

Measuring image concern

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Abstract

It is now well documented that individuals are sensitive to the way others perceive them and yet there is no systematic way of measuring this dimension of preferences. In this paper, we propose a novel experimental game to measure the sensitivity to image concerns and we test it experimentally. We find a large heterogeneity in the population: one third of the sample appears totally insensitive to perceptions by others. Older people, foreigners and those with less friends seem to be more image concerned. We find that more image concerned individuals are not typically more altruistic, but appear to be more sensitive to deviations by others from the social norm. Finally, we find preliminary evidence suggesting that individuals do not only care about the absolute image they convey, but also about how far this image is from reality.

JEL Classification:

Keywords: image concern, social norm

1 Introduction

Individuals behave differently when their choices and actions can be observed by others. This dimension of preferences, called image concern, is now well documented empirically (Ariely et al. 2009, Andreoni and Petrie...) and some important theoretical implications have been drawn (see for instance Benabou and Tirole 2006, 2011). Yet, nothing is known about the heterogeneity in the population in the degree of sensitivity to image concerns. Moreover, neither the drivers of image concern, nor the consequences are comprehensively documented. One of the main reasons for this gap in the literature is that there is currently no systematic way of measuring individual sensitivity to the perception by others.

The first and most important goal of this paper is to propose an experimental game designed to measure individual image concern. This game is constructed to be portable so that it can be tested in a variety of settings, in the spirit of other games aimed at measuring social preferences, such as the trust game, the dictator or the public goods game. It should be easily implemented

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even remotely, in other words should not involve interactions repeated over a longer period of time, and should be easy to include at the start of a lab or field experiment. The second goal of the paper is to study the socioeconomic determinants of sensitivity to image concern and to examine how it correlates with behavior in other games. This analysis will lead us to suggest that the way image concern is currently modeled in the theoretical literature might be incomplete.

The *image concern game* we propose involves three players: a dictator, a recipient and an observer. The dictator determines how much money to transfer to a lottery with two possible outcomes: success, in which case the recipient receives a given amount of money, or failure, in which case the recipient receives nothing. The more money the dictator transfers, the higher the chances of success. Before the lottery is actually run, the dictator has to reveal (in an incentive compatible way) his willingness to pay μ to remain anonymous (i.e for his picture not to be revealed to the observer), *in case the lottery is a failure*. Independently of whether the dictator remains anonymous, the outcome of the lottery is revealed, but never the amounts the dictator transferred.

There are two main aspects that drive the structure of this game. First, image concern is easily measured by using the willingness to pay μ to remain anonymous. Second, and most importantly, this measurement is independent of other social preferences including altruism. Indeed, what is revealed in case the dictator does not remain anonymous, is not the actual amount transferred, but the fact that the lottery was a failure. Thus, the inference the observer makes when she sees the picture is an updated belief on the preferences and characteristics of the dictator conditional on the fact that the lottery was a failure.

Specifically, consider two dictators with the same image concern but a different level of generosity. In our setting, the two dictators will give different amounts in the lottery but will bid the same way for anonymity. If we had designed the game using the classical dictator game and added a phase where the dictator could bid to remain anonymous, the more generous dictator would still transfer more than the other in the first phase, but would then bid less since he would have less to be ashamed of. We would thus mistakenly conclude that the first dictator was less image concerned. Our game, at a slight cost of complexity, is designed to overcome this potential issue.

Running this game in the lab, we find a large amount of heterogeneity: about one third of the participants chooses to not pay anything, while one third gives a large amount to remain anonymous. We validate our measure in a number of ways. The first approach we use is to build a different game to measure image concern and to show that the distribution appears broadly similar.¹ The second is to validate the measure with survey data. There is unfortunately no well established question aimed at measuring image concern, contrary to the case of trust where one question is used very systematically.² We thus constructed ourselves one main question "It is important for me not to be perceived as selfish". We show that the answers are indeed correlated

¹We however find this game less appropriate since it suffers from the issue mentioned above that it cannot separate the measurement of generosity and the measurement of image concern.

²The "Interpersonal Trust" question, is usually asked in the following terms: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?"

with our image concern measure.

Turning to drivers of image concern, we find that few socio economic variables have explanatory power except age and nationality. While the limited sample size and the sampling of our laboratory subject pool of course warrant some caution, it is nevertheless interesting that older individuals appear more image concerned as well as non French citizens.³ Moreover, more image concerned people tend to have less friends and be less involved in political parties. WE NEED TO BUILD A BIT ON THESE POINTS

The dictators in our study can view the picture of the observer before making their decision. We can therefore determine whether the characteristics of observers influence the amount transferred since they each play the game four times with different observers. Few characteristic of the observer significantly impact the willingness to pay to remain anonymous. This is encouraging evidence of the portability of the setup.⁴ Interestingly, one dimension that clearly stands out is that non French individuals pay much more for anonymity when facing French observers, a fact linking nicely to the literature on discrimination. One possible interpretation is that they fear that due to prejudice, a failed outcome of the lottery will be more adversely interpreted if the dictator is not French than if he is.

Our experiments involve two phases: in the first we run our measurement game and in the second we run either an ultimatum game or an infinitely repeated prisoner's dilemma, the purpose being to correlate behavior in these games to our measure of image concern. The first thing we find is that there is no link between image concern and altruism, either in the ultimatum or in the first round of the repeated prisoner's dilemma. We however find that image concerned individuals are much more ready to punish at a cost deviations from the norm by other participants: they give a higher minimal acceptable offer in the ultimatum game,⁵ and tend to cooperate less in the repeated prisoner's dilemma, following a deviation by their partner in the previous round.

We explore further the behavior in the repeated game. The first thing to point out is that in this game, it is not straightforward to know what actions are judged favorably by the community since they involve strategic considerations. One of the side contributions of our paper is to document this social norm. We do that by asking observers to rate the behavior of those they observe after each round. We find that two main factors drive favorable ratings by observers, on top of socioeconomic factors, such as age and nationality, and appearance on the photo, such as the fact of smiling. First, cooperating increases rating. Second, this higher rating of cooperation depends on what the player did the round before. Cooperation is significantly better rated when it follows cooperation by the same player in the previous round. Observers seem to value consistency in cooperation.⁶ Comparing treatments where phase 2 was run with observers to those where

³Mostly nationals of ex African French colonies

⁴Indeed if the experiment is run in different settings, different observers will be used. This evidence suggests that the measurements are not sensitive to this fact

⁵The top 30th percentile in terms of image concern require on average 45 percent to be transferred by the sender to be ready accept the offer.

⁶Surprisingly, the rating does not depend on the actions of the partner in the previous round. In particular a deviation following cooperation by the partner in the previous round does not receive a worse rating than if it follows

it wasn't, we can show that more image concerned individuals are relative to others even more likely to follow the social norm when observed. This is particularly true for the second aspect of the social norm related to consistency of cooperation. This result provides further validation of our experimental game.

