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Cooperation under oath: A case for context-dependent preferences

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ABSTRACT

The oath has been shown to improve behavior toward social objectives. Existing research suggests that the oath promotes pro-social behavior without affecting an underlying preference for cooperation. We examine whether an oath impacts behavior in the simultaneous and sequential versions of the prisoners' dilemma and explore whether that impact could be attributed to a change of preference for the cooperative outcome. We observe an overwhelming transfer of reported strategies by oath-takers moving second from selfish (always defect) to conditionally cooperative (cooperate against cooperation by first movers). Our results lend support to the hypothesis that preferences depend on the oath-taking context.

1. Introduction

Recent studies have examined the role of a solemn oath to honesty as a device against self-interest. The oath procedure involves a pre-experiment request to sign a truth-telling oath, so that subsequent decisions can be evaluated within the oath-taking context. The honesty oath has been applied to situations of honest reveal of stated preferences (Jacquemet et al., 2013, 2017), compliance in tax-evasion games (Jacquemet et al., 2020), and truthful communication in coordination games (Jacquemet et al., 2018). These studies find that the oath can improve behavior toward social objectives.[1]

The working hypothesis is that the oath impacts behavior without affecting internalized social norms or, alternatively, social preferences.[2] According to the socio-psychology theory of commitment, the oath is a commitment device that makes salient to the oath-taker the type of behavior that would be consistent with their private preference (see, e.g., Kiesler, 1971; Joule et al., 2007). This hypothesis is supported by Hergueux et al. (2022), who, in a public goods game, find that conditional cooperators are more likely to match the average contribution of others, and by Jacquemet et al. (2020), who, in a tax-evasion game, find that compliance increases among individuals with weak preferences for lying. In both instances, researchers find no appeal to a change of preference among polar types of pure selfishness (free riders and "chronic" liars) and pure altruism (unconditional cooperators and never liars).

The extant literature considers a truth-telling statement meant to regulate intrapersonal conflict, such as the incentive to lie in favor of material gain, though not necessarily (or explicitly) at the expense of others. There nevertheless exist other-regarding statements that entail a commitment to a counterparty in situations of strategic conflict. Examples include swearing fidelity in marriage vows, putting the interests of clients first in fiduciary oaths, or to do no harm to patients in medical oaths.

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[1] Related work includes experiments examining the impact of verbal commitments, such as promises (e.g. Ellingsen and Johannesson, 2004; Charness and Dufwenberg, 2006). Beyond its informational content, the oath is distinct from promises in experimental settings for two main reasons. First, signing the oath precedes knowledge of the decision task. In typical experiments, in-game promises are (endogenously) elicited within an individual's intention to perform a specific action. The pre-experiment request to sign an oath to a general class of "good" behavior is such that virtually everyone agrees to take it, which allows for causal inference of the impact of the oath. And second, the oath can be viewed as the first of a two-part strategy to achieve commitment. The oath works similar to foot-in-the-door techniques which involve a low-cost request that increases acceptance of subsequent high-cost requests (Freedman and Fraser, 1966). Unlike promises, the oath implements commitment before game play and is better interpreted as a contextual device that changes the target-decision environment (i.e., being under oath or not), rather than a within-game commitment technology.

[2] Social norms are usually defined on a set of social situations (i.e., game forms), while social preferences are defined over outcomes of a game. Norms and preferences are nevertheless often used interchangeably, since social preferences (e.g., distributional preferences) implicitly import a social norm (e.g., fairness) into the utility function (Krupka and Weber, 2013; Kimbrough and Vostroknutov, 2016).

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The objective of this paper is two-fold. First, evaluate whether an other-regarding oath has an impact on cooperation in strategic situations. And second, evaluate whether that impact could be attributed to a change of preference. To do so, we consider the impact of the oath in a prisoners' dilemma (PD) game. Unlike previous work, where the oath is private and administered to all subjects, we ask that only one of the players sign a public oath. This allows us to explore differentiated impacts of the oath on oath-takers and oath-recipients. To understand whether the oath acts through a change of preference, we consider both the simultaneous and sequential versions of the PD. In the sequential PD (SPD), second movers can condition their action on that of first movers, which allows for the revelation of preferences over outcomes in the PD.

