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# Promoting pro-social behavior with public statements of good intent

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## Abstract

Voluntary and compulsory (but rarely enforced) public statements of good intent are frequently observed in the real world, as for example the 'Banker's oath', the 'Hippocratic oath' or the requirement of many academic journals for authors to affirm that research was carried out ethically.

In this study we investigate what effect such public statements have on contribution behavior in a public goods experiment. We argue that compliance with professional conduct can be seen as a public good and public statements of good intent can therefore be a low-cost policy intervention to foster contributions for the public good.

Using a 'between-within subjects design' we identify three channels by which non-enforceable statements of intent are associated with higher levels of contributions to the public good. First, in a selection effect, socially-oriented participants are more likely in the experiment to make a public statement. Second, in a commitment effect, participants who make a public statement are contributing more to the public good. Third, in a coordination effect, aggregate contributions are higher when 'Statement-Makers' observe that also other group members make the statement. The latter explains why compulsory statements of good intent are more effective over time.

*Keywords:* social dilemma, prosocial behavior, commitment, compliance, group decision making, policy making

*JEL Classification:* A13, C72, C91, H41

*PSYINFO Classification:* 3660, 3000, 3020

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# 1 Introduction

‘Codes of conduct’ are widely used in practice to promote pro-social behavior. The ‘Banker’s oath’, the ‘Hippocratic oath’ or the requirement of many academic journals for authors to affirm that research was carried out ethically can serve as examples. These pledges can be understood as public statements of good intent which are intended to motivate individuals to remember their social orientation and consequently contribute to the public good. Given that these statements are a relative low cost policy instrument, we believe that it is important to understand how they affect behavior. Existing studies focus on the effect of intent statements in bilateral interactions (see for example Ellingsen and Johannesson(2004), Charness and Dufwenberg (2006) and Vanberg (2008)). Evidence on the role of public promises in influencing group behavior by contrast limited. In this study, we focus on the social dimension of misconduct and the effect of non-enforceable compliance statements to reduce individual free-riding and misconduct.

To better understand the link between these public statement and resulting changes in behavior we undertook an economic experiment in the controlled setting of a laboratory. This experiment allows us to identify three ways in which public statements of good intent can be associated with higher levels of contributions to a public good: a selection effect, a commitment effect, and a coordination effect.

The selection effect refers to the fact that the statement is more likely to be made by individuals who contribute to the public good anyway. We are able to disentangle this effect by starting our experiment with a baseline session before introducing the possibility make a pledge. We then identify the real effect of the public statement by comparing the levels of contributions before and after the statement introduction and between treatment groups. Changes in behavior after the pledge are due to two origins: first, a preference for keeping one’s word leads to a direct commitment effect and second, observing others making (also) the statement helps to coordinate on better group outcomes. This coordination effect is particularly dominant when the dynamic development of contributions is taken into account.

This research is in our eyes very timely. After various cases of professional misconduct, pledges and public statements of intended behavior have repeatedly received attention in the public debate.

In many industries individual actors can gain private benefits by deviating from professional standards: a doctor or lawyer may charge for services not provided, a researcher may manipulate data, a bank employee may give advice that is not in the client’s best interest. These behaviors have often been analyzed and simply judged as criminal or unethical behavior in bilateral relationships. However, unethical conduct not only carries costs for the client or patient, but also implies potential costs for the entire profession.

The detection of academic misconduct, for instance, can lead to a loss of

credibility in the entire scientific community (See Ioannidis (2005); Martinson et al. (2005); Fanelli (2009) for a general discussion on scientific fraud; Begley and Ellis (2012) for unreproducible ‘landmark’ studies in cancer research; List et al. (2001); Necker (2014) for a discussion of economic research.). Tighter regulations, and fewer investments or client interactions may result from the erosion of professional integrity. And even without obvious and publicized misconduct negative effects are present. In the case of scientific research, unethical methods, for example, limit the progress in the field.

On the basis of these market externalities we argue that professional conduct possesses the characteristics of a public good; and is the reason why we investigate the matter within a public good game. In practice, one approach for addressing misconduct issues is to require oral and written statements from actors in the field in question, promising proper, pro-social conduct. Statements of this kind are either voluntary or compulsory. The Hippocratic Oath of doctors or statements of good conduct that are compulsory for many academic journals serve as examples. It is also becoming more popular to require oaths for economists (DeMartino, 2010), bankers and managers. While some of these pledges are voluntary and others are compulsory<sup>1</sup>. Whether a voluntary or compulsory statement is the better choice is surely context dependent, but based on our results we demonstrate that the overall increase in pro-social behavior is longer lasting when all players make the statement.

The remainder of the paper is organized as follows. In Section 2 we review the related literature. In Section 3 we present the experimental design. Behavioral predictions are listed in Section 4, followed by the experimental results in Section 5. Finally, we conclude with some discussion and potential insights for management practice in Section 6.

## 2 Related Literature

Academic interest on oaths and codes of good conduct as institutionalized coordination devices is only just emerging (de Bruin and Dolfsma, 2013). In an economic experiment, Jacquemet and colleagues (2013) introduced a voluntary solemn oath to tell the truth during experiments. Following the oath, participants were more likely to reveal their true preferences. Also Carlsson et al. (2013) and Stevens et al. (2013) show that an oath helps to eliminate a hypothetical bias in a contingent valuation task. In a follow-up study, Jacquemet et al. (2015) provide additional evidence that the tested

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<sup>1</sup>The Harvard Business and Columbia Business School, for example, implemented an MBA oath in their graduate program. While the graduates from Harvard can freely decide, whether they want to state that the goal of a business manager is to serve the greater good, students at Columbia must honor the code.

solemn oath not only helps in revealing true preferences in willingness to pay questions, but also promotes truthful communication in experiments. As a consequence, coordination failure is less common in a congestion game (Jacquemet et al., 2015). Further evidence for the effectiveness of ethical declarations is provided by Mazar et al. (2008). At the beginning of the experiment participants were told that the study falls under the university’s honor code. Following this announcement significantly more students self-reported honestly the amount of test questions answered correctly. Not only pledges, but also the act of signing an undertaking is found to have a significant effect on behavior. Shu et al. (2012), for example, find in a field study that signing a (tax) declaration at the beginning of the document rather than at the end leads to more truthful reports.

Contrary to these studies which investigate the effect of a vow on honesty, we are interested in the impact of a public statement of intent on actions, i.e. pro-social behavior. Such as in the real world examples of the ‘Banker’s oath’, the ‘Hippocratic oath’ or general business code of conducts we are looking at public statements of intent given by an institution. The communicative act, in form of a public statement of good intent, is induced with the aim to motivate the agents to act pro-socially in the future. With the psychological concept of cognitive dissonance (Festinger, 1957) a resulting positive effect on the behavior can be explained. According to this concept, individuals seek for consistency in their behavior and experience emotional disutility when acting inconsistently with previous actions or statements. The avoidance of inner disharmony motivates thus the commitment towards the action stated. Hence, even in anonymous interactions, in which reputational concerns are non-existent, statements of intent can create commitment. This perspective stands in contrast to the standard economic assumption that communication is under such conditions ineffective cheap talk.

Complementary research in experimental economics shows that a substantial number of individuals avoid lying, even if they have to forgo a material gain by doing so (Gneezy, 2005; Kartik et al., 2007; Kartik, 2009; Hurkens and Kartik, 2009; Lundquist et al., 2009; Fischbacher and Föllmi-Heusi, 2013). People who make a promise about future cooperative behavior in pre-play communication, are likely to keep their word<sup>2</sup>.

