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Abstract

Cheap talk, mainly in the form of promises, has shown to increase the efficiency in bilateral exchanges and to promote cooperation. This paper provides evidence of consistent behavior when messages aiming to directly update the recipients' second order beliefs, instead of updating first order beliefs as promises do, are exchanged. Artisanal fishermen played a common pool resource game in which they were allowed to send simultaneous non-binding recommendations to their exogenously predefined neighbors. Building a link between experimental behavior and survey data, I found that the preferences for being consistent (i.e. for minimizing the difference between the extraction level and the outgoing recommendation) are negatively correlated with the earnings considered as satisfactory by the fishermen that took part in the study, but they are not correlated with their realized earnings.

JEL Classification: A13, C93, D03

Keywords: Common pool resource experiment, lie aversion, preferences for consistency

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1 Introduction

Costless and non-enforceable communication preceding social interactions is labeled in economic theory as "cheap-talk". To this category belongs the revelation of private attributes, intentions and beliefs; and, theoretically, its usefulness on subsequent stages depends on whether the strategic setting emulates a coordination problem or a pure conflict situation (Farrell and Rabin, 1996). The exchanged information is considered useful in coordination problems, in which messages are credible and commit both parties to select symmetric strategies; but are less successful when the interests of the different parties are not well aligned.

Nevertheless, experimental evidence support the impact of cheap-talk beyond coordination games. For bargaining games, in which incentives are not only misaligned but certainly opposed, false statements about private information and non-credible threats affect the outcome of the game (Croson et al., 2003). Another example is provided by Ellingsen and Johannesson (2004), in which cheap-talk is introduced in a trust game in form of promises and threats. Their main finding, that promises are more credible than threats, suggests the existence of a personal cost of being inconsistent.

The role of promises, and the reasons why they are often credible by the receiver and kept by the proposers, has been studied experimentally by economists and social psychologists (Loomis (1959); Ellingsen and Johannesson (2004); Charness and Dufwenberg (2006); Vanberg (2008)). Promises are considered a useful mechanism in the tranmission of intentions. However, there are still competing explanations on why promises are honored. Apart from the preferences for consistency, some alternatives explanations are the disutility derived from guilt aversion and a psychological bias known as the false consensus effect.

In this paper I show that the influence of cheap-talk in strategic behavior can be extended to the exchange of second order beliefs of players' intentions. I conduct an artifactual field experiment emulating the extraction of a common pool resource in which participants have the chance to exchange simultaneous non-binding recommmendations with a set of neighbors defined by an exogenous network. The messages consist on written numbers regarding the extraction level recommended to the nodes with whom they were connected.

I find that the distance between what is recommended and what is extracted follows a symmetric distribution centered around zero. This result reflects, in first instance, a divergence from a "babbling equilibrium" in which exchanged information is meaningless (Farrell and Rabin, 1996). In second instance, this pattern is useful to evaluate individual behavior in presence of a tradeoff between consistency, pursued by making credible their outgoing message by following it; and responsiveness, by taking the incoming message as credible and therefore using it as a coordination device.

The relevance of recommendations in the experimental data lead this work to reconsider the necessary conditions that make cheap talk effective. Although promises and recommendations are non-binding, only recommendations are altering the recipient's expectations regarding the sender's behavior. If a message like *"I promess you that I'll choose X"* is replaced by another one of the form *"I recommend you to choose X"*, and is still observed an effect of pre-play communication, then we can state that interpersonal commitment is not necessary to raise efficiency via cheap talk.

Preferences for consistency are heterogeneous among subjects, but they can also have some degree of plasticity and be heterogeneous across environments. I also explore if individuals are equally likely to deviate from their own recommendation regardless of the others' expected behavior or, on the contrary, if cooperative environments strengthen the consistency preferences while less cooperative environments are seen as an excuse to lie without harming the self-image (Mazar et al., 2008). To tackle this question, I exploit an exogenous variation in the expected cooperation levels derived from the between-subjects experimental design. Using this variation, I show that the distance between what is recommended and what is extracted is shifted towards lower consistency levels in less cooperative environments. Nevertheless, the proportion of highly consistent subjects remains roughly stable for large increases in the average extracted level.

Connecting the experimental findings with survey data, I found a negative and significant correlation between the degree of consistency and the earnings reported by fishermen as satisfactory for a week of work, but not with their realized weekly income. This result contributes to the existing literature merging laboratory and field data to establish clearer connections between behavior under controlled environments and the likelihood to use less sustainable fishing technologies (Fehr and Leibbrandt, 2011).

The remainder of this paper is organized as follows. Section 2 provides a brief revision of the literature regarding cheap talk, the determinants of promise keeping at the theoretical and experimental level, and the evidence of the use of recommendations in public good games. In Section 3 I describe the experimental design and discuss which explanations for consistency may be extended from promises to recommendations. Experimental results are presented in Section 4. Section 5 summarizes the results and concludes.

2 Existing literature

2.1 What makes cheap talk effective?

According to Farrell and Rabin (1996), an exchanged message must be self-signaling and self-committing to be relevant in the decision-making process. Suppose there is a set of two strategies X and Y and subjects can communicate their intended play. A given message is self-signaling when the receiver knows that the sender does not have incentives to say X and then do Y. The message is self-committing when the receiver knows that if he believes the message X and the sender is aware of that, the sender does not have incentives to play Y. These conditions are satisfied in coordination games, but are less likely to be held in presence of a conflict of interests between subjects.

Now suppose that the message allowed to exchange is not of the form "(I promise) I will play X," but instead has the form "I recommend you to play X" as in the experimental setting described in this work. Both are intended to update beliefs, but the recommendation is directly updating the second order beliefs. While the message "(I promise) I will play X" intends to update the receiver's beliefs of the sender's intentions, i.e. the first order beliefs; the message "I recommend you to play X" intends to update the receiver's beliefs of the sender's expectations of the receiver's intentions. Interpersonal commitment is only induced if the first order beliefs are directly affected by the exchange of information, which may occur with promises but not with recommendations.

An additional feature of the game affecting cheap talk's effectiveness is the available information regarding the counterpart's play. Charness and Grosskopf (2004) find that learning about the other subject's payoffs increases the salience of cheap talk in coordination games. Given the random rematching after each interaction, the effect is explained as driven by a regret-satisfaction mechanism. For cooperation dilemmas with repeated interactions this information is also helpful as a reputation building mechanism, making lying behavior more costly at early stages of the game (Kreps et al., 1982).

Therefore, it is possible to define three conditions related to the cheap talk effectiveness: the intensity of the conflict dimension, the inducement of interpersonal commitment, and the identification of individual behavior.

2.2 Why do we keep our promises?

Standard economic models assume that agents do not have preferences for honesty or against deceiving in a particular situation (Gneezy (2005); Demichelis and Weibull (2008)). If deceiving is materially beneficial, an individual will lie irrespective of the consequences on the other. If any, the incurred costs of lying will be derived from strategical reasons (Kreps et al. (1982); Koukoumelis et al. (2012)).

Developments in psychological game theory gave origin to models with a stronger interdependence between players' beliefs and utilities (Geanakoplos and Stacchetti, 1989). To understand how inconsistency may decrease our utility level, and therefore affect our decisions, two alternative explanations have been proposed and tested empirically. Guilt-aversion, defined as the disutility of not fulfilling the other's expectations (Charness and Dufwenberg, 2006), and lie-aversion, suggesting the existence of a fixed cost of lying (Ellingsen and Johannesson, 2004). A third rival explanation, not based on the existence of social preferences but rather on a psychological bias, is known as the false consensus effect (Ross et al., 1977).