The oath that we ask subjects to swear is "to help others at all times", which is in line with oath statements that prescribe doing service unto others (e.g., Scout Oath and Hippocratic Oath). "To help others" has a direct connection to the PD, insofar as defection is harmful to one's opponent. This expressive cue contrasts with the honesty statement: "to tell the truth and always provide honest answers", which is unrelated to choices in the PD. To examine whether the oath-taking environment alone is enough to prevent defection, we also test the effectiveness of the honesty oath in the simultaneous PD. Throughout, we call our primary oath treatment the "cooperation oath" to distinguish it from the honesty oath applied in previous experiments.

Our analysis provides three main findings. First, the cooperation oath significantly increases cooperation by oath-takers across variants of the PD. Second, the honesty oath has no impact on cooperation by either oath-takers or oath-recipients. And third, we find an overwhelming transfer of reported strategies of second movers under the cooperation oath from unconditional defection to conditional cooperation. Our data support the view that the oath operates through a change of preference.

2. Hypotheses

There are two main mechanisms that could explain changes in behavior following the oath. One explanation is provided by social preference theories, such as inequity aversion (e.g., Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) or intentions-based reciprocity (e.g., Rabin, 1993; Falk and Fischbacher, 2006). These theories concur with the hypothesis that individuals are conditional cooperators, who interpret games with a PD structure as a coordination game in terms of utilities. Because a coordination game has multiple equilibria, the oath may act as an equilibrium selection device that changes behavior through changes in expectations. We call this the coordination hypothesis.

An alternative explanation is that the oath works through a change of preference. Theories of context-dependent preferences applied to social interactions include team reasoning (e.g., Sugden, 1993; Bacharach, 1999) and compliance with social norms (e.g., March, 1994; Montgomery, 1998; Weber et al., 2004). These theories predict that changes in behavior result from a change in the utility value placed on cooperation. We call this the variable-preference hypothesis.

The two hypotheses predict that cooperation increases in the PD because of either a change in expectations or a change of preference. In the SPD, however, second movers respond to observed choices and their behavior is motivated by preferences alone. If the oath operates through a change of preference, cooperation should increase in response to choices of first movers. Otherwise, the choice of second movers should remain unaffected.[3]

[3] The first-mover choice depends on her belief about the preferences of the second mover (i.e., whether they expect cooperation will be reciprocated). If the oath operates through beliefs alone, provided that first movers recognize that preferences have not changed, cooperation by first movers should also remain unaffected.

Table 1
Payoff matrix in US dollars.

1\2	*A*	*B*
A	5.5\5.5	0.5\8
B	8\0.5	3\3

3. Experimental design and data

The experiment was administered on Amazon Mechanical Turk (MTurk). We used Qualtrics surveys to document individual decisions, and emulated interactions through post-hoc matching. Table 1 presents the PD game described in the experiment. Option A is cooperation and option B is defection. In the text, we use labels C and D. In sequential treatments, we elicit preferences by employing the strategy method, whereby second movers choose one of four contingent strategies: CC, CD, DC, and DD. The first entry corresponds to their choice against cooperation by the first mover and the second entry their choice against defection. Based on players' chosen strategy, we classify individuals as unconditional cooperators (CC), conditional cooperators (CD), unconditional defectors (DD), and conditional defectors (DC).

The experiment is cast along two dimensions. In the first dimension, we consider no-oath and oath-groups. In the second dimension, we consider simultaneous-move and sequential-move games. In oath groups, one player is the potential oath-taker, and her match is the oath-recipient. In oath treatments with sequential play, we consider two subtreatments, in which the potential oath-taker moves first or second.

In oath treatments, potential oath-takers were asked to take the oath prior to reading the instructions of the game. To reproduce the environment of a public oath, potential oath-takers were told that their match had not been given the option of taking the oath and would be informed whether the oath had been signed. Accordingly, oath-recipients were informed whether their match had signed the oath before proceeding to the instructions block of the PD.

We recruited a total of 858 MTurk workers. The average age was 35 and the majority of participants were male (62%), white (62%), attended higher education (88%), were never married (52%), and were US citizens (78%). Each treatment included an average of 70 pairs of subjects. The experiment lasted about 5 min and participants earned on average $5.8 (including a $1.5 show-up fee). Across treatments, the oath uptake was 92.3%. Due to lack of data for statistical validity, we dropped observations of oath-recipients whose match had refused the oath.