The strength of commitment induced by the promise may vary with

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<sup>2</sup>Two theoretical explanations for promise-keeping are prominent in the literature. First, an aversion to lying exists, either because the person has a preference for keeping their word per se (Ellingsen and Johannesson, 2004; Vanberg, 2008; Sánchez-Pagés and Vorsatz, 2009; Erat and Gneezy, 2012; López-Pérez and Spiegelman, 2013) or because the promisor does not want to act against the social norm of not breaking a promise (Binmore, 2006; Bicchieri and Lev-On, 2007). Second, the effect may be indirect: the statement raises the expectations of others, the person making the statement anticipates the raised expectations and is motivated not to disappoint the expectations of others (Charness and Dufwenberg, 2006; Battigalli et al., 2013).

the form of statement made. Research in social psychology stress in this context the importance of decision autonomy (Joule and Beauvois, 1998). Individuals who decide freely to express an intention about future behavior feel committed to this action (Kiesler, 1971; Schlesinger, 2011). Elicited or pre-formulated promises, by contrast, have none or only limited effect (Charness and Dufwenberg, 2010; Belot et al., 2010). Also, public promises have a stronger commitment effect than private pledges (Joule and Beauvois, 1998); and being engaged in a pledge, i.e. the statement making is in some form effortful, increases the binding function.

So far, the behavioral impact of statements of intent has been analyzed in one-on-one interactions. Often promises are used in these studies to signal trustworthiness, so that a consequent interaction will take place. We, on the contrary, study a promise addressed to a group and investigate whether the publicly expressed intention to act in a socially beneficial way can help to circumvent a social dilemma. This links our work to a vast amount of studies on the effect of communication in social dilemma situations (Ledyard, 1995; Chaudhuri, 2011, for reviews)<sup>3</sup>. In these situations communication reduces strategic uncertainty and subjects treat one another's messages as a serious attempt to coordinate (Ostrom et al., 1992; Bochet et al., 2006). Communication may also help to establish a social norm and improve the understanding of the common situation (Kerr and Kaufman-Gilliland, 1994).

In reality, however, discussions between all actors involved in a social dilemma situation can be very time consuming or just not feasible (Messick et al., 1983). Finding consensus in an open discourse format poses an additional challenge. To restrict communication in these settings may help to ease coordination. Koukouvelis et al. (2012) provide in this context first evidence that the cooperation enhancing effect of communication also exists when not all group members can communicate with each other. In their study they give the option to send a free message only to one randomly selected person in a public good game. Contributions still increase substantially. Our study is similar to Koukouvelis et al. (2012)'s in the regard that also we offer only one message as a coordination device; a design feature which may ease efficiency and substantially lowers communication costs in reality. However, in contrast to Koukouvelis et al. (2012), the message in our design is not endogenously chosen by one of the group members, but given and predetermined by an institution. We gain with this design difference control since the message content is not arbitrary. Moreover, our design elicits a form of self-commitment from each player. For previously

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<sup>3</sup>Pre-play communication is in economic experiments typically cheap talk, messages which are non-binding and costless. Various forms of communication have been tested and particular face-to-face communication improves cooperation (Balliet, 2009). But also communication via a chat window, as typically used in experiments, leads to higher cooperation levels and significantly larger contributions to the common (Bicchieri and Lev-On, 2007).

listed reasons, we expect the effect of the statement thus to be stronger than in the pure messaging setting of Koukoumelis et al. (2012).

Close to our work are also the studies of Dannenberg (2015) and Tavoni et al. (2011). Both studies model the decision process of national contributions in climate negotiations. In the setting of a public good game players need to decide to contribute to the common (mitigate climate change) or keep the endowment for their private interests.

In Dannenberg (2015), one player can announce the intended contribution level before all players need to make their final allocation decision. This communicator is either randomly chosen or volunteers, depending on the treatment variation. Only when the communicating player volunteered, a small increase in contributions is observed. Pledged contribution levels, howsoever, were high in both treatment groups, but rarely followed through. Followers anticipated this inconsistency and the pledge was consequently not an effective tool to coordinate on higher contributions<sup>4</sup>. In Tavoni et al. (2011)'s study all players are given the option to announce their intended contribution in a threshold public good game. This non-binding pledge (option) effectively increased contributions to the common and was a successful coordination mechanism to reach the threshold to avert a climate catastrophe. In Tavoni et al. (2011) as well as Dannenberg (2015), the decision situation is strongly framed and announced contribution levels are arbitrary.

Our study adds to this literature by offering a highly controlled message as a coordination device in an abstract social dilemma situation. We furthermore identify the channels through which a statement of intent may affect the contribution behavior. Existing promise or oath studies identified the effect of a statement so far in a between-subject design. Consequently, it is not clear whether an increase in pro-social behavior, observed in these studies, is due to a commitment effect or due to the fact that only socially oriented people are making a statement about intended social behavior. In our within-subject design we can address this issue and can distinguish between a selection and a commitment effect. Additionally, we control in a between-subject treatment variation whether the commitment effect varies when the statement is voluntary or compulsory.

## 3 Experiment

### 3.1 Design

For this experiment we employed a standard linear public good game with a voluntary contribution mechanism (Marwell and Ames, 1979). The experiment consisted of two stages and subjects played in each stage ten rounds

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<sup>4</sup>Contrary to Koukoumelis' study the communication in Dannenberg (2015) only contains the announcement of the intended contribution level and is not in free text format. This may explain the weaker effect of the message.

of the standard public good game. The first stage served as a baseline to measure heterogeneity and allows us to carry out a within-subject analysis.

Groups of four were randomly formed and at the beginning of each round subjects were endowed with 20 Experimental Currency Units, which they could consume either privately or contribute to a public good. The payoff function was the following:

$$p = 20 - z_i + 0.4 * \sum_{j=1}^n z_j \quad (1)$$

$z_i$  denotes  $i$ 's contribution level, where  $0 < z_i < 20$  and  $0.4 * \sum_{j=1}^n z_j$  presents the income from the project. Contributions to the public good increase the collective output, but the marginal per capita return of a contribution is less than one. Therefore, the dominant strategy of a profit maximizing individual is to keep the entire endowment for oneself and free-ride on the contributions of the other players.

After the ten rounds, experimental groups were re-matched<sup>5</sup> and the treatment variations were implemented. Participants were randomly allocated between three groups: Control, Voluntary and Compulsory. Table 1 summarizes the design. In the two treatment groups a statement was offered to communicate intended future contribution behavior. The promise was directed to the other group members and stated that the player will make significant contributions to the project, at least 75% of the endowment<sup>6</sup>, in each of the subsequent ten rounds of the second stage.

In the first treatment group (Voluntary) participants simultaneously decided whether or not to make this statement, in the second treatment group (Compulsory) players had to make the statement in order to proceed in the experiment. In both cases it was made explicit that making the statement has no consequence on the set of possible future choices and does not limit the decisions later in the experiment. All participants who decided to pledge the statement had to type in the following, *'I promise to contribute each round at least 15 ECUs to the project'*. According to Kiesler (1971) and Joule and Beauvois (1998) commitment is stronger when the subject is engaged in the act of promise making. For this reason we chose the typing instead of choosing the statement by purely checking a box.<sup>7</sup>

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<sup>5</sup>The rematching of players was done in a way that no player interacted with one player twice. With 16 participants per session a perfect stranger matching was guaranteed and this was common knowledge.

<sup>6</sup>We have chosen 75% instead of 100%, the Pareto optimal contribution level, to still allow for some latitude in the contribution choices.

<sup>7</sup>Subjects who decided not to pledge, had to type in a neutral text. This text was already introduced in the baseline stage and stated an agreement to participate in the experiment. This text was of similar length as the contribution statement and can be found in the Appendix.