Battigalli and Dufwenberg (2007)'s model of guilt aversion suggests that a subject might inflict harm on a relationship partner by letting him down. This unfulfillment of expectations can occur through two different mechanisms. A subject may experience *simple guilt* when the counterpart is let down by its actions; but also he may experience *guilt from blame* if he cares about the counterpart's inference of being let down, even if it was caused by someone else's action. Experimental evidence in favor of *simple guilt* is provided in Charness and Dufwenberg (2006) and Charness and Dufwenberg (2010) by introducing promises in a modified trust game. To the best extent of my knowledge, the *guilt from blame* mechanism has not been explored experimentally.

Under the lie-aversion hypothesis the disutility of being inconsistent is created by the lying act *per se*, irrespective on its consequences on the other. Ellingsen and Johannesson (2004) conduct a trust game in which messages from the truster and the trustee are considered promises and threats respectively. They find that promises are more credible than threats, and propose a model combining preferences for fairness and for consistency to explain their results. This view of self-deception as individually costly is also explored in an experimental setting in Mazar and Ariely (2006) and Mazar et al. (2008). They found that when participants have a chance to cheat without being detected, on average they cheat at low to moderate levels that do not interfere with their self-image utlity.

Vanberg (2008) proposes a modified dictator game to disentangle the effects of guilt-aversion and lie-aversion. Pre-play communication between paired subjects allows them to make promises before the random selection of the dictator. Half of the dictators are then reshuffled to a different partner, blocking for them the disutility of not fulfilling the recipient's expectations. The author finds support for the lie-aversion hypothesis given the low share of self-advantageous decisions made by reshuffled dictators[1].

An alternative explanation is the false consensus effect. This psychological bias, originally reported in Ross et al. (1977), states that people usually overestimate the likelihood that other's perceptions and thoughts matches their own. Ellingsen et al. (2010) argue that the preferences for consistency observed in previous experiments were mainly driven by the consensus effect. In their setting the expectations from second movers are unexpectedly revealed to the first movers in a dictator game and a trust game, reducing the bias from the consensus effect. The authors show that, after this information is revealed, receiver's expectations are poorly correlated with the sender's actions.

Bacharach et al. (2007) propose an independent experiment reaching an equivalent conclusion, in which they claim that trust is self-fulfilling. A subject is "trust-responsive" if he will trust the other because he believes the other trust him. Although they do not mention it, this is a direct manifestation of the consensus effect described above. Subjects played a simultaneous trust game with elicitation of first and second order beliefs, i.e., the truster's belief that the trustee will fulfil and the trustee's belief about the truster's belief that he will fulfil. After accounting for reciprocity and inequality aversion, the authors find support for the existence of trust responsiveness: the higher the second order beliefs, the larger the probability that the trustee fulfils.

2.3 Recommendations in n-players cooperation dilemmas

Pre-play communication is well-known as an efficiency enhancing institution for collective action problems (Ostrom et al., 1994; Sally, 1995). However, in the initial experiments was not possible to disentangle the effect of face-to-face interactions from the effect of the information *per se*; and was neither possible to determine if bilateral communication was a necessary condition to reach efficient agreements.

[1] In this experiment dictators were not choosing between different allocations of a fixed endowment. Instead, they were choosing between a self-advantageous allocation without risk and a lottery for himself that in addition gives a positive and fixed payoff to the recipient

Recent laboratory experiments have explored in isolation the role of asymmetric recommendations in n-players social dilemmas. That is, a single subject is chosen to send a recommendation to the other group members in a public goods game. Levy et al. (2011) show that contributions substantially increase when the subject is randomly selected or endogenously chosen by a voting procedure, but recommendations do not have an effect if players know that these are public and exogenous signals provided by the experimenter. Koukoumelis et al. (2012) expand this result to one-shot public good games in which individual contributions are public information.

3 Experimental design

3.1 The common-pool resource game

The game is characterized by n users sharing a common-pool resource (CPR hereafter) under an open access scheme. Subjects must decide, in each round, their desired extraction level $x_i \in \{\underline{x}, \bar{x}\}$. Earnings are increasing and concave in x_i, and decreasing linearly with the group's aggregate extraction $\sum_{i=1}^{n} x_i$ as is shown in equation (1).

$$\pi_i(x_i, x_{-i}) = \left(ax_i - \frac{bx_i^2}{2}\right) + \gamma\left(n\bar{x} - \sum_{i=1}^{n} x_i\right) \quad (1)$$

The Nash equilibrium (NE) of the game is given by $x_i^{NE} = \frac{a-\gamma}{b}$ and the per capita socially optimum (SO) extraction level is $x_i^{SO} = \frac{a-n\gamma}{b}$. The parameter values are set as in Cárdenas (2004): $a = 60$; $b = 5$; $\gamma = 20$; $n = 5$; $\underline{x} = 1$ and $\bar{x} = 8$. Replacing these values we have that $x_i^{NE} = 8$ and $x_i^{SO} = 1$[2].

Subjects initially interacted for five rounds without any kind of communication. This was the first stage of the game. The only feedback received at the end of each round was the group's aggregate extraction[3].

The timing of each round in the first stage goes as follows[4]: *(i)* Each participant chooses its extraction level. *(ii)* The experimenter collects the individual decisions and announces publicly the group's aggregate extraction. Round's earnings are calculated individually.

[2]For our parameteres the extraction level socially desirable is negative. However, given that $\underline{x} = 1$ I will define this value as our per capita social optimum.

[3]This information was sufficient for participants to calculate their round's earnings using the payoffs table. If they need help in their calculations they received assistance from the monitor.

[4]Full instructions are available in the Appendix.

The recommendations are introduced during the second stage of the game. Before starting this stage, that lasted ten rounds, the experimenter announced that all the players were allowed to suggest an extraction level to their neighbors. Each subject's neighborhood was determined by an exogenous network structure shown by the experimenter with the help of a poster. The poster indicated the nodes, one per subject, and its connections to the other nodes. The communication network was common knowledge, but the specific node of each subject remained as private information. Players were told that the messages had the form "I recommend you to choose Z", where Z was a number between $\underline{x} = 1$ and $\bar{x} = 8$. They had to write the recommended extraction in their decision sheet. The experimenter was in charge to collect all the recommendations and deliver them to their corresponding recipients[5].

The timing of each round in the second stage goes as follows: *(i)* each participant writes a number between 1 and 8, corresponding to the units that he will recommend to his neighbors to extract. In case that he does not want to send any recommendation, he could write "NO" instead of a number. If this is the case, his neighbors receive a blank card instead of a numbered one. *(ii)* The experimenter collects the recommendations and put them in a board designed to show each message only to the recipient. Players were insistently informed that the incoming messages were non-binding. *(iii)* The experimenter delivers, privately, the recommendations to each node. *(iv)* Each participant chooses its extraction level. *(v)* The experimenter collects the individual decisions and announces publicly the group's aggregate extraction. Round's earnings are calculated individually.