The final result we obtain is that, in spite of finding no link between image concern and altruism, there is a significant positive correlation in Phase 1, between the amount given in the lottery and the bid for anonymity. We interpret this as evidence that individuals care not only about the absolute image they convey, as in models of image concern, but also about how far this image is from reality. This interesting possibility should be further explored as it might lead to an essential modification of the theoretical literature on the topic.

Our paper is closely connected to the empirical literature on the influence of being observed, involving both field and lab experiments. We differ in both our goal and approach. The goal of most of these papers is to document the average influence of being observed and the methodology they use is to compare average differences between treatments. We, on the other hand, are interested in individual measurements and individual consequences. Ariely et. al. for instance compares effort levels in treatments that varied in three dimensions: subjects were either observed or unobserved, received monetary incentives or not and contributed either to a "good cause" (Red Cross) or a "bad one" (NRA). They find that being observed increased effort levels only when subjects did not receive monetary incentives and only when they volunteered for a good cause.

There is also a literature documenting what can be seen as consequences of being image concerned. Mellstrom and Johannesson (2008) show that offering small monetary rewards significantly decreases blood donations and that offering the possibility to donate the reward to a charity immediately restores blood donation rates. This suggest that image concern can be an important driver of unselfish actions (see also Lacetara and Macis 2010). Della Vigna et al. (2012) show that notifying residents in advance of the exact time of solicitation in a door to door fundraiser significantly decreases the share of households opening doors, one possible interpretation being that image concerned individuals attempt to avoid the pressure.

There is also extensive evidence on this topic using laboratory experiments. Andreoni and Petrie (2004) find that contributions in a public goods game increased when the players were not anonymous. Dana et al. (2006) offer participants a costly option to opt out of a dictator game and show that giving in the dictator game is in part motivated by participants not wanting to appear selfish. In the same spirit, other contributions (Rege and Telle 2004, Sanek and Sheremeta 2013), find that providing options for the participants to overcome their moral dilemmas significantly lowers transfers.

We point out one branch of the literature that tries to find individual proxies for image concern. Carpenter and Myers (2010) use data on the purchase by firefighters of vanity plates that make them identifiable at all times. They show that this proxy can predict higher responses to emergency calls but has no effect on less visible activities such as training. Algan et al. (2013) in a

deviation by the partner.

study of Wikipedia, used the size of the contributors page and the extent to which they choose to display awards as a proxy for image concern.⁷ We share the goal of these papers to find individual proxies for image concern but try to determine a less context specific measure exploitable in a wide variety of settings.

Our approach is similar to some extent to the approach in the literature on trust. Analogously to Glaeser et al. (2000), Fehr et al. (2003) and Sapienza et al. (2007) we compare measurements of preferences obtained by survey questions to those resulting from laboratory experiments.

Our results also link us to the literature on racial discrimination and brings a new twist. We find that non French are particularly imaged concerned when facing French individuals. There is a growing literature studying experimentally issues of discrimination and prejudice (Laitin et al.) ADD

Finally the second phase of our experiments links us to the literature on infinitely repeated games in the lab (Dal Bo and Frechette 2011 among others). On top of our analysis on image concern, our study also allows for a better understanding of the social norms governing those games, using the ratings by observers of the behavior of participants.

The paper is organized as follows. In section 2 we introduce our main experimental game. In section 3 we present the experimental setup. In sections 4 and 5 we describe both correlates of image concern in terms of socio economic characteristics as well as behavior in other games. Finally in section 6 we discuss possible limitations of our game and further research directions.

2 Measuring image concern: the procedure

2.1 The image concern game

The **image concern game** is played between three players: the dictator, the recipient and the observer. The game is played as follows:

1. The dictator sees the photo of the observer (in the right panel of his screen as shown in Figure 8) but neither the observer nor the recipient see any pictures yet.
2. The dictator receives an amount of 100 tokens. He decides how much to allocate to a lottery. The lottery has two possible outcomes: success, in which case the recipient receives 50 tokens or failure, in which case the recipient receives nothing. For each token transferred by the dictator, the chances of success increase by one percent, i.e if the recipient gave an amount $X \in (0, 100)$, the probability that the lottery is a success is $0.01 * X$.
3. Before the lottery is actually run, the dictator chooses the maximum amount μ he is willing to pay to remain anonymous in case the lottery results in failure.
4. The lottery is run:

⁷Algan et al. 2014 in an analysis of open source software programmers use the answer to a survey question to identify image concern.

- (a) If it is a success, the recipient receives 50 tokens and the picture of the dictator appears on the screen of the observer.
- (b) If it is a failure, the recipient receives nothing and the willingness to pay μ chosen in step 3 is used. To guarantee truthful revelation of the willingness to pay in step 3, the following mechanism is implemented: a random draw of $b \sim U(0, 100)$ is taken. If $b \leq \mu$, the dictator pays b and remains anonymous (the observer does not see the dictator's picture). If $b > \mu$, the dictator pays nothing and the observer sees the picture of the dictator. In both cases, the observer learns that the lottery outcome was a failure.

No matter the result of the lottery, neither observer nor recipient ever learn about the amount actually transferred in either step.

As suggested in the introduction, there are two key ideas that underly the setup of this game. First, the individual image concern can be measured by the maximum willingness to pay μ to remain anonymous chosen in step 3. Second, the decision to pay for anonymity is separated from the amount actually transferred in the lottery by the dictator. Indeed, regardless of how much the dictator gave in step 1, the inference that an observer makes about the dictator's generosity when he sees a failure is the same since he does not observe the actual amount transferred.

2.2 The random observation game

A second game, **the random observation game**, will be used to corroborate some of the results obtained using **the image concern game**. We nevertheless believe it is less well suited to measuring image concern for reasons outlined in section 2.3.2.

The game is played in four rounds. In each round, three players are matched such that no player encounters another subject twice: the dictator, the recipient and the observer. The game is then played as follows:

1. The dictator receives an endowment of 100 tokens. On his screen he sees the picture of the observer.
2. A random draw determines if the round will be *deterministic* or *probabilistic*
 - If the round is *deterministic*, the dictator chooses how much to transfer to the recipient and the observer sees both the picture of the dictator and the amount he transferred
 - If the round is *probabilistic*, the dictator chooses an amount to transfer to the recipient and pays this amount. However his decision is implemented only with probability 1/3. With probability 2/3 the recipient receives a random amount drawn from a uniform distribution over $[0, 100]$. The observer sees both the picture of the dictator and the amount received by the recipient, but does not observe the actual amount paid by the dictator.

As for our main game, the setup of this game was driven by some specific ideas. First the image concern is measured by the difference in amounts transferred by the dictator between probabilistic and deterministic rounds. A simpler setup can of course come to mind where we would just switch on and off the presence of observers across rounds. However, this setup would suffer from a strong experimenter demand effect, since this would clearly push the participants to give more when observed. Our setup mitigates this concern.