Table 1: Experimental Design

	<b>STAGE 1</b>	<b>STAGE 2</b>	N
<b>CONTROL</b>	Standard PGG	Standard PGG	64
<b>VOLUNTARY</b>	Standard PGG	<i>Voluntary Statement</i> Standard PGG	64
<b>COMPULSORY</b>	Standard PGG	<i>Compulsory Statement</i> Standard PGG	64

Before the first contribution decision in Stage 2, all players in the two treatment groups learned which players in their group (also) made the statement. Statement-Makers were consequently labelled in the second stage. Screenshots and instructions can be found in the Appendix.

To control how beliefs influenced the contribution choice, we asked subjects after their contribution decision, to indicate their expectations about the contributions of the other players (first order beliefs) and the guess of others expectations with respect to their own contributions (second order beliefs)<sup>8</sup>. After all participants stated their beliefs for each group member, feedback was given about all individual contributions within one's group<sup>9</sup>. To determine the payments for the decision choice and the accuracy of the beliefs three rounds were randomly selected at the end of each stage. By this mechanism we minimized wealth effects and prevented hedging within a stage.

### 3.2 Behavioral Predictions and Identification Strategies

Under the assumption of purely self-serving and money maximizing behavior, contributions are expected to be 0 in all groups and stages. Statements,

<sup>8</sup>The belief payment function was incentive compatible and based on the quadratic scoring rule. However, to make it easier for the students to understand, we described the possible outcomes verbally in the instructions (see Appendix). We elicited the beliefs in both stages and all treatment groups.

<sup>9</sup>Croson and Marks (2001) find that feedback about each single players' contribution compared to information about the total contribution does not change the average contributions. Also Fehr and Gächter (2000) do not find a difference in contributions for feedback on an average level or feedback that displays the entire contribution vector.

if they are made, are considered as meaningless by the participants and do not affect their choices of contribution. This also applies to the repeated setting of the game. A rational decision maker will always break the promise in the last round and try to free-ride on the contributions of the others. Applying backward induction, the statement is consequently also non-credible in all previous rounds.

Empirical evidence, however, shows human behavior deviates fundamentally from these predictions. Contributions in public good games are on average between 40 – 60% of the endowment and deteriorate over repetitions of the game (Ledyard, 1995; Fehr and Gächter, 2000; Chaudhuri, 2011). Moreover, non-institutionalized, multilateral communication enhances the contribution levels significantly (Sally, 1995; Bochet et al., 2006; Balliet, 2009). Koukoulis et al. (2012)’s study provides first evidence that also one-dimensional communication may be sufficient to increase public good contributions.

Following these insights, public and institutionalized statements of intent should increase contributions to the public good in this experiment. This reasoning is also supported by the promise literature. Individuals are reluctant to lie; either because the person has a preference for keeping their word (Ellingsen and Johannesson, 2004; Vanberg, 2008) or because the promisor does not want to go against the social norm of not breaking a promise (Binmore, 2006; Bicchieri and Lev-On, 2007). Other authors argue that the effect is more indirect: the statement raises the expectations of others, the promisor anticipates this and is motivated not to disappoint the expectations of the interaction partners (Charness and Dufwenberg, 2006). Both theories, howsoever, suggest that making a statement increases contributions to the public good in our experiment.

In case of the voluntary statements, this increase can come from two potential explanations: First, a *selection effect* indicating that people who are intrinsically motivated to contribute more, tend to make the statement; second, a *commitment effect*, based on the theories above the pledge motivates an increase in contributions. Given our experimental design, the treatment group 1 (Voluntary) allows us to disentangle the commitment effect from the selection effect by comparing the Stage 1 to the Stage 2 behavior, where the voluntary statement was offered. We can see whether participants who voluntarily choose to make the statement in Stage 2, have on average, higher contributions in Stage 1 (*selection effect*). And we can determine if participants who voluntarily made the statement, increase their contributions in Stage 2 compared to Stage 1 (*commitment effect*).

**Hypothesis 1 (selection effect):** *Participants who voluntarily choose to make the statement in Stage 2, have on average higher contributions in Stage 1.*

**Hypothesis 2 (commitment effect):** *Participants who make the state-*

*ment subsequently increase their contributions to the public good in Stage 2 compared to their contributions in Stage 1.*

If making a statement triggers commitment, due to lying aversion or cognitive dissonance, and the interaction partners are aware of this effect, they may also adapt in their contribution behavior. To be more specific, if subjects observe other group members are making the statement, they expect higher group contributions in the future. Following conditional reciprocity (Fischbacher et al., 2001), this belief change motivates the subject to also contribute more to the public good. We refer to this as *coordination effect*, and see it as the second source for an increase in pro-social behavior after a pledge. In the compulsory treatment this coordination effect should be stronger, since all subjects (are forced to) make the statement. Particularly over time we expect this coordination effect to extrapolate.

**Hypothesis 3 (coordination effect):** *In treatment group 2, where statements are compulsory, a positive increase in contributions can be sustained for longer than in treatment group 1, where statements are voluntary and the number of Statement-Makers is thus determined endogenously.*

Nevertheless, with respect to the self-driven commitment it is to mention that existing research (Kiesler, 1971; Schlesinger, 2011; Charness and Dufwenberg, 2010; Belot et al., 2010) indicates that the effect of a compulsory statement should be weaker than of a voluntary statement, since participants do not decide autonomously to commit. But this finding is derived from studies analyzing the effect of a promise in bilateral interactions. No evidence exists for groups or aggregate contributions. Hence an open, empirical question is to what extent the commitment effect of a voluntary statement is stronger than of the commitment effect of a compulsory statement. By controlling for the amount of statements made in one group we observe a coordination component varying in strength. Particularly interesting are observations, where all group members voluntarily decide to make the statement. The comparison with the compulsory group can provide insights into how the obligation to make the statement impairs the commitment effect. One would expect that contributions in the voluntary groups with four Statement-Makers are higher than in the compulsory groups, since a strong commitment is paired with a high coordination component.

## 4 Results

Investigating how public statements of good intent affect the contribution behavior we first focus on voluntary statements of intent (treatment group 1). By controlling for a selection effect, we can identify a possible commitment effect. In a second step, the effect is compared with the behavioral

change when the statement is compulsory (treatment group 2). Finally, we analyze the dynamic development of the effects.

#### 4.1 Voluntary Statement

Whilst the rational money maximizing assumption predicts that statements are irrelevant and therefore not worth being made, we find subjects make the voluntary statement, and also get affected by it.

Overall, 48% of the subjects made the statement before entering Stage 2. We call these subjects Statement-Makers. Subjects who had the option to make a statement, but decided against it are referred to as Non-Takers. The two groups are noticeably different in their behavior<sup>10</sup>. Ultimately, Statement-Makers contribute significantly more in Stage 2 than Non-Takers (Pairwise Wilcoxon ranksum test<sup>11</sup>:  $Z = -3.682$ ,  $p < 0.001$ ). Table 2 provides an overview of the average contribution levels for each group and stage.<sup>12</sup>

[Table 2 here]

**Result 1:** *Contributions in the Stage 2 are higher when subjects make voluntarily the public statement of good intent.*

Comparing the contributions in Stage 1 between subjects who later make the statement and those who do not, we find strong support for a *selection effect*. Contributions from Statement-Makers are significantly higher in Stage 1 than the contributions of Non-Takers ( $Z = -2.506$ ,  $p = 0.0122$ ). Figure 1 sketches this difference graphically.

