



## Coordination with Communication under Oath

Nicolas Jacquemet, Stephane Luchini, Jason Shogren, Adam Zylbersztejn

### ► To cite this version:

Nicolas Jacquemet, Stephane Luchini, Jason Shogren, Adam Zylbersztejn. Coordination with Communication under Oath. 2011. halshs-00635801v1

**HAL Id: halshs-00635801**

**<https://shs.hal.science/halshs-00635801v1>**

Preprint submitted on 26 Oct 2011 (v1), last revised 5 May 2012 (v2)

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

**Coordination with  
Communication under Oath**

**Nicolas Jacquemet  
Stéphane Luchini  
Jason F. Shogren  
Adam Zylbersztein**

**October 2011**

DT-GREQAM

# Coordination with Communication under Oath<sup>\*</sup>

Nicolas Jacquemet<sup>†</sup>      Stéphane Luchini<sup>‡</sup>  
Jason F. Shogren<sup>§</sup>      Adam Zylbersztein<sup>¶</sup>

October 2011

## Abstract

We study the simultaneous move version of a coordination game in which failures arise due to the use (and fear) of weakly dominated strategies. Existing evidence shows neither cheap talk communication between players nor historical information on past decisions nor even repetition-based learning are able to implement the efficient outcome. We study the effect of one addition to the design: subjects sign a truth-telling oath before participating to the game with cheap-talk communication. We find oath significantly improves the truthfulness of messages sent, as well as helps eliminating weakly dominated actions. This change however has very few consequences on coordination, because receivers do not adjust their own strategies for this change.

**Keywords:** Coordination game; Cheap talk communication; Oath.

**JEL Classification:** C72; D83.

## 1 Introduction

A coordination game captures the idea that value can be created when people coordinate their non-cooperative actions in a strategic environment (see Schelling, 1960; Cooper, DeJong, Forsythe, and Ross, 1990). If people coordinate their otherwise sovereign actions, they can reach a first best equilibrium among many suboptimal ones. Coordination failure arises when people fail to achieve the first best outcome due to strategic uncertainty – the risk associated with not knowing how your opponent

---

<sup>\*</sup>We wish to thank the PACA Regional Council for funding this research. Jacquemet greatly acknowledges the *Institut Universitaire de France*.

<sup>†</sup>Paris School of Economics and University Paris I Panthéon–Sorbonne. Centre d’Economie de la Sorbonne, 106 Bd. de l’Hôpital, 75013 Paris. Nicolas.Jacquemet@univ-paris1.fr

<sup>‡</sup>GREQAM-CNRS, Centre de la Vieille Charité, 13236 Marseille Cedex 02. stephane.luchini@univmed.fr

<sup>§</sup>Department of Economics and Finance, University of Wyoming, Laramie, WY 82071-3985, United States; and Department of Economics, Umeå University, S 901 87 Umeå, Sweden. JRamses@uwyo.edu

<sup>¶</sup>Paris School of Economics, University Paris I Panthéon–Sorbonne. Centre d’Economie de la Sorbonne, 106 Bd. de l’Hôpital, 75013 Paris. adam.zylbersztein@malix.univ-paris1.fr

will play the game (see, *e.g.*, the survey by Devetag and Ortmann, 2007). Better communication is the most frequently prescribed institution to overcome coordination failure (see, *e.g.*, Cooper, DeJong, Forsythe, and Ross, 1992; Parkhurst, Shogren, and Bastian, 2004). Accumulated evidence shows (i) communication can improve coordination and the efficiency; but (ii) many coordination failures remain.

Herein we explore whether an oath to tell the truth can enhance the power of communication and overcome coordination failure. Cheap talk communication in coordination games is typically non binding, *i.e.* there is no economic consequence for the individual if she does not act as she said she would. What misses in that context is a commitment device that makes individuals more likely to keep their word, which would in turn reduce strategic uncertainty. Commitment-experiments in social psychology have shown that subjects comply with certain actions much more often when they have freely chosen to commit themselves to doing them through a prior engagement or promise (see Joule and Beauvois, 1998).<sup>1</sup> Results of economic experiments are in line with those obtained in social psychology. Subjects who make promises about future actions after pre-play communication are more likely to keep them (see *e.g.* Ellingsen and Johannesson, 2004; Charness and Dufwenberg, 2006; Vanberg, 2008).

Our experimental design uses a classic sequential coordination game originally proposed by Selten (1975) and Rosenthal (1981), in which failures are driven by strategic uncertainty – due to subjects being reluctant to rely on the ability of others to maximize payoffs (see for instance Beard and Beil, 1994; Beard, Beil, and Mataga, 2001; Goeree and Holt, 2001; Jacquemet and Zylbersztejn, 2010). We strengthen the link between subjects and the actions they take inside the lab by relying on the oath procedure introduced by Jacquemet, Joule, Luchini, and Shogren (2009) which consists of presenting to subjects a truth-telling oath before they enter the lab. Our results show that the content and truthfulness of communication from the sender, as well his actions in the game, all are significantly affected in the appropriate direction by the oath. This does not induce a significant change in the distribution of outcomes, however, because receivers either do not trust the communication or they fail to anticipate this effect. Our findings reveal the two-sided nature of communication – one should account for how to design communication devices, and how the message is received. Having committed communication accurately adjusted for by receivers is the next challenge.