3.2 Treatment cells

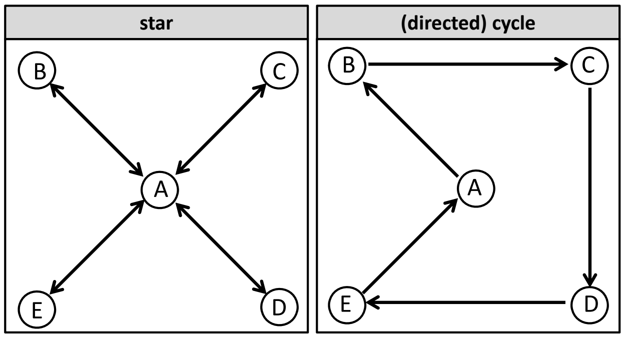
The experimental design introduces two different network structures. A star, in which non-central players exchange messages exclusively with the central node; and a (directed) cycle, in which messages are transmitted in such a way that no player is sending and receiving a message from the same node (see Figure 1).

In two thirds of the sessions a subject, the one assigned to node A, was randomly selected to send a predetermined recommendation during all the second stage. The message sent by node A was determined by a coin toss[6].

[5] Avoiding face-to-face communication was crucial to block confounding effects of the interplay with others (Cárdenas and Ostrom, 2004; Bicchieri and Lev-on, 2007)

[6] To guarantee that the other players did not suspect about the identity of node A, the coin was tossed during an individual talk with each participant. For the remaining four subjects, this one-to-one conversation was used to verify that the neighbor structure and

Figure 1: Networks for transmission of non-binding suggestions



Depending on the coin's outcome the subject must send a low extraction suggestion of 1 unit, which I call the *good message*; or a high extraction suggestion of 8 units, the *bad message*. In the remaining third of sessions the subjects located in node A were free to choose their desired message in each round. This is our *endogenous message* variation of the game. Under all three conditions subjects in node A were reminded that they were free to choose their extraction level, independently of the outgoing suggestion. The experimental design is summarized in Table 1.

Table 1: Experimental design

Node A's recommendation	**Network structure**	
	Cycle	**Star**
Endogenous message	cycle-E	star-E
Good message (1)	cycle-1	star-1
Bad message (8)	cycle-8	star-8

In the cycle the node A was symmetric to the other nodes, meaning that the exogenous recommendation was reaching only one subject. In the star the node A was at the center of the network; which means that the *good*, *bad* and *endogenous* messages reached the remaining four nodes. In addition, these messages were common knowledge.

The treatments defined by a star network with predetermined recommendations provide us the exogenous variation in the expected cooperation levels required to test the plasticity of the preferences for consistency.

Before proceeding to describe the field setting I will discuss why I do not consider that the manipulation of the exogenous recommendations sent by node A implies deception. A potential concern is that participants in the

the new instructions of the second stage were understood.

other nodes did not know that node A was sending a predetermined recommmendations. However, it did not implied the disclosure of false information. The protocol did not say that the received message was endogenously selected by the player in node A, neither the contrary. Honesty does not imply revealing everything to the participants. In fact, an excess of information may increase the effect of the experimenter demand (Ellingsen et al., 2010).

In this particular design, the most probable result of revealing the exogeneity of the central node's recommendations would be a replication of the null effect of the exogenously provided coordination mechanisms reported in Levy et al. (2011).

An additional minor concern would be that participants in the node A perceive the exogenous outgoing message as an imposition to themselves. Nevertheless, it was insisted to them that their action set remained unrestricted, regardless of the transmitted suggestion.

3.3 Field setting

The experiment was conducted in June of 2012 in Cispatá Bay, in the northwestern region of Colombia bordering the Caribbean sea. 145 of a total of 150 participants were fishermen from the zone. The remaining five were members of fishermen households. 26.9% of the fishermen were dedicated exclusively to fishing, the rest of them combine this task with other economic activities, principally agriculture (40.7%). The fishing technologies used more often were drift nets (45.0%), handlining or line-fishing (35.0%) and cast nets (27.1%). Confirming the fishermen's low income reported in previous literature (Rojas and Sierra-Correa, 2010), I find that the average income in our sample corresponds to the 62.6% of the Colombian minimum wage[7].

The participants were also asked about the earnings level that they will consider as satisfactory after a journey of work. While the average daily earnings are 11,968 cop (in an alternative specification, in which weekly earnings are divided by five instead of by seven, the daily average earnings are 16,755 cop), the satisfactory earnings are on average 27,677 cop. The average ratio between satisfactory and realized earnings is 2.72 with a standard deviation of 2.52 (1.94 in the alternative specification, with a standard deviation of 1.80).

[7]The daily minimum wage for 2012 was of 18,890 Colombian pesos (cop).

3.4 The effectiveness of recommendations

Could the effectiveness of cheap talk be extended, in theory, from promises to recommendations? And most importantly, how the experimental design proposed in this work could be useful to address this question? To tackle these inquiries it is necessary to evaluate the three conditions mentioned in Subsection 2.1: the intensity of the conflict dimension, the inducement of interpersonal commitment, and the identification of individual behavior.

The conflict dimension is characteristic of CPR games: earnings are incresing in individual extraction levels and decreasing in aggregate extraction levels. Assuming self-regarding precerences, the only message that could be self-signaling and self-committing will be the extraction level $\bar{x}$. Any recommendation below this value will not be self-signaling nor self-committing, since the sender of the message will always have individual incentives to deviate upwards.

The identification of individual behavior is not possible, since the only feedback after each round is the aggregate extraction of the group. The *ex-post* inference of individual actions required for the regret-satisfaction and the reputational mechanisms to work is very noisy in our experimental setting. Therefore, the informational condition required to evidence preferences for consistency could be relaxed to the observability of aggregated behavior instead of individual behavior.

Regarding the inducement of interpersonal commitment, the analysis can be reformulated as a discussion of the mechanisms that can be extended from promise keeping to the exchange of recommendations. To begin with, guilt-aversion, the expectation based mechanism, is ruled out from our analysis. Recommendations are expected to directly update the receiver's expectations regarding what the sender is expecting from him (i.e. the second order beliefs), skipping the update of the receiver's expectations regarding the sender's actions (i.e. the first order beliefs). As the fulfillment of second order expectations depends only on the receiver's behavior, the sender cannot suffer a disutility from its potential guilt aversion.

Lie-aversion, based on self-commitment rather than on interpersonal commitment, is one of the mechanisms that might sustain the relevance of exchanged recommendations. In terms of self-commitment, or consistency between what is said and what is subsequently chosen, a neglected outgoing recommendation may generate a similar disutility than a broken promise. Although average small distances between the chosen and the recommended extraction levels are part of the behavioral hypothesis, it is important to remark that full consistency cannot be expected given the tradeoff with responsiveness due to the simultaneous exchange of messages.

The other mechanism that might explain consistency in this scenario is the false consensus effect. Given that recommendations are intended to update second order beliefs, an incoming message close to the recipient's expectations can magnify this consensus effect, as the subject could erroneously infer that the beliefs of the rest of the group matches the received message. One weakness of this work is that the experimental data reported here does not allow to disentangle the effects between this psychological bias and the lie-aversion preferences.

4 Results

4.1 Distribution of recommendations

The distribution of outgoing recommendations is separately shown for each treatment cell in Figure 2. The first column in each panel is labeled "NO," and corresponds to the cases in which subjects decline to send a suggestion. The next columns correspond to the extraction levels from 1 to 8. The dark bars indicate the number of endogenous messages for each extraction level, and the light bars indicate the exogenous recommendations of 1 and 8 units in the corresponding treatments. In the remaining of this paper all the subjects sending predetermined messages are excluded from the sample. The distribution of suggestions has full support for all the treatments. The same patterns from Figure 2 are also observed when the distributions are computed only for the last five rounds of the stage. The average (endogenous) recommendation for ten rounds is 3.58 units, while for the last five rounds it slightly increases to 3.63 units.