**Result 2:** *Subjects who decide to voluntarily make the statement, act already before the pledge in a more socially oriented way. We call this selection effect.*

[Figure 1 here]

In a second step, we investigate, whether contribution behavior changes due to the statement. On an aggregate level mean contributions in Stage 2 are significantly higher in the Voluntary treatment group than in the Control group ( $Z = -2.231$ ,  $p = 0.0026$ ), as well as compared to the own contributions in the baseline stage ( $Z = -2.210$ ,  $p = 0.0271$ ). The effect is driven

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<sup>10</sup>For example are women significantly less likely to make the voluntary statement. A detailed analysis on the individual characteristics of the Statement-Makers is offered in the Appendix.

<sup>11</sup>Mean contributions per person, averaged over all stage rounds, are chosen as level of analysis, if not indicated differently.

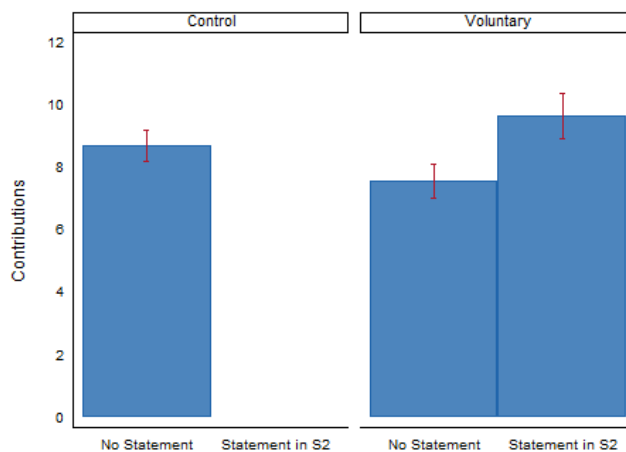
<sup>12</sup>For the comparison between treatment groups, it must be mentioned that contributions in the compulsory group were different in the baseline to the contributions in the voluntary and control group. The standard deviation of average contributions is relatively large and some of this difference is caused by the strong variation across the experimental groups. In the regression analysis, however, we control for these initial differences and can show that they do not impair the findings presented in the following.

Table 2: Average contributions for each group and stage

Contributions	Stage 1 ( <i>Baseline</i> )	Stage 2	Number participants
CONTROL	8.70 (4.67)	7.65 (4.52)	64
VOLUNTARY	8.57 (3.35)	10.08 (5.77)	64
Non-Takers	7.56 (2.83)	7.52 (4.98)	33
Statement-Makers	9.65 (3.56)	12.82 (5.33)	31
COMPULSORY	10.61 (6.02)	13.13 (5.61)	64
Number of participants			192

*Note: Standard deviations are in parantheses.*

Figure 1: Selection: Contributions in Stage 1



*Note: This graph displays the mean contributions, averaged over time in **Stage 1**, with error bars: The left column displays contributions in the Control group, the right columns represents contributions of participants who will later choose to make the statement and those who will not. The significant difference in the height of the two bars confirms the selection effect.*

by Statement-Makers. Their average contributions increase significantly in Stage 2 (Voluntary Statement-Makers - Stage 1 vs. Stage 2:  $Z = -2.732$ ,  $p = 0.0063$ )<sup>13</sup>.

By looking at the differences in contribution levels of Statement-Makers between Stage 1 and Stage 2, we can ensure that this effect is not due to selection, but due to a change in behavior that we call commitment effect (Difference in contribution levels between Stage 1 and Stage 2 - Vol. Statement-Makers vs. Non-Takers:  $Z = -3.070$ ,  $p = 0.0021$ ). Figure 2 displays the corresponding average differences in contribution levels.

**Result 3:** *Statement-Makers show, in addition to their previously higher contributions, an increase in contributions after the statement of intent has been made. We call this commitment effect.*

We described now the change in behavior of Statement-Makers. A change also the other players were able to anticipate in our experiment. Table 3 displays the expectations from other players, players' own second-order beliefs and the actual contributions. To measure the pure effect of the statement in regard to others' expectations, we look on the beliefs and contributions only from the first round of the second stage. This is the first interaction after a new group was matched. Players were at this point not yet able to predict the other players' behavior based on the history. Expectations towards Statement-Makers are significantly higher in the treatment group than in the Control group ( $Z = -4.114$ ,  $p < 0.0001$ ), but also the expectations toward the Non-Takers are significantly higher ( $Z = -2.043$ ,  $p = 0.0410$ ). The difference between the first order beliefs towards Statement-Makers and Non-Takers is hereby weakly statistically significant:  $Z = -1.797$ ,  $p = 0.0723$ . This difference becomes stronger when applied to all rounds of Stage 2. Hence, introducing the statement influences positively the first order beliefs and helps to coordinate on a more efficient group outcome.

The second-order beliefs, in contrast, are only higher for the Statement-Makers. They believe that other players expect significantly higher contributions from them ( $Z = -5.572$ ,  $p < 0.001$ ). This finding is in line with previous research (Charness and Dufwenberg, 2006, 2010), which argued that promises are kept due to a expectation based guilt aversion. According to this view, subjects raise the expectations (first-order beliefs) of other group members on their future contributions when making the statement. At the same time the Statement-Makers anticipate this raise (Second-order beliefs) and feel guilty when disappointing these raised expectations. How-

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<sup>13</sup>These results hold when the analysis is based only on the first round of Stage 2, i.e. when subjects have not received any information about the other group members' contribution behavior and their reaction on the statement (Round 11 - Control vs Voluntary group:  $Z = -2.150$ ,  $p = 0.0315$ ; Voluntary Statement-Makers - Round 1 vs Round 11:  $Z = -3.380$ ,  $p = 0.0007$ )

Table 3: Beliefs

	<b>Control</b>	<b>Voluntary</b>	
		Non-Taker	Statement-Maker
<b>Expectation of others</b>	8.04 (3.82)	8.61 (4.06)	12.73 (4.17)
<b>Second order belief</b>	8.12 (4.41)	7.58 (4.48)	13.33 (4.79)
<i>Corr.coef.</i>	<i>0.92</i>	<i>0.93</i>	<i>0.93</i>
<b>Real contribution</b>	7.65 (4.53)	7.52 (4.98)	12.82 (5.33)

*Note: This table presents the average beliefs and contributions in round 11, with standard deviations in parantheses.*

*The first row displays the average expectation towards a player in the control group (column 1), a player who decided against the statement (column 2), and a player who made the statement (column 3). The second row lists the average second order belief, i.e. the guess of a player about the average expectations of the other group members about the own contribution behavior. The last row presents the average contributions realized by the respective players. The row in-between displays Pearson correlation coefficients, which measure the association between second-order beliefs and realized contributions.*

ever, it needs to be here mentioned, that we are not able to rule out that Statement-Makers state higher second order beliefs simply to be consistent with the higher contributions made. To control for this is left for future research.

As a last analysis step in this section, we move the focus back to the actual contributions, and perform a multivariate analysis controlling for group interdependencies and analyze how the take up of the statement by others affects the contribution behavior. Table 4 presents the results of Ordinary least square regression models estimating the average contributions for each stage and treatment group. Contributions of the Control group in Stage 1 serve as baseline.

