

# Do oaths of office trigger social behaviour? An experimental analysis of institutionalized promises

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## **Abstract**

Codes of conduct and oaths of office are widely used in practice, but surprisingly little research has been done on their effect on human behaviour. In this study we analyse the commitment effect of these institutionalized promises. By a lab experiment we tie in with existing experimental studies on the effect of promises. Rather than looking on one-to-one interactions, like the previous studies, we examine the effect of promises in a social dilemma situation over time. Our promise is addressed to a group, institutionalized and valid for a period of time. Our results suggest that if a institution gives the voluntary option to subscribe to a code of conduct the more social individuals self-select themselves into the option. But the commitment leads in addition to a longer maintenance of social behaviour of the oath-takers.

**keywords:** voluntary, oath, promise, public good game, moral commitment

# 1 Introduction

Oath and code of conducts are said to be an effective instrument to fight fraud and selfish behaviour in economic activities. The idea is to strengthen/awaken moral feelings and support socially oriented behaviour instead. Traditionally we know oath from professions that are responsible for the welfare of a greater society. The Hippocratic oath for doctors, the oath of office for presidents, politicians, judges or civil servants to name only a few examples. The person in charge acts as an agent, making decisions regarding the well being of others. The decision making process is conflicted by the need to serve the interest of the common and temptation of maximizing the own benefits. A doctor can either prescribe the most helpful and cost effective treatment or the treatment, for which he gets a nice holiday from the pharmacy industry. A politician can either vote for policies that help the society in the long run or he/she can promote measures that will ensure the re-election. Corrupt policemen, bribable judges, interest driven clerks are all examples for office fraud. And since the financial crisis (GFC) the idea of moral commitments became even popular in the banking and management sectors. Recently a banker oath was in the public discussion, to encourage “(...) *bankers to take into account the impact of their activities on the wider economy and on society, rather than focusing on making a short-term profit.*” (Webb, 2010)<sup>1</sup>. Codes and oaths have nowadays also found their way into M.B.A. programs of several Business Schools. Whereby the realization differs. Graduates at the Harvard Business school can decide if they want to pledge the oath at the end of their study. Students at Columbia must swear to honour the code. In both cases the graduate commits himself to serve as a business manager the ‘greater good’ of the society. While social psychology suggest that a commitment is stronger when self-determined (Kiesler, 1971), the question arises if a voluntary oath is nothing else than the separation of social oriented from egoistic agents.

Given the increase in the application of oaths and codes of conduct<sup>2</sup>, it is surprising that little research has been done. There is a paucity of such studies in Psychology and Behavioural Economics. Characteristic for all

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<sup>1</sup>The Netherlands established was the first country to implement a code of conduct for bankers Since 2010 all Dutch bankers are subject to this Bank Code where requires every banker to declare the following oath before entering the profession. *I declare that I will perform my duties as a banker with integrity and care. I will carefully consider all the interests involved in the bank, i.e. those of the clients, the shareholders, the employees and the society in which the bank operates.”*

<sup>2</sup>An introduction of oath and codes in economics and business with the examples from above can be found by de Bruin and Dolfsma (2013).

oaths and codes is the institutionalized promise; a commitment to the public that an officeholder has pledged to serve Boatright (2013). The oath-takers declare their intention to serve the common good in the future. The promise aims to overcome the conflict of interest, in which the agent feels while doing the exercise of its office.

Our study analyses the effect of an institutionalized promise in a social dilemma situation. We work with a voluntary public statement about the agent's intention in an abstract economic experiment. Two main questions are driving the investigation: Does a voluntary oath really affect the decision making, or do we observe nothing else than a simple selection process? Second, can an oath keep its effectiveness over time? How does the tension between swearing an oath and living up to it develop over time?

The main difference to existing promise studies, is that our oath is directed towards a group, the players are interacting with each other over several periods, the oath is valid for the entire time. Studies which particularly address oaths are using the oath as a research tool to encourage subjects to reveal their real preferences. The experiments show that the oath is able to eliminate hypothetical bias<sup>3</sup>. The subjects reveal as a consequence more often their real preferences. The researcher tested also the effect of an oath on communication in a follow up study. They gave again the possibility to pledge a solemn oath before playing the game with cheap talk communication. And indeed the coordination increased significantly, due to the fact that communication was and got treated more truthful. But the effect of the oath is restricted on the communication channel, in a treatment without communication no change in the behaviour due to the oath can be found (Jacquemet et al., 2013b). The participants interpret the promise from the solemn oath only in regards to communication. Our study in contrast uses the oath as an outlines of social future behaviour. Existing studies on promises provide empirical evidence that promises can be effective commitment device to foster coordination (Gneezy, 2005; Charness and Dufwenberg, 2006; Ellingsen and Johannesson, 2004; Vanberg, 2008; Sánchez-Pagés and Vorsatz, 2007). Subjects experience internal costs from promise breaking and keep in consequence their word, even if this means waiving potential material gains. Promises are thereby defined as non-binding, cooperative statement, which are made ex ante and shall initiate a change for the beliefs of the exchange partner, so that the exchange can be relied upon. All of the studies

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<sup>3</sup>Hypothetical bias describes a lack of commitment to telling the truth. This becomes relevant when the real economic value of a good is surveyed. Often due to the hypothetical nature of surveys responses are significantly greater than actual payments, e.g. willingness to pay for environmental protection (Jacquemet et al., 2013a).

focus in their analysis on single one-to-one interactions<sup>4</sup>. Whereas the participants in our study have to do repeated investment decisions in a group environment and the promise is, contrary to previous studies, valid for the entire period of time. One exception is noteworthy to mention: In Camera et al. (2012) the subjects have the possibility to pledge in an indefinitely repeated prisoners dilemma: participants can send a message to a subgroup before starting to play. The results suggest that such a message does not increase cooperation and might even backfire. The possibility to make the promise binding got used very frequently in their experiment and caused a hold up problem, by which the communication became inefficient.

We provide empirical evidence that a voluntary oath option about can lead to an increase in cooperation, driven by the agents who decide to commit to the oath and live up to it. The non-oath-takers do not get affected by the introduction of the oath. However a pure oath is not able to stop the declining dynamic of contributions over time. Whereas combining the oath with a punishment option stops the deterioration of contributions, but at the same time the efficiency gains get depleted by excessive punishing behaviour.

## 2 Experiment

To investigate the decision dilemma between maximizing your own interest and acting in favour of the common we use a public good game. Subjects have to decide whether to contribute to a common project or to keep the endowment for themselves. A social optimum outcome can be reached if all players contribute to the common project, but the personal dominant strategy is to free-ride. Our experiment is divided in three sections. The first section serves as baseline, the subjects play the standard public good game for 10 rounds. Individual differences and learning effects can be captured. Before the second section starts subjects have the possibility to pledge a statement about their intended behaviour in the future. The statement is valid for the entire section, costless and without consequences onto the game structure. The players decide if they want to pledge the statement or not before entering the second section. In a third section, players have the possibility to punish each other.

The experiment was conducted between November 2012 and April 2013 with the experimental software CORAL(Schaffner, 2013). Participants were students from the Queensland University of Technology, recruited with the online recruitment system ORSEE(Greiner, 2004). The experiment consisted of three sections and lasted for about an hour. Each session had 16 subjects.

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<sup>4</sup>trust game or proposer-responder game; one shot

Table 1: Experimental Design Oath

	<b>CONTROL</b>	<b>CONTROL PUNISH</b>	<b>OATH + PUNISH</b>
<b>first stage</b>	baseline	baseline	baseline
<b>second stage</b>	baseline	baseline	oath option
<b>third stage</b>	baseline	punish	oath + punish

The participants were divided in groups of four and the group composition stayed the same for each section. Before the the subjects could start the experiment, they had to answer comprehension questions. After each section new groups were matched together. A perfect stranger matching was guaranteed.

In the first section subjects played the standard public good game (Fehr and Gächter, 2000). Each round contained a decision stage, in which the subjects decided how many ECUs of the endowment to contribute to the public good<sup>5</sup>. To control for beliefs we asked subjects subsequently for their first and second order beliefs about the other players' contributions<sup>6</sup>. The participants received feedback about each individual contribution in the group after each round<sup>7</sup> and their potential round payoff<sup>8</sup>.