Note however that one of the drawbacks of this setup, and actually of most alternative setups except for our image concern game, is that the individual level of generosity will interact with the measure. Consider the extreme case of a completely altruistic dictator who transfers the full amount in the probabilistic round. She cannot possibly give more in the deterministic rounds. We would thus conclude that the image concern is absent even though this player might care a lot about the way she is perceived.

2.3 Experimental data

2.3.1 Organization of the sessions

The experiment was entirely computer-based and there was no communication between subjects. All participants were seated in the same room, separated by screens, and briefed together. Before the experiment started, a picture was taken of each participant and fed into the experimental software, so that subject anonymity could be removed in a controlled manner. Each session was organized in 2 phases:⁸

1. *Phase 1*: we run the game measuring image concern. In some sessions the image concern game was run, in others the random observation game. Regardless of which one was played, four rounds were conducted. In each round, subjects were randomly assigned to be either a dictator, a recipient or an observer and informed of their assignment. The observer and the dictator saw each other's computer name and photo on their screens throughout the round for the random observation game, whereas the recipient did not know with whom he had been matched. In the image concern game, the choices of the dictator determined whether the observer saw her picture (as described above). The players were informed that they would play four rounds of a game of which one would be selected at random to determine their payoffs. In the random observation game, a random draw at the start of each round determined whether the round would be deterministic or probabilistic such that in the end, each dictator had played two probabilistic and two deterministic rounds. After each round, new groups of participants were formed, so that no dictator encountered an observer or a recipient twice. The observers received a fixed payment independent of other players' actions.
2. *Phase 2*: we run either a repeated prisoner's dilemma game or a repeated prisoner's dilemma game *and* an ultimatum game. In about half the sessions, the prisoner's dilemma games were

⁸At the end of these two phases, the same survey was administered in all sessions

run with observers, in the others without.

Ultimatum game. Players are organized in pairs and a classical ultimatum game was run. One player is given the role of the sender, the other the role of the receiver. The sender decides on a split of a 100 tokens. Before the split is communicated, the receiver specifies the minimal amount he is ready to accept.

Infinitely repeated games. Players were organized in pairs and played the following prisoner's dilemma.

TABLE 1: PAYOFFS OF PRISONER'S DILEMMA

	C	D
C	0.8,0.8	0,1
D	1,0	0.4,0.4

The infinitely repeated game was implemented as a random continuation rule game where at the end of each round there was a probability 7/8 that another round was played in the game.⁹ After each game, the participants were rematched so that no group of subjects encountered each other more than once.¹⁰ In practice, as in Peysakhovich and Rand (2013) or Fudenberg et al. (2012), we didn't make the draw of the continuation probability during the game since we wanted to compare behavior across treatments and thus wanted games of identical length. We chose exactly the same length as in the first three games run by Peysakhovich and Rand (2013), who also used a continuation probability of 7/8: given this approach, each participant played three games, the first with 12 rounds, the second with 1 round and the third with 3 rounds.

In some sessions, the actions of both players was visible for an observer. Each observer was assigned to two pairs of players. The observers saw the players' photos and computer names, as well as the decisions they made in the game. A picture of the observer and his or her computer name was visible on the players' screens while they took their decisions so that they knew by whom they were observed. For each round, the observers received a flat payment of 0.50 that was independent of the players' actions. Importantly, observers were asked whether they had met the other participants before and after each round, how they rated the behavior of the participant in the game.

2.3.2 Constructing measures of image concern

The image concern game

⁹With that continuation probability, cooperation is both a subgame perfect and risk dominant action.

¹⁰Within a repeated game the same group would of course play all the rounds.

The image concern game is designed to measure image concern in a straightforward way using the willingness to pay for anonymity. However we are running the game four times for each individual, using different observers and recipients. We thus have four individual measures that we could potentially combine in different ways. Throughout the experiment we will use three measures:

1. *First mu*: the willingness to pay the first time the game is played
2. *Average mu*: the average value of the willingness to pay over the four periods
3. *Positive mu*: an indicator variable taking the value 1 if the average mu is positive

The random observation game

In the random observation game, which we use only for some validation of our base game, the image concern is naturally measured by the difference in amounts transferred by the dictator between probabilistic and deterministic rounds. As shown in panel a) of figure 1, we see that there is on average a difference between contributions in the two types of rounds. As expected, transfers are higher in deterministic rounds, i.e rounds for which the dictator is sure that his choice will be observed. This average effect is coherent with the literature (Ariely et. al. , Andreoni and Petrie 2004 and others).

However, when testing experimentally this game in the laboratory, a further issue emerged: as visible in panel b) of Figure 1, the average donation decreased round to round even though it was clearly specified that only one round would be chosen at random to determine the payoffs.¹¹ Thus the measurement of μ proposed above turns out to be dependent on the order in which these games were played. We thus throughout this paper use a different measure of image concern that we call the robust mu: the average difference between rounds at switching points, where switching points are periods where a probabilistic round follows a deterministic round or vice versa.

2.3.3 The sample

The experiment was run in May 2014 at the Laboratoire d'Economie Experimentale de Paris (LEEP). The lab has access to a diverse subject pool that comprises individuals not affiliated to any university as well as students and staff. Table 3 provides descriptive statistics for the sample of participants who played the image concern game in phase 1 since this is the main focus of the analysis. The number of sessions and participants are detailed below:

¹¹This interesting feature does not seem to appear in the literature although Engel (2010) notes in his meta-study of dictator game experiments that repeating the game decreases transfers. A possible explanation could be that subjects who are generous in the beginning become satiated with feeling generous over the course of the game and thus decrease their transfers.

