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Economics from the NOVA School of Business and Economics.

PRIMING DILEMMAS' PRISONERS:  
AN ENQUIRY INTO AGENTS' MINDS

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*“The good men of every age  
are those who go to the roots  
of the old thoughts  
and bear fruit with them.”*

Friedrich Nietzsche  
In *The Gay Science*

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## THANK YOU NOTE

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## ABSTRACT

This work tries to understand how an exposure to economic logic and the current definition of rationality influences behavior. I use a randomized scrambled-sentence test that *primes* different groups either with economic or moral oriented key-words; then follows a set of ethical games, mainly variations of the Prisoner's dilemma. In both an experimental setting (117 economics/business graduates) and online survey (113 subjects), I do not find evidence that this short-term, conceptual *priming* has an impact on agents' decisions regarding this sort of dilemmas. This might be due to the ineffectiveness of the priming, or due to its subtle nature that only bigger datasets can uncover. However, it is found evidence in the online survey corroborating the literature stance that having had an economics background alters behavior towards defection. The evidence also highlights a particularly robust find in the literature: cooperation rates are far higher than expected by the self-interest model. These findings then open a more in depth discussion about the very concept of rationality and the epistemological path within economics.

## KEY-WORDS:

Behavioral-economics; Priming; Prisoner's Dilemma; Rationality.

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## INTRODUCTION

The present work aims at giving another insight into those workings of the mind, that we now recognize as essential to further our understanding of economics. Hopefully, the brief empirical evidence presented below and the corresponding theoretical framing will allow a small but consistent step in that direction. As a complement, this work aims also at reviving the discussion between ethics and economics (which, from its Ancient Greek birth, used to be a branch of the former) and if, as it seems to be happening with psychology, they should be brought together once more (Amemiya, 2007; Sen, 1987).

I run one experiment in a computer lab environment and collect additional information through an online questionnaire. Both using *priming* techniques (scrambled sentence) into randomized groups within the studied group. The subjects then play a series of prisoner's dilemma hypothetical games. Although no significant evidence is found to support the hypothesis that the *priming* is working, the evidence does not allow one to unequivocally discard it.

I will start by giving an overview of the scientific literature on broad aspects of economics (namely its history of thought) and then narrow it down to experiments directly related to the one conducted here. I will then describe the methodology used, briefly depict the data and present the results. Finally, I will discuss the results, their meaning and possible directions of further research.

Modern economics has its history first tailored by an attempt to step away from any “metaphysical traces”; an attempt to shed light into the mental models that drive agents' actions but refrain from delving into the field of psychology and philosophy in a way that would strip an approach from any impartiality (Hurtado & Mick, 2011). That same impartiality, independent of the need of introspection, that would allow a mathematical modelling of

economies and their principles. And despite the marveling advances and quantitative beauty those instruments allowed, intertwined with a rational choice theory approach, previous decades' insights into behavior have shown those do not suffice in understanding reality with precision (Cardoso, 2014; Hurtado & Mick, 2011). As such, the reunion of economics with psychology into the field of behavioral economics has delivered those innovations this science urged for. Yet, despite the effortful job of brilliant economists and psychologists (Tversky, Thaler and Kahneman, to name just a few), a sound theoretical construct that does not rely on ad hoc addendums to utility functions is still over the horizon. This is not to say the science has been still, but that too many "*short-theories*" have yet to be reconciled over a larger umbrella.

It is not a novelty that observed human behavior often mismatches from theoretical foresight. Many of those deviations and biases might become very predictable (Ariely, 2008), others might still offer some resistance for clear explanations (Damásio, 2010; Kahneman & Thaler, 1986). The Prisoner's dilemma setting usually offers a very clear insight into that disparity, since it has a sound theoretical formulation on logical operations within game theory, yet, when confronted with empirical evidence of human decision, it often fails to predict the rational response (Marwell & Ames, 1981; Frank & Regan, 1993). In fact, the strategy predicted by the self-interest model is seldom followed empirically; joint cooperation is much more common (Kahneman & Thaler, 1986). Although, in all fairness, the model follows a self-interest assumption not only due to historical reasons but due to its simplifying nature.

Marwell & Ames (1981) and Frank et al. (1993) built experimental settings using variants of prisoner's dilemma, including public goods game, and other ethical dilemmas to assert if behavior fits the theoretical prediction and to see if previous knowledge of economic theory changes behavior. Under public good's game circumstances, the socially optimal behavior is for all subjects to use their entire endowment in the public good. But from an individual perspective, the optimizing strategy is to use none and expect instead others to

contribute to the public good. Marwell & Ames (1981) found that economics students contributed an average of only 20 percent of their endowments to the public account, significantly less than the 49 percent average for all other subjects. It is relevant to note that both values are still quite far from the theoretically predicted zero. Frank et al. (1993) found similar results in a typical prisoner's dilemma where subjects were playing for money. Here, defection rate for economics majors was 60.4 percent, as compared to only 38.8 percent for nonmajors, which again is far from 100 percent in both cases despite the anonymity ensured in responses. The authors run a series of other games (e.g. ultimatum game) which delivered compliant outcomes.