---

<sup>1</sup>In so called low-ball experiments, for instance, subjects are asked their willingness to perform a target behavior before knowing the full costs of the target behavior. Evidence show that low-balling significantly increases compliance in comparison to a situation where individuals are asked to perform the target behavior directly (see Cialdini, Bassett, Miller, and Miller (1978) for the seminal experiment, Cialdini and Sagarin (2005) for an overview and Joule and Beauvois (1998) for a comprehensive work on procedures that create commitment).

TABLE 1: THE EXPERIMENTAL GAME

Player A	Player B	
	$l$	$r$
$L$	(9.75; 3)	(9.75; 3)
$R$	(3; 4.75)	(10; 5)

## 2 Description of the experiment

### 2.1 The game

**Coordination game.** We rely on the normal form game presented in Table 1.<sup>2</sup> The game involves two players: player A, who chooses between actions  $R$  and  $L$ , and player B, who chooses between actions  $r$  and  $l$ . If  $R$  is chosen by player A, player B can maximize both players' payoffs by selecting action  $r$ . Alternatively, player B may choose action  $l$ , which slightly undermines her own payoff and furthermore sharply decreases player A's payoff. If, in turn, player A chooses  $L$ , then both players' payoffs do not depend on player B's decision – payoffs are the same whatever action is chosen.

From the theoretical standpoint,  $(R, r)$  is a Pareto dominant and a pure-strategy perfect Nash equilibrium.  $(L, l)$  also happens to be a Nash equilibrium, which is nonetheless imperfect – since it involves a weakly dominated strategy  $l$  from player B. Therefore, player A's best choice is  $R$  should player B be an own-payoff maximizer who seeks to use the dominant strategy  $r$ , and  $L$  otherwise. Furthermore, action  $L$  involves the least strategic uncertainty for player A. Depending on the stakes, player A's expected payoff from an unreliable decision  $L$  can dominate the expected payoff of a reliant decision  $R$ , even if the probability that player B uses dominated strategies is very low.<sup>3</sup>

**Pre-play communication.** Prior to decision making, player B transmits a cheap talk signal to player A, indicating (truthfully or not) her intended decision. We are interested in a fixed-form communication, in which player Bs choose between three messages: “I will choose  $r$ ”, “I will choose  $l$ ”, “I will either choose  $l$  or  $r$ ”. Clearly, the first two messages are informative, while the last one is uninformative in what concerns player Bs' intentions. The first of these signals has important theoretical

<sup>2</sup>This payoff structure appears as Treatment 1 in the genuine experiment of Beard and Beil (1994). Among several reported payoff schemes, this one induces the most striking behavior among participants: (i) the frequency of player As' unreliable choices related to this treatment is remarkable: 65.7%, and (ii) this is the only treatment where deviations from the dominant strategy by player Bs were observed (in 17% of all cases where player A made a reliant decision  $R$ ). (Jacquemet and Zylbersztejn, 2010) report that roughly 50% of all player As' decisions are unreliable, and that player Bs use dominated strategy in about 20% of all cases, when this simultaneous-move game is repeated. Jacquemet and Zylbersztejn (2011) show that these results are robust to a change in the payoff structure that eliminates inequality in payoffs between players.

<sup>3</sup>The cut-off probability of decision  $l$  by player B which makes player A indifferent between actions  $L$  and  $R$  equals 0.036.

properties: namely, it is self-committing, but not self-signalling (Farrell and Rabin, 1996; Aumann, 1990). It is self-committing because, if trusted, it induces player A to choose  $R$ , to which player B's best response is  $r$  – exactly as the message announces. However, it is not self-signalling, since it does not reveal player B's true intentions: she may use message “I will choose  $r$ ” to persuade her partner to choose  $R$ , and take any action afterwards. Hence, communication in our game provides some reassurance to the receiver about the rationality of the sender. If individuals have a weak preference for truthfulness, player Bs always reveal their true intention and use message “I will choose  $r$ ” to signal that they disregard the weakly dominated strategy. One-way communication between partners is generally found to improve efficiency in coordination games by reducing strategic uncertainty. For an insightful review of related literature see, *e.g.*, Crawford (1998); Ellingsen and Östling (2010).