<sup>5</sup>Following payoff function applies:

$$\pi_i = \omega_i - z_i + a * \sum_{j=1}^n z_j \quad (1)$$

with  $\omega = 20$ ,  $a = 0.4$ ,  $n = 4$

<sup>6</sup>Belief elicitation was incentivized with following formula

$$10 - \sqrt{2}(\text{belief} - \text{actualentry}) \quad (2)$$

<sup>7</sup>Croson (2001) found that feedback about each single players' contribution compared to information about the total contribution does not change the average contributions. But individual feedback causes significantly higher variances in contributions. Also Fehr and Gächter (2000) do not find a difference in contribution levels for feedback on a average level and feedback that displays the entire contribution vector. We elicit the beliefs in all sections and all treatment groups.

<sup>8</sup>To determine the payments for the decision choice and the accuracy of the beliefs, three rounds got at the end of each section randomly selected. Thus we minimize wealth effects and prevent hedging within in the section. There is no consensus whether or not

Before entering the second section subjects had opportunity to pledge a statement about their intended behaviour. The statement declared the player will contribute a minimum amount to the common project in each round of the second section. The text was predefined and described as social behaviour in the given situation<sup>9</sup>. *I promise to contribute each round at least 15 ECUs to the project.* It was costless to make the statement and subjects could choose if they wanted to do so. Those who decided to make the statement, had to type down the statement and were labelled throughout the next section<sup>10</sup>. After subjects finished the typing, they got informed who in their group pledged the statement. 10 rounds of the standard public good game followed.

The third section gives the players additionally a possibility to punish the other players, after they learnt how many ECUS everyone contributed to the common project<sup>11</sup>. We added this feature to test how strong social norm enforcement is in such a context. After each round subjects learnt the aggregate of punishment points imposed on them by the other group members<sup>12</sup>.

## 2.1 Experimental Results

The data comprises 8 sessions with 16 subjects each. In four sessions subjects played the following sequence: baseline- oath- oath/punish. Two sessions included a pure baseline with the standard public good game over all sections: baseline-baseline-baseline. Two other sessions controlled for the effect of punishment, with a punishment option in the last section: baseline-baseline-baseline/punish. Each session consisted of 3 sections with 10 rounds, that sums up to a total of 3840 decisions.

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subjects change their behaviour when only one random period gets paid out. But Anderson et al. (2008) show that doing so, does not change the fact that contributions in a public good game are still deteriorating over time.

<sup>9</sup>The exact wording of the introduction can be found in the appendix.

<sup>10</sup>By letting the subjects type down the statement, we hoped to initiate a higher commitment than with pure clicking. The typing is comparable with speaking an oath. Subjects who decided not to pledge the statement, also had to type in a text. This text was already introduced in the first section and was an agreement to participate in the experiment, the length of the sentence was similar to the statement. It was therefore difficult to identify who in the room pledged a statement and who not.

<sup>11</sup>Up to 5 punishment points could be distributed to each player. Received punishment points decreased the period income by a double. The cost for a punishment point was 1 ECU each and was paid from the income out of the contribution stage.

<sup>12</sup>A table with the costs and the effect of the punishment points can be found in the appendix.

### 2.1.1 The effect of the statement

At the beginning of the second section subjects could choose if they wanted to pledge a statement about their intended behaviour in the second section. The oath is voluntary, costless and does not have any consequence on the later game. Further it is explicitly stated that the promise is valid for the entire second section. 47% of the subjects in the treatment group decided to take the oath<sup>13</sup>. Subjects in the oath group contribute more on an aggregate level than subjects in the control group. The average contribution increased by more 30% in the treatment group compared to the control group and by 17% compared to the first section within the treatment group. Testing with a Mann Whitney U Test reveals statistically significant results: Control vs. Treatment within Section2 :  $Z = -6.303$ ,  $p < 0.001$  and Section 1 vs. Section2 within Treatment group:  $Z = -4.016$ ,  $p < 0.001$ .

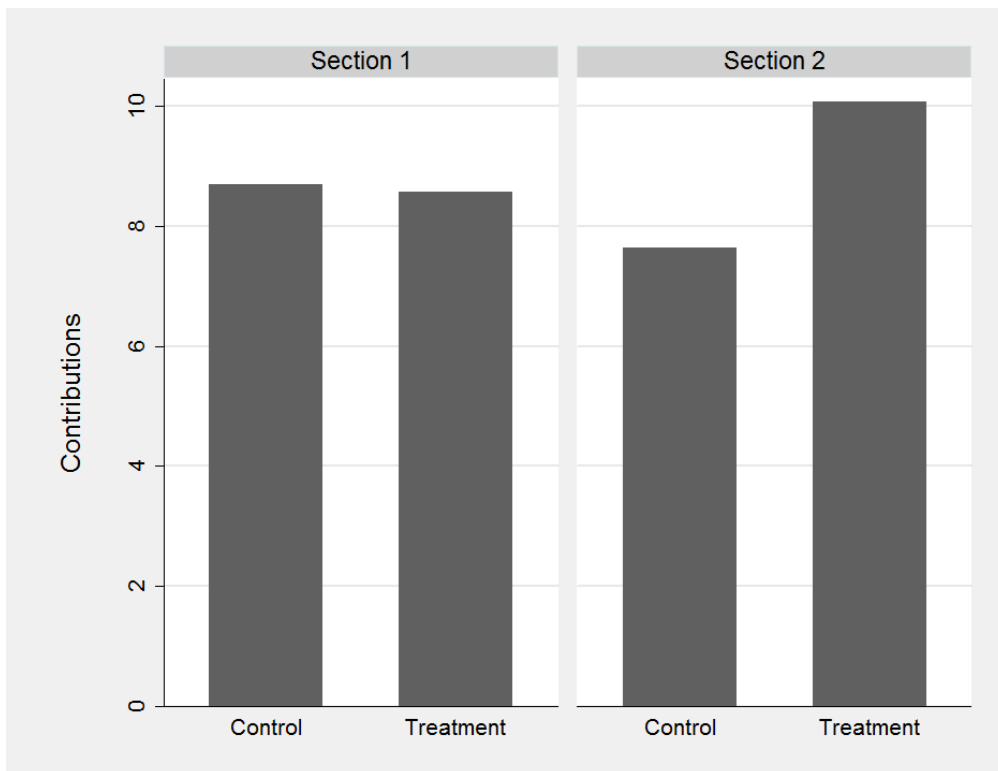


Figure 1: Comparison in Contributions

<sup>13</sup>An interesting difference to Jaquemet's oath experiments, in which more than 95% of the participants pledged the solemn oath.

**Time dynamics** Previous studies showed that a promise can effectively increase cooperation in single one shot interactions. But no study, to our knowledge, controlled how the commitment effect develops over time. Our design allows to control for temporal development. Typically cooperation declines over time in repeated public good games in repeated settings. People are on average imperfect conditional cooperators, who indulge after some time the free riding incentives. Thus voluntary cooperation is inherently fragile (Fischbacher and Gächter, 2010). In the baseline section we observe the decline of contributions consistent with previous public good studies. The group re-matching and the introduction of the second section caused a restart effect in all groups, which increases contributions again. Additionally we observe a upward shift in the treatment group. While contributions are still deteriorating in the treatment group, the shift remains over time. Cooperation is always higher in the treatment group <sup>14</sup>. DISCUSS: If we control for single group dynamics by clustering on group levels, then the oath effect on an aggregate level is not significant any more. But by clustering we are also taking out the differences in oath-takers. One group has 1 oath-taker another 4 ( DISCUSS). Related Regressions can be found in the appendix.

**Result 1:** *The voluntary oath is able to increase cooperation on an aggregate level. The oaths does not stop the declining dynamic of contributions, it only lifts contributions up to a higher level.*

**Oath-takers** According to economic standard theory, subjects should always make the oath, if they believe that they can though change the beliefs of the other players. While benefiting from the higher contributions of the other players, they freeride on the common project. However we do not find support this in our data. Half of the subjects take the oath, but also get affected by it. Oath-takers contribute more to the common project. We therefore distinguish in further analysis between subjects who pledged the statement , oath-takers, and subjects who decided not to pledge the statement, non-oath-takers. The two groups are noticeable different from each other. Subjects who contributed for instance more in the first section, are more likely to pledge a statement. Regressions with demographic characteristics of the oath-takers can be found in the Appendix.

48% of the subjects in the treatment group are oath-takers, 31 subjects in total. The contribution level of these players is significantly different to

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<sup>14</sup>The graph displays fitted values without session 8. In session 8 contributions increased over time in the first section, under the same experimental procedure. This can happen due to different group dynamic. The latter treatment effect is not affected by this, and all parametric tests include session 8. We decided to exclude it for the graph to avoid confusion. However the same graph with session 8 can be found in the appendix.