Frank et al. (1993) then goes a long way to empirically show that it is not just that students which go for economics are more probable to be selfishly rational, but it is likely that it is how and what is being taught that influences behavior.

These results unequivocally point to an important discussion: why do people who appear to understand the game conditions choose to behave in an apparent irrational fashion, and why economics students behave differently? There are some slightly alternative views to answer such conundrum (Thaler, 2015; Güth & Van Damme, 1998; Kahneman & Thaler, 1986; Akerlof, 1983) but they seem to agree on the fundamentals of that decision: notions of fairness, regardless if those come from true altruistic motives or just long-term strategic behavior.

It seems, thus, unavoidable that economics is crossing not only the path of psychology, but of ethics once more. Especially when considering that the efforts of our discipline in abstaining from normative stances have led its students to a particular *biased* decision. However, could it be that *biasing* people towards a systematic answer coherent with a body of axioms is not just educating?

The present thesis aims to narrow down why and what exactly influences these decisions either towards a classic *Homo Economicus* stance or, conversely, towards a *Homo Moral*is one (i.e.



a portrayal of a human exclusively guided by morals). A decision that might fall, to great extents, over the realm of unconsciousness (Dijksterhuis, 2006; Van Dijk & Wilke, 2002). Liberman et al. (2004), for example, use a prisoner's dilemma setting once more to show simple name-framing the game beforehand, either as "*Wall Street Game*" or as "*Community Game*", has a considerable effect on cooperation rates, increasing that rate when changing the name from the former to the latter on around 40%.

The literature has already made curious discoveries about the interaction of social and economic motives. Perhaps the most insightful, is the case where a daycare implemented penalties for parents taking too long in picking up their children which resulted in longer delays afterwards (Ariely, 2008). And when the daycare decided to go back and remove the penalties, parents did not go back to their pre-penalty behavior right away. The author reasons that what leads parents to such behavior is a mental shift from a social rule - leaving their kids to be picked up last and after dark is naturally bad - to an economic one - paying money is an inconvenience but it might be worthwhile to work an extra hour. This hints that are two separate streams of decision, and toying with different types of rules might have unexpected consequences.

Actually, these social-economic frictions are an argument that stretches at least to Polanyi (2013, [1944]), where from an historical and anthropological perspective, the author points out to the forces within market-structured economies that prevent full *social embeddedness* - i.e. that prevent the existence of a "unique stream" of social rules.

## METHODOLOGY

I conducted two sets of experiments to extract the information that allowed the results below. One in a lab environment setting, other through an online questionnaire.

The lab experiment (Questionnaire 1. Laboratory setting in Appendix) had 118 subjects - all business and economics students from NOVA either from bachelors or masters, of which only 8 were coming from a different field of study. There was no monetary incentive involved in this experiment due to budgetary limitations, but students participating gained instead partial ECTS for a course they were attending. Students entered the computer lab where the experiment took place at no more than 7 at a time and, at the beginning of each experiment, it was made clear to them no one could leave the room before at least 20 minutes had passed, to avoid subjects from rushing. The subjects were then delivered the set of questions, including demographics, some individual characteristics (political orientation, reported GPA, religious beliefs, gender, age, income level, education level, occupation, nationality, highest education level of parents, and main field of studies) the *priming* and the games themselves.

The focus of the experiment is to take advantage of the unconscious to glimpse into the inner workings of the mind. This is done with a *priming* technic that tries to influence subjects' responses. *Priming* offers an opportunity to avoid endogeneity of peoples' predictions of what the experiment is intending (Molden, 2014) and it allows for insightful conclusions for real-world scenarios since the essence of *priming* "*represents a ubiquitous occurrence in everyday life.*" (Tulving & Schacter, 1990). For the case where subjects are insightful enough to understand what the experiment is trying to do, an additional question was added to the end of all games to check if they had guessed the purpose of the experiment (out of all 118 participants, only one seemed to spot the purpose of the experiment and was, therefore, dropped from the analysis). *Priming* has been used for quite a while in the fields of psychology, more frequently now on fields of game theory and behavioral economics, and comes in several forms (e.g. verbal, non-verbal, conceptual, perceptual). In this experiment is used a conceptual *priming*, i.e. through the semantic linkage among different words. Specifically, before subjects play the main games (Prisoner's dilemma, Trust game and a Probabilities game) they had to