## 2.2 Experimental design

**Baseline treatment (NoOath).** Each experimental session consists of 10 rounds of the game presented in Table 1. Roles are fixed, so that each participant takes 10 decisions as either player A or player B. After each interaction, pairs are rematched according to a perfect stranger round robin procedure. For the sake of avoiding the end-game effects, we do not reveal to participants the exact number of rounds, but only inform in the experimental instructions that there will be several of them. At the beginning of each round, player B sends one of the three messages to player A by clicking on a relevant button on her computer screen. We explain to the subjects that messages sent by player Bs do not affect their payoffs, and that they can be followed by any decisions. Once player A has confirmed receiving the message, the game moves to the decision-making stage, where player A chooses between  $R$  and  $L$ , while player B – between  $r$  and  $l$ . Instructions inform the participants that decision is first taken by player A, then by player B, and the final payoff depends only on player A's decision should  $L$  has been chosen, and on both partners' decisions otherwise. At the end of every round, each subject is only informed about her own payoff. Next, individuals are informed that either another round is about to start, or that the experiment ends.<sup>4</sup>

**Oath treatment.** This treatment uses an identical experimental environment as the baseline treatment, except that each subject is asked to sign an explicit oath before entering the lab (see Jacquemet, Joule, Luchini, and Shogren (2009) and Jacquemet, James, Luchini, and Shogren (2010)). The oath is implemented as follows: each subject enters alone and is directed to a monitor at the front of the laboratory. The monitor then offers each subject a form to sign entitled “solemn oath” as presented in Figure 1.<sup>5</sup> The *Paris School of Economics* logo on the top of the form and the address at the bottom indicate that it is an official paper; the topic designation and the research number were added so to ensure the credibility. The monitor explicitly points out to the subject before she reads the form that she is free to sign the oath or not, and that participation and earnings are not conditional on signing the oath (subjects are, however, not informed about the topic of the experiment when asked to take

<sup>4</sup>The material used in the experiment is available from the authors upon request.

<sup>5</sup>The word “oath” is written on the form and read by the subject, but never said aloud.

FIGURE 1: OATH FORM USED IN THE EXPERIMENT

PARIS SCHOOL OF ECONOMICS  
ÉCOLE D'ÉCONOMIE DE PARIS

**SOLEMN OATH**

Topic: "JZ"; Research number 1842A

I undersigned ..... swear upon my honour that, during  
the whole experiment, I will:

**Tell the truth and always provide honest answers.**

Paris, ..... Signature.....

---

Paris School of Economics, 48 Boulevard Jourdan 75014 Paris - France.

the oath). The subject reads the form, which asks whether she agrees “to swear upon my honor that, during the whole experiment, I will **tell the truth and always provide honest answers**” (in bold in the original form). Regardless of whether the subject signs the oath, he or she is thanked and invited to enter the lab. The exact wording used by the monitors to offer the oath to respondents was scripted to standardize the phrasing of the oath. One monitor stayed in the lab until all subjects had been presented with the oath, to avoid communication prior to the experiment. Subjects waiting their turn could neither see nor hear what was happening at the oath-desk.

## 2.3 Experimental procedures

We run five experimental sessions, three for the baseline treatment and two for the oath treatment, each of them involving 20 subjects – 10 player As and 10 player Bs.<sup>6</sup> In the oath treatment, subjects first come one by one to the oath-desk and are exposed to the above described procedure. Although signing the oath was not mandatory, a large majority of subjects accepted to do so. Four subjects did not take an oath. This leads to a 90% acceptance rate. This is in line with previous experiments involving an oath procedure (see Jacquemet, Joule, Luchini, and Shogren, 2009; Jacquemet, James, Luchini, and Shogren, 2010).<sup>7</sup> We apply an intention to treat strategy, so that these four subjects are kept in the statistical analysis – given the number of observations this does not affect the statistical results, though.

In both treatments, participants are randomly assigned to their computers and asked to fill in a small personal questionnaire containing basic questions about their age, gender, education, *etc.* The written instructions are then read aloud. Players are informed that they will play some (unrevealed) number of rounds of the same game, each round with a different partner, and that their own role will not change during the experiment. Before starting, subjects are asked to fill in a quiz assessing their understanding of the game they are about to play. Once the quiz and all remaining questions are answered, the experiment begins. Prior to the first round, players are randomly assigned to their roles – either player A or player B. Subsequently, they are anonymously and randomly matched to a partner. Then, player B sends a message to player A, after which they are both asked for their choices,  $R$  or  $L$  for player As, and  $r$  or  $l$  for player Bs. At the end of every round, each participant is informed solely about her own payoff. Once all pairs complete a round of the game, subjects are informed whether a new round starts. If this is the case, pairs are rematched. Otherwise, a single round is randomly drawn and each player receives the amount in Euros corresponding to her gains in that round, plus a show-up fee equal to 5 Euros.