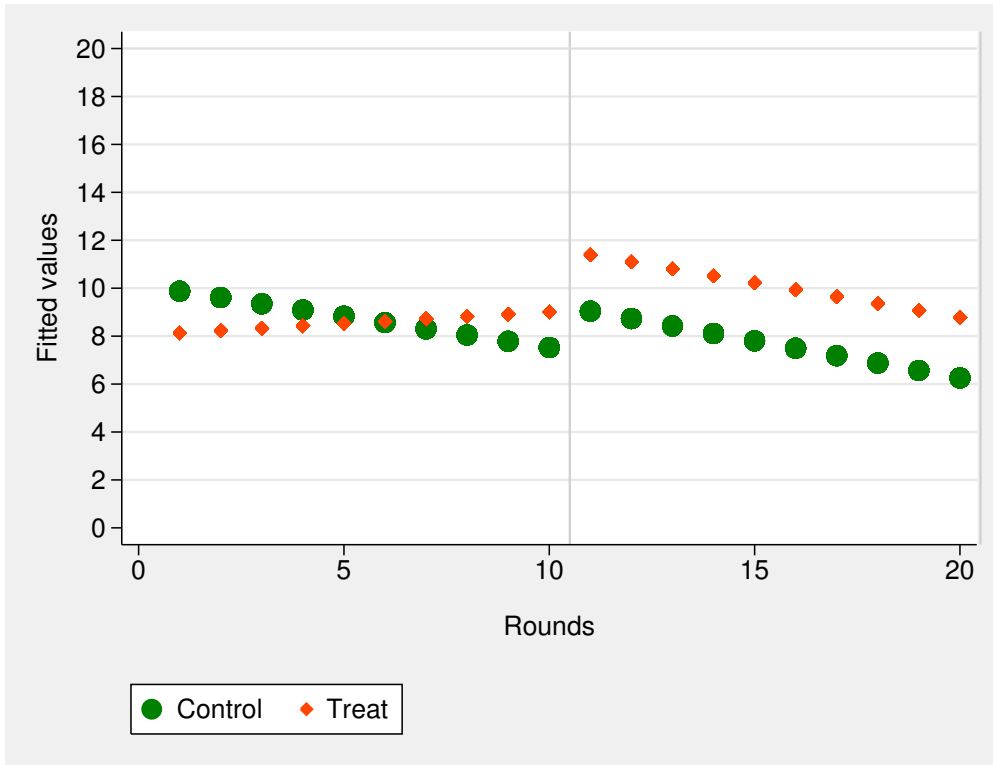


Figure 2: Fitted values

the non-oath-takers in the second section ( $Z = -9.72, p < 0.001$ ). The average contribution for oath-takers is 12.82 ECUs, whereas the contribution of the non-oath-takers is 7.60 ECUs. These subjects, who decided not to take the statement, are behaving very similar to the subjects in the control group, average contribution 7.64 ECUs. Though the contributions increase is exclusively created by the oath-takers. Subjects who decided not to take the statement do not change their behaviour. An interesting finding, as such a statement is a kind of moral framing for the situation. It provide a reference point for “good behaviour”. But the data demonstrates that only subjects get affected who have chosen to pledge the statement.

**Result2:** *The treatment effect is driven by those who committed themselves to the statement, the oath-takers.*

The treatment effect consists of two components: a selection effect and a commitment effect. We observe that subjects who take later the oath, are contributing already more in the baseline situation. Non-oath-takers contribute on average 7.56 ECU (sd 5.11) , the oath-takers contribute 9.65 (sd 6.53) on average. A significant difference ( $Z = -4.13, p < 0.001$ ) , that sug-

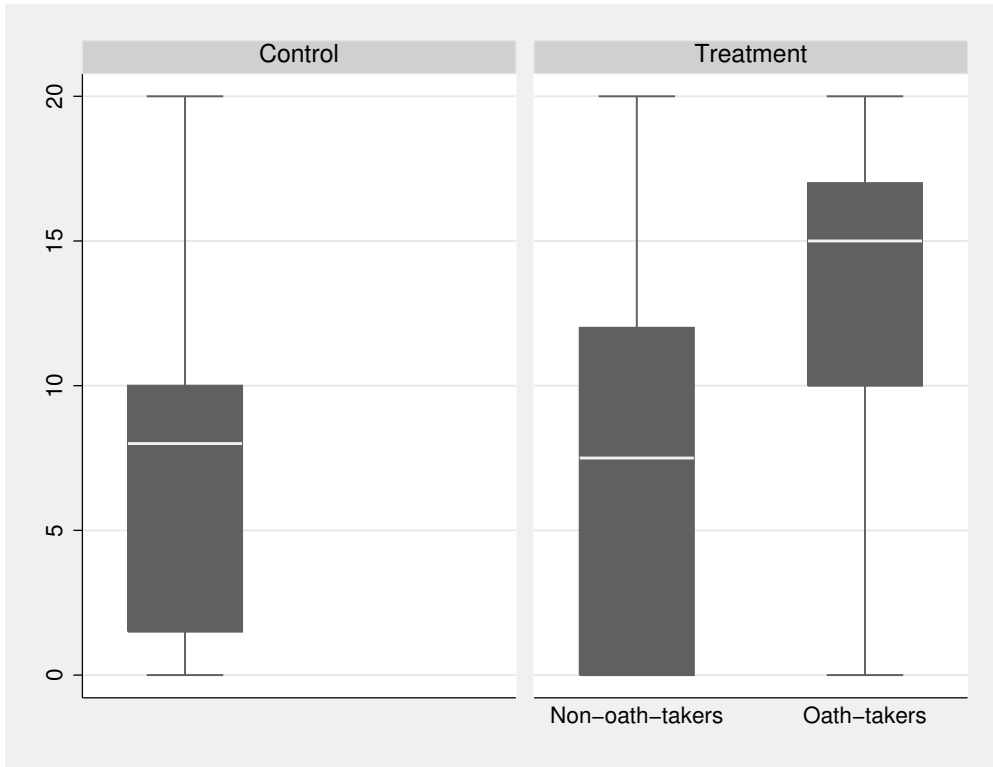


Figure 3: Contributions Section2

gests different types of players.

**Result 2a:** *Subjects who decide to take the voluntary oath are already high contributors in the first section. We call this selection effect.*

But additional to the selection effect we also observe a commitment effect. the oath-takers significantly increase their contribution in the second section due to their made promise ( $Z = -6.14, p < 0.001$ ). The promise literature sees guilt aversion as a possible reason for promise keeping. People raise others' expectations by making a promise. When it is the turn to fulfil the expectations and they do not want to let down the other person. We find support for this explanation in our data. Players expect higher contributions from a player that pledged the statement, and the oath-takers anticipate correctly the higher expectations (second order beliefs) and act according to them (higher contributions). To measure the pure effect of the statement in regards of others' expectations, we look only on the first round of the second section. This is the first interaction when the new group got matched together. Players are therefore not able yet to predict the other players' be-

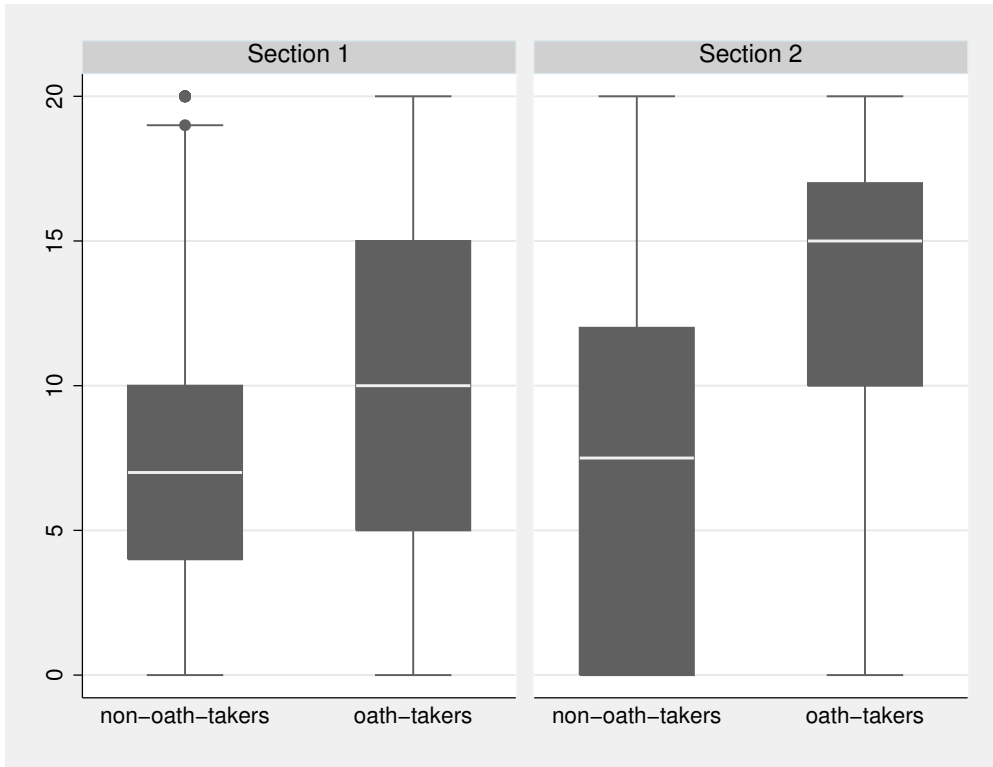


Figure 4: Contributions Oath-takers

haviour based on history. In the table below the expectations from the other players, the own second order beliefs and the actual contributions are listed.