reorder between five and six scrambled sentences that included those cue words intended in leading the *prime*. The subjects were randomized between three *priming* groups: the neutral group, herein *Homo Inscius*, that had to reorder sentences with no conceptual pattern; the moral group, herein *Homo Moralis*, that reordered sentences with key words related to morality (Morality, Ethics, Goodwill, Right/Wrong, Social) and one extra sentence that was added from the neutral group to decrease the chance of subjects understanding the underlying pattern of the primed words; and the rational group, henceforth *Homo Economicus*, which sentences had key words related to rationality (strategy, analytical, games, utility/objectives, rationality) and one extra sentence from the neutral group for the same reasons. The neutral group was placed to ensure the *priming* strategy was not the sole responsible for the effects.

The randomization is not fully blocked due to software and logistic constraints of the experiment implementation but it is randomized in blocks over some feasible characteristics (political orientation and field of studies) – stratified randomization – which aims at increasing the efficiency of the randomization procedure without affecting the bias (Imai et al., 2008). A visual example is left below – *fig 1* – where different shapes represent different observable characteristics.

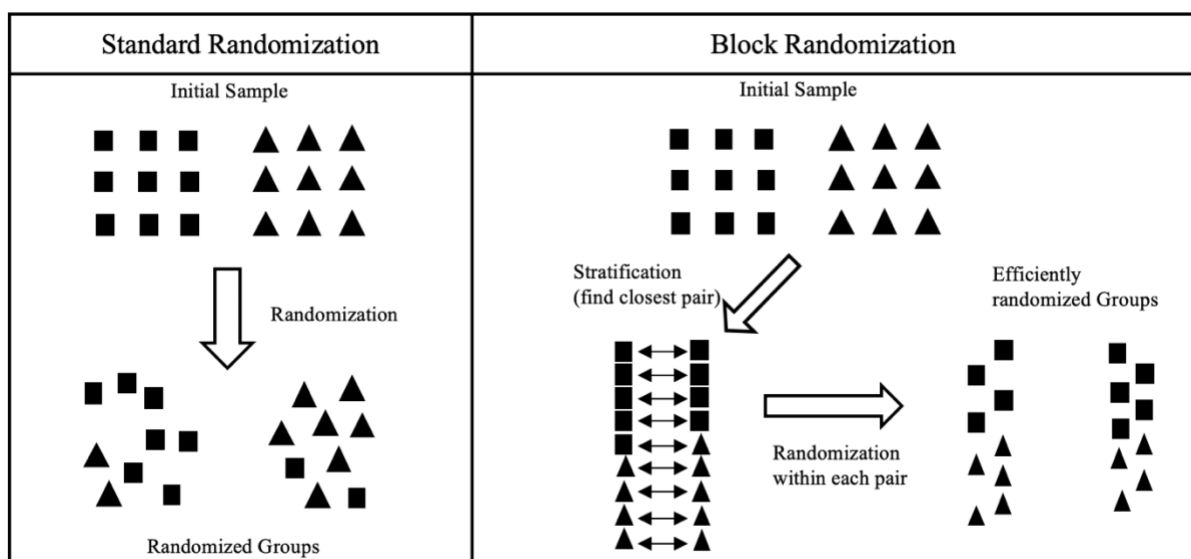


Fig 1. Illustration of block randomization vs standard randomization.

The scramble sentence usage is far from new either within *priming* or to infer subliminal information out of subjects. Is used here due to its easy implementation and stealthy nature in *priming* (Postmes et al., 2001; Costin, 1969). In addition to deviate attention of participants from the specific words while doing the reordering, the scrambled sentences ensures the placing of an ideomotor effect (i.e. unconscious mental motions due to the provided clues) regardless of being correctly ordered or not, thus seeding the idea under the consciousness of subjects which has a non-negligible influence. As a matter of fact, in some cases, *priming* has been powerful enough to change walking speed (Bargh et al., 1996).

After the *priming* game, participants were shown an image of a word with four letters in which one was not filled out: “G O \_ D”. And were then asked to fill out the corresponding word. There were here essentially two hypotheses, either “GOOD” or “GOLD”. This aimed to be a check if the *priming* was working, where we would expect the *Homo Economicus* to be more likely to answer “GOLD” than the *Homo Moralis* group, despite the fact that the word “GOOD” is with all likelihood more intuitive. The games followed.