All sessions took place in the lab of University Paris 1 (LEEP) in between June 2009 and March 2010. The recruitment of subjects has been carried out via LEEP database among individuals who have successfully completed the registration process on Laboratory’s website.<sup>8</sup> The experiment involved a total group of 100 subjects, 60 males and 40 females. 87% of them are students, among which 46 subjects are likely to have some background in game theory due to their field of study.<sup>9</sup> 30% never took part in any economic experiment in LEEP before. Participants’ average age is roughly 24. No subject participated in more than one experimental session. Each session lasted about 45 minutes, with an average payoff of 12 Euros.

---

<sup>6</sup>The data for the baseline treatment come from the communication treatment of Jacquemet and Zylbersztejn (2010).

<sup>7</sup>This is also a standard acceptance rate for commitment experiments (see Joule and Beauvois, 1998; Burger, 1999).

<sup>8</sup>The recruitment uses ORSEE (Greiner, 2004); the experiment is computerized through a software developed under REGATE (Zeiliger, 2000).

<sup>9</sup>Disciplines such as economics, engineering, management, political sciences, psychology, mathematics applied in social sciences, mathematics, computer science, sociology.



TABLE 2: AGGREGATE RESULTS

	Round										Overall
	1	2	3	4	5	6	7	8	9	10	
<b>No oath</b>											
Coordination ( $L, l$ )	56.7	46.7	60.0	63.3	66.7	70.0	80.0	66.7	66.7	83.3	<b>66.0</b>
Efficient outcome ( $R, r$ )	43.3	26.7	50.0	50.0	50.0	60.0	66.7	60.0	56.7	63.3	<b>52.7</b>
Miscoordination ( $L, r$ )	36.7	43.3	40.0	33.3	16.7	20.0	20.0	23.3	30.0	10.0	<b>27.3</b>
Miscoordination ( $R, l$ )	6.7	10.0	0.0	3.3	16.7	10.0	0.0	10.0	3.3	6.7	<b>6.7</b>
<b>Oath</b>											
Coordination ( $L, l$ )	60.0	70.0	75.0	80.0	70.0	70.0	65.0	75.0	75.0	70.0	<b>71.0</b>
Efficient outcome ( $R, r$ )	55.0	55.0	60.0	70.0	65.0	60.0	65.0	70.0	75.0	70.0	<b>64.5</b>
Miscoordination ( $L, r$ )	40.0	30.0	25.0	15.0	25.0	25.0	35.0	25.0	20.0	20.0	<b>26.0</b>
Miscoordination ( $R, l$ )	0.0	0.0	0.0	5.0	5.0	5.0	0.0	0.0	5.0	10.0	<b>3.0</b>

**Note.** Columns 1-10 summarize the frequencies of outcomes (defined in rows) as % of all outcomes observed in each round of a given experimental treatment. The last column provides overall results.

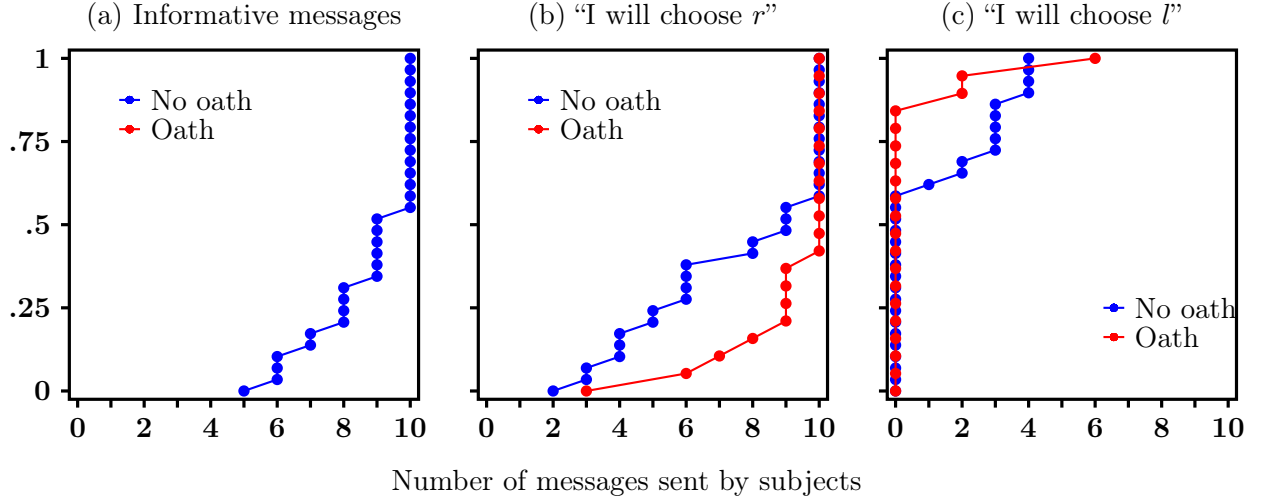
### 3 Results

Table 2 summarizes aggregate results by round from both treatments. Surprisingly, the contribution of the oath to coordinating agents' actions happens to be marginal – Nash equilibria account for 66% of all outcomes in the baseline treatment, and 71% in the oath treatment. The likelihood of observing the Pareto-efficient outcome also increases only slightly due to oath – from 52.7% to 64.5%. The patterns of each type of miscoordination – that is, ending up at either  $(L, r)$  or  $(R, l)$  – in both treatments are almost identical. Finally, aggregate outcomes in each treatment hardly evolve over time.