FIGURE 1: AVERAGE TRANSFER DECISIONS IN THE RANDOM OBSERVATION GAME

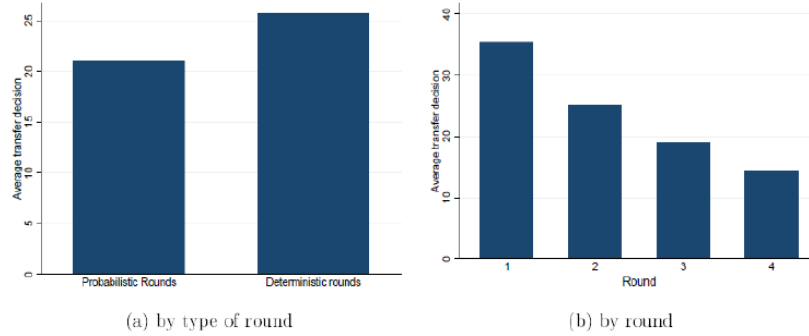


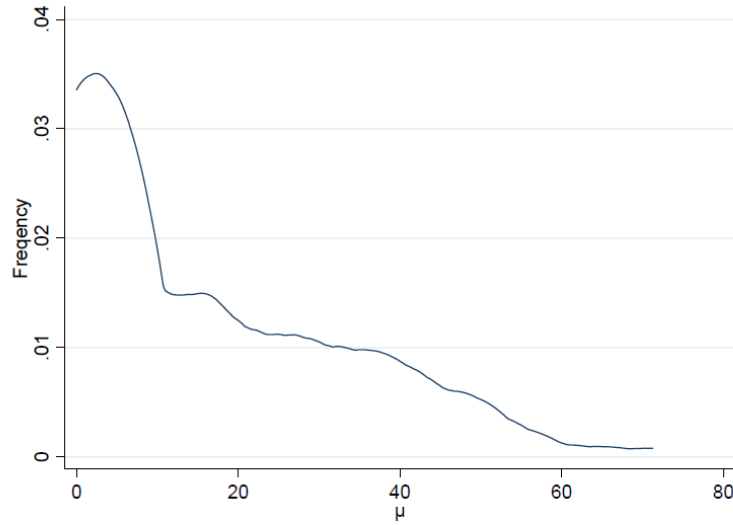
TABLE 2: SESSIONS

Phase 1	Phase 2	Nber of sessions	Nber of participants	Average gain
Image concern game	PD (observed)			
Image concern game	PD (unobserved)			
Image concern game	Ultimatum game			
Random observation game				

3 Measuring image concern: the results

The results of the experiment reveal a significant heterogeneity in the sensitivity to image concern. The distribution of the average value of μ across all four rounds (average μ variable) is given in Figure 2. 35 percent of the sample is completely insensitive, i.e. does not pay to stay anonymous. WE SHOULD CHECK HERE VALUES WE MIGHT GET FROM THE FIGHERFIGHTER SUDY On the contrary, more than 30 percent seem quite sensitive and give more than 20. Since this is the first study to measure individual sensitivity to image concern, it is difficult to compare the distribution to existing results. It is however interesting to note that we find a similar distribution and a similar proportion of non-concerned individuals when using the results of the random observation game (see Figure 9 in the appendix). The proportion of completely insensitive individual is slightly

FIGURE 2: DISTRIBUTION OF IMAGE CONCERN



higher (47 percent of the sample), but we nevertheless also find a high degree of heterogeneity.

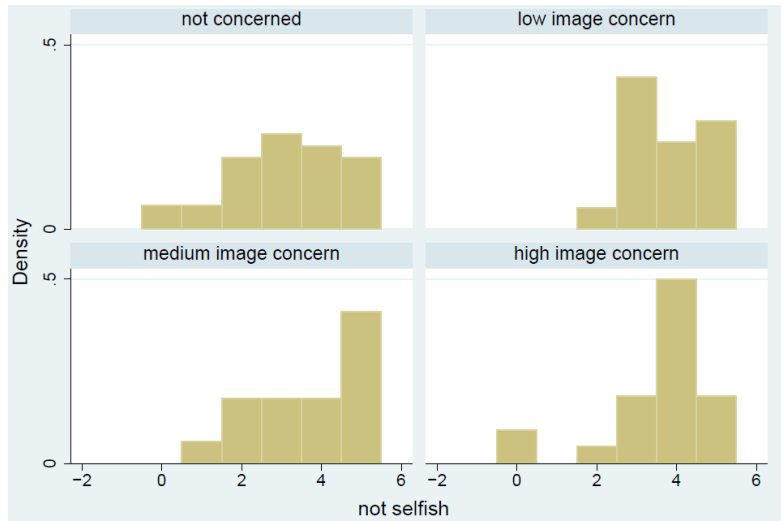
One key question immediately arises: are we indeed measuring image concern? As explained earlier, there is not, as in the case of trust, a widely accepted question convincingly capturing the degree of image concern. We therefore constructed a question that appeared to reasonably measure this construct: "It is important for me not to be perceived as selfish" on a 0-5 Likert scale. We show in Figure 3 the distribution of answers to this question by level of image concern. The distribution tends to shift to the right for higher levels of image concern, suggesting that indeed our measure captures the sensitivity to the perception by others. As robustness we show in the appendix the distribution distinguishing only two categories, image concerned versus not (Figure 10), and find a similar shift.

In table 4 we present the results of an ordered logit using alternatively the first μ , the average μ or the positive μ variable. All of them are positively associated with higher answers, but only the effect of the first μ is significant. It is important to note that it is the only variable that can explain variations in the answer to that question. In particular, none of our socio economic variables turns out to significantly impact the answers. We find similar results in table 5 where we use as dependent variable whether the individual answered 4 or 5 to that question.¹² ONE REMAINING QUESTION IS WHY IT IS THE FIRST MU THAT WORKS BEST

The consistency between the results using both games and the association with the natural question in our questionnaire offers an initial validation of our measure of image concern. We

¹²We also point out that we do not find a relation between image concern and the answers to the other questions 22 to 31 in the questionnaire presented in Appendix.

FIGURE 3: DISTRIBUTION OF ANSWER TO QUESTION BY IMAGE CONCERN LEVEL



offer further validation in section 5 when we compare sessions where the repeated game was observed to those where it wasn't and show that the more image concerned individuals are relatively more likely to follow the social norm when observed. The rest of the paper studies the main characteristics of the image concerned individuals, the sensitivity to observer characteristics and how image concern affects the behavior in other games.

3.1 What drives image concern?

In table 6, we present the main socioeconomic characteristics that drive image concern. In columns (1) and (2) we consider the full sample, in column (3) and (4) we restrict the sample to those having a positive μ , while in columns (5) and (6), we use as explanatory variable the indicator variable of whether μ is positive (positive μ variable). Two main facts appear: older people and non French citizens are more image concerned. In particular age can explain both the decision to give a positive amount to remain anonymous (column (5)) as well as the level given (column (3)). Sex, level of study or profession appears to play no role.¹³ The special sensitivity of non French is consistent with the idea that these populations may face discrimination and stereotypes. This interpretation is confirmed below. To give a sense of magnitudes, non French, keeping all else equal, bid 10 tokens more for anonymity: i.e starting with a non image concerned individual, changing the nationality moves the individual from the 65th to the 45th percentile in terms of image concern.

¹³We do not report all coefficients here, but all controls are included

At the end of the study, a relatively detailed survey was conducted and we examine further correlations with these survey questions. We find that the more image concerned individuals seem to report having less friends and be less involved in parties, as reported in table 7. Other dimensions such as being involved in non profit or the amount of donations made seems unrelated to image concern. **Do we have further interpretation/ validation of this?**

To understand these effects in more detail we examine whether the characteristics of the observer has an impact on the amount paid to preserve anonymity. Table 8 shows that the sex, age or nationality of the observer has no influence on average. The fact that the observer smiles has a slight positive impact but that tends not to be significant.

The fact that the observer knows the dictator has an interesting effect: it increases the probability of giving something (column (5)), but when some amount is given, it decreases this average amount. We highlight the fact that there is no clear expectation to be had on the direction of these effects. We might suppose image concern should be higher for individuals the dictator knows since he might be brought to interact with them outside the lab. At the same time, the individuals he knows might have already formed an opinion and infer less based on the outcome of the experiment.