Model 1 estimates the contributions for each treatment group and stage, considering the average contributions of other players an individual experienced in Stage 1. In the Control group, contributions are lower in the second Stage than in the first Stage. Contrary, in the Voluntary treatment group contributions increase in Stage 2. Model 2 differentiates between subjects, who made the statement and subjects who decided against it. Statement-Makers are contributing statistically significantly more in Stage

Table 4: Average Contributions in Control and Voluntary

	Model 1	Model 2	Model 3
Voluntary	-0.127 (1.128)		
Voluntary $\times$ No		-1.138 (1.158)	-1.138 (1.165)
Voluntary $\times$ State		2.088** (0.816)	2.088** (0.821)
Stage 2	-1.050 (1.278)	-1.050 (1.283)	-4.542*** (1.392)
Stage 2 $\times$ Voluntary	2.562 (1.814)		
Stage 2 $\times$ Voluntary $\times$ No		1.005 (1.803)	2.640 (1.986)
Stage 2 $\times$ Voluntary $\times$ State		4.221** (1.930)	3.922* (2.238)
Stage 2 $\times$ Voluntary $\times$ No State $\times$ N_State			-1.056 (0.970)
Stage 2 $\times$ Voluntary $\times$ State $\times$ N_State			0.178 (0.833)
Others_contrib_S1			0.134*** (0.0339)
Constant	8.698*** (0.988)	8.698*** (0.992)	8.698*** (0.998)
Observations	256	256	256
Adjusted $R^2$	0.023	0.108	0.143

Note: This table presents the results of OLS regressions, estimating average contribution levels for each stage in the Control and Voluntary treatment group. The variable  $N\_State$  lists how many of the other players in the individual's matching group made a statement.  $Others\_contrib\_S1$  is a control variable for the average contributions a subject experienced other players made in the first Stage. Standard errors, clustered on the matching group level, are in parentheses. \*\*\*, \*\*, \* indicates significance at the 1%, 5% and 10% levels, respectively.



1 ( $p = 0.0129$ ) than Non-Takers, this is what we described before as the *selection effect*. These Statement-Makers additionally increase their contributions significantly in Stage 2 ( $p = 0.032$ ). Model 3 considers as additional controls the subjects' experience of others' contributions in Stage 1 and the number of other players who (also) made a statement in the subject's Stage 2 matching group ( $N\_State$ ), considering also the subject's own statement decision. When considering these additional influences, the commitment effect ( $Stage\_2 \times Voluntary \times N\_State$ ) is slightly weaker, but still significant ( $p = 0.085$ ). The experience individuals made in Stage 1 has hereby a strong positive effect on the contribution behavior in Stage 2. The effect of the presence of (other) Statement-Makers depends on whether the individual is a Statement-Maker oneself. If this is the case ( $Stage\_2 \times Voluntary \times State \times N\_State$ ), the presence of other Statement-Makers promotes contributions. When subjects, on the contrary, decided against the statement, the presence of Statement-Makers weakens average contributions. One possible interpretation for this is a diffusion of responsibility; when players decided not to take the statement and then observe that others pledged to contribute a substantial amount to the public good, the Non-Takers feel they can settle back.

To summarize, we observed that more socially oriented subjects select themselves into the statement and second, that Statement-Makers increase their contributions after the pledge. This increase is anticipated by the other group member and the Statement-Makers are aware of these higher expectations. We also observed that the change in contribution behavior is not only driven by the pure commitment towards the statement, but also influenced by the statement choices of the other players in the subject's matching group. So is the contribution increase stronger when also other group members made the statement. We conclude that not only the self-driven commitment due to lying aversion determines the increase in contribution after the pledge, but also a coordination component. To investigate this influence further we contrast in the following the results from the voluntary treatment with a setting in which the statements were compulsory. The number of Statement-Makers was hence constant in this treatment group. Thereupon we will analyze the dynamic development over time.

## 4.2 Voluntary versus Compulsory Statements

Since most codes of conduct are compulsory in practice, we contrast our results from the first part with a scenario in which all group members are forced to pledge the public statement of intent. This comparison is also from a theoretical point interesting. On one hand, we have seen in the previous section that contributions of Statement-Makers increase when also other group members made the statement, we called this *coordination effect*. On the other hand, from the social psychological perspective, the pure,

self-driven commitment associated with a compulsory statement should be negligible since the pledge is not self-chosen (Kiesler, 1971; Joule and Beauvois, 1998). Based on this second hypothesis, the commitment effect should be smaller in the compulsory setting than in the voluntary treatment group. Our data, however, provides opposing results.

When we compare the change in contributions on an individual level, i.e. comparing the effect of a voluntary versus a compulsory statement<sup>14</sup>, we find contributions increase slightly more when the statement is made voluntarily. However, this difference is not statistically different to the average increase we observe for compulsory Statement-Makers ( $Z = 0.099$ ,  $p = 0.9210$ ). Figure 2 displays the average change in contributions for each round between Stage 1 and Stage 2, for Statement-Makers and Non-Takers in each group. The similarity remains when we exclude potential learning effects and base our analysis only on the first round after the statement has been made (Increase from Round 10 to Round 11: Voluntary Statement-Makers - 4.903 ECUs vs. Compulsory Statement-Makers - 4.734 ECUs:  $Z = -0.120$   $p = 0.904$ ). This finding stands in contrast to previous research on statements in bilateral interactions, which argued that elicited, or else compulsory commitments are significantly less effective than voluntary ones (Charness and Dufwenberg, 2010; Belot et al., 2010).

**Result 4:** *Contributions increase significantly after subjects made the compulsory statement. This increase is not statistically different to the increase in contributions of voluntary Statement-Makers.*

[Figure 2 here]

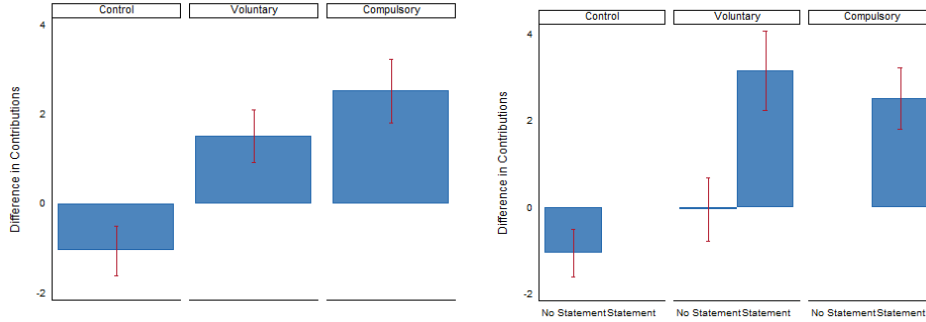
Furthermore, when we pool the data over all subjects in the Voluntary group the average increase in the Compulsory treatment is weakly stronger than in the Voluntary treatment group ( $Z = -1.466$ ,  $p = 0.1428$ ). Hence, we reject the hypothesis that compulsory commitments in a public good setting are less effective than voluntary ones. We even find weak evidence for higher contributions when the overall effect of the statements is analyzed.

This finding is also mirrored in the beliefs. Expectations towards Statement-Makers are higher in the Compulsory group than in the Voluntary group (First order beliefs: Voluntary Statement-Makers 12.73 ECUS (SD: 5.31), Compulsory Statement-Makers 13.75 ECUS (SD: 5.83):  $Z = -4.489$ ,  $p < 0.001$ )<sup>15</sup>. And again anticipate the respective Statement-Makers these higher expectations correctly (Second order beliefs: Voluntary Statement-Makers 13.33 ECUS (SD: 6.09), Compulsory Statement-Makers 14.05 ECUS (SD: 5.85):  $Z = -2.21$ ,  $p = 0.03$ ). We attribute these findings to a *coordination*

<sup>14</sup>Since baseline contributions in the compulsory group were higher than in the voluntary and control group, we base the comparison between treatments on the difference between Stage 1 and Stage 2 contributions.

<sup>15</sup>When only the beliefs of the first round in Stage 2 are chosen as unit of analysis, this difference is even stronger.

