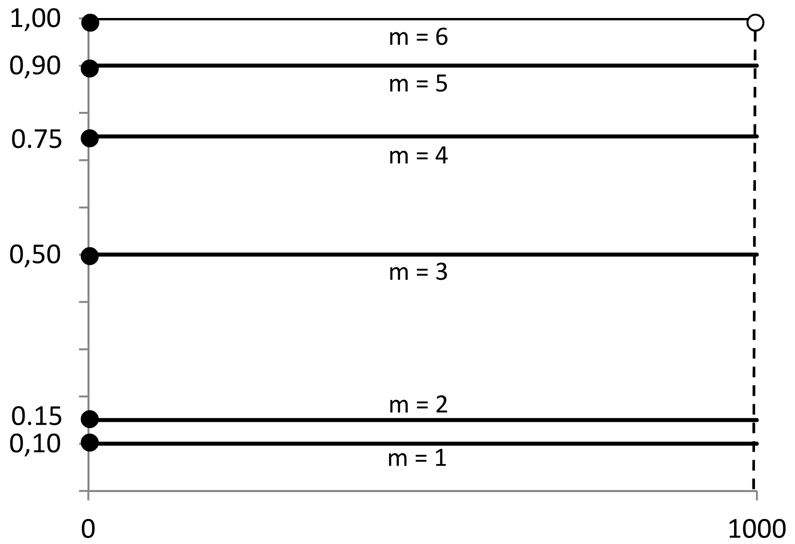

Figure 2 Uncertain Treatment: an exemplary set of distribution functions

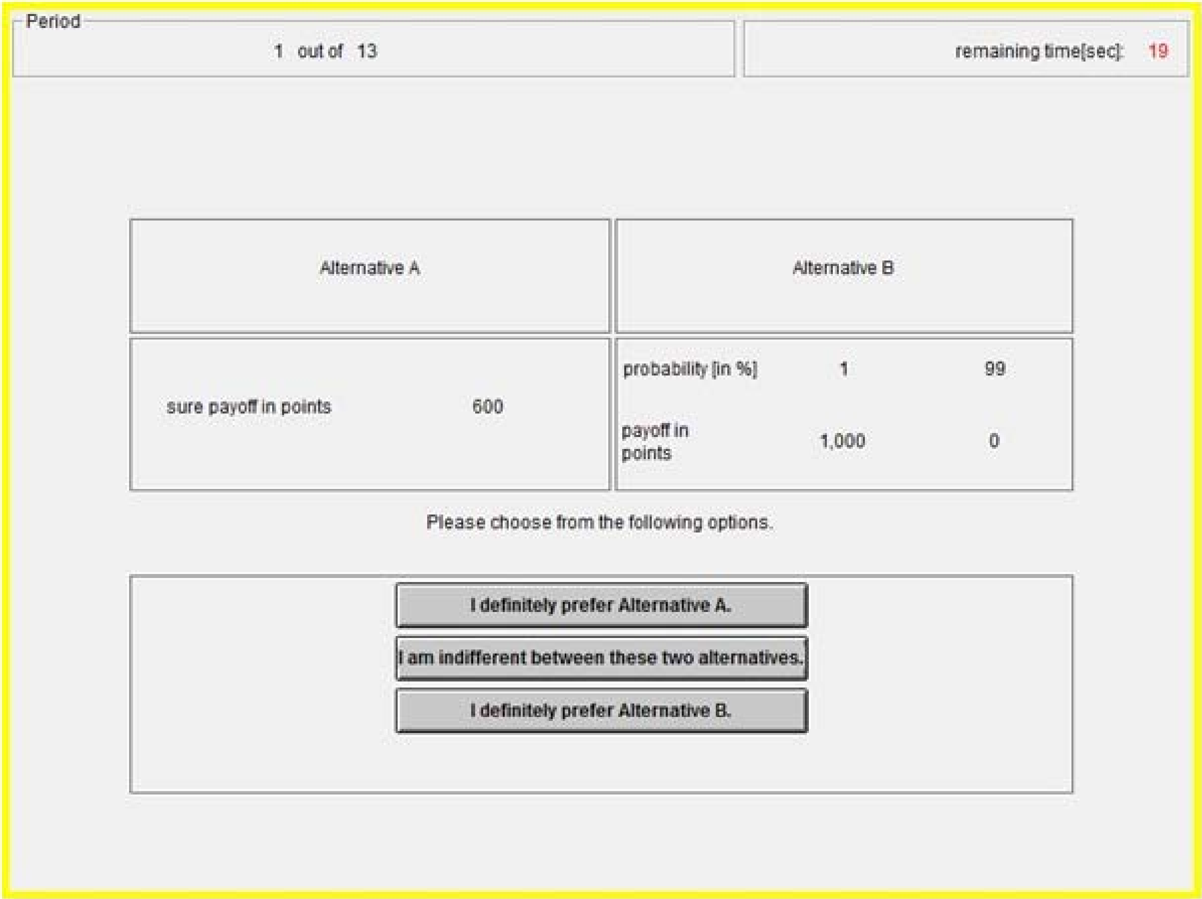

Figure 3: Screenshot of the decision-screen shown to each subject

Tables

Table 1
Eliciting players' risk attitudes

No.	Alternative A (secure payoff)	Alternative B $[0,(1-w);1{,}000,w]$	
1	600 Points	.99	.01
2	600 Points	.95	.05
3	600 Points	.90	.10
4	600 Points	.80	.20
5	600 Points	.70	.30
6	600 Points	.60	.40
7	600 Points	.50	.50
8	600 Points	.40	.60
9	600 Points	.30	.70
10	600 Points	.20	.80
11	600 Points	.10	.90
12	600 Points	.05	.95
13	600 Points	.01	.99

Table 2
Switching points of the 64 players who employed a threshold strategy

No.	Alternative A	Alternative B $[0,(1-w);1{,}000,w]$		No. of players who switched from Alternative A to Alternative B	No. of players who switched from Alternative B to Alternative A
1	600 Points	.99	.01	0	0
2	600 Points	.95	.05	0	0
3	600 Points	.90	.10	0	0
4	600 Points	.80	.20	0	0
5	600 Points	.70	.30	1	0
6	600 Points	.60	.40	1	0
7	600 Points	.50	.50	13	0
8	600 Points	.40	.60	13	0
9	600 Points	.30	.70	20	0
10	600 Points	.20	.80	8	0
11	600 Points	.10	.90	6	0
12	600 Points	.05	.95	2	0
13	600 Points	.01	.99	0	0

Table 3
Chosen alternative and switching point

No.	Alternative A	Alternative B $[0, (1-w); 1{,}000, w]$		No. of players who chose A	No. of players who chose B	No. of indifferent players
1	600 Points	.99	.01	63	5	4
2	600 Points	.95	.05	67	3	2
3	600 Points	.90	.10	68	3	1
4	600 Points	.80	.20	70	1	1
5	600 Points	.70	.30	68	2	2
6	600 Points	.60	.40	68	4	0
7	600 Points	.50	.50	52	12	8
8	600 Points	.40	.60	42	12	18