When interaction terms are introduced, a more subtle picture emerges. Males give more when they are observed by a female and the opposite for females, although these effects are not significant. The main result that emerges is that dictators give significantly more when they are non-French and observed by a French. This is particularly important to explain the decision of giving more than zero to remain anonymous (column (5)). This could be driven by the experience of discriminating behavior. In fact there are two explanations. The first is that the non French are just intrinsically more sensitive to the perception French people might have of them. The second is that they expect the French to be prejudiced against them and thus interpret a bad outcome more negatively, pushing the non French to initially give more. Note that this prejudice if it was indeed present, would not be justified, since the non French give more in the lottery, even though the difference is not significant.¹⁴

4 Do image concerned people behave differently than others?

Having an individual measure of image concern opens lots of research possibilities that we start exploring in this second part of the paper. We ask the questions: are image concerned individuals more generous? are they more susceptible of following the norms in place? are they more sensitive to deviations by others from the norm? To start addressing these questions, we use the measures of image concern obtained in phase 1 of the experiment to explain the behavior in other experimental games run in phase 2.

¹⁴Non French: 0.22, French: 0.17, $t=1.571$

4.1 The level of altruism

We can measure the level of altruism using the amount transferred in the ultimatum game as well as the amount initially transferred in lottery of phase 1 (although this second measure, which is a contribution to a lottery, has not yet been systematically tested). An indirect measure of altruism is also the rate of cooperation in the first round of the repeated prisoner's dilemma.

Overall we do not find a link between the level of altruism and image concern. In the ultimatum game, there is no significant link between the level of image concern and the amount transferred, and this regardless of the measure used (columns (1) and (2) of table 9). In the prisoner's dilemma, there tends to be a negative correlation between the level of image concern and the cooperation in the very first round of the very first game (that can be seen as an indicator of cooperativeness). As shown in table 10, this is significant only for one measure of image concern.

The only clear correlation we find is a link with the amount transferred in the lottery in the first phase (see table 11). We argue in section 6 that this is not an indication of a higher level of generosity. We propose the following explanation for this correlation: individuals care not only about the absolute image they give but about the gap between this image and the reality. In this game, the inference the observer makes when he sees a failure in the lottery is given and therefore, under this interpretation, those who gave more in the lottery would be ready to bid more for anonymity since the impression of the observer would be further from the truth.

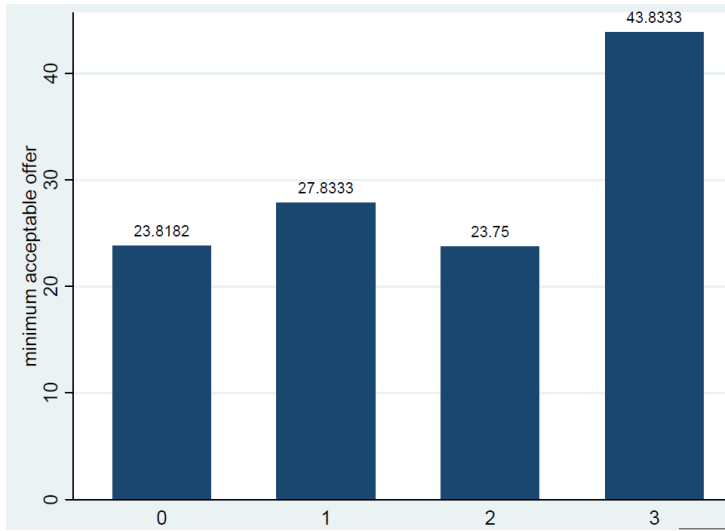
4.2 The norm of behavior

We now examine a possible link between image concern and reactions to the behavior of others. In the ultimatum game, we find that image concerned individuals tend to request higher minimum acceptable offers. In Figure 4 we see that this is mostly true for those individuals who are very image concerned (i.e give on average more than 25 tokens to remain anonymous). Half of this group chooses a minimum acceptable offer of 50, suggesting a very strong norm of perfect equity. The regression analysis in table 9 confirms this although this effect is not significant (possibly due to the small sample size of those who played the ultimatum game).

In the literature, a large array of explanations has been proposed for the fact that people tend to place a positive minimal offer, contrary to the pure payoff maximizing action: for example inequity aversion (Fehr and Schmidt 1999, Bolton and Ockenfels 2000), spiteful preferences (Kirchsteiger 1994), negative reciprocity (Rabin 1993) or norm-compliance (Lopez-Perez 2008). According to some of these interpretations, the evidence would suggest that the more image concerned individuals are also more sensitive to deviations from the norm by the others. In a sense, those that are more sensitive to the image they give are also more sensitive to the image the others project. This echoes the finding that often individuals who are more altruistic are also more susceptible of punishing those who are not (JAN IS THIS TRUE / CAN WE CITE EVIDENCE).

Some evidence from the prisoner's dilemma appear to confirm this claim. We show in the next section that image concerned individuals are more prone than others to punish deviations from the norm.

FIGURE 4: MINIMUM ACCEPTABLE OFFER BY IMAGE CONCERN LEVEL



5 prisoner's dilemma

We now turn to examining in more detail the behavior in the prisoner's dilemma. To the best of our knowledge, this is the first time infinitely repeated prisoner's dilemma are played with observers. We will exploit both the differences across sessions (sessions with and without observers), as well as individual heterogeneity in image concern within sessions.

5.1 The social norm

The first thing to determine is what actions in the prisoner's dilemma are well considered by the community, i.e what is the social norm. This first step is essential to interpret the effect of image concern; we need to know what image is considered positive. We can address this interesting and novel question by studying observer's ratings of player's actions. The first thing that unambiguously appears in Figure 12 is that the action of cooperating is highly rated by the observers.

However, the perception of observers is also based on a more subtle reaction to the history of play. We can use the fact that the observers were asked to give a rating following each round and the observation of actions of both players. In Figure 13, we examine the rating of the current behavior conditional on the action of the player in the previous period. We still see that cooperation is better rated than deviation, but we also see that this reaction is particularly strong when the player also cooperated in the previous round. The observers rate very highly consistency in cooperation. One interpretation could be that they value unconditional cooperators, who consistently avoid deviating.