The distributions also evidence between-treatments variation. They are skewed to the left for the *cycle-1*, *star-E* and *star-1*; and their cumulative distributions for a recommendation of 4 units are 75.8, 83.2 and 78.4 percent respectively. These distributions are not statistically different from each other according to a pairwise Kolmogorov-Smirnov test (p-values are reported on Table 2). On the other hand, the recommendations in the *cycle-E* and the *star-8* are not skewed towards more cooperative messages, and they are not statistically different from each other. For these treatments, the cumulative distributions for a recommendation of 4 units reach 58.2 and 55.6 percent respectively. The distributions in the *cycle-E* and the *cycle-8* either differ statistically, but the latter is different from the *star-8* distribution.

The rate of unsent messages exhibits a large variation between network structures. 26 out of the 28 cases in which a subject preferred to not send a message appear in the star, half of them in the one with an exogenous *bad*

Figure 2: Histogram of sent recommendations by treatment

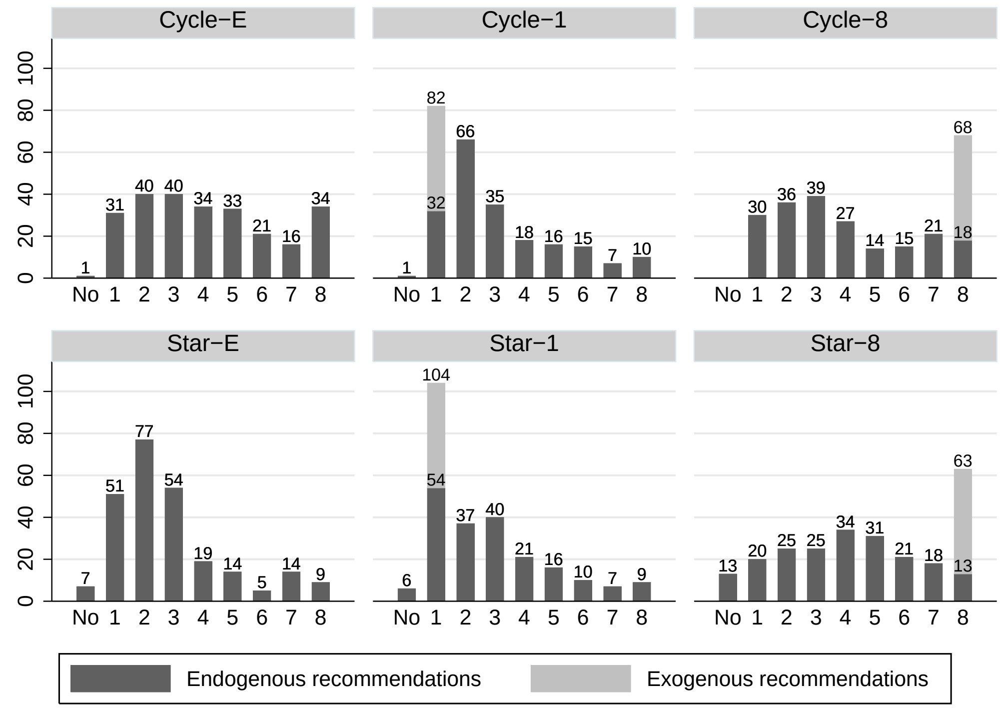


Table 2: Kolmogorov-Smirnov tests for equality of endogenous recommmendations' distributions

	Cycle-E	*Cycle-1*	*Cycle-8*	*Star-E*	*Star-1*
Cycle-1	(0.000)***				
Cycle-8	(0.444)	(0.007)***			
Star-E	(0.000)***	(0.430)	(0.000)***		
Star-1	(0.000)***	(0.108)	(0.018)**	(0.556)	
Star-8	(0.602)	(0.000)***	(0.019)**	(0.000)***	(0.000)***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

message. Despite that subjects declined to send a message in only 2% of the cases, our data reveals that message dismissal is positively correlated with the presence of a central node.

4.2 Distribution of preferences for consistency

I define the inconsistency of player i in round t as the difference between the chosen extraction level and the outgoing recommendation. Low differences between what is done and what is recommended correspond to low inconsistency levels. The distribution of inconsistency is shown in Figure 3 disaggregated at the *subject* × *round* level. For all treatments, except *Star-8*, the modal value is zero. The statistical tests reported in Table 3 show that for the treatments with a cycle structure the mean does not differ statistically from zero. Given that the distributions for the *Star-E* and *Star-1* are skewed to the right, the mean value of inconsistency is positive and statistically significant. In addition, it is also possible to reject that they follow a normal distribution. For the *Star-8*, despite that the mean inconsistency is positive, the normality of the distribution cannot be rejected.

Figure 3: Inconsistency distribution by treatment (only endogenous recommendations)

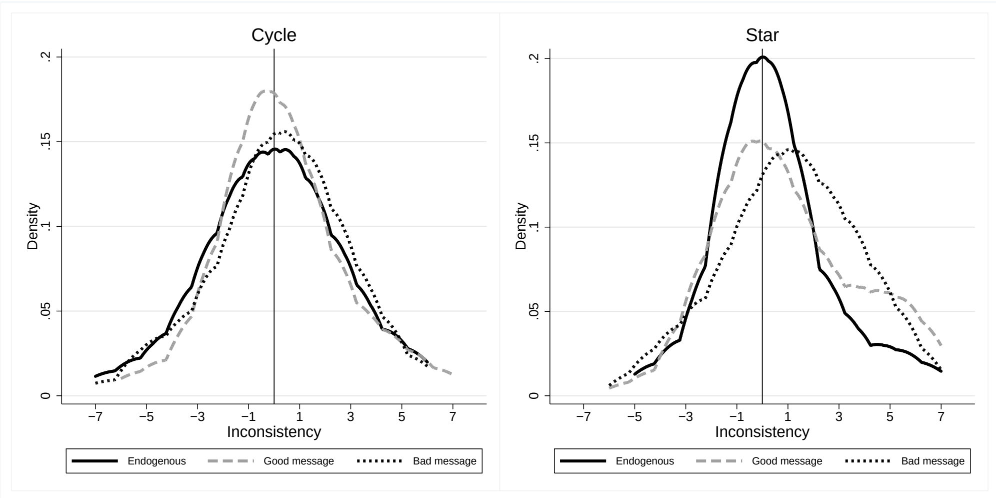


Table 3: Mean and normality test for inconsistency distributions

	Cycle-E	*Cycle-1*	*Cycle-8*	*Star-E*	*Star-1*	*Star-8*
Mean	0.096	0.276	0.255	0.547***	1.041***	1.123***
	(0.570)	(0.107)	(0.163)	(0.000)	(0.000)	(0.000)
Normality test (χ^2)	0.52	6.18**	1.62	13.38***	6.73**	1.67
	(0.770)	(0.045)	(0.445)	(0.001)	(0.035)	(0.436)

Exogenous recommendations excluded. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

On average, the difference between what is recommended and what is played is at most one unit for 49.7% of the observations (51.4% if the *Star-8* treatment is omitted in the calculation). This result supports the presence of lie-aversion preferences in the transmission of recommendations. This proportion of observations is not negligible considering the existing trade-off between consistency, to foster the credibility of the outgoing message; and responsiveness, by using the incoming recommendation for coordination purposes. Nevertheless, the interpretation of the observations with high inconsistency levels remains open, particularly for those in which the outgoing recommendation exceeds the selected extraction level.