Aggregate outcomes, however, hide important changes in individual behavior. First, we look at the patterns of communication by player Bs. Figures 2.a, 2.b and 2.c show the empirical distribution functions (EDF) of the number of messages sent by subjects in the role of player Bs over all 10 decision periods.<sup>10</sup> Each bullet inside the graph indicates an individual, on the  $x$ -axis we present the number of messages she has sent (between 0 and 10), the  $y$ -axis represents the probability of observing an individual who has sent at most a given number of messages. Figure 2.a depicts the empirical distribution of informative messages (“I will choose  $r$ ” and “I will choose  $l$ ”) in both treatments. In both cases communication is widely used by player Bs, since no subject has abstained from sending at least one informative message. The number of messages sent by each subject is relatively high, ranging from 5 messages to 10 messages in the baseline treatment and from 8 to 10 messages in the oath treatment. In particular, 14 subjects out of 30 (46.7%) in the baseline treatment send 10 informative messages, i.e. one such message in every round; 12 subjects out of 20 (60%) do so

<sup>10</sup>Behavior does not vary greatly by round. Tables with detailed data on individual behavior by round is available upon request to the authors.

FIGURE 2: COMMUNICATION BEHAVIOR OF PLAYER BS BY TREATMENT



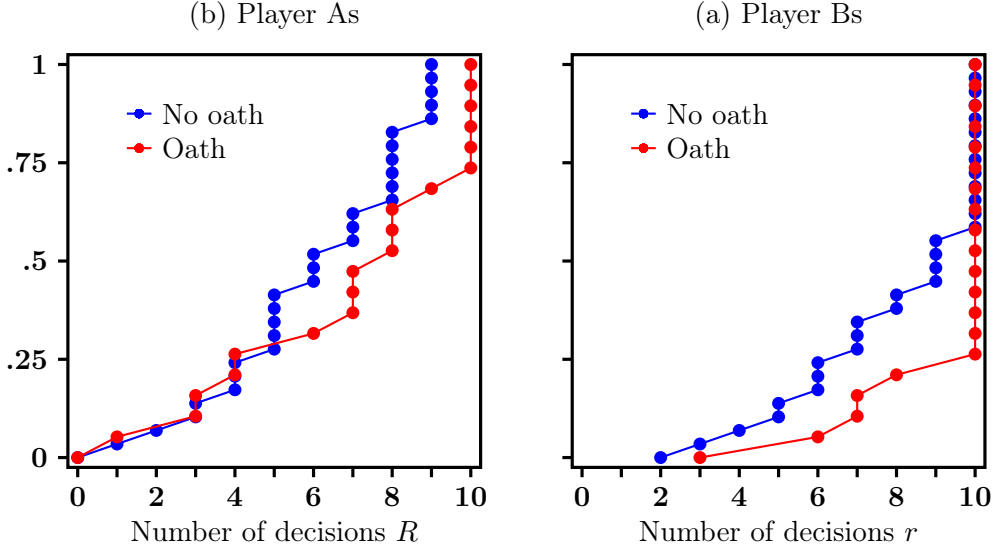
in the oath treatment. However, this difference is not significant according to a bootstrap test for equality of proportions accounting for different sample sizes ( $p = .676$ ). Overall, although player Bs in the oath treatment seem to use communication slightly more often than player Bs in the baseline treatment, the EDF from the baseline treatment does not first-order dominate the EDF from the oath treatment ( $p = .168$ ).<sup>11</sup> Figure 2.b, in turn, presents the analogous EDF exclusively for messages "I will choose  $r$ ". We find that subjects in the oath treatment display a stronger willingness to signal their credibility than subjects in the baseline treatment: for this class of messages, the EDF from the oath treatment first-order dominates the EDF from the baseline treatment ( $p = .083$ ). Finally, Figure 2.c focuses on messages "I will choose  $l$ ". These messages are seldom used – only 3 subjects out of 20 send them at least once in the oath treatment, whereas 12 of them out of 30 do so in the baseline; this difference is significant at the 10% level ( $p = .099$ ), although it must be noted that the number of observations is quite low. Altogether, we find that the individual communication behavior does not vary in quantity – since player Bs use communication to a similar extent in both treatments – but does change in quality – in the oath treatment messages "I will choose  $r$ " are sent significantly more often, while messages "I will choose  $l$ " are sent significantly less often.