It would be natural to think that ratings would also depend on what the other player did in the

FIGURE 5: RATING OF BEHAVIOR BY OBSERVER

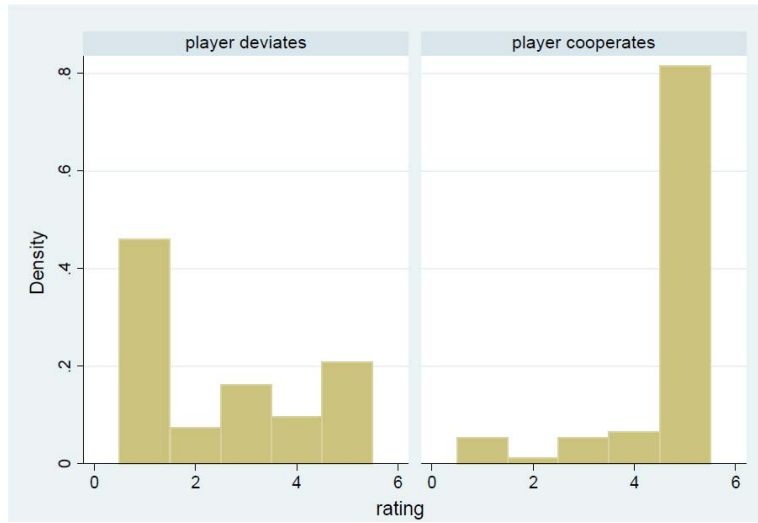
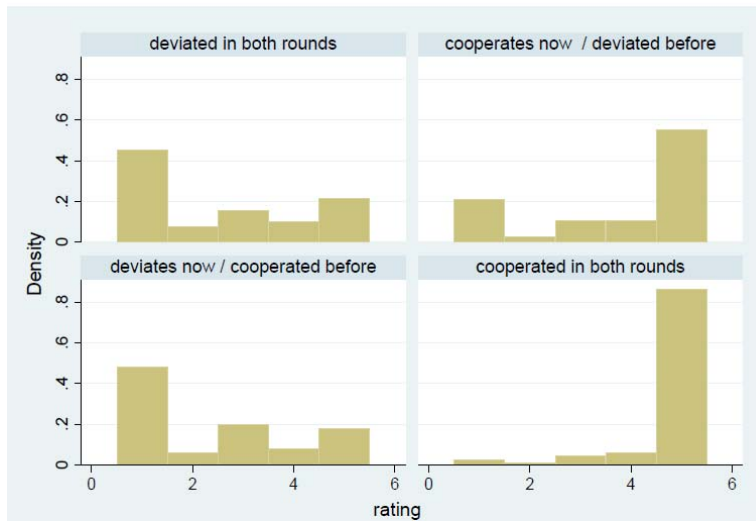


FIGURE 6: RATING OF BEHAVIOR BY OBSERVER DEPENDING ON PAST CHOICES



past. We show in the appendix Figure 12 how rating of current actions depend on past actions of the partner. The most striking fact is that there is no extra negative rating coming from a deviation that follows a cooperation by the partner. There does not seem to be a judgment on betrayal of the partner.

The regression analysis confirms these findings. We first note that a certain number of facts not linked to behavior affect the ratings. Students, younger people and those who smile on the picture are better rated than others. One interesting fact, linking back to the issue of perception of discrimination, is that French observers tend to give a significantly higher rating to non French. A natural interpretation is that they fear being perceived as prejudiced.

In terms of observed behavior, we find that indeed, cooperation in a round significantly increases the rating. This is true in an ordered logit (table 12) as well as in a probit regression where the depend variable is an indicator variable of whether the maximal rating was given. The second main finding is that the confirmation of the result visible in Figure 13: the fact that cooperation follows cooperation in the previous round has an extra positive effect on ratings. Stability is valued. On the other hand, there is no significant dependency of the rating on the action of the partner in the previous round.

5.2 The impact of image concern on behavior in the prisoner's dilemma

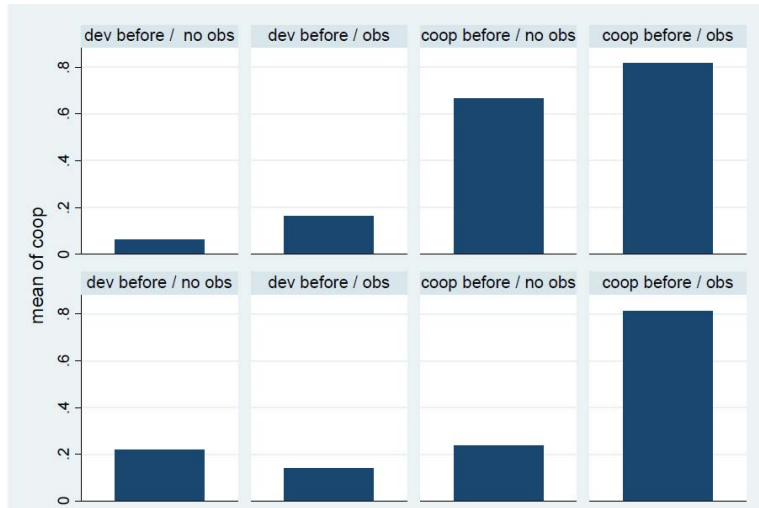
We first examine how the level of cooperation depends on the image concern. Two things clearly appear from the results in tables 14 (all rounds) and 15 (first round only). First, as mentioned before, individuals who are more image concerned do not appear to be more cooperative, and this is true for all our measures of image concern. Second, image concern does not play a bigger role in sessions that are done in the presence of observers.¹⁵

We however notice that when we focus on the last game, i.e allow for the players to gain experience, then being observed plays a larger role for imaged concerned individuals (table 16). We see that when they are not observed, these individuals tend to cooperate significantly less (column (2)) but that this result is reversed when they are observed (column (3)). When we include the full sample and include an interaction term between the image concern and being observed, we confirm it is positive and significant (column (4)).

We now examine the second aspect that was highly rated by observers: the consistency in choices. We first look at it graphically in figure 7, where the first line are for individuals who are not very imaged concerned (average μ below 20) and the second line is for those that are very concerned (average μ above 20). We see that for individuals who cooperated in the previous round, the effect on cooperation of being observed is much stronger for image concerned individuals than for others.

¹⁵This second fact is somewhat troubling. Even though we of course need to be careful with these results based on comparisons between treatments since the dynamics inside sessions can be very session specific, we see in column 5 that on average, being in sessions that are observed has a large significant impact on the level of cooperation; individuals cooperate more when observed. However, it does not appear to be significantly more the case for individuals with higher image concern.

FIGURE 7: COOPERATION



These graphical results are confirmed in tables 17, 18 and 19. In column (2) we restrict the sample to non-observed sessions and we see that more image concerned individuals tend to cooperate less after a round where they cooperated than the less imaged concerned (this was also visible in Figure 7). However we see in column (3) that for observed sessions, this effect disappears. Image concerned individuals seem to take into account the fact that this lack of consistency in cooperation is badly perceived by observers. This is confirmed in column (4) where the interaction term between the level of image concern, cooperation in previous round and the fact of being observed is positive and significant. These results are even stronger when we restrict to the last game (table 18) and is also present if we just compare the image concerned and the non imaged concerned individuals. Overall the picture that emerges is that imaged concerned individuals are more sensitive to deviations from the norm by others: they care about their image but are also sensitive to the image the others project.

6 Discussion

We have presented in this paper a novel experimental game to measure image concern, validated the measure and presented initial facts about image concerned individuals. To conclude this paper we discuss some of the possible issues that might be raised about this game.

Experimenter as observer

It can be feared that the dictator has the feeling of being observed, not only by the observer

in the game, but also by the experimenter. If the dictator believes that the experimenter can view how much he pays to be anonymous and if he thinks the observer will adversely view payments for anonymity, it could imply that the image concerned individuals could be less inclined to give than if the experimenter was not present.