**Result 2b:** *Oath-takers show higher contributions due to their promise. They believe that the other group members expect higher contributions from them. We call this commitment effect.*

Expectations are higher in the treatment group as in the control group<sup>15</sup>, ( $Z = -3.75, p < 0.001$ ). The expectations are higher towards the oath-takers, but also from the non-oath-takers the other players expect higher contributions in the treatment group. The introduction of the statement influences the beliefs though, not the actions. The second order beliefs in contrast are only higher for the oath-takers, they believe that the others expect a significantly higher contribution from them ( $Z = -5.58, p = 0.000$ ). Thus they contribute more in consequence. Analysing temporal dynamics a deterioration is even recognizable for the oath takers. In the first round of the second section the

<sup>15</sup>The Mann Whitney test is only for the first round of the second section, but if done for the entire section, the results do get stronger.

Table 2: Beliefs

	<b>Control</b>		<b>Treatment</b>	
			non-oath-taker	oathtaker
<b>expectation of others</b>	9.12 (3.02)		10.54 (3.35)	12.00 (2.72)
<b>second order belief</b>	8.90 (5.30)		8.32 (3.53)	14.10 (3.62)
<i>corr. coef.</i>		<i>0.64</i>	<i>0.73</i>	<i>0.69</i>
<b>real contribution</b>	8.98 (6.54)		8.21 (3.82)	14.39 (5.39)

average contribution is on the the dynamic over time is on the promised minimum with 15 ECUs. Over the time contributions decline. The oath is not able to stop the decline of contributions. The contributions of oath-takers even decrease marginally steeper than the contributions of the other subjects ( $p = 0.07$ ).

**Result 3** *The oath is not able to stop deterioration over time, the contributions of the oath-takers even decrease slightly steeper.*

**Promise-Breaking** As contributions decline over time, also the promise keeping rate declines. Later in the section oath-takers break more frequently their promise. While 87% of the oath-takers contribute the minimum of 15 ECU's in the first round, only 52% contribute the promised level in the last round of the second section. Thus making a promise does not mean necessarily keeping a promise. Promise keeping is a function of outweighing material gains from deviation and internal costs from braking the promise. But Hurkens and Kartik (2009) also suggest type based difference. In their study they identify two types of promise makers. The idealistic promise maker, who cares about the promise and will keep it, no matter to which cost. And the opportunistic promise maker, who uses the promise as a signal to change other's beliefs, but breaks the promise as soon as it is beneficial for him. By separating oath takers , who always keep the promise from those who sometimes kept the promise, we gain interesting insights. 45.1 % of the oath-takers keep the promise in all rounds. The others decrease their contri-

Table 3: Regression table: dynamics section 2

Contributions	
Round	-0.253** (0.0813)
Treat	-3.002 (2.117)
Statement	10.73*** (2.511)
Treat*Round	0.103 (0.134)
Statement*Round	-0.351* (0.159)
Constant	11.93*** (1.282)
Observations	1560
Adjusted $R^2$	0.097

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

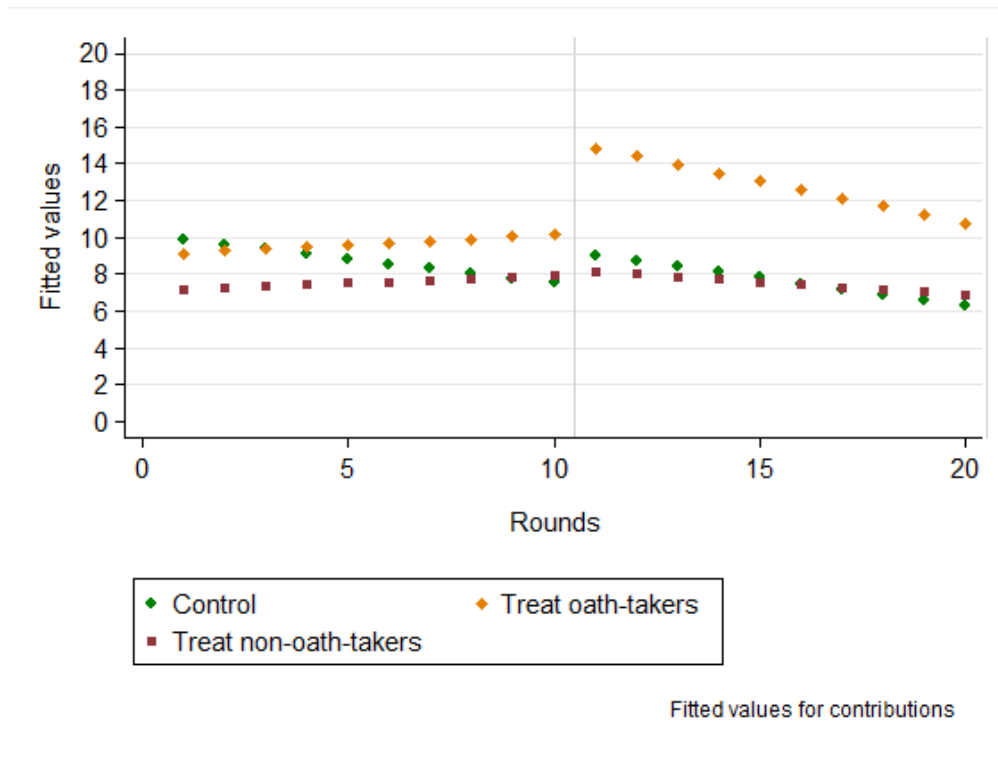


Figure 5: Dynamic oath-takers

butions over time. Interestingly separating these two types and looking on the behaviour in the first section, we see that the high contributors in the first section, were actually the all-time promise-keepers. The oath-takers who kept the promise in the first round, but then broke it, did behave in the baseline section not differently to the non-oath-takers. This finding suggests that these players are the opportunistic promise makers, who used the oath as a cheap talk signal. These players are also causing the deterioration of contributions<sup>16</sup>.

**Result 4:** *We identify two different types of oath-takers, those who keep their promise all time and the opportunistic oath-takers who deviate in time more and more from the promised level of contributions. These are the ones who are causing the deterioration in the contributions of the oath-takers.*

Figure 6: Promise Keepers

<sup>16</sup>A demographic analysis of promise-keepers can be found in the Appendix

**Punishment Option** The last section gives the subjects the possibility to punish the other players after they learnt how many ECUs everyone contributed to the common project. Each player could sanction the other players with maximal 5 points, to a cost of 1 ECUs and an reducing effect of 2 ECUs. Punishment was therefore costly and linear. The driving source behind the punishment option was to test the strength of norm enforcement in promise-keeping. We control for the pure punishment effect with a control group in which we introduce the sole punishment option in the last section. The contribution in the control punishment group stop deteriorating, this trend is significantly different to the control group. Means punishment is an effective tool to stop the cooperation decline. However the oath punishment group does not show a significantly different trend over time than the pure punishment group. The contribution level experienced an upward shift, but the trend over time is similar<sup>17</sup>. It seems that the oath does not interact with the punishment option. Also the contribution dynamic of oath takers and non-oath takers is exactly the same as before in the second section.