4. Results

Table 2 shows the results of simultaneous treatments. Mean cooperation in the control (no-oath) group is 50.6%. We contrast behavior in the control group against behavior in four distinct treatment groups: oath-takers and oath-recipients in cooperation- and honesty-oath treatments. The only statistically significant change in behavior is that of oath-takers under the cooperation oath, whose cooperation rate increased to 62.2%.

In sequential treatments, we consider the impact of the cooperation oath alone. Tables 3 and 4 report the results in control and oath-groups of first movers and second movers. Among first movers, the cooperation rate of oath-takers significantly increased by 17pp, while that of oath-recipients remained unaffected. As for second movers in the control group, 41.4% chose strategy CD, 38.6% DD, 11.4% CC, and 8.6% DC. This is the distribution of strategies against which we compare strategies adopted in oath groups. Among oath-takers, the proportion of CD significantly increased to 65.1%, while the proportion of DD significantly

Table 2
Treatment effects: Simultaneous treatments.

		Cooperation			Diff.	SE	*p*-value
		Mean	SD	*n*			
No oath		0.5063	[0.5032]	79	–	–	–
Coop. oath	POT	0.5900	[0.4943]	100	−0.0837	(0.0747)	0.1318
	OT	0.6222	[0.4875]	90	−0.1159*	(0.0760)	0.0646
	OR	0.5047	[0.5023]	107	0.0017	(0.0742)	0.5089
Honesty oath	OT	0.5857	[0.4962]	70	−0.0794	(0.0814)	0.1658
	OR	0.5775	[0.4975]	70	−0.0711	(0.0812)	0.1914

Note: POT are potential oath-takers, OT oath-takers, and OR oath-recipients whose match accepted the oath. Standard deviations of mean cooperation in square parentheses and standard errors of the difference in means in parentheses. *p*-values for one-sided proportions test (outcome in treatment larger than in control). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3
Treatment effects: Sequential treatments (first movers).

		Cooperation			Diff.	SE	*p*-value
		Mean	SD	*n*			
No oath		0.4571	[0.5018]	70	–	–	–
Coop. oath	POT	0.6143	[0.4903]	70	−0.1571**	(0.0832)	0.0312
	OT	0.6250	[0.4880]	64	−0.1679**	(0.0849)	0.0258
	OR	0.5079	[0.5040]	63	−0.0508	(0.0867)	0.2791

Note: POT are potential oath-takers, OT oath-takers, and OR oath-recipients whose match accepted the oath. Standard deviations of mean cooperation in square parentheses and standard errors of the difference in means in parentheses. *p*-values for one-sided proportions test (outcome in treatment larger than in control). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4
Treatment effects: Sequential treatments (second movers).

			Strategy			Diff.	SE	*p*-value
			Mean	SD	*n*			
No oath		*CC*	0.1143	[0.3205]	8	–	–	–
		CD	0.4143	[0.4962]	29	–	–	–
		DC	0.0857	[0.2820]	6	–	–	–
		DD	0.3857	[0.4903]	27	–	–	–
Coop. oath	POT	*CC*	0.1549	[0.3644]	11	−0.0406	(0.0574)	0.4798
		CD	0.6620	[0.4764]	47	−0.2477***	(0.0814)	0.0032
		DC	0.0282	[0.1666]	2	0.0575	(0.0388)	0.1397
		DD	0.1549	[0.3644]	11	0.2308***	(0.0723)	0.0020
	OT	*CC*	0.1587	[0.3684]	10	−0.0444	(0.0597)	0.4544
		CD	0.6508	[0.4805]	41	−0.2365***	(0.0841)	0.0064
		DC	0.0317	[0.1767]	2	0.0540	(0.0401)	0.1912
		DD	0.1587	[0.3684]	10	0.2270***	(0.0742)	0.0035
	OR	*CC*	0.2000	[0.4029]	13	−0.0888	(0.0630)	0.1577
		CD	0.5429	[0.5018]	33	−0.1013	(0.0858)	0.2399
		DC	0.0143	[0.1195]	1	0.0701*	(0.0369)	0.0686
		DD	0.2429	[0.4319]	17	0.1201	(0.0802)	0.1392