**Result 1** *The oath does not change the amount of information sent, but significantly shifts messages towards more payoff maximizing announcements.*

Figures 3.a and 3.b summarize both players' decision making patterns. The degree of player As' reliance in both treatments is alike: out of 10 decisions, an average of 5.9 decisions  $R$  is observed in the baseline treatment, and 6.8 in the oath treatment. Both EDF presented in Figures 3.a

<sup>11</sup>This result comes from a bootstrap version of the univariate Kolmogorov-Smirnov test. This modified test provides correct coverage even when the distributions being compared are not entirely continuous and, unlike the traditional Kolmogorov-Smirnov test, allows for ties (see (Abadie, 2002; Sekhon, 2011))

FIGURE 3: DECISIONS OF PLAYER AS AND PLAYER BS BY TREATMENT

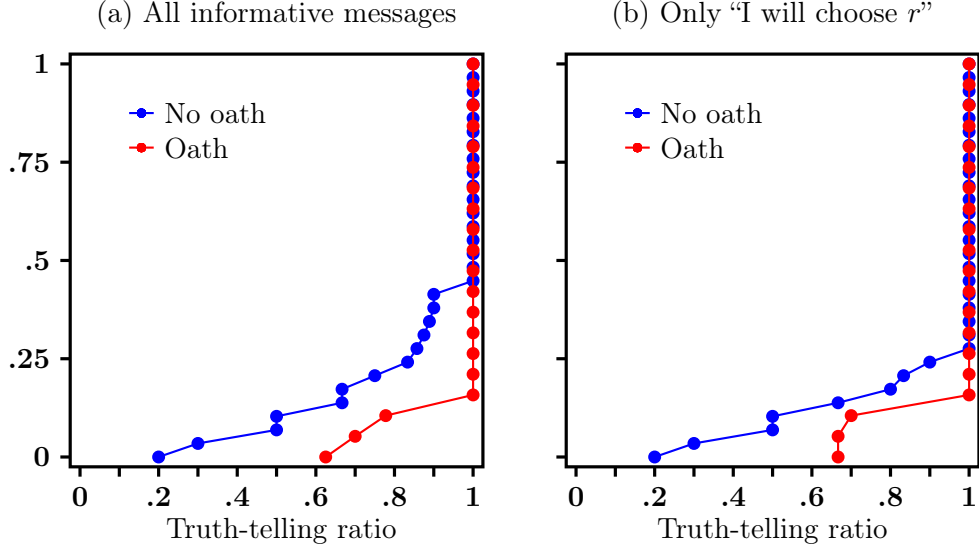


are similar on the low end, *i.e.* for players who do not play  $R$  often, while some discrepancies are visible on the upper end, where the oath treatment induces subjects to play  $R$  more often. However, the bootstrap test suggests that the differences between the two EDF are not significant ( $p = .104$ ). Substantial differences appear in player Bs' behavior, as revealed in Figure 3.b. Based on the empirical frequencies of decisions  $r$ , we find that the EDF from baseline first-order dominates the EDF from the oath treatment ( $p = .056$ ). Therefore, in the presence of oath player Bs are more likely to cooperate with player As. In particular, 75% of player Bs choose to play  $r$  in all 10 rounds in the oath treatment, while only 43.3% do so in the baseline. A bootstrap test for equality of proportions indicates that the difference is significant at the 5% level ( $p = .047$ ).

**Result 2** *The oath shifts sender's actions towards more payoff maximizing decisions.*

We now explore the link between messages and actions through the truth-telling behavior of player Bs. For each individual in this role we calculate the proportion of cases where action is coherent with message should the latter be informative, amongst all the cases where an informative message is sent. We refer to this proportion as the truth-telling ratio, and present its EDF from both treatments in Figure 4.a. We find striking evidence that misinforming partner about intended move is substantially more widespread among player Bs in the absence of oath. First, the minimum values of the truth-telling ratio are 1.6 in the baseline and 5 in the oath treatment. Second, only 17 subjects out of 30 (57%) always reveal their actual intentions when sending an informative message in the baseline treatment, against 16 out of 20 (85%) in the oath treatment (the difference is statistically significant with  $p = .057$ ). Third, the EDF from the baseline significantly first-order dominates the EDF from the oath treatment ( $p = .069$ ). In Figure 4.b, in turn, we represent the same truth-telling ratio using only messages "I will choose  $r$ ". Here the difference between the two treatments is much more

FIGURE 4: TRUTHFULNESS OF PLAYER BS BY TREATMENT (EMPIRICAL DISTRIBUTION FUNCTION)