The games played are of hypothetical nature, hence the conclusions extracted from this setting might differ from actual recorded behavior in other experimental setting and/or real life situations, but its conclusions are not rendered futile whatever that discrepancy might be (i.e. it is essentially a problem of external validity onto actual behavior which is, in the worst case, just slightly linked to response recorded). For these 118 students the games presented were: (1) a version of a prisoner’s dilemma with a more convoluted narrative, to prevent an immediate association with Game Theory and its traditions; (2) a game under similar settings of the previous but that translated into a trust game; (3) a probabilities game where participants had to decide between two scenarios that had a corresponding payoff and probability of success; and a (4) final game only delivered to the last 29 of participants which was a classic case of prisoner’s dilemma.

(1) The first game – Tale of two cities – is a non-standard version of the prisoner’s dilemma. In this setting there is a disease outbreak in a vast region and the *Amaurotum* town has 1000 people sick with this illness and only 1500 units of alfa medicine in stock. To produce a cure for this illness it is needed 0.5 units of alfa and omega medicine combined. There is only one neighbor town, *Ademos*, with 1200 people sick and only 1500 units of omega medicine in stock. It is very difficult to travel between towns and they only exchange some goods every 3 years. That time is coming and each town will send a truck to the other. The participant, being in *Amaurotum*, has to decide how many units of medicine will be sent to *Ademos*.

(2) The second game – Trust Game – happens in a similar setting of the first game but now *Ademos* has the ability to produce one unit of the cure with only 0.25 of each medicine. The participant, being in *Amaurotum*, has to decide how many units will be sent to *Ademos* so that town can produce and later send a batch of the cure back. This game is slightly different in nature from the prisoner’s dilemma because the trusted party plays afterwards. A general payoff matrix for this case is left below (Table 1), where cooperation/trusting is sending at least 550 units of medicine to the neighbor town and the *Ademos* delivering 1200 units of medicine.

		Player who is trusted	
		Trust Game	
Player who trusts	Cooperate	(+;+)	(--;++)
	Defect	(;-)	(;-)

Table 1. Payoff Matrix of a typical Trust Game

(3) In the third game – Probabilities Game – the participant has to decide whether to try to save an individual stuck in a well or not. There are payoffs associated with a series of conditions and respective probabilities which are purposefully hard to solve in the short time available. If the participant was able to finish all the math they would, however, get roughly equal payoffs for both decisions.

(4) Lastly, the fourth game - Classic Prisoner's dilemma – was only presented to a subsection of those 118 students (29 to be precise). They had to choose between cooperation and defection in a situation where they had committed a crime and got caught with another person. Police offers a deal to tell on the other and go free or remain quiet and get imprisoned for a short period of time. If the other person decides to tell and they remain silence they have to serve a longer sentence. The same if both tell on one another.

Between game (2) and (3) a second round of *priming* was delivered which consisted of a brief text speaking in favor of rationality, morality or a neutral news report for each corresponding group. The complete questions are left at the appendix (Lab Experiment Survey), to avoid turning this into a morose reading. At the end of questions (1) and (2) it is also asked how many medicine units their colleagues answering this question gave to the neighbor town. Below (Table 2) is the generic payoff matrix of the respective games and a synthesis of the information of the probabilities game.