Note: POT are potential oath-takers, OT oath-takers, and OR oath-recipients whose match accepted the oath. Standard deviations of mean cooperation in square parentheses and standard errors of the difference in means in parentheses. *p*-values for two-sided proportions test. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

decreased to 15.8%. Fig. 1(a) illustrates the distribution of strategies adopted by oath-takers against that of the control group. The null hypothesis that the two distributions are equal is rejected (two-sample Kolmogorov–Smirnov (KS) test; $p = 0.005$). Among oath-recipients, the distribution of strategies followed a similar pattern to that of oath-takers, but the null that the distribution remained unchanged cannot be rejected (KS test; $p = 0.151$).

5. Discussion

Our results indicate that the cooperation oath has a direct effect upon those who take it, but not upon those who receive it. We find that oath-takers are more likely to cooperate in simultaneous (12pp increase) and sequential interactions, both when moving first (17pp) and second (24pp). We find no effect of the honesty oath in simultaneous play.

There are three main experimental regularities observed in social dilemmas. First, although free riding is a dominant strategy, a substantial share of individuals cooperates in one-shot social dilemmas, but free riding is also frequently observed (e.g., Dawes, 1980; Dawes and Thaler, 1988). Second, a large proportion of individuals are conditional cooperators (e.g., Fischbacher et al.,

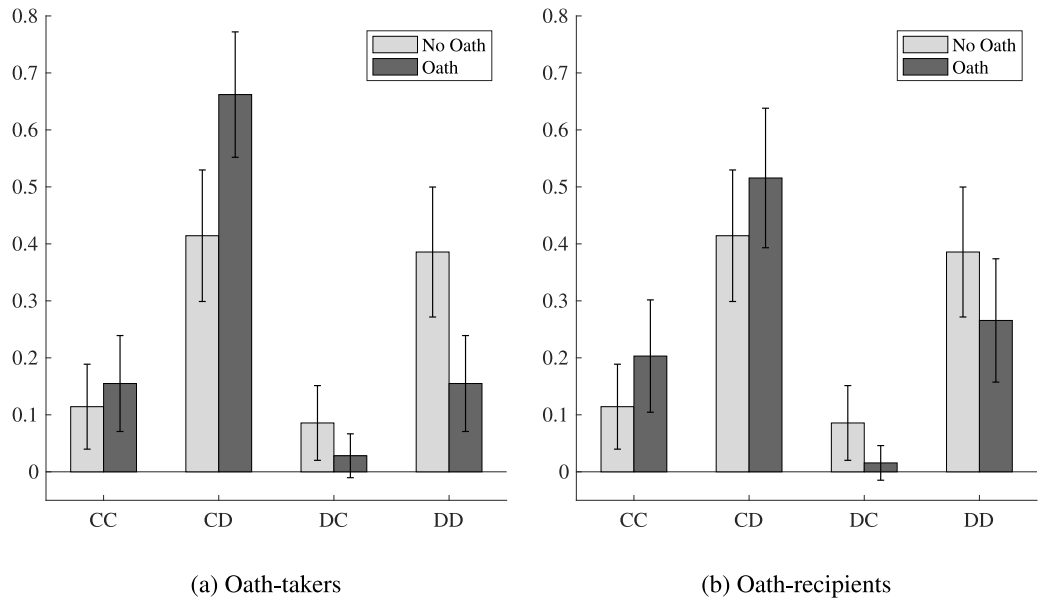

Fig. 1. Distribution of types in experiment.
Note: Distribution of types of second movers in no-oath (control) group (light gray in panels A and B) against the distribution of oath-takers (dark-gray in A) and against the distribution of oath-recipients (dark-gray in B). Each staple indicates the fraction of second movers that chose the corresponding strategy. Error bars indicate 95% confidence intervals.

2001; Kocher et al., 2008; Chaudhuri, 2011). And third, pro-social manipulations of the game cause substantial increases in cooperation (e.g., Sally, 1995; Alekseev et al., 2017).

Our results are in line with previous studies. In the baseline case, we find that roughly 50% of subjects cooperate in the PD and in the SPD when moving first, and that 40% of individuals report a preference for conditional cooperation in the SPD when moving second. Following the cooperation oath, our results indicate a significant increase in cooperation by oath-takers in different roles across variants of the PD.