4.3 The interplay of consistency and extraction levels

Four behavioral types are defined as a function of the subjects' outgoing recommendations and extraction levels. The *cooperative* behavior is characterized by a low extraction and a low recommendation. The *lie-averse* behavior is characterized by low inconsistency levels, but now defined by high extracted and recommended levels. The *predatory* behavior consists on inducing low extraction levels among the other subjects by sending low recommendations, and then take individual advantage by choosing high extraction levels. Finally, there is a set of observations kept as *non-classifiable* because they are characterized by high recommendations levels followed by low extraction levels.

The share of observations catalogued according to each behavioral type are reported in Table 4. Recommendations and extraction levels are considered "low" if they reach at most 4 units, and "high" if they are of at least 5 units.

Table 4: Percentage of each behavior type (by treatment)

	Behavior			
Treatment	***Cooperative***	***Lie-averse***	***Predatory***	***Non-classifiable***
Cycle-E	37.4 (93/249)	23.3 (58/249)	20.9 (52/249)	18.5 (46/249)
Cycle-1	59.3 (118/199)	14.1 (28/199)	16.6 (33/199)	10.1 (20/199)
Cycle-8	48.0 (96/200)	17.0 (34/200)	18.0 (36/200)	17.0 (34/200)
Star-E	67.5 (131/194)	9.8 (19/194)	14.4 (28/194)	8.3 (16/194)
Star-1	50.0 (97/194)	15.0 (29/194)	28.4 (55/194)	6.7 (13/194)
Star-8	22.9 (43/187)	33.2 (62/187)	32.6 (61/187)	11.2 (21/187)
Aggregate	47.7 (559/1,173)	18.7 (219/1,173)	21.7 (254/1,173)	12.0 (141/1,173)

Unit of observation is player per round.

Three patterns emerge from the between-treatments comparison. First, the treatments with the distribution of recommendations more shifted to the left have also the larger and smaller proportions of *cooperative* and *lie-averse* behavior, respectively. Second, the between-treatments variance of *cooperative* behavior is relatively large (2.09%); but the variance of the joint share of *cooperative* and *lie-averse* is almost as low as the share of *predatory* behavior (0.52% and 0.43%, respectively). Third, the proportion of "non-classifiable" behavior is on average 8.3% for the three treatments with more *cooperative* behavior and 15.6% in the other three.

The lower proportion of "non-classifiable" in the treatments with more *cooperative* behavior not entirely intuitive. If this behavior would reflect mere random play it would be equally distributed across all treatments. However, data suggests that "non-classifiable" is capturing more than a subset of subjects that did not understand the game instructions. In fact, there is only a subject for whom the ten actions were catalogued as "non-classifiable", while the remaining observations in this category are spreaded among 57% of the participants.

4.4 Dissonance between recommendations

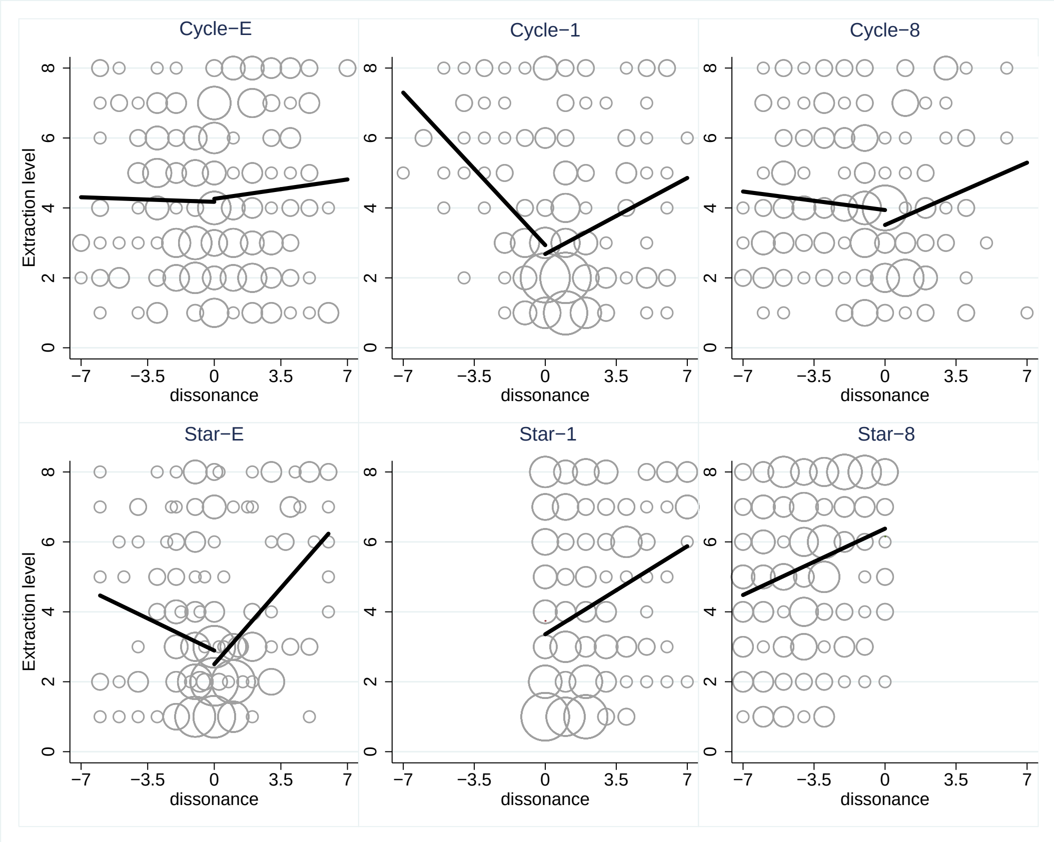
I define dissonance, D_{it}, as the difference between the outgoing and the incoming messages exchanged by subject i in round t. This concept is useful to check for the tradeoff between responsiveness and consistency by computing the correlations between extraction and dissonance levels. A positive correlation will evidence consistency, as the extraction level is increasing with the outgoing recommendation; while a negative correlation will give support to responsiveness, as the extraction level increases with the incoming message.

However, it is also possible to find a mixed behavior that depends on the sign of D_{it}. If the sign of the correlation matches the sign of the dissonance, it will be observed an opportunistic behavior characterized by subjects following the maximum recommended level between the outgoing and the incoming message. The hypothetical opposite pattern, defined as the moralistic or "Kantian" behavior, will correspond to subjects choosing the minimum recommended level between the outgoing and the incoming message as the "right thing to do."

The relationship between dissonance and extraction is shown in Figure 4. The circle size indicates the number of observations in a given position. The linear fit is displayed separately for negative and positive values of dissonance to identify the mixed behaviors defined above. The numerical correlations, as well as their statistical significance, are reported in Table 5. I find evidence of opportunistic behavior in the *Cycle-1* and *Star-E*, while in the *Cycle-E* and *Cycle-8* the correlations are weak and, at most, marginally significant in one case. By construction, for the *Star-1* and *Star-8* treatments the dissonance levels only fall into the positive or negative domain, respectively. As a consequence, in these two treatment cells I cannot identify opportunistic or moralistic behaviors, only consistency or responsiveness.

Having in mind the partial evidence of responsiveness in the treatments

Figure 4: Dissonance *versus* extraction level



Cycle-1 and *Star-E*, I further explore if this behavior can explain the observations in which the outgoing recommendation is larger than the extracted level. The last two columns of Table 5 report the correlations for the subsample of observations with strictly negative consistency values.