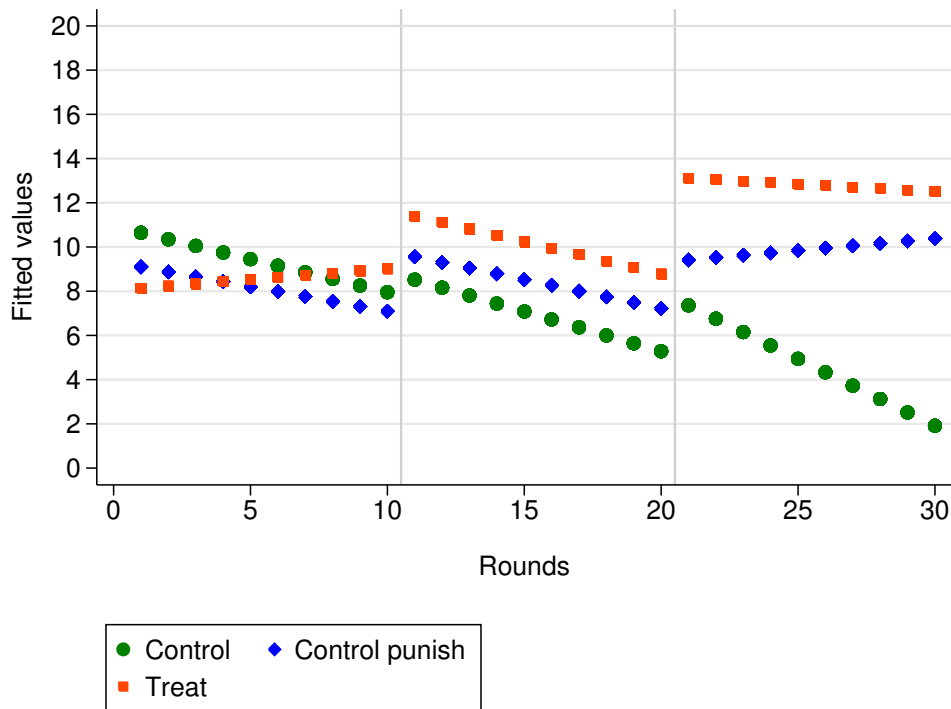


Figure 7: Section3

<sup>17</sup>Regressions are in the Appendix

Our question was whether oath-takers get harsher punished for the same contribution than non-oath-takers. We do not find support for this hypothesis on an aggregate level. People punish significantly more in the treatment group than in the control group. But clustering the average punishment points on contributions level we do not see a difference in punishment for low contributions between oath-takers and non-oath-takers. By looking only on contributions the real dynamic is not make visible. Then players who contributed a lot to the common project punish those player who contributed less, on the other hand these low contributors punish also the high contributors. The oath enhances this effect. If a player pledged the oath, but contributes less than promised he gets more punished than someone who did not take the oath, by high contributors. Especially when the punisher also pledged; these players enforce the norm of promise keeping. Sánchez-Pagés and Vorsatz (2009) found similar punishment behaviour. Subjects who punished with a high probability after being deceived were precisely those who sent before truthful messages. But our story can also be told in a different way; if a high-contributor faces a low contributor he is less likely to get punished if he pledged the oath. The oath serves as a justification for the 'too' good behaviour.<sup>18</sup>

Two groups exist, low and high contributors who punish each other for the equivalent behaviour in the game. If a low contributor is identified by a high contributor as an oath-taker, he gets significantly harsher punished. The effect is stronger when the opponent is an oath taker as well.

**Result 4a:** *The oath leads to norm enforcement- more punishment - from the high contributors' perspective.* Contrary if a high contributor is revealed as an oath-taker by a low contributor, his behaviour is more justified and he gets punished less.

**Result 4b:** *The oath serves as an explanation of too good behaviour form the low contributors' perspective, and leads to less punishment.*

From a policy perspective we want to consider that punishment is costly: punishing as well as receiving punishment points. However we can see the highest average payoff with the oath and punishment option, the results are not robust. Subtracting the costs of punishment reveals that the oath option is actually more efficient. While the payoffs in the control group deteriorate, are the payoffs in the oath option significantly higher ( $Z = -4.59$ ,  $p < 0.001$ ). After incorporating the punishment costs, no significant difference can be observed any more between the control punish and the oath

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<sup>18</sup>The exchange with player 1 is chosen for the analysis of the punishment behaviour. Robustness checks were made also with the data of player 2 and player 3, the main results are consistent. See regressions in the appendix



punish group. The positive effect of the oath implementation is extinguished by extensive punishment behaviour.

**Result5:** *The pure oath option is the most efficient policy in enhancing group payoffs. Whereas the combination of oath and punishment is able to increase the contributions significantly, the punishment costs burn off the additional gains.*

Figure 8: Payoffs Section 1 & 2

Figure 9: Payoffs Section 3

### 3 Conclusion

The aim of this study was to analyse the commitment effect of an institutionalized promise over time. Our results suggest that a voluntary oath motivates a selection process. But in addition the oath-takers are initiated to behave more socially. We observe two types of oath-takers, the opportunistic promise makers who deviate over time more from the promise and the idealistic promise makers, who live up to their statement. The oath does not interact with the decline over time neither with a punishment option. The oath generates an upward shift in cooperation, but no change in the dynamic. The findings suggest that a policy design should take care of the opportunistic oath-takers who get distracted by potential material gains after some time. Controls and an automatic punishment mechanism can help to keep them on track. Nevertheless should idealistic oath-takers who live up to their promise, should be honoured. An endogenous punishment options are not favourable, it results in excessive punishment behaviour between the different types. conclusions for real world applications are restricted as our design implements a voluntary oath. Most oath of office in real world are compulsory. Theories in social psychology Kiesler (1971) as well as a study from (Charness and Dufwenberg, 2010) suggest that the commitment effect of a promise is heavily minimized, if the promise making is not self determined. it is the aim of future research to investigate the difference between compulsory and voluntary oath of office and their impact on agent's behaviour.

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## 4 Appendix

### 4.1 Oath effect

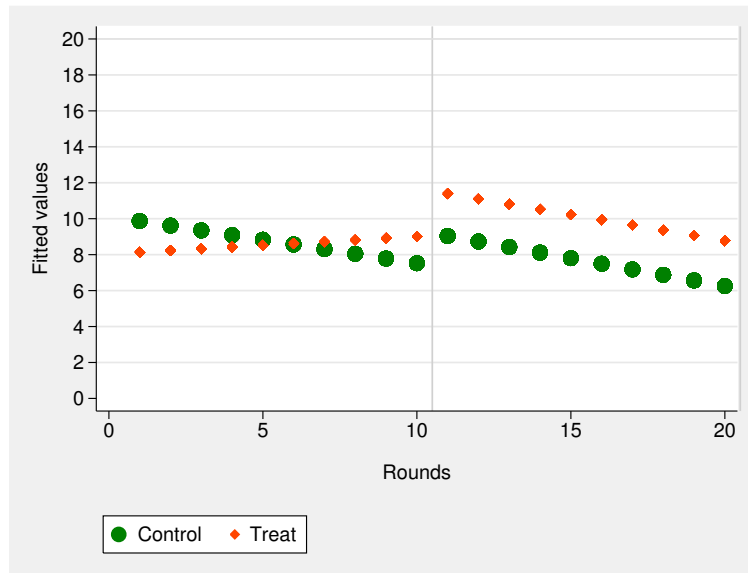


Figure 10: Fitted values, all sessions included

Table 4: Regression: Oath effect

	(1)	(2)	(3)	(4)
	Contrib	Contrib cl	Contrib	Contrib cl
Section 2	-1.050** (0.359)	-1.050 (1.271)	-1.050*** (0.292)	-1.050 (0.614)
Treat	-0.127 (0.359)	-0.127 (1.122)	-0.0194 (0.292)	-0.0194 (0.171)
Treat * Section 2	2.563*** (0.507)	2.563 (1.804)	2.563*** (0.413)	2.563* (1.016)
avg. Contrib in Section 1			1.031*** (0.0410)	1.031*** (0.0671)
avg. Pot in Section 1			-0.0460*** (0.0131)	-0.0460* (0.0218)
Constant	8.698*** (0.254)	8.698*** (0.983)	1.330*** (0.353)	1.330* (0.624)
Observations	2560	2560	2560	2560
Adjusted $R^2$	0.017	0.017	0.348	0.348