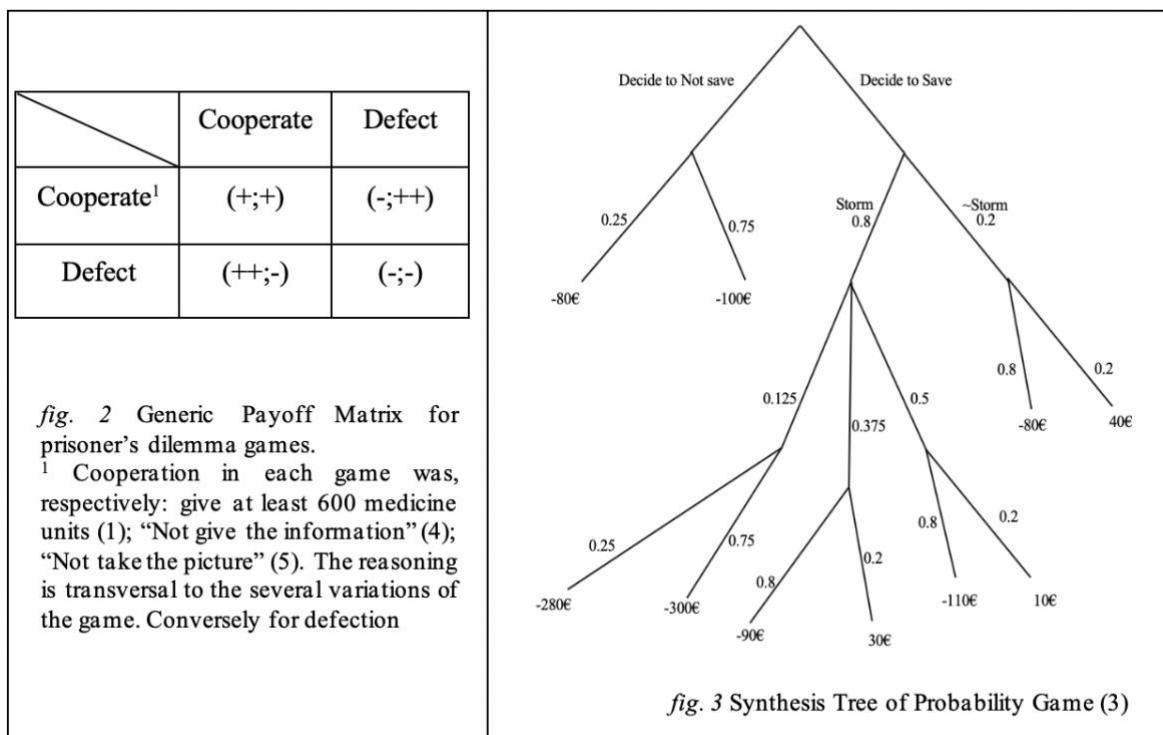


Table 2. Payoff Matrix of Prisoner's dilemma games and Synthesis of probability game.

The non-lab. questionnaire (Questionnaire 2. Online setting in Appendix) was distributed online through social-media and contact sharing, which is not ideal since it entails

an unavoidable selection bias (only captures people willing to help and closer to the specific social circles from which departs). This represents again only an issue of external validity to further extrapolate conclusions to the overall population but that is a problem only scientific replication can solve. However, *priming* effects are usually indistinguishable from different individuals regardless of age or explicit memory performance and, thus, one should expect group differences to remain constant (Tulving & Schacter, 1990).

The structure of this questionnaire comes close to the one in the lab experiment. However, in this case, there were only two *priming* groups: *Homo Economicus* and *Homo Moralis*. This was made so due unclear results regarding the neutral group from the lab experiment and to the increased statistical power that having only two groups allows. In order to retain a maximum number of people in those web-distributed surveys, the demographics information is collected after the *priming* and games are played (which unfortunately impeded the randomization to be fully or partially blocked). The games played were the (4) Classic Prisoner's dilemma described above and (5) a, yet again, different version of this game with the following setting: The participant is set to be on a tour through the jungle and happens to be in a perfect spot to take an amazing picture of a rare exotic bird. There is a stranger who has the same opportunity and the participant has to decide to take the picture or not. After the picture is taken the bird will fly away. If both decide to take the picture, the bird will get startled and will fly away with no opportunity to get the shot for neither. If none decides to take the picture the bird will eventually fly away but both can at least enjoy that brief moment. The payoff matrix associated with this game is equivalent to the one in (4) so I will abstain from reproducing it once more.

Between game (1) and (2) a second round of *priming* was also delivered which consisted of a brief quote speaking in favor of rationality or morality, consistent with the first *priming* (quotes used for *priming* exhibited below – *Table 3*).

<i>Priming Quote for Homo Economicus group</i>	<i>Priming Quote for Homo Moralis group</i>
<p><i>"A rational man is guided by its thinking - a process of Reason - not by his feelings or desires."</i></p> <p>Ayn Rand</p>	<p><i>"Emotions make us human. Denying them make us beasts."</i></p> <p>Victoria Klein</p>

Table 3. Quotes used in second round *priming* of the online survey.

This survey collected a total of 113 full responses and 33 as partial data collected from unfinished surveys.

In both questionnaires (lab. and online version) time taken to answer each question and number of mouse clicks were counted. Participants were not aware of such since that might had changed the way they answered.

After the experiments, the three/two randomized groups were compared to look for significant differences as custom in randomized experiments. Additionally, I looked for relevant patterns between subjects' choices and their personal information (e.g. income, education) but preliminary observations did not find consistent patterns and, in any case, a thorough analysis goes outside the scope of this work. Reported significance tests were made using two-sided Analysis of Variance (ANOVA) for the lab setting and two-sided Fisher tests for the online-survey.

## DATA

The three differently primed groups (*Economicus*, *Moralis* and *Inscius* of 38, 40, and 39 subjects respectively) from the lab experiment are well balanced across the different variables except for the gender one where the *Homo Economicus* group has 74% females where *Homo Moralis* and *Inscius* have 50% and 58% respectively. This might diminish the perceived impact of the *Homo Economicus priming* since females are thought to be more prone to cooperate in these sorts of prisoner's dilemma games (Frank et al., 1993). Since only NOVA Bachelors and Master's students were a part of this experiment, the sample age is around 21 years old and has little variation (variance around 4,31).