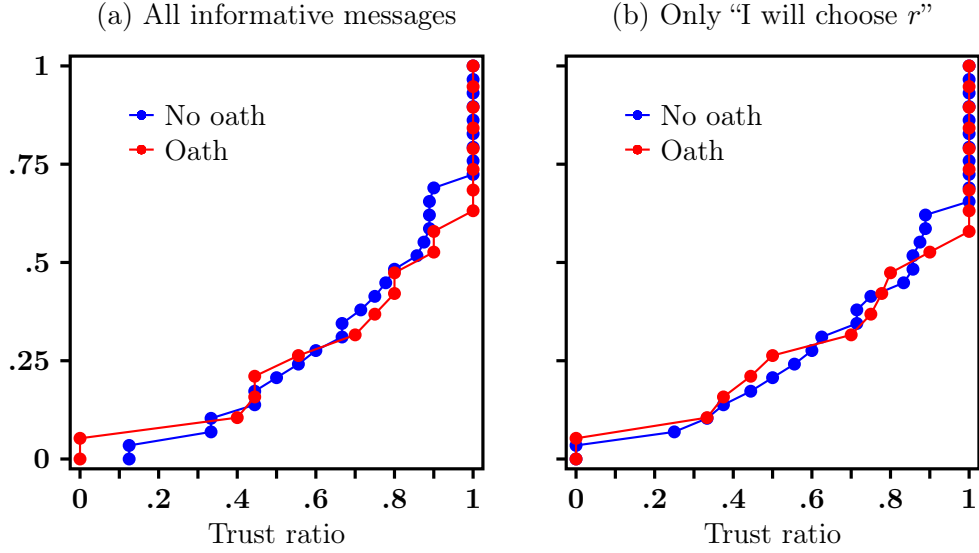


ambiguous. The EDF of the truth-telling ratio from the baseline still first-order dominates the EDF from the oath treatment, however this result is not statistically significant ( $p = .462$ ).

**Result 3** *The oath improves the truthfulness of announcements.*

Last, in Figures 5.a and 5.b, we look at player As' perception of information obtained from their partners, conditional on the presence of oath. More precisely, for each individual in the role of player A we calculate the proportion of cases where she gives the best response to an informative signal (that is, when player A plays  $R$  should the signal from player B announce action  $r$ , or players A's move  $L$  follows message announcing move  $l$  by player B) among all the cases when the received message happens to be informative. We call this proportion the trust ratio, and present its EDF in Figures 5.a and 5.b. The first figure suggests that oath has no important influence on how player As react to messages: the two EDF are fairly similar ( $p = .691$ ). This remains true when restricting attention to messages "I will choose  $r$ ", as it can be seen in the second figure; once again, both EDF are similar and the differences in behaviors is not significant ( $p = .849$ ). This last feature is key to understand our first observation that the oath leaves all aggregate outcomes unchanged: while the oath significantly increases payoff maximizing behavior, and leads player Bs to truthfully announce it, player As fail to adjust to this change in behavior. There is an asymmetrical reduction in strategic uncertainty: while player Bs was more predictable *ex post* with the oath, the oath alone was insufficient to reduce player A's uncertainty about what B would do.

FIGURE 5: MESSAGES TRUSTED BY PLAYER AS (EMPIRICAL DISTRIBUTION FUNCTION)



## 4 Conclusion

This paper investigates whether *commitment* (in the meaning it has in social psychology, see Joule and Beauvois, 1998) improves the ability of communication to reduce strategic uncertainty and thereby induce more coordination on efficient outcomes. Commitment is obtained by having subject sign an oath to tell the truth before participating to the experiment, following the procedure developed and tested in Jacquemet, Joule, Luchini, and Shogren (2009).

Based on the distribution of outcomes, the answer to our research question is no: the oath is neutral on the probability that players achieve both coordination and efficiency. But this result hides significant improvements in sender's behavior. The oath has two effects. First, the share of payoff maximizing actions significantly increases under oath. This may suggest the oath better focuses subject's attention on the game in such a way that they take the experiment more seriously. Second, the oath increases the truthfulness of messages: the content (but not the number) of informative messages changes under oath in accordance with sender's change in behavior, and messages are more often followed by the announced action. The oath appears to create the commitment needed to better link signals and actions.

The reason why the improvement in player B's actions did not translate into more coordination is that player As did not respond in kind – the oath did not seem to reduce the strategic uncertainty affecting player A's choices. In particular, they fail to realize that messages are better predictors of partner's actions. Finding a device which not only improves the informational content of messages sent, but also how seriously they are received is next in our agenda.