The significant change in the distribution of strategies adopted by oath-takers gives support to the variable-preference hypothesis. If preferences had remained the same, second movers would have maintained their ordering of all four outcomes in the SPD. Instead, we find a significant decrease in unconditional defection (23pp) and a significant increase in conditional cooperation (24pp).

We emphasize that support for the variable-preference hypothesis does not rule out the competing coordination hypothesis. The coordination hypothesis states that the oath acts as a selection device in the presence of multiple equilibria. Given the presence of conditional cooperators in the baseline group (>40%), this hypothesis predicts that cooperation increases in the PD at the intensive margin among conditional cooperators. It is possible to have a simultaneous increase in the *number* of conditional cooperators (i.e., extensive margin) and in the *choice* of cooperation among pre-existing conditional cooperators (i.e., intensive margin).

Our results nevertheless indicate that the coordination hypothesis has limited scope for explaining the behavior of pre-existing conditional cooperators. In the baseline case, by pooling the share of unconditional (11.4%) and conditional cooperators (41.4%), we find that the proportion of cooperative types amounts to 52.9%, which is roughly equal to the cooperation rate observed in the PD (50.6%). These figures suggest that there is no room for cooperation to increase at the intensive margin, since all conditional cooperators cooperate without the oath.[4]

As a robustness check, we tested the impact of the honesty oath and found no impact on behavior of neither oath-takers nor oath-recipients. This result contrasts with Hergueux et al. (2022), who find that the honesty oath had a positive impact on cooperation in a public goods game. Despite the difference in results, our findings are not strictly incompatible. The authors argue that the honesty oath leads individuals to cooperate in accordance with their (fixed) preference for conditional cooperation. Our results, on the other hand, suggest that there is no room for conditional cooperators to adhere to cooperation beyond baseline compliance.

More broadly, our findings relate to the small set of empirical studies that elicit preferences following changes in context (e.g., framing of games and action labels) using the strategy method in public goods settings.[5] Consistent with our results, Frackenpohl et al. (2016), Fosgaard et al. (2017), and Gächter et al. (2022) find that preferences for conditional cooperation are sensitive to (give/take) institutional frames, although Fosgaard et al. (2014) in a similar setting find that behavioral changes are instead explained by changes in expectations. Directly connected to our approach are studies that examine context effects in a PD and use the SPD to isolate the preference channel. Yamagishi and Kiyonari (2000) elicit group membership in a PD and use the SPD to articulate that in-group favoritism is driven by expectations, not preferences, and Ellingsen et al. (2012) examine the role of community framing in a PD and find that the framing effect disappears in sequential play, which is a result consistent with the coordination hypothesis. In contrast, we consider the contextual manipulation of the oath and find support for preferences to be context dependent.

[4] This argument assumes that preferences are independent of the role assigned to players in the PD and in the SPD. Findings from previous experiments indicate that behavior across roles of the same game is consistent with stable social preferences (e.g. Blanco et al., 2011, 2014).

[5] The literature examining contextual manipulations of social dilemmas is vast, but the majority of studies does not disentangle preferences from expectations in determining behavior, instead focusing on cooperation decisions alone. See Gerlach and Jaeger (2016) and Alekseev et al. (2017) for two reviews of context effects.

6. Conclusion

Altogether, our findings are relevant for understanding the determinants of cooperation. The observation that cooperation increases following the cooperation oath is of practical significance, considering the widespread use of solemn pledges to resolve conflict in strategic interactions (e.g., nonbinding international agreements and employment codes of conduct). Moreover, the result that the oath transforms selfish tendencies into cooperative dispositions is especially important for the debate of whether preferences are dependent on the oath-taking context, in particular, and on context in strategic settings, in general. Here, we present direct evidence of an instance where preferences for cooperation in strategic settings are context dependent. Future research should investigate whether our findings can be sustained beyond immediate decision contexts. This includes evaluating the persistence of oath effects over multiple interactions, as well as assessing the impact of repeated exposure to oath treatments. Understanding the duration and potential for satiation of oath effects is essential for informing the strategic implementation (e.g., timing and frequency) of oath interventions.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2023.111229.

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