While this could a priori be a valid concern, two facts make us think it is probably minor. First, we clearly told the participants that they would remain anonymous from the point of view of the experimenter: they were told that the photos would be deleted at the end of the session, and that we would of course preserve the anonymity when we conduct the analysis. Furthermore, while the picture of the observer was always visible on the screen of the dictators, the experimenter was not visible during the experiment. However, in spite of these precautions, subjects might still unconsciously be influenced by the experimenter effect. The second point however is that this would only decrease the variance in the answer but not change the ranking of individuals in terms of μ .¹⁶ This did not prevent us from finding a high degree of heterogeneity in the population.

The nature of observers

We set out with the goal of proposing a game that would be portable, as defined in the introduction, and could be used for comparison across geographical areas. Of course, if this game was run on a large scale, the same observers would not be systematically used. A comforting feature of our analysis is that we find that the characteristics of the observers have no impact on the bid for anonymity up to one exception. We find the interesting result that non French bid more when observed by French. This fact, that needs to be more broadly confirmed, may suggest that ideally observers should not be chosen among the ethnic majority in the country where the analysis is run.

Correlation between image concern and lottery contribution

We saw in section 4 that, even if there is no evidence from the phase 2 games (the ultimatum or the prisoner's dilemma) that image concerned individuals are more generous than others, in phase 1, there is a strong correlation between the image concern and the amount transferred in the lottery. We view two possible interpretation of this fact. The first is that some individuals just misunderstand the willingness to pay question and mechanically give the same answer as for the lottery participation. This interpretation, which of course would be an issue for our experiment, seems unlikely since in pre game questionnaires where we test their understanding of the instructions, there is no apparent misunderstanding. JAN DO WE HAVE THE DATA ON THESE QUESTIONNAIRES. COULD WE TEST WHETHER MORE IMAGE CONCERNED GUYS ANSWER THEM DIFFERENTLY

The second interpretation of this result, which appears potentially much more interesting, is that individuals do not care only about the absolute perception that others have of their underlying generosity, but that they dislike the fact that the perception others have is not aligned with

¹⁶Unless of course there are two dimensions of image concern that can both vary across the population: being concerned about the perception by the experimenter of the level of generosity and being concerned about the perception of the experimenter about trying to hide your true type.

reality. Stated differently, the observers when they see a failure as outcome of the lottery, make the same inference about all individuals regarding the level of generosity. However, it seems that dictators do not care only about this inference, but also about how correct this inference is. If they gave a lot, they will be more ready to bid for anonymity.

This second interpretation suggests that even though the design of the game was to isolate the choice of the dictator from the willingness to pay by using the lottery, the two parts cannot be in fact totally isolated. One solution is to systematically control for the level transferred in the lottery. We examine in Appendix B the robustness of our main results to the introduction of this control, and show that our results are preserved.

This interesting interpretation should be investigated further in future work. Indeed it would be a challenge to the way image concern is typically modelled in the theoretical literature, for instance in Benabou Tirole (2006, 2011). We propose in Appendix B an alternative formulation, coherent with the results above.

7 Appendix

TABLE 3: SUMMARY STATISTICS

Variable	Mean	Min	Max
Female	.57	0	1
Student	.59	0	1
economist	.27	0	1
Married	.59	0	1
Age	30.1	18	71
French	.86	0	1

TABLE 4: EXPLAINING SENSITIVITY TO SELFISHNESS

TABLE 5: EXPLAINING SENSITIVITY TO SELFISHNESS

	(1)	(2)	(3)
	not selfish	not selfish	not selfish
first mu	0.02 ^b (0.01)		
risk aversion	-0.06 (0.11)	-0.04 (0.12)	-0.04 (0.12)
economist	-0.74 (0.56)	-0.60 (0.51)	-0.73 (0.59)
age	0.02 (0.02)	0.02 (0.02)	0.02 (0.03)
family status	0.66 (0.43)	0.64 (0.42)	0.65 (0.44)
french	-0.49 (0.57)	-0.49 (0.57)	-0.53 (0.61)
positive mu		0.64 (0.44)	
average mu			0.01 (0.02)
Observations	87	87	87
R^2			
Pseudo R^2	0.051	0.045	0.040

Standard errors in parentheses

^c p<0.1, ^b p<0.05, ^a p<0.01

TABLE 6: EXPLAINING IMAGE CONCERN

	(1)	(2)	(3)	(4)	(5)	(6)
	first mu	first mu	first mu	first mu	positive mu	positive mu
female	0.49 (3.55)	0.49 (3.56)	-1.70 (4.92)	-1.73 (4.93)	0.24 (0.28)	0.24 (0.28)
age	0.42 ^b (0.17)	0.42 ^b (0.17)	0.29 ^c (0.17)	0.29 (0.17)	0.03 ^c (0.01)	0.03 ^c (0.01)
student	-0.99 (4.71)	-0.99 (4.73)	4.16 (5.64)	4.15 (5.69)	-0.38 (0.38)	-0.39 (0.38)
family status	-2.42 (2.91)	-2.42 (2.92)	-3.99 (4.43)	-4.01 (4.45)	-0.04 (0.22)	-0.04 (0.22)
french	-9.83 ^c (5.06)	-9.83 ^c (5.08)	-2.59 (5.25)	-2.60 (5.30)	-0.90 ^b (0.42)	-0.91 ^b (0.42)
Observations	348	348	203	203	348	348
R ²	0.119	0.122	0.054	0.058		
Pseudo R ²					0.151	0.155

Standard errors in parentheses

^c p<0.1, ^b p<0.05, ^a p<0.01

TABLE 7: EXPLAINING OTHER BEHAVIORS

TABLE 8: ROLE OF OBSERVERS

	(1)	(2)	(3)	(4)	(5)
	first mu	first mu	first mu	first mu	positive mu
know observer	-0.86 (3.32)	-0.13 (3.30)	0.16 (3.35)	-7.78 ^b (3.84)	0.79 ^a (0.30)
observer smiles	4.13 (6.29)	4.07 (6.59)	4.11 (6.55)	13.27 (8.01)	-0.10 (0.37)
observer female	0.12 (2.20)		0.34 (2.21)	1.76 (3.04)	-0.01 (0.15)
observer age	-0.09 (0.09)	-0.07 (0.09)	-0.08 (0.09)	-0.03 (0.13)	-0.01 (0.01)
observer french	4.09 (2.95)	3.92 (2.93)			
female w. obs female		2.78 (3.63)			
female w. obs male		5.57 (3.79)			
male w. obs female		4.39 (3.47)			
french w. obs french			5.06 (8.25)	-3.18 (8.82)	0.90 (0.72)
french w. obs non-french			2.47 (7.85)	-8.78 (9.29)	0.96 (0.70)
non-french w. obs french			15.17 ^c (8.54)	-1.51 (9.82)	2.01 ^a (0.53)
Observations	348	348	348	203	348
R ²	0.132	0.135	0.132	0.094	
Pseudo R ²					0.166