A summary of this studied sample (117 subjects) is left below – *Table 4*.

Gender	Relative Frequencies	Nationality	Relative Frequencies
Female	60%	Portugal	67%
Male	40%	Germany	15%
		Italy	8%
		Other	9%
Political identity		Religious beliefs	
Right	30%	Yes	55%
Center	53%	No	45%
Left	17%		
Academic Background		Parents Education level	
Business/Economics	93%	Below High-School	4%
Other	7%	High-School	11%
		Bachelor's Degree	38%
		Master's Degree	38%
		Doctorate Degree	9%
Attended a Game Theory Course			
Yes	52%		
No	48%		

Table 4. Lab experiment sample summary.

For the online survey case there are only two groups (*Economicus* and *Moralis* of 61 and 52 subjects respectively), well balanced across variables. This sample has an average age of approximately 28 years old and a much bigger variance (123,7) than the previous lab setting data and comprises non-student subjects (slightly more than 50%).

The different setting in which the subjects submit the answers to the games played (i.e. a controlled environment in lab context conversely to the online survey) is likely to influence those answers and inference should take that into account. Besides the structural difference between the two experiments, there are also noticeable differences in the sample. More poignantly, there is a 22% rise in atheism when we move from the lab sample to the online one, and a much more academic diverse group although half are still coming from business/economics. The parent's education level is also slightly higher for the sample of NOVA students. These differences highlight the importance of treating the results derived from each experimental setting separately and assessing which might be more suitable for certain

hypothesis testing (e.g. the experimental setting is not appropriate to test if students of economics are less cooperative since it has almost non-variation in that regard).

Gender	Relative Frequencies	Nationality	Relative Frequencies
Female	50%	Portugal	77%
Male	50%	Canada	12%
		Thailand	4%
		Other	7%
Political identity		Religious beliefs	
Right	15%	Yes	33%
Center	52%	No	67%
Left	33%		
Academic Background		Parents Education level	
Business/Economics	41%	Below High-School	11%
Other	59%	High-School	30%
		Bachelor's Degree	35%
Attended a Game Theory Course		Master's Degree	17%
Yes	35%	Doctorate Degree	8%
No	65%		
Occupancy		Education Level	
Employed	42%	High-School	19%
Unemployed	5%	Bachelor's Degree	53%
Student	49%	Master's Degree	27%
Retired	4%	Doctorate Degree	1%

Table 5. Online Survey sample summary.

As already referred, one subject was dropped from the analysis in the lab experiment (hence the 117 and not 118 subjects). No more subjects were dropped since a thorough evaluation of the answers on the sentence scrambling game and of the time records allowed to conclude that subjects committed to the questionnaire in an adequate manner to consider their answers trustworthy (this applies to both the lab and online survey settings). In the online survey only fully filled questionnaires were taken into account for the final analysis but the 33 partial data responses revealed a curious detail over its distribution. Of those 33 that failed to complete the survey, 22 were randomized into the *Homo Moralis* and 11 to *Homo Economicus*. This is not

likely to be by change (significant using a 10% significance level for a two tailed test) but the reasons for such, if not sheer luck, are out of the scope of this work.

A summary with the main statistics of the online survey data is left above – *Table 5*.

## RESULTS

Due to aforementioned reasons I will separate the results into two groups: lab setting and online survey setting.

In the lab experiment setting, the differently primed groups show no statistically significant difference in responses using both the median and the average, and number of “yes” (probabilities game) for the first three games. In the first game (1) the median is exactly equal across all groups, 600€, and the average goes, in ascending order, *Inscius*, *Economicus* and *Moralis*. But again, small differences that do not hold across games with p-values around 90%. I will not go into much more detail around each of these three games since the data essentially points to a non-rejection of the hypothesis that different group individuals are drawn from a common distribution function.

The “GO\_D” image and subsequent question were devised to check if the priming was working or the potential difference in the groups were due to any other reason, and despite the bigger percentage of “gold” vs “good” responses from *Homo Economicus* to *Moralis* it is not statistically significant, hence the *priming* appears to not have exerted any effect.

But other points are worth mentioning, namely that cooperation rates are far higher than the self-interest model predicts. In fact, only two out of the 117 subjects answered zero and when asked how much they thought other subjects gave, only five answered zero. Around 29% of subjects decided to give less than 600 units of medicine to the neighbor town, and only 39% thought others would give less than 600 units. In the trust game none answered zero in neither of the questions and the median is slightly below the quantity needed to produce enough

medicine to cure everyone (550 units alfa medicine units) but is quite close – 500€, 525€ and 538€ to *Inscius*, *Economicus* and *Moralis* groups respectively.