I do not find evidence of responsiveness for this subsample in the two treatments in which a negative correlation was reported for $D_{it} \leq 0$, *Cycle-1* and *Star-E*. However, I find a negative and statistically significant correlation for positive dissonance in the *Cycle-E*. Responsiveness may explain extracted levels below the recommended extraction only in a very particular case: in a decentralized structure without exogenous messages, when the outgoing recommendation exceeds the incoming one.

Table 5: Correlations between dissonance and extraction levels

Treatment	Full sample		Consistency < 0	
	$D_{it} \leq 0$	$D_{it} \geq 0$	$D_{it} \leq 0$	$D_{it} \geq 0$
Cycle-E	-0.018	0.062	0.509***	-0.323***
	(0.828)	(0.458)	(0.001)	(0.004)
Cycle-1	-0.466***	0.253***	0.785	0.295**
	(0.000)	(0.002)	(0.115)	(0.013)
Cycle-8	-0.085	0.195*	0.384**	-0.106
	(0.319)	(0.071)	(0.036)	(0.441)
Star-E	-0.192**	0.490***	0.202	0.658***
	(0.018)	(0.000)	(0.356)	(0.000)
Star-1		0.277***		0.816***
		(0.000)		(0.000)
Star-8	0.251***		0.732***	
	(0.001)		(0.000)	

Outgoing exogenous recommendations excluded.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.5 Building a link with survey data

Up to this point there are clear signals of heterogeneous preferences for consistency across the sample: the distribution of inconsistency is skewed to the right in the treatments with lower extraction levels, *predatory* behavior displays the lower variance between treatments, and the most extreme observations in the relationship between dissonance and extraction shown above characterize the opportunistic behavior previsouly mentioned. In this subsection I explore the link between the subjects' preferences for following their own recommendation and the earnings they reported as satisfactory after a journey.

Fehr and Leibbrandt (2011) validate the relationship between experimental findings and field data with a sample of Brazilian fishermen and shrimpers. They show a link between time and social preferences with the use of technologies that are more likely to exploit the common resource. I use the information regarding the fishing technology (cast nets, drift nets, handlining or "others"[8]) as controls in the statistical regressions, but due to the large variation in the employed technologies it is not possible to define an ordinal arrangement from the best to the worst in terms of sustainability, as was done by Fehr and Leibbrandt (2011) using the eye size of the fishing nets.

One potential interpretation of the reported satisfactory earnings, the closest to the existing literature, is to consider it as an indirect measure of

[8]In this category are grouped other fishing technologies reported less often such as harpoon, harvesting mollusks or crabs, and fish-farming.

impatience once we control for the average realized earnings. The underlying assumption behind this interpretation is that the higher the amount required to consider a journey of work as comforting, the more the impatient is the fisherman.

Nevertheless, there are multiple alternative interpretations of the satisfactory and realized daily earnings such as productivity levels or self-defined goals. With respect to the productivity approach, it is not clear how to interpret the large gap between satisfactory and realized earnings. The definition of personal goals seems to be a more plausible interpretation. However, it requires the assumption of systematic underachievement as part of the goal setting process. A third potential interpretation involving the satisfactory and realized earnings is that the gap between these two responses is a signal of the fishermen's level of greed, which also offers a connection to the preferences for consistency when deceiving could be individually beneficial.

I run an OLS regression to explain the *Inconsistency Index (II)* for each subject as a function of the satisfatory earnings. The variables mentioned above, realized earnings and fishing technology, are used as controls along with some experimental variables such as treatment fixed effects and individual extraction during the second stage of the game (the ten rounds including recommendations). The *Inconsistency Index* was defined as

$$II = \sum_{t=t_0}^{T} \begin{cases} x_t - r_t, & \text{if } x_t - r_t \geq 0 \\ 0, & \text{otherwise.} \end{cases} \tag{2}$$

Intuitively, the inconsistency values are aggregated for each subject but only when the outgoing recommendation is below the extraction level. This is assumed to be an indicator of the intention to take advantage of other's cooperative behavior.

The coefficients from the OLS regression are reported in Table 6. In columns (1) and (2) are shown the regression results when the satisfactory earnings are directly introduced into the specification. When controls are also included, the effect is no longer significant. As an alternative specification, the ratio between satisfactory and average realized earnings is used as independent variable. Estimation results are reported in columns (3) and (4). It is easy to check that this specification of the satisfactory earnings is robust to the introduction of controls.

Table 6: Inconsistency index explained by satisfactory earnings (OLS results)

VARIABLES	(1)	(2)	(3)	(4)
Satisfactory earnings	0.0537***	0.0237		
	(0.0178)	(0.0147)		
Average realized earnings		-0.107		
		(0.0767)		
Satisfactory/Realized earnings			1.189***	0.643**
			(0.378)	(0.270)
Constant	10.71***	-6.634**	9.152***	-8.797***
	(0.989)	(2.554)	(1.335)	(2.433)
Observations	130	129	129	129
R-squared	0.055	0.545	0.076	0.556

Controls included: Treatment fixed effects, total extraction per subject during the second stage, fishermen's technology. Exogenous nodes were excluded from the sample.
Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5 Final remarks

I conduct an artifactual field experiment emulating the extraction of a CPR with real fishermen from the Colombian Caribbean coast. It involves the exchange of non-binding and anonymous recommendations between subjects prior to their extraction decision. Recommendations were exchanged through on one of two different and exogenous network structures. A star, with a centralized communication structure, or a cycle, a decentralized structure without hierarchical nodes. In addition, the outgoing recommendations from one of the nodes in the network were controlled exogenously. The predetermined message could be a *good* recommendation, i.e. to encourage low extraction levels; or a "bad" recommendation, i.e. to promote high extraction levels.

I find evidence supporting that preferences for consistency can be extended to the simultaneous exchange of recommendations in a CPR game. These preferences are heterogeneous across the fishermen that took part of the study, and they are positively correlated with the earnings considered by them as satisfactory but not with the reported average realized earnings. Three patterns revealed in our experimental results support this heterogeneity in preferences. First, the distributions of inconsistency are skewed to the right in the treatment cells with lower extraction levels, the *Star-E* and *Star-1*. Subjects with low disutility from being inconsistent free ride on the others' cooperative behavior, exploiting the increase in the marginal utility of extraction. Second, the relationship between dissonance and extraction reveals a "U-shaped" pattern when low recommendations are more often. Extraction levels for low dissonance values are very distant from those observed for extreme dissonance values, suggesting the coexistence of consistent and cooperative individuals with inconsistent and self-regarding subjects. Third, from the four behavioral types defined in Subsection 4.3, the *predatory* behavior exhibits the lower between-treatments variance.

This last pattern brings into discussion if the preferences for consistency are affected by environmental cues regarding aggregate behavior. By environmental cues I define the exogenous variations in the expected extraction levels induced by a combination of the network structure and the predefined messages in a given treatment. In particular, are less cooperative environments capable of reducing the individual costs of being inconsistent? Do we observe more inconsistent behavior when a *bad* recommendation is a public signal?

I present evidence that cooperative and lie-averse behaviors, characterized by low inconsistency, seem to be substitutes for a subsample of the experimental participants. The lowest shares of lie-averse behavior are observed in the three treatments with the largest percentage of cooperative behavior, the *cycle-1*, *star-E* and *star-1*. More importantly, in the treatment with a public *bad* recommendation, the *star-8*, a 56% drop in cooperative behavior is compensated by a 210% increase in lie-averse behavior (with respect to the other treatments). However, the drop in cooperative behavior is also correlated with a 165% increase in the proportion of predators. In conclusion, I contribute to the existing evidence of the sensitivity to contextual manipulations in lying behavior Mazar et al. (2008), but this behavior is only exhibited by a fraction of the subjects.