Standard errors in parentheses

^c p<0.1, ^b p<0.05, ^a p<0.01

TABLE 9: EXPLAINING THE ULTIMATUM GAME

	(1)	(2)	(3)	(4)
	ug offer	ug offer	ug minimum	ug minimum
first mu	0.07 (0.11)		0.34 (0.30)	
risk aversion	-2.17 (1.31)	-1.82 (1.28)	2.46 (2.32)	2.74 (2.15)
economist	4.26 (5.35)	2.70 (5.21)	-5.02 (12.21)	-4.44 (12.19)
age	-0.05 (0.11)	-0.02 (0.12)	0.19 (0.38)	0.06 (0.42)
family status	1.02 (6.34)	-1.11 (6.15)	-0.41 (8.62)	-0.41 (8.63)
french	1.84 (4.23)	-1.79 (4.77)	-14.94 (13.46)	-14.06 (13.70)
average mu		-0.14 (0.15)		0.41 (0.26)
Observations	31	31	31	31
R^2	0.316	0.334	0.385	0.401
Pseudo R^2				

Standard errors in parentheses

^c p<0.1, ^b p<0.05, ^a p<0.01

TABLE 10: COOPERATION IN FIRST ROUND FIRST GAME OF PD

TABLE 11: EXPLAINING THE LOTTERY PARTICIPATION

	(1)	(2)	(3)
	transfer to lottery	transfer to lottery	transfer to lottery
first mu	0.33 ^a (0.09)		
economist	-1.50 (4.08)	-0.76 (4.02)	0.27 (3.85)
risk aversion	0.65 (0.78)	0.83 (0.80)	0.89 (0.84)
age	0.12 (0.19)	0.06 (0.19)	0.15 (0.18)
family status	-1.14 (3.95)	-0.24 (4.13)	-1.38 (4.12)
french	-5.15 (6.19)	-4.16 (5.78)	-4.74 (5.34)
average mu		0.41 ^a (0.12)	
Observations	87	87	87
R ²	0.276	0.273	0.236
Pseudo R ²			

Standard errors in parentheses

^c p<0.1, ^b p<0.05, ^a p<0.01

TABLE 12: OBSERVER RATINGS

TABLE 13: OBSERVER RATINGS

TABLE 14: COOPERATION ALL ROUNDS

TABLE 15: COOPERATION FIRST ROUND

TABLE 16: COOPERATION LAST GAME

TABLE 17: COOPERATION AS A FUNCTION OF PLAYER'S LAST ROUND ACTION

TABLE 18: COOPERATION AS A FUNCTION OF PLAYER'S LAST ROUND ACTION IN LAST GAME

TABLE 19: COOPERATION AS A FUNCTION OF PLAYER'S LAST ROUND ACTION

FIGURE 8: SCREEN SHOT

FIGURE 9: DISTRIBUTION OF IMAGE CONCERN USING THE RANDOM OBSERVATION GAME

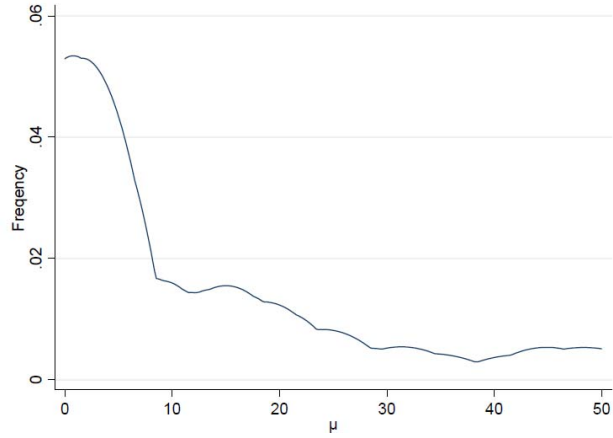


FIGURE 10: DISTRIBUTION OF ANSWER TO QUESTION ON SELFISHNESS

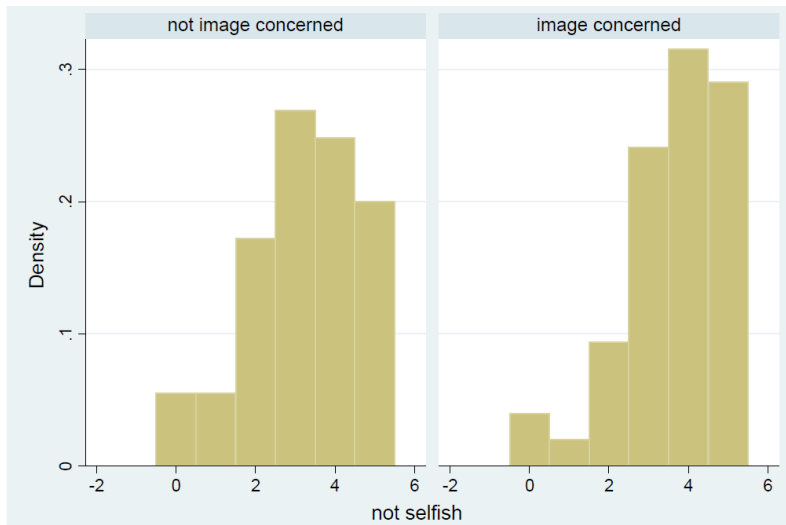


FIGURE 11: RATING OF BEHAVIOR BY OBSERVER DEPENDING ON PAST CHOICES OF PARTNER

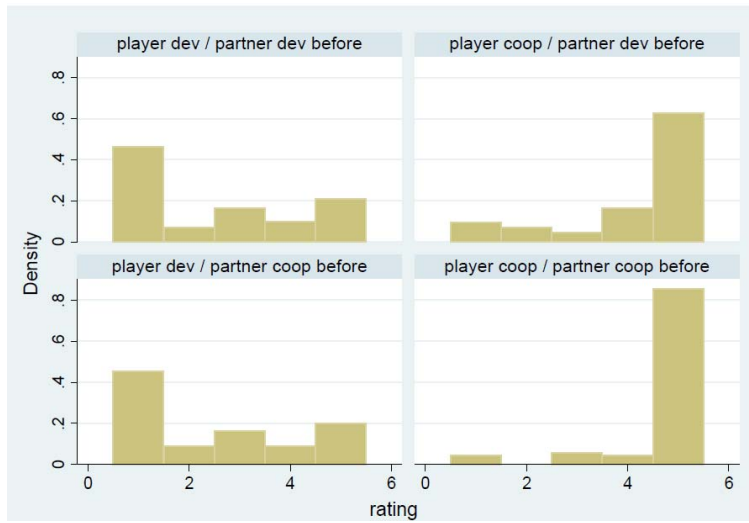


FIGURE 12: RATING OF BEHAVIOR BY OBSERVER DEPENDING ON PAST CHOICES OF PARTNER