Also worth mentioning, albeit quite intuitive, people's predictions of others responses in these two games were usually aligned with their own responses. A simple linear regression of those two variables, regressing predictions on their own responses, allowed an R-squared of 0.41 and 0.61 for the first and second games respectively with coefficients around 0.8 for both cases .

The Probabilities game (3) aimed at checking if subjects, faced with a somehow complex game to solve with a short time constraint, would just randomize away their answers (in which case we should expect a fifty-fifty share for “save” and “not save”) or they would choose to answer based on moral principles and just decide to save. The evidence goes in support of the latter, with a global saving rate close of approximately 85%.

Nonetheless, game (4) – the classic prisoner's dilemma – that was only played by a 29 subsample – revealed significant differences for a 5% significance level that followed the initial prediction. Despite the significance level, this sample is far too small to support a robust argument in favor of the hypothesis and further studies should attempt to replicate these results with bigger data sets. But, once more, cooperation rates are far from the self-interest model predictions. Total cooperation rates were close to 68%.

In an attempt to extract maximum value out of the data collected, I did a surface level exploratory analysis that aimed at linking subjects' personal information with their answers. No variable revealed noteworthy in explaining the answering patterns and despite the myriad of combinations that would definitely output strong correlations between individual characteristics and their survey answers, there is a great likelihood those would be simply spurious relations. Hence, more intricate relations within the data are omitted from this analysis for their little scientific value and to avoid attempts in justifying correlations that might as well just be the work of randomness (Austin et al., 2006).

Only with prisoner's dilemma (4) religion seemed to make a statistically significant difference. Once more, on a sample far too small that allows only a splinter of curiosity for further studies to investigate.

Finally, the time measurement for each question did not reveal any discernible pattern among groups or each type of response.

Table 6 below summarizes the relevant information from this lab experimental setting.

For the online-survey setting, the two differently primed groups reveal once more no statistically significant differences. Despite the fact that, in the previous setting, *priming* in the classical prisoner's dilemma game (4) appeared to be effective, in this setting with the same game but a bigger sample (113) there were no significant differences across groups. Neither in the photo dilemma game (5), notwithstanding the fact that the *Homo Moralis* group had slightly higher cooperation rates. Just not high enough to dismiss that sheer luck played the entire role.

The "GO\_D" image display revealed again no differences amongst groups. Either the test for the priming is inadequate, or it is adequate and the priming appears to be ineffective.

The exploratory analysis conducted for this data-set was unfruitful in providing any robust link between subjects' personal information and their responses. However, since this data-set has greater heterogeneity in individual educational background, allowed a comparison of cooperation rates across business/economics and others that revealed a statistically significant difference, which goes in line with the presented literature (economic students are less cooperative). However, this only applies when talking about the classic prisoner's dilemma case (fisher test p-value of around 0.0018) and not the photo dilemma (5). An equivalent finding goes when looking if the subjects had taken a game theory course before or not: having had a game theory course increases the chances of the subject defecting but only on the classic version of the game. In addition, this data exhibits a curious finding: only around 55% of respondents are consistent with their choices of defection/cooperation across the two games.

“GO_D”	Inscius	Economicus	Moralis	(Moralis – Economicus)	(Economicus-Inscius)	(Moralis - Inscius)
Good	72%	84%	93%	8%	12%	21%
Gold	26%	16%	8%	-8%	-10%	-18%
Other	3%	0%	0%	0%	-3%	-3%
Tale of two cities (1)						
Median	600	600	600	0	0	0
Average	672	666	646	-20	-6	-26
Prediction for others (1)						
Median	600	600	600	0	0	0
Average	635	703	634	-69	68	-1
Trust (2)						
Median	500	525	538	13	25	38
Average	560	579	571	-8	19	11
Prediction for others (2)						
Median	500	500	550	50	0	50
Average	515	545	613	68	29	97
Probabilities Game (3)						
Try to Save	90%	82%	85%	3%	-8%	-5%
Not Try to Save	10%	18%	15%			
Classic Prisoner's Dilemma (4)						
Stay silent	75%	40%	90%	50%**	-35%**	15%*
Betrays	25%	60%	10%			
Religion	Tale of two cities (1) Average	Others (1) Average	Trust (2) Average	Others (2) Average	Probabilities game (3) - saving	Prisoner's dilemma (4) - cooperating
Believer	654,46	624,62	549,23	553,85	86%	79%
Non-believer	669,23	696,15	596,25	563,46	85%	57%
(Believer - Non-believer)	-14,77	-71,54	-47,02	-9,62	2%	21%
Game Theory Course						
No	672,32	680,36	537,59	545,54	89%	75%
Yes	650,66	634,43	600,00	569,67	82%	65%
(No-Yes)	22	46	-62	-24	7%	10%

Table 6. Summary statistics for lab experiment across groups.  
(\*,\*\*,\*\*\* below 10%, 5% and 1% p-value respectively)

The other 45% alternate in defecting for one game and cooperating in the other. And among those 45%, they split perfectly into two groups that choose to cooperate in the first, defect in the second and vice-versa.