A question that emerges from the results reported on Subsection 4.2, and that I was not able to address completely, is how to reconcile the existence of negative inconsistency values with any kind of rationality, not necessarily self-regarding motives. Under the assumption that messages are meaningful, and are useful rather to coordinate or to induce an exploitable cooperative behavior, the rationality behind choosing an extraction level below the outgoing recommendation is not clear. A salient explanation for this behavior could have been the responsiveness to the incoming recommendation. If a given subject considers that the incoming recommendation will lead to a preferred outcome with respect to its previous expected play, where "preferred" may or may not include other-regarding motives, then this subject will rationally opt for following the message. However, as was shown in the exercise analyzing the dissonance level with the extraction pattern (see Table 5), I only find support for the responsiveness mechanism under very particular and limited conditions.

Although it was not possible to offer a full explanation for the recurrent negative inconsistency values, there are two patterns in the data that offer partial explanations of this behavior. First, selecting an extraction level below the outgoing recommendation seems to have small costs for those subjects that are more likely to cooperate. For 71% of the observations in which inconsistency has a value of -1, the corresponding extraction levels reaches at most two units. Second, I find a larger variance for inconsistency at the within-subjects level rather than at the between-subjects level. The within-subjects variance is 1.6 times larger than the between-subjects variance, and this ratio increases to 2.0 for the subsample of observations with negative inconsistency. In addition I find that 92 out of 120 participants (77%) extracted below their suggestion at least in one of the ten rounds.

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Appendix

Experimental instructions

The following instructions were presented in Spanish to the players. These instructions were read to the participants from the script below by the same person during all sessions. The participants could interrupt and ask questions at any time. Whenever the following type of text and font e.g. [. . .MONITOR: distribute PAYOFFS TABLE to participants. . .] is found below, it refers to specific instructions to the monitor at that specific point.

Instructions

Greetings. We want to thank everyone here for attending the call, and special thanks to the *(local organization that helped in the logistics)* that made this possible. We will spend about two hours between explaining the exercise, playing it and finishing with a short survey at the exit. So, let us get started.

The following exercise is a different and entertaining way of participating actively in a project about the economic decisions of individuals. Besides participating in the exercise, and being able to earn some cash, you will participate in a community workshop next Monday (date and time of the meeting) to discuss the exercise and other matters about natural resources. Once the game finishes, we will ask you some information about you and your community, and then we will give you what you have earned during the game. The funds to cover these expenditures have been donated by the Latin American and Caribbean Environmental Economics Program.

Introduction

It is very important that while we explain the rules of the game you do not engage in conversations with other people in your group. This exercise attempts to recreate a situation in which a group of families must make decisions about how to use the resources of, for instance, the sea, a mangrove, a fishery, or any other case where communities use a natural resource. In the case of this community, an example would be the extraction of *(name of a fish usually caught in the community)* in the *(name of an actual local commons area in that village)* zone. You have been selected to participate in a group of five people among those who have signed up for playing. The game in which you will participate now is different from the ones others have already played in this community; thus, the comments that you may have heard from others do not apply necessarily to this game. You will play for several rounds equivalent, for instance, to fishing trips. At the end of the game you will receive your earnings in cash according to the amount of money you accumulate during the exercise. Your earnings will be approximated to the closest multiple of $1,000 [. . .MONITOR: Give a couple of examples of how to approximate the game earnings. . .]

The PAYOFFS TABLE

We call this game **THE FISH MARKET** given the similarity between the **PAYOFFS TABLE** and the mechanism that assigns the price of the fish based on the aggregated catch. [. . .MONITOR: Explain that when fish is abundant the price decreases and the earnings per unit caught are reduced. As an analogy, explain that when fish is scarce its price increases. After this basic explanation, ask participants what will happen with the earnings of a hypothetical player with low extraction when the rest of the group has high levels of extraction. Similarly, ask participants about the inverse case. . .] If we have understood the payoffs in each round, now we can introduce the **PAYOFFS TABLE**.

Table A.1: Payoffs table

		MY LEVEL OF EXTRACTION							
		1	2	3	4	5	6	7	8
THEIR LEVEL OF EXTRACTION	4	2273	2370	2453	2520	2573	2610	2633	2640
	5	2213	2310	2393	2460	2513	2550	2573	2580
	6	2153	2250	2333	2400	2453	2490	2513	2520
	7	2093	2190	2273	2340	2393	2430	2453	2460
	8	2033	2130	2213	2280	2333	2370	2393	2400
	9	1973	2070	2153	2220	2273	2310	2333	2340
	10	1913	2010	2093	2160	2213	2250	2273	2280
	11	1853	1950	2033	2100	2153	2190	2213	2220
	12	1793	1890	1973	2040	2093	2130	2153	2160
	13	1733	1830	1913	1980	2033	2070	2093	2100
	14	1673	1770	1853	1920	1973	2010	2033	2040
	15	1613	1710	1793	1860	1913	1950	1973	1980
	16	1553	1650	1733	1800	1853	1890	1913	1920
	17	1493	1590	1673	1740	1793	1830	1853	1860
	18	1433	1530	1613	1680	1733	1770	1793	1800
	19	1373	1470	1553	1620	1673	1710	1733	1740
	20	1313	1410	1493	1560	1613	1650	1673	1680
	21	1253	1350	1433	1500	1553	1590	1613	1620
	22	1193	1290	1373	1440	1493	1530	1553	1560
	23	1133	1230	1313	1380	1433	1470	1493	1500
	24	1073	1170	1253	1320	1373	1410	1433	1440
	25	1013	1110	1193	1260	1313	1350	1373	1380
	26	953	1050	1133	1200	1253	1290	1313	1320
	27	893	990	1073	1140	1193	1230	1253	1260
	28	833	930	1013	1080	1133	1170	1193	1200
	29	773	870	953	1020	1073	1110	1133	1140
	30	713	810	893	960	1013	1050	1073	1080
	31	653	750	833	900	953	990	1013	1020
	32	593	690	773	840	893	930	953	960

To be able to play you will receive a **PAYOFFS TABLE** equal to the one shown in the poster. [. . .MONITOR: show PAYOFFS TABLE in poster and distribute **PAYOFFS TABLES** to participants. . .] This table contains all the information that you need to make your decision in each round of the game, as we will see now. The numbers that are inside the table correspond to the money that you would earn in each round.

To play in each round you must write your decision number between 1 and 8 on the yellow **GAME CARD** like the one I am about to show you. [. . .MONITOR: show **GAME CARDS** and show in the poster. . .] When you choose your desired level of extraction, you are selecting the column of the **PAYOFFS TABLE** corresponding to the earnings of the round. It is very important that we keep in mind that the decisions are absolutely individual, that is, that the numbers we write in the **GAME CARD** are private and that we do not have to show them to the rest of members of the group if we do not want to.

The monitor will collect the **5 GAME CARDS** from all participants, and will add the total units of extraction that the group has decided to allocate. The difference between the total extraction of the group and your individual extraction will indicate the row in the **PAYOFFS TABLE** to calculate your round earnings. Please remember, your level of extraction indicates the column and the level of extraction of the rest of the group indicates the row in the **PAYOFFS TABLE**. With this information, the monitor will help calculate the points that you earned in the round, and you will write your earnings in the **DECISION FORM**.