9	600 Points	.30	.70	18	42	12
10	600 Points	.20	.80	9	55	8
11	600 Points	.10	.90	3	68	1
12	600 Points	.05	.95	1	70	1
13	600 Points	.01	.99	0	72	0

Table 4
Chosen alternative in the Corruption Game

Period No.	No. of players who chose A	No. of players who chose B	No. of indifferent players
1	9	27	0
2	10	26	0
3	5	31	0
4	7	29	0
5	8	28	0
6	4	32	0
7	5	31	0
8	8	28	0
9	4	32	0
10	8	28	0

Table 5
Chosen alternative in the Modified Corruption Game

Period No.	No. of players who chose A	No. of players who chose B	No. of indifferent players
1	14	22	0
2	12	24	0
3	18	18	0
4	16	20	0
5	16	20	0
6	12	24	0
7	14	22	0
8	16	20	0
9	14	22	0
10	18	17	1

Table 6
Means of the elicited beliefs of obtaining the higher payoff (Modified Corruption Game)

Period No.	Means of the beliefs of players who chose A	Means of the beliefs of players who chose B
1	.28	.67
2	.28	.71
3	.25	.75
4	.21	.71
5	.26	.67
6	.15	.73
7	.17	.69
8	.31	.76
9	.26	.76
10	.25	.84
Mean of all rounds	**.24**	**.72**

Table 7:
Regression coefficients to predict decisions based on risk attitudes and beliefs and to predict beliefs in T + 1 based on risk attitudes and beliefs in T

Explanatory variables	**Logit regression on *decision*** Risk attitude		Beliefs		**Regression on *belief* in T + 1 (regression)**	
Risk Attitude	-1.89	(.51)	-	-	0.12	(.22)
Belief	-	-	6.17	(.00)	0.70	(.00)
Players convicted in T-1	-1.89	(.99)	0.27	(.28)	-0.00	(.90)
Self not convicted in T-1	-0.00	(.00)	2.61	(.00)	0.12	(.00)
Treatment	-2.62	(.00)	-	-	-	-
Constant	6.23	(.02)	-3.92	(.00)	0.02	(.79)
Wald overall χ^2	33.62		59.25		-	
R^2	-		-		0.12	
Observations n	566.00		323.00		306.00	

Notes: p-values in parentheses