The cooperation rates are around 69% for both games, consistent with the lab-experiment data.

Timings recorded for each question exhibit no apparent relation to *priming* groups or answers given and are, therefore, not exhibit here for the sake of succinctness. Relevant data is summarized in the below table, Table 7.

"GO_D"	Economicus	Moralis	(Moralis - Economicus)	Religion	Classic Prisoner's Dilemma (4) Cooperation %	Photo Dilemma (5) Cooperation %
Good	77%	71%	-6%			
Gold	23%	23%	0%	Believer	78%	54%
Other	0%	6%	6%	Non-believer	64%	76%
				(Believer - Non-believer)	14%	-22%**
Classic Prisoner's Dilemma (4)						
Stay silent	67%	71%	4%	Game Theory Course		
Betrays	33%	29%		No	77%	65%
				Yes	54%	77%
Photo Dilemma (5)				(No-Yes)	23%**	-12%
Take the Photo	36%	25%	-11%			
Not take the photo	64%	75%		Field of studies		
				Business/Economics	52%	78%
				Mathematics, Engineering, Technology	77%	68%
				Arts, Architecture, History, Social Studies	82%	59%
Consistency in Cooperation between Games				Psychology	78%	44%
Cooperates in both Games			47%	Law	100%	100%
Defects in both Games			9%	Other	82%	65%
Cooperates in (4), defect in (5)			22%	(Business/Economics - All others)	-29%***	15%*
Defects in (4), cooperates in (5)			22%			

Table 7. Summary statistics for online-survey experiment across groups. (\*, \*\*, \*\*\* below 10%, 5% and 1% p-value respectively)

Worth remembering that these data by itself does not causally link having game theory, being an economics student, being religious, *et cetera*, to the cooperation patterns found because there might be subliminal reasons within that data (e.g. it might be that it is not religion per se that leads individuals to be more honest but the fact that less secular families have stricter educations). To disentangle those effects a whole new work has to take place in the future.

The data found only fuels the following discussion when also supported by the literature.

## DISCUSSION

Before discussing the results, it is important to highlight the methodological subtleties that limit the inference of this study. First of all, an innate problem in generalizing a hypothetical decision in an unrealistic situation, and a rather restricted sample, are intrinsic to the method. Ideally the subjects would at least play a game where their decisions faced real consequences even if with small amounts of money or other variable compensation. As it is, we strongly depend on what subjects report they would do rather than on what they do when faced with the *de facto* conditions.

Ideally a truly random-sourced group would allow inference to be made outside of these small social/academic circles from which respondents depart. The present setting has little grounds to proclaim external validity albeit the randomization allows for internal one.

On hindsight, the first two games, Tale of Two cities and Trust Game, would have been better devised if the possible answers were in a smaller range or were part of a fixed set of answers. That is, instead of having a possible answer that went from 0 to 1500, having, for example, 5 possible values from which the subjects choose. This would decrease the variance of responses and allow for greater statistical power. This is particularly relevant when the available sample is small. In that same line, it is also important to try to formulate the questions in the simplest manner possible to avoid Arithmetic playing a far too relevant role in experiments.

A curious detail that I only noticed after running the experiments was that the “GO\_D” image could have somehow primed God concepts and hence increase the likelihood of cooperation, which is a



documented finding in the literature (Postmes et al., 2007; Shariff & Norenzayan, 2007). A hypothesis that here I deem frankly unlikely given the slightness of the prime itself and the recorded cooperation rates that are not far from the remaining literature on prisoner's dilemma.

The results fail to support the hypothesis that the *priming* is working. This might be due to two reasons: either *priming* is powerless to affect subjects' decisions, or the effect exerted is slight and only bigger data-sets will be able to reveal its true effect. I argue that different effects are playing a role in this setting.

First of all, answers on both experiments are straight to identify that subjects do not play similar games in similar manners. Albeit the payoff matrix of prisoner's dilemma games being identical, subjects seem to use different strategies for each game. Which means that instead of following the structure of the problem to deduct an optimal answer, subjects rely heavily on its context. Meaning at least a good share of subjects follow a deductive reasoning not on grounds of abstract logic but on its context/content. Finding what splits respondents over those