Figure 2: Commitment: Difference between Stage 1 and Stage 2 contributions



Note: This graph displays the average difference in contributions between Stage 1 and Stage 2, with error bars: As known from the literature, contributions in the Control group (left bar) are on average lower in Stage 2. For the Statement-Makers contributions increase on an aggregate level more in the Compulsory treatment group than in the Voluntary treatment group. We call this coordination effect. In the right panel, the contributions of Statement-Makers and Non-Takers in the Voluntary group (middle bar) are displayed separately. Contributions of voluntary Statement-Makers significantly increase, while the contributions of Non-Takers remain constant. Also for the compulsory Statement-Makers (right bar) contributions increased significantly. We call this increase commitment effect.

effect. The assurance that everyone signed up for the same 'rule', shifts expectations and promotes higher contributions. Potentially this increase can compensate for a weaker intrinsically motivated commitment following the imposition of the pledge.

To investigate a possible difference between the voluntary and compulsory statements in this self-driven commitment effect, we look at the data of two experimental groups, in which all four group members voluntarily chose to make a statement. Contributions, as well as the differences in contributions between Stage 1 and 2, are significantly higher in these two groups than in all other groups (contribution level: 15.46 ECUs (SD: 4.190), average increase 3.59 ECUs (SD: 2.33) compared to 2.52 ECUs (SD: 6.53) average increase in the Compulsory group, a graph with the respective contributions can also be found in the Appendix). While the high contribution levels can be explained by the selection effect, the stronger increase points to the positive combination of coordination and self-driven commitment. This observation, howsoever, is based on two experimental groups and can thus be taken only as indicative finding.

**Result 5:** *Compulsory statements of intent are effective in motivating higher contributions to the common. The assurance that everyone has to make the statement eases coordination. We call this coordination effect.*

Further support for the effectiveness of compulsory statements and for

the existence of a coordination effect is also found in the development of contributions over time. Figure 3 shows first the dynamic development of contributions in each treatment group, then the fitted values of the differences in contributions between Stage 1 and 2. The effect of a voluntary statement is, in the beginning, as strong as the compulsory statement, but the effect deteriorates faster when the statement is voluntary ( $p = 0.0753$ ). The pattern is driven by participants who made the statement voluntarily and reduce their initial high contributions over time. This can be explained with conditional cooperation. After the first round, subjects learn how the other group members contribute and adjust their contributions accordingly; over time the good intentions of contributing 15 ECUs or more vanishes. In the compulsory group, contrarily, everyone committed to the statement and contributions stay high for longer.

[Figure 3 here]

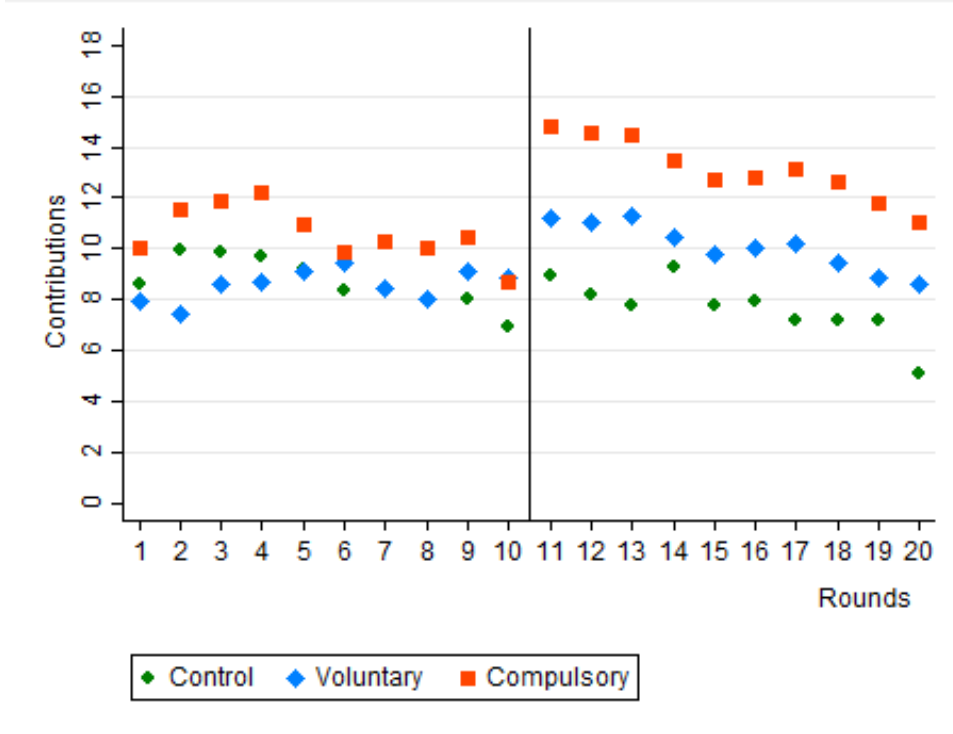
[Table 5 here] The OLS regressions in Table 5 support these findings statistically. All estimations are based on the change of individual contributions for each round between Stage 1 and Stage 2. The left side of Figure 3 is based on Model 4. The coefficients ‘Voluntary’ and ‘Compulsory’, measuring the average difference in contributions between Stage 1 and 2, are not statistically different from each other ( $F = 0.86, p = 0.359$ ), but statistically different to the change in contributions in the Control group ( $p < 0.05$ ). In this model, the developments over time are not statistically different between the treatment groups ( $F = 0.144, p = 0.2362$ ). Model 5 distinguishes between voluntary Statement-Makers and subjects who decided not to make a statement. The lower right side of Figure 3 is based on this estimation. The coefficients ‘Voluntary State’ and ‘Compulsory’, measuring the mean change in contributions between Stage 1 and 2 for voluntary and compulsory Statement-Makers, are statistically different ( $F = 6.61, p = 0.0133$ ). This result indicates that voluntary statements possibly induce stronger, self-driven commitment at the beginning of Stage 2. The consequent increase in contributions, however, vanishes faster for the voluntary than for the compulsory Statement-Makers ( $H_0: \text{Voluntary} \times \text{State} \times \text{Round} = \text{Compulsory} \times \text{Round}: F = 3.02, p = 0.0885$ ). The results remain when the individuals’ average contribution level in Stage 1 is taken into account (*Avg.contrib\_S1*). Groups, who made the compulsory statement are more steered against the deterioration of contributions over time.

**Result 6:** *The positive effect of the statement lasts longer in the Compulsory treatment group than in the Voluntary treatment group.*

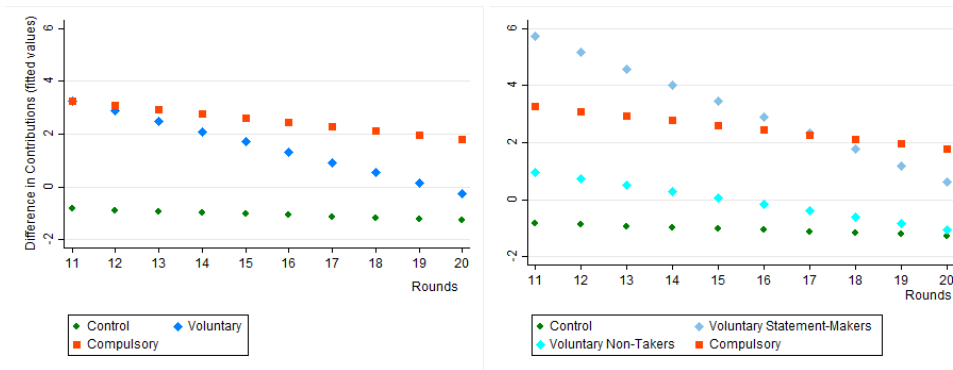
Result 6 suggests that not only compulsory statements of intent may help to reach higher level of contributions on an aggregate level in public good situations, they may also help to sustain this increase in contributions for longer.