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ 

Regression (2) and (4) are clustered on group level

Table 5: Regression Oath effect dynamic

	(1)	(2)	(3)	(4)
	Contrib	Contrib	Contrib	Contrib
c.Round	-0.261** (0.0878)	-0.261*** (0.0751)	-0.261*** (0.0713)	-0.261*** (0.0751)
Section 2	2.312 (1.488)	2.312 (1.748)	2.312 (1.208)	2.312 (1.413)
Section 2 *c.Round	-0.0485 (0.124)	-0.0485 (0.103)	-0.0485 (0.101)	-0.0485 (0.103)
Treat	-2.099** (0.771)	-2.099 (1.360)	-1.992** (0.626)	-1.992* (0.925)
Treat*c.Round	0.359** (0.124)	0.359* (0.170)	0.359*** (0.101)	0.359* (0.170)
Treat *Section 2	4.252* (2.104)	4.252 (2.447)	4.252* (1.708)	4.252 (2.170)
Treat *Section 2*c.Round	-0.340 (0.176)	-0.340 (0.214)	-0.340* (0.143)	-0.340 (0.214)
avg. Contrib in Section 1			1.031*** (0.0406)	1.031*** (0.0672)
avg. Pot in Section 1			-0.0460*** (0.0130)	-0.0460* (0.0219)
Constant	10.13*** (0.545)	10.13*** (0.954)	2.766*** (0.525)	2.766*** (0.733)
Observations	2560	2560	2560	2560
Adjusted $R^2$	0.028	0.028	0.360	0.360

Standard errors in parentheses

$p < 0.10$  \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Regression (2) and (4) are clustered on group level

Table 6: Regression: Oath-takers demographics

	(1) Oath-takers	(2) Oath-takers	(3) Oath-takers
Avg contrib in Section 1	0.0592* (0.0264)	0.0662* (0.0276)	0.0534 (0.0292)
Avg pot in Section 1	-0.00489 (0.0102)	-0.00882 (0.0114)	-0.00602 (0.0117)
Payoff from Section 1	0.0129 (0.0137)	0.0251 (0.0150)	0.0227 (0.0155)
Econ		-0.0109 (0.136)	-0.0635 (0.142)
Female		-0.326* (0.130)	-0.341* (0.133)
Less finsat		0.0482 (0.144)	0.0653 (0.146)
CRT		-0.0224 (0.0589)	-0.0443 (0.0623)
Less relig			0.0361 (0.0434)
SDS			0.0227 (0.0342)
Constant	-0.187 (0.391)	-0.0112 (0.556)	-0.134 (0.604)
Observations	64	56	55
Adjusted $R^2$	0.067	0.150	0.143

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Finsat: satisfaction with general financial situation, CRT: Cognitive reflection test

Relig: Frequency of visits in religious institutions, SDS: Social desirability scale



## 5 Instructions

### Instructions Section 1

You are about to participate in an economic experiment. Please read the following instructions carefully. Depending on your decisions and those made by the other participants, you can earn a substantial amount of money. It is therefore important that you take your time to understand the instructions.

Please note that all information provided during the experiment is treated confidentially. You are not allowed to communicate with the other participants during the experiment. If you have any questions now or during the experiment, please indicate this by raising your hand.

Independent of your behaviour in the experiment, you receive 5 AUD for showing up.

In the experiment we use ECUs (Experimental Currency Units) as the monetary unit. Profits during the experiment will be converted from ECUs into Australian Dollars and added to your show up fee.

The exchange rate complies

$$5 \text{ Experimental Currency Unit} = 1 \text{ AUD}$$

#### Game Structure

The experiment is divided in three sections. Each section is seen as independent and decisions from a previous section do not affect the possibilities or payments in a latter section of the experiment. At the beginning of every section the participants will be randomly matched into groups of 4. You will be therefore in a group with 3 other participants. The groups will remain the same throughout each section of the experiment.

Each section lasts for 10 periods.

#### Payment

The sections last for 10 periods. At the end of every section one round of the 10 rounds will be chosen by a random draw, which determines your payoff for this section.

## Contribution Stage

As mentioned before you will be a member of a group consisting of 4 people. At the beginning of each round each participant receives **20 ECUs** and has to decide what to do with them.

You have to determine how many of the 20 ECUs you want to contribute to a project and how many of them to keep for yourself. The consequences of your decision are explained in detail below.

$$\text{project income} = 0.4 * (\text{sum of contributions of all 4 group members})$$

The income of each group member from the project is calculated in the same way. This means that each group member receives the same income from the project.

Example: Suppose the sum of the contribution of all group members is 60 ECUs, then each group member receives an income from the project of  $0.4 * 60 = 24$  ECUs. If the sum of all contributions is 9, then every member receives an income of  $0.4 * 9 = 3.6$  ECUs from the project.

Once all the players have decided their contribution to the project you will be informed about the group's total contribution and your personal total income from this round.

## Total Income

Your total income consists of two parts. First the ECUs which you have kept for yourself and second the income from the project.

Your total income per round can be thus written as:

$$\text{total income} = (20 - \text{your contribution to the project}) + 0.4 * (\text{sum of contributions of all 4 group members})$$

You have always the option of keeping the ECU for yourself or contributing them to the project. Each ECU that you keep raises your total income by 1 ECU. Supposing you contributed this point to the project instead, then the total contribution to the project would rise by 1 ECU. Your income from the project would rise by  $0.4 * 1 = 0.4$  ECU. However, the income of the other group members would also rise by 0.4 ECU each, so that total income of the group from the project would be 1.6 points. Your contribution to the project therefore raises the income of the other group members.

On the other hand you also earn an income for each point contributed by the other members to the project. In particular, for each point contributed by any member you earn 0.4 ECU.

To make a contribution to the project, type a number between 0 and 20 in the input field. Then you have to press the Continue button. After that your decision cannot be revised anymore.

Once everyone in the group made her/his decision, you will learn how much each group member contributed to the project and what your payoff will be, if this is the round is chosen by a random draw as the payoff round.

## Practice Round for Contribution Stage

Let's practice the Contribution Stage, where you decide how you want to allocate your endowment of 20 ECUs. Please answer therefore the following questions. They will help you to gain an understanding of the calculation of your income per round.

*Remember your total income from the contribution stage is calculated as **total income** = 20 - your contribution to the project + 0.4 \* (sum of all contributions)*

1. Each group member has an endowment of 20 ECUs. Nobody (including yourself) contributes any point to the project.
  - How high is your total income ?
  - What is the income of each other group members ?
2. Each group member has an endowment of 20 ECUs. You contribute 20 points to the project at the first stage. All other group members contribute 20 ECUs each to the project.
  - What is your total income ?
  - How high is the income of each other group members ?
3. Each group member has an endowment of 20 ECUs. The other three group members contribute together a total of 30 ECUs to the project.
  - What is your total income if you contribute 0 ECUs to the project ?
  - What is your total income if you contribute 15 ECUs to the project ?
4. Each group member has an endowment of 20 ECUs. You contribute 8 ECUs to the project.
  - What is your total income if the other group members together contribute 3, 0 and 4 ECUs to the project ?
  - What is your total income if the other group members together contribute 16, 12 and 4 ECUs to the project ?

## Belief Stage

After you made your own contribution, we ask you to guess what the contribution of the other group members is. Please enter what you think the contribution of each single group member will be.

Next we ask you what you think what the other players' best guess about your contribution is. For both guesses you can also earn money. Your payoff depends on the distance between your best guess and the actual contribution of the player/ the player's guess about your contribution. The following payment rule is applied:

Your best guess is

- exactly right you receive 10 ECUS
- deviates by 1 point you receive 9 ECUS
- deviates by 2 points you receive 6 ECUS
- deviates by 3 points you receive 1 ECUs

At the end of the section one round will be randomly chosen for which you get paid for the accuracy of your guesses.

Example: Suppose your guess about Player's 2 contribution in round 6 is chosen randomly as payoff determining. Your best guess about Player's 2 contribution was 13, but his actual contribution is 12. Following the payment rule you get 9 ECUs for the accuracy of your best guess.

## Practice Round for Belief Stage

Let's practice now the belief stage, where you have to guess what the other player did. Please answer the following questions. Remember:

*If your guess is exactly right, you receive 10 ECUs from this stage.*

*If your guess deviates by 1 point, you receive 9 ECUs.*

*If your guess deviates by 2 point, you receive 6 ECUs.*

*If your guess deviates by 3 point, you receive 1 ECUs.*

*If your guess deviates by more than 3 points, you receive 0 ECUs.*

### Your best guess about the other players' contributions:

Assume Player 2's contribution has been selected as the payoff determining entry. Following the payoff rule for the belief stage (see above), you have to compare his actual contribution with your guess about his contribution.