In this game we assume that each player extracts a maximum of 8 units of a resource like fish or oysters. In reality this number could be larger or smaller, but for purposes of our game we will assume 8 as maximum. In the **PAYOFFS TABLE** this corresponds to the columns from 1 to 8. Each of you must decide from 1 to 8 in each round and, given that you will only know your own decision, the monitor will publicly announce the group's total extraction. With this information you will be able to calculate your earnings using the **PAYOFFS TABLE**. If you need help the monitor will calculate your payoff in each round. Let us explain again with some examples. Suppose you decide to extract 2 units and the monitor announces that the group extracted 22 units. Your earnings correspond to the cell in the second column in which the rest of the group extracted 20 units. Let us look at other examples in the poster [. . .MONITOR: show an example with each player. Then, show more examples where participants explain to others how they calculate their earnings].

The DECISIONS FORM (First Stage Rounds 1 to 5)

To play each participant will receive one green **DECISIONS FORM** like the one shown in the poster in the wall. We will explain how to use this sheet. [. . .MONITOR: show the **DECISIONS FORM** in the poster and distribute the **DECISIONS FORMS**. . .]. With the same examples, let us see how to use this **DECISIONS FORM**. Now, suppose that you decided to play 2 units in this round. In the yellow **GAME CARD** you should write 2. Also you must write this number in the second column of the decisions form. The monitor will collect the 5 yellow cards, will add and will inform the total of the group. In this example 22 units were extracted. He will help you complete the last two columns of the **DECISION FORM** with the average extraction from the other players and your period earnings.
It is very important to clarify that nobody, except for the monitor, will be able to know the number that each of you decides in each round. The only thing announced in public is the group total, without knowing how each participant in your group played. It is important to repeat that your game decisions and earnings information are private. Nobody in your group or outside of it will be able to know how many points you earned or your decisions during rounds. If at this moment you have any question about how to earn points in the game, please raise your hand and let us know. [. . .MONITOR: pause to resolve questions. . .] If there are no further questions about the game, then we will assign the numbers for the players and the rest of forms needed to play.

Preparing for playing

Now write down your player number and name in the **DECISIONS FORM**. Also write the current date and time. Now we will summarize for you the steps to follow to play in each round. Please raise your hand if you have a question. [MONITOR: Summarize the steps to follow in each round. . .]
We will start with a practice round to test that the activity instructions have been understood. The earnings from the practice round will NOT be included in the total earnings of the game. After practicing the game in this initial round we will play for 15 rounds for cash. Once we complete the fifth round we will pause to give you a new **DECISIONS FORM** and to introduce a new rule in the activity. To start the first round of the game we will organize the seats and desks to guarantee that your decisions and earnings information are private. Finally, to get ready to play the game, please let us know if you have difficulties reading or writing numbers. If so, one of the monitors will sit next to you and assist you with these. Also, please keep in mind that from now on there should be no conversation nor should you make any statements during the game, unless you are allowed to. We can now start with the practice round, the earnings of which will NOT

count toward your real earnings, as they are just for practicing the game.
Given that we understand how the activity works, now we can proceed to sign the **INFORMED CONSENT** that will be read now [. . .MONITOR: Read the **INFORMED CONSENT** and verify that all participants sign it. . .]

The DECISIONS FORM (Second Stage Rounds 6 to 15)

We have completed Round 5 and, as we announced at the beginning of the exercise, we will introduce a new rule. From now on you can send **RECOMMENDATIONS** with the level of extraction desired from other players, in a number from 1 to 8. The number of participants that will receive your message will depend on your location in the **NEIGHBORS STRUCTURE** shown in the poster. [. . . MONITOR: show the poster with the **NEIGHBORS STRUCTURE**. . .] In this structure each one of you is represented by one of the white circles labeled with the corresponding player number. These numbers will allow you to determine your location and your connections to other participants. Each one of the lines corresponds to a connection between two players. The number of lines will indicate the number of connections for each one of you.
Remember that you will not be able to know the player number of the rest of players before, during or after the conclusion of the game. This means that sent and received **RECOMMENDATIONS** will remain anonymous. To confirm that you have understood the **NEIGHBORS STRUCTURE** the monitor will ask you about the connections of a particular circle [. . .MONITOR: Use the poster to ask for the neighbors of a couple o nodes. . .]
Now you will receive the new **DECISIONS FORM** like the one shown in the poster. [. . . MONITOR: show the poster with the DECISIONS FORM and distribute the **DECISIONS FORM** to participants. . .] This new form includes an extra column. Let's see how to use it according to the new rule of the game. At the beginning of each round, and only if you want, you can write in the second column the **UNITS OF EXTRACTION** that you recommend to your neighbors. In case you'd rather not send any recommendation you should write **"NO"** in the second column. The monitor will collect all the recommendations and he will privately show to each one of you the RECOMMENDATIONS received using the **MESSAGE EXCHANGING BOARD**. [. . . MONITOR: show the **MESSAGE EXCHANGING BOARD**. . .] You will be able to decide your **EXTRACTION LEVEL** only after the monitor shows you the **RECOMMENDATIONS** sent to you.
It is important to clarify that sending or receiving a particular **RECOMMENDATION** does not imply any kind of commitment from you or from any other participant. You're not obligated to follow the sent or received **RECOMMENDATION**; hence, if you want you can extract a different level from this **RECOMMENDATION**.
The rest of the **DECISIONS FORM** will be completed as in the first part of the game. You will write your **LEVEL OF EXTRACTION** in the third column and in the **GAME CARD**. The monitor will collect the five **GAME CARDS** and will announce the total extraction of the group. Finally, the monitor will help you complete the last two columns of the **DECISIONS FORM** with the extraction of the rest of the group and your earnings of the round.
Remember that your decisions and earnings information are private, and not even your neighbors according to the **NEIGHBORS STRUCTURE** will access this information.
The new rule of the game introduces a preliminary step in each round to exchange **RECOMMENDATIONS** according to the **NEIGHBORS STRUCTURE**. After this step each round will be similar to the first stage of the activity. Please remember that you're

not obligated to send a **RECOMMENDATION**, and that these messages do not directly affect your earnings. If at this moment you have any question about how to earn points in the game, please raise your hand and let us know. [. . .MONITOR: pause to resolve questions. . .]
Now write down your player number and name in the new **DECISIONS FORM**. We will next summarize for you the steps to follow to play in each round. Please raise your hand if you have a question. [MONITOR: Summarize the steps to follow in each round. . .] We will play with the new rule for another ten rounds.

Flipping a coin to determine the exogenous RECOMMENDATION (Player A only)
You have been selected to play a special role in this game: your sent **RECOMMENDATION** will be determined by a coin toss. You will toss this coin. If the coin lands on this side (heads) during the next 10 rounds you will send a **RECOMMENDATION** to extract **1 UNIT**. If the coin lands on this side (tails) during the next 10 rounds you will send a **RECOMMENDATION** to extract **8 UNITS**. Please bear in mind that the coin indicates the **RECOMMENDATION** that you must send, but you can freely choose your desired level of extraction. Please take into account that **NOBODY BUT YOU** knows that you were selected to play this role in the game. Only you know that your sent **RECOMMENDATION** will be determined by the COIN FLIPPING.
If you don't have any more questions please flip the coin I've just given you to determine your **RECOMMENDATION** to the other players. [. . . MONITOR: Give the coin to the participant, observe the outcome and confirm that the player's **RECOMMENDATION** procedure is clear. . .]