Finally, subjects’ compliance with the statement should be discussed.

Figure 3: Dynamic Development



(a) Note: This graph shows the average contributions of the Control, Voluntary and Compulsory treatment group in all rounds of Stage 1 and 2.



(b) Note: This graph displays the dynamic development of contributions between Stage 1 and 2. We used fitted values, based on the average change of individual contributions for each round: The left column shows that the increase in contributions is deteriorating faster in the Voluntary group than in the Compulsory group, another aspect of the coordination effect. In the right column it can be seen that the decline of average contributions in the Voluntary treatment group is driven by the voluntary Statement-Makers. But, the effect of the statement prevails until the end of the ten repetitions.

Table 5: Dynamic Change in Contributions, per Treatment in Stage 2

	Model 4	Model 5	Model 6
Round	-0.0485 (0.110)	-0.0485 (0.110)	-0.0485 (0.110)
Voluntary	7.838** (2.991)		
Voluntary $\times$ No		3.700 (3.132)	3.516 (3.101)
Voluntary $\times$ State		8.542** (3.322)	8.775** (3.320)
Compulsory	5.366** (2.475)	5.366** (2.477)	6.445** (2.498)
Voluntary $\times$ Round	-0.340* (0.187)		
Voluntary $\times$ No $\times$ Round		-0.174 (0.190)	-0.174 (0.190)
Voluntary $\times$ State $\times$ Round		-0.517** (0.231)	-0.517** (0.231)
Compulsory $\times$ Round	-0.116 (0.156)	-0.116 (0.156)	-0.116 (0.156)
Avg_contrib_S1			-0.189*** (0.0231)
Constant	-0.298 (1.993)	-0.298 (1.994)	4.625** (1.980)
Observations	1920	1920	1920
Adjusted $R^2$	0.039	0.052	0.131

*Note: This table presents the results of OLS regressions on the change in contribution levels for each round of Stage 1 and Stage 2. Standard errors, clustered on the matching group level, are in parentheses.*

*\*\**, *\**, *\** indicates significance at the 1%, 5% and 10% levels, respectively.

In the first round of Stage 2 both groups of Statement-Makers, voluntary and compulsory, are with their contributions close to stated level (Voluntary Statement-Makers: 14.387 ECUS (SD: 5.018) and Compulsory Statement-Makers: 14.797 ECUs (SD: 5.265)). The compliance rates of 87% for the Voluntary Statement-Makers and 83% for the compulsory Statement-Makers are not statistically different ( $Z = 0.534$ ,  $p = 0.593$ ). The compliance rates, however, deteriorate over the course of Stage 2 and reach on average 68% for the voluntary and 73% for the compulsory Statement-Makers. Over all rounds, compulsory Statement-Makers are thus weakly significantly more often compliant than voluntary Statement-Makers ( $Z = -1.671$   $p = 0.095$ ). The reason here fore lies in the faster depletion of the motivation of voluntary Statement-Makers to fulfill the statement when playing with Non-Takers. The two groups, in which all group members voluntary chose to make the statement are meeting, in comparison, in all rounds, except the last two, the required contribution level (Average contribution: 15.462 ECUs (SD:5.619)). This finding points again to the power of the coordination effect.

**Result 6:** *Compliance with the statement of intent is more frequent in the Compulsory treatment group than in the Voluntary treatment group.*

## 5 Conclusions

Our results suggest that public statements of good intent, used in oaths and codes of good conduct, can help to promote pro-social behavior in public good settings. On the assumption of rational behavior and pure self-interest one would see such statements as merely cheap talk and attribute behavioral changes, if at all, to a *selection effect*.

In this study we showed that this conclusion is wrong: with a within-subject design we controlled for endogeneity and demonstrated that the public statement elicits an additional *commitment effect*. Once a statement has been made, it has a positive effect on the level of contributions. We find hereby that the commitment effect has two components, the behavioral change due to the self-driven commitment and the effect of coordination which helps groups to coordinate on better outcomes. On basis of this *coordination effect* contributions and compliance with the public statement was higher when all group members made a statement of good intent.

In contrast to bilateral interactions, this finding suggests compulsory statements of good conduct are more effective in promoting public good contributions.

To what extent are these results specific to the artificial situation in an experimental laboratory and what can be drawn out as implications for the real world? It can be argued that contributions to the public good are contrived in our design and misconduct is clearly defined. Misconduct in the real world is in some cases clearly identifiable, but in most cases the

distinction between a violation of norm conducts and simply less socially acceptable behavior is rather blurry.

These considerations are in general a downside of abstract laboratory experiments. But on the positive side, the purity of incentives and clarity of the decision setting formed a control, which enabled us to identify the three effects that motivate potential behavioral changes as a result of the use of public statements of good intent.

Our results suggest public statements of good intent can help to promote professional integrity. Our findings support policies that require public statements regarding conflicts of interest or ethical conduct, as is mandatory, for example, to enter a profession or for submission of an article to an academic journal.

In general, our research suggests that even a non-binding statement of the 'intended public good' contribution increases the overall level of contributions and can hence be a low-cost policy intervention to increase adherence to norms associated with contribution to public goods. Thus, where it may be politically difficult to ensure adherence to legally binding rules and regulations that assure contributions to the public good, public statements may be a less invasive and politically-easier solution to mitigate this problem.

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## 6 Appendices

### 6.1 Subject pool

#### 6.1.1 Demographics

Table 6: Summary Statistics

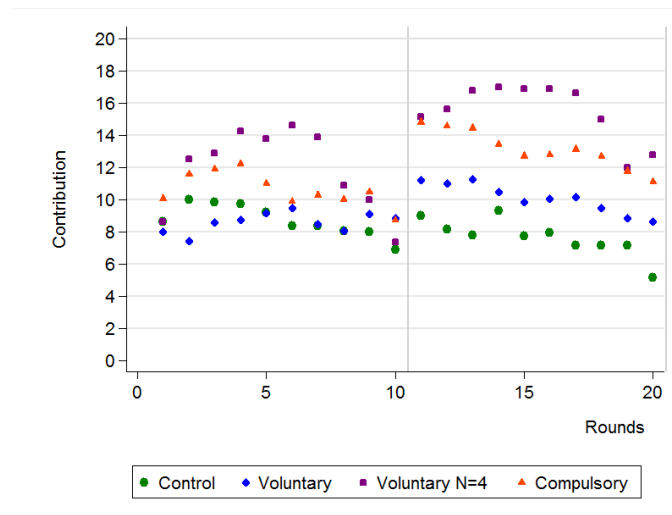
Variable	Mean	Std. Dev.	Min.	Max.	N
Econ	0.56	0.50	0	1	192
Undergrad	0.85	0.23	0	1	192
Female	0.46	0.50	0	1	192
Age	22.60	6.35	17	63	192
Income	171.53	16.05	50	1000	144
Finsat	0.32	0.468	0	1	175
lessRelig	4.43	1.55	1	6	175
CRT	1.21	1.12	0	3	192
SRM	5.83	1.51	4	11	191
SDS	4.43	2.35	0	11	190

Table 7: Demographics over Treatment groups

	Treatment groups			Total
	Control	Voluntary	Compulsory	
Econ-Fin-Bus (%)	57.8	54.7	56.3	56.3
Undergrad (%)	92.2	84.4	78.1	84.9
Female (%)	45.3	45.3	48.4	46.4
Av. Age	22.94	23.64	22.23	22.93
Av. Income	174.44	169.79	170.59	170.53
Finsat	0.29	0.34	0.33	0.32
lessRelig	4.40	4.63	4.27	4.43
CRT	0.95	1.34	1.33	1.21
SRM	5.67	5.86	5.97	5.83
SDS	4.27	4.46	4.57	4.43
N	64	63	63	190*

\* Two subjects did not answer the psychological questionnaires.