1. Your best guess about his contribution was 12, Player 2's actual contribution was 12.

How many ECUs will you receive?

2. Your best guess about his contribution was 2, but Player 2's actual contribution was 18.

How many ECUs will you receive?

3. Your best guess about his contribution was 8, but Player 2's actual contribution was 10.

How many ECUs will you receive?

### Your belief about the others' best guess about your contribution:

Here we ask you to state what you believe about what the other players' best guess about your contribution will be. Following the payoff rule for the belief stage, you have to compare his actual guess about your contribution with your belief about his best guess.

1. Player 3's best guess about your contribution was 8, but you stated he will guess 16.

How much ECUs do you receive from the second belief stage?

2. Player 3's best guess about your contribution was 8, but you stated he will guess 7.

How much ECUs do you receive from the second belief stage?

3. Player 3's best guess about your contribution was 8, but you stated he will guess 11.

How much ECUs do you receive from the second belief stage?

## Instructions Section 2

In the second section you need to make the same decisions as in the first section. Again you have to decide how much you want to contribute from your endowment of 20 ECUs to a project and how much you want to keep for yourself.

But now you are matched with a different group of 3 people. You will remain in the same group for all rounds of Section 2.

Section 2 has 10 rounds.

This section differs slightly from what you have done so far. You have now the chance to make a statement about your intended behaviour in Section 2. The statement outlines social behaviour in the given context and is non-binding.

If you want to make the statement, you click Yes and you confirm your intention by writing down the statement in the designated box on the following page. If you do not want to make the statement you click on No.

Your decision on the statement, does not restrict your range of choices later on.

Once all the players have decided if they want to make the statement or not, you will learn who made the statement in your group.

The following statement is offered to describe your intended behaviour for the entire Second Section.

***I promise to contribute each round at least 15 ECUs to the project.***

Do you want to make this statement?[Yes,No]

Please be aware that everyone has to enter a text in the next stage, regardless if he/she made the statement or not.

You have decided that you want to make the statement. Therefore please type the statement into the designated box.

Alternatively: *I am a voluntary participant in this experiment, no coercion or interference has taken place.*



## Instructions Section 3

In the third section you need to make the same decisions as before. Once again you have the possibility to make a statement about your intended behaviour in Section 3 before you enter the contribution stage.

But now you are matched with a different group of 3 people. You will remain in the same group for all rounds of Section 3.

Section 3 has 10 rounds.

In addition you now have the possibility to decrease the earnings of the other group members after they made their contributions. (Details are explained on the next page.)

### Distributing points

Once everyone learned how much each group member contributed, you can decide if you want to reduce the income of the other group members or leave it equal. The other group member can also reduce your income if they wish to.

To reduce another player's income you have to distribute points. Each point will cost you 1 ECU and will reduce the income of the other person you assign it to by 2 ECU. If you choose 0 points for a particular group member you do not change his or her income. You can distribute between 0 and 5 points per group member .

The following table illustrates the relation between distributed points to each group member (what you pay for them) and the effect on the payoffs of others.

Table 7: Distributing Points

---

<b>cost of points for you</b>	0	1	2	3	4	5
<b>reduce of other group member's payoff</b>	0	2	4	6	8	10

---

Supposing you give 2 points to one member this costs you 2 ECUs and reduces his/her payoff by 4. The total reduction for any player depends on the points that the player received from the rest of the group. If somebody received a total of 3 points (from all other group members in this period) his or her income would be reduced by 6 ECUs.

Your total income from the two stages is calculated as follows:

**total income** = income from the 1st stage - points you receive - points you distribute

After all participants have made their decisions, your final income from the period will be displayed on the screen. Please note that your income in ECUs at the end of the period can be negative.

### Practice Questions for Points

Let's practice this new stage. Your income varies now with your distribution as well as with your receipt of points. Remember every distributed point costs you 1 ECU, every received point decreases your income by a multiple of 2.

1. You distributed the following points to your three group members:  
5, 3, 1  
- What are the total costs of your distributed points?
2. You distributed the following points to your three group members:  
0, 0, 0  
- What are the total costs of your distributed points?
3. You received a total of 0 points from the three group members.  
- By how many ECUs will your income from the first stage be reduced?
4. You received a total of 8 points from the other three group members.  
- By how many ECUs will your income from the first stage be reduced?