## References

- ABADIE, A. (2002): “Bootstrap Tests for Distributional Treatment Effects in Instrumental Variable Model,” *Journal of the American Statistical Association*, 97(457), 284–292.
- AUMANN, R. (1990): “Nash Equilibria Are Not Self-Enforcing,” in *Economic Decision-Making: Games, Econometrics, and Optimization: Contributions in Honor of Jacques H. Dreze*, ed. by J. J. Gabszewic, J.-F. Richard, and L. A. Wolsey, pp. 201–206. North-Holland, Amsterdam.
- BEARD, T. R., AND J. BEIL, RICHARD O. (1994): “Do People Rely on the Self-Interested Maximization of Others? An Experimental Test,” *Management Science*, 40(2), 252–262.
- BEARD, T. R., R. O. J. BEIL, AND Y. MATAGA (2001): “Reliant behavior in the United States and Japan,” *Economic Inquiry*, 39(2), 270–279.
- BURGER, J. M. (1999): “The Foot-in-the-Door Compliance Procedure: A Multiple-Process Analysis and Review,” *Personality and Social Psychology Review*, 3(4), 303–325.
- CHARNESS, G., AND M. DUFWENBERG (2006): “Promises and Partnership,” *Econometrica*, 74(6), 1579–1601.
- CIALDINI, C., J. BASSETT, R. MILLER, AND J. MILLER (1978): “Low-ball procedure for producing compliance: Commitment, then cost,” *Journal of Personality and Social Psychology*, 36(5), 463–476.
- CIALDINI, R., AND B. SAGARIN (2005): “Interpersonal influence,” in *Persuasion: Psychological insights and perspectives*, ed. by T. Brock, and M. Green, pp. 143–169. Sage Press, Newbury Park, CA.
- COOPER, R., D. V. DEJONG, R. FORSYTHE, AND T. W. ROSS (1992): “Communication in Coordination Games,” *Quarterly Journal of Economics*, 107(2), 739–771.
- COOPER, R. W., D. V. DEJONG, R. FORSYTHE, AND T. W. ROSS (1990): “Selection Criteria in Coordination Games: Some Experimental Results,” *American Economic Review*, 80(1), 218–233.
- CRAWFORD, V. (1998): “A Survey of Experiments on Communication via Cheap Talk,” *Journal of Economic Theory*, 78(2), 286–298.
- DEVETAG, G., AND A. ORTMANN (2007): “When and why? A critical survey on coordination failure in the laboratory,” *Experimental Economics*, 10(3), 331–344.
- ELLINGSEN, T., AND M. JOHANNESSON (2004): “Promises, Threats and Fairness,” *Economic Journal*, 114(495), 397–420.
- ELLINGSEN, T., AND R. ÖSTLING (2010): “When Does Communication Improve Coordination?,” *American Economic Review*, 100(4), 1695–1724.
- FARRELL, J., AND M. RABIN (1996): “Cheap Talk,” *Journal of Economic Perspectives*, 10(3), 103–118.
- GOEREE, J. K., AND C. A. HOLT (2001): “Ten Little Treasures of Game Theory and Ten Intuitive Contradictions,” *American Economic Review*, 91(5), 1402–1422.

- GREINER, B. (2004): “An Online Recruitment System for Economic Experiments,” in *Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63*, ed. by K. Kremer, and V. Macho, pp. 79–93. Ges. für Wiss. Datenverarbeitung, Göttingen.
- JACQUEMET, N., A. JAMES, S. LUCHINI, AND J. SHOGREN (2010): “Referenda under oath,” *GREQAM WP*, 10(15).
- JACQUEMET, N., R.-V. JOULE, S. LUCHINI, AND J. SHOGREN (2009): “Eliciting Preferences under Oath,” *CES Working paper*, 09(43).
- JACQUEMET, N., AND A. ZYLBERSZTEJN (2010): “Learning, words and actions: experimental evidence on coordination-improving information,” *CES Working Paper*, 2010(64).
- (2011): “What drives failure to maximize payoffs in the lab? A test of the inequality aversion hypothesis?,” *CES Working Paper*, 2011(36).
- JOULE, R., AND J. BEAUVOIS (1998): *La soumission librement consentie*. Presses Universitaires de France, Paris.
- PARKHURST, G. M., J. F. SHOGREN, AND C. BASTIAN (2004): “Repetition, Communication, and Coordination Failure,” *Experimental Economics*, 7(2), 141–152.
- ROSENTHAL, R. W. (1981): “Games of perfect information, predatory pricing and the chain-store paradox,” *Journal of Economic Theory*, 25(1), 92–100.
- SHELLING, T. (1960): *The strategy of conflict*. Harvard University Press, Cambridge, MA.
- SEKHON, J. (2011): “Multivariate and Propensity Score Matching Software with Automated Balance Optimization,” *Journal of Statistical Software*, 42(7), 1–52.
- SELTEN, R. (1975): “Reexamination of the perfectness concept for equilibrium points in extensive games,” *International Journal of Game Theory*, 4(1), 25–55.
- VANBERG, C. (2008): “Why Do People Keep Their Promises? An Experimental Test of Two Explanations,” *Econometrica*, 76(6), 1467–1480.
- ZEILIGER, R. (2000): “A presentation of Regate, Internet based Software for Experimental Economics,” <http://www.gate.cnrs.fr/~zeiliger/regate/RegateIntro.ppt>, *GATE*.