Figure 4: Comparison Contributions in Stage 1 and 2, Statements



Note: This figure displays average contributions for each round in Stage 1 and 2. The development of the two groups in the voluntary treatment, in which all group-members decided to make the statement voluntarily, is plotted separately.

## 6.2 Demographic Characteristics of Statement-Makers

**Post-experimental Questionnaire** In the following two paragraphs, we investigate whether subjects who choose to make a statement hold specific characteristics. For this purpose we elicited demographic information and psychological measures in a post-experimental questionnaire. We asked subjects for their sex, age, degree, course and religiosity.<sup>16</sup> We also asked five questions from the Socio-moral Reflection Measure Questionnaire (Basinger and Gibbs, 1987; Gibbs et al., 2013, SRM, see ), which contains items addressing socio-moral values like truth telling. The questions we asked were addressing the attitude towards promises and lying.<sup>17</sup>

We also elicited a short version of the Crowne and Marlow Social Desirability Scale (SDS). This scale is often used in Psychology and Clinical Research to measure the need for social approval.<sup>18</sup> A person with a high SDS score is more likely to perform certain behavior with the desire to be socially accepted or approved.

Ultimately, as an estimator for strategic reasoning we integrated the cognitive reflection test (CRT) (Frederick, 2005). This test is designed to assess an individual's ability to suppress an intuitive and spontaneous idea, which is incorrect, and engage in further reflection that leads to the correct response. Answers were incentive compatible, so that participants were paid 1 AUD for each correct answer. The CRT measure ranges from 0 to 3, indicating a person with a high CRT score is able to resist intuitively compelling responses.

In the following, we shed light on the characteristics of subjects who voluntarily made the statement in the Voluntary treatment group.

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<sup>16</sup>To have an indication how religious participants were, we asked "*Apart from weddings, funerals and christenings, how often do you attend religious services these days?*" The variable was coded with "*More than once a week*" (1), "*Once a week*" (2), "*Once a month*" (3), "*Once a year*" (4), "*Less often than once a year*" (5), "*Never*" (6).

The observed average of 4.43 suggests that participants on average went to church between once per year or less; apart from weddings, funerals and christenings.

<sup>17</sup>We asked the following questions: 1) *How important is it for people to keep promises, if they can, to friends?* 2) *How important is it for people to keep promises, if they can, even to someone they hardly know?* 3) *How important is it for parents to keep promises, if they can, to their children?* 4) *How important is it for people to tell the truth?*

The variable is coded in reverse order: very important (1), important (2), not important (3).

Thus a high score in SRM indicates that the person stated that he/she perceives promise keeping as less important.

<sup>18</sup>The original version includes 50 items, we used a shorter version from Fischer and Fick (2003) which is proofed to be also valid and internally consistent (Barger, 2002).

Table 8: Regression: Statement-Makers demographics

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Econ	-0.0611 (0.138)			-0.170 (0.171)	-0.0588 (0.189)
Postgrad	0.187 (0.209)			0.383 (0.273)	0.535* (0.310)
Experiment	0.153 (0.146)			0.219 (0.181)	0.259 (0.209)
Female	-0.276** (0.130)			-0.418*** (0.156)	-0.395** (0.163)
Age	-0.00695 (0.0107)			-0.00876 (0.0162)	-0.00993 (0.0182)
Finsat		-0.0876 (0.143)		-0.153 (0.169)	-0.150 (0.185)
lessRelig		0.0537 (0.0446)		0.0573 (0.0555)	0.0632 (0.0579)
CRT			-0.0241 (0.0560)	-0.0571 (0.0732)	-0.0497 (0.0756)
SRM			0.0607 (0.0388)	0.0393 (0.0470)	0.0555 (0.0503)
SDS			0.0540* (0.0310)	0.0407 (0.0375)	0.00774 (0.0416)
Avg_contrib_S1					0.0662** (0.0305)
Avg_others_contrib_S1					-0.00856 (0.0140)
Observations	64	56	63	55	55

Standard errors are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Note: This table presents the marginal effects (calculated at the means of all variables) from a probit regression on the likelihood a participant takes voluntarily the statement in Stage 2, based on the demographical characteristics.*

**Characteristics of Voluntary Statement-Makers** Table 8 shows the likelihood that a participant takes the statement voluntarily in Stage 2 based on demographic characteristics.

Model 1 takes course, degree of studies and experience in the laboratory, gender and age into account. The variables Female, Econ and Postgraduate are dummy variables which take the value one when the participant was respectively female, studying Economics or enrolled in a postgraduate course. Model 2 predicts the likelihood of making the voluntary statement based on the extent to which a participant was satisfied with his or her financial situation and the degree of religiosity. Model 3 uses the psychological measurements we elicited in the experiment as explanatory variables. Model 4 combines all previous three models and Model 5 controls additionally for the experience a participant has made in the previous stage (average contribution of the other group members in Stage 1) and the own contribution



behavior in Stage 1. The results show that only gender has a significant and robust impact on the decision to voluntarily make a statement about intended social behavior. When a participant was female, she was 40% less likely to make the voluntary statement ( $p = 0.016$  in Model 5).

## 7 Instructions

### 7.1 Section 1: Baseline

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?

## Experiment / Choose a Contribution

**Contribution Stage**

Please enter your contribution to the project:

Continue

Figure 5: Screenshot Enter Contribution

The screenshot shows a window titled "Experiment / Estimation". It contains two columns of text and input fields. The left column asks for the user's best guess about the contribution of three other players (PLAYER 1, 2, and 3). The right column asks for the user's best guess about the contribution of the other player about their own contribution. Each question is followed by a text input field. A "Continue" button is centered at the bottom of the form.

<b>What is your best guess about the contribution of.</b>	<b>What do you think is the best guess of the other player about YOUR contribution .</b>
Guess about the contribution of PLAYER 1: <input type="text"/>	Player 1's best guess about YOUR contribution: <input type="text"/>
Guess about the contribution of PLAYER 2: <input type="text"/>	Player 2's best guess about YOUR contribution: <input type="text"/>
Guess about the contribution of PLAYER 3: <input type="text"/>	Player 3's best guess about YOUR contribution: <input type="text"/>

Continue

Figure 6: Screenshot Enter Beliefs

## 7.2 Section 2 : Voluntary Statement

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.

You are matched with a different group of 3 people than in the previous section. You will remain in this group for all rounds of Section 2.

Section 2 has 10 rounds.

This section differs slightly from what you have done so far. You now have the possibility 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 in the designated box.

**Alternatively:** Please type the following text in the designated box. *I am a voluntary participant in this experiment, no coercion or interference has taken place.*

### 7.2.1 Compulsory Statement

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.

You are matched with a different group of 3 people than in the previous section. You will remain in this group for all rounds of Section 2.

Section 2 has 10 rounds.

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

You confirm your intention by writing down the statement in the designated box on the following page. The statement does not restrict your range of choices later on.

Once all the players have written down the statement the game continues.

The following statement shall describe your intended behaviour for the entire Second Section.

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

Please be aware that everyone has to enter the text in the next stage.

**Statement**

The following statement is offered to describe your intended behavior 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.

[Continue](#)

Figure 7: Screenshot: Decide Statement

**Statement**

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

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

[Next](#)

Figure 8: Screenshot: Enter Statement