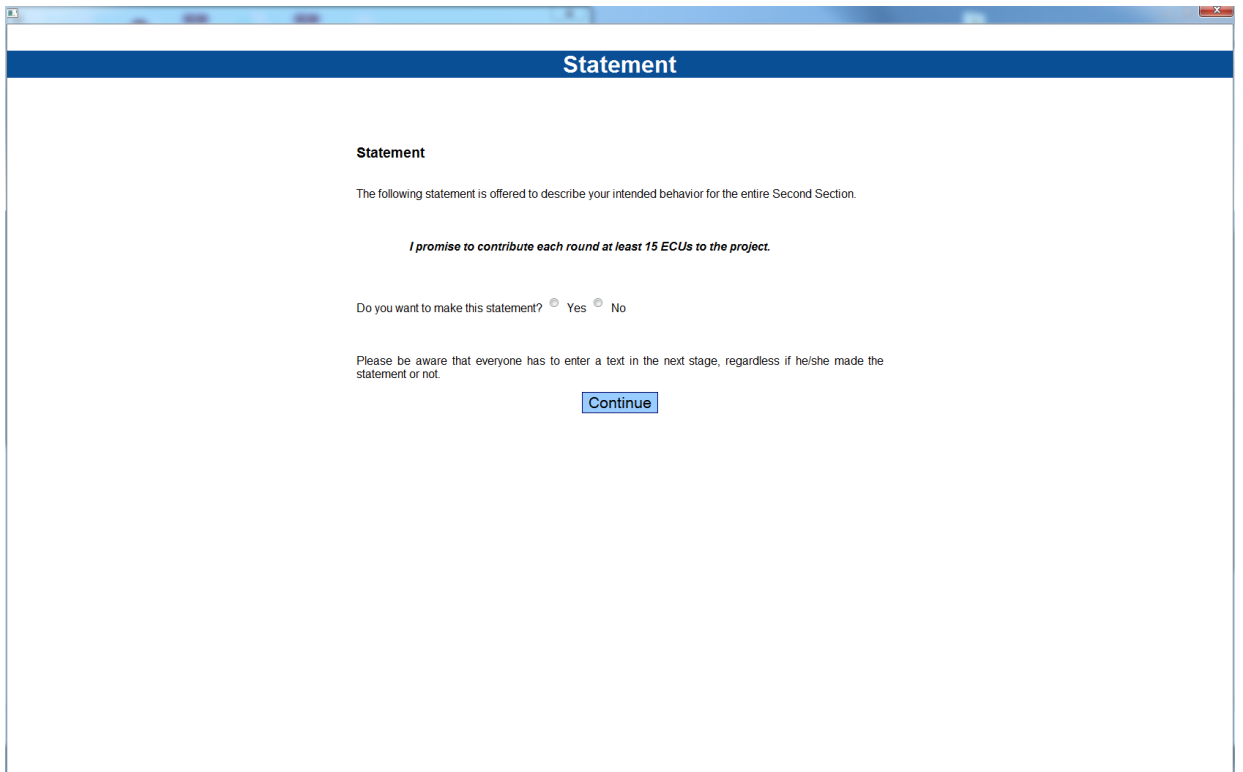


Figure 11: screenshot oath

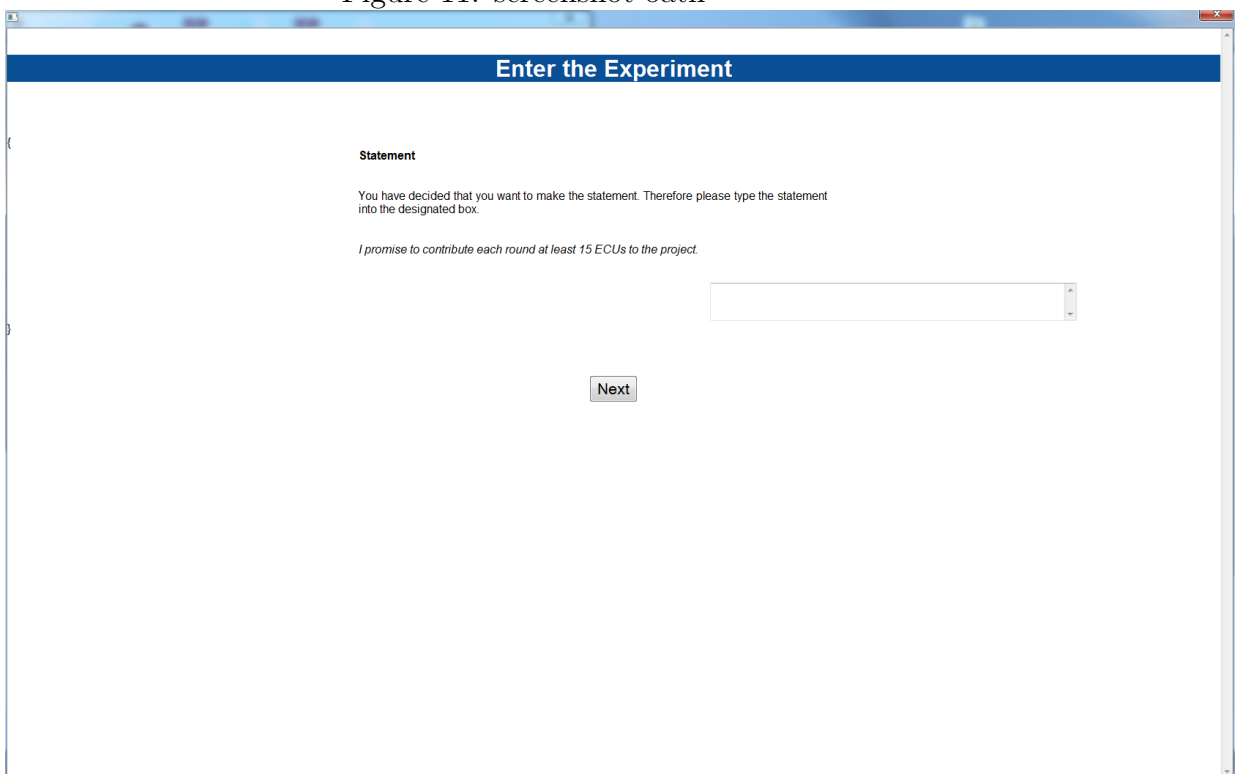


Figure 12: screenshot oathtype

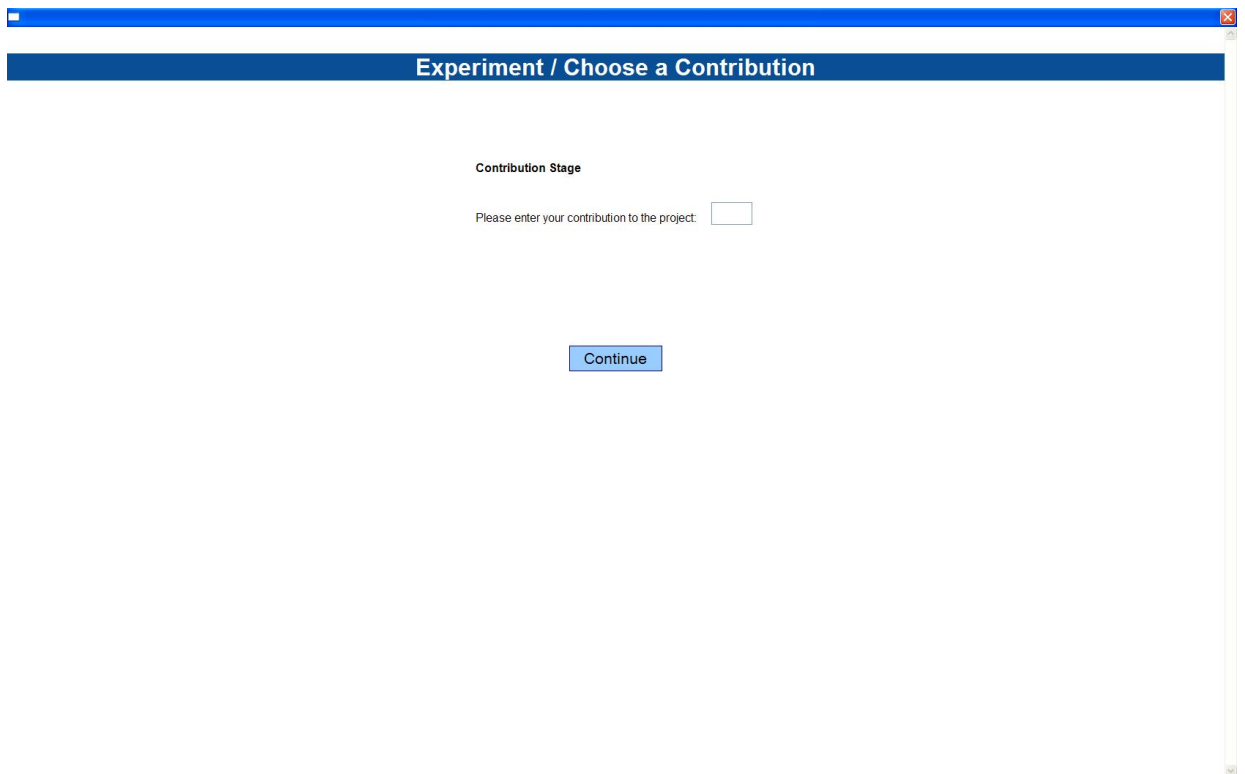


Figure 13: screenshot contribution

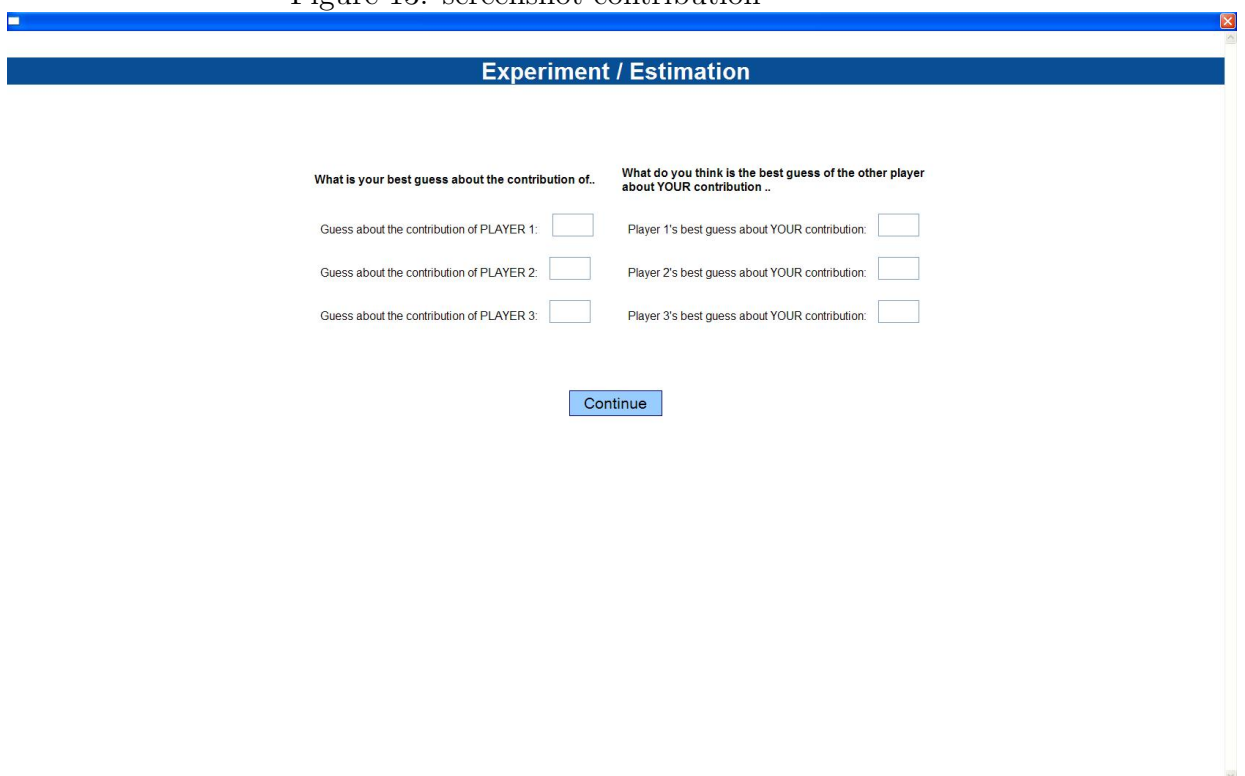


Figure 14: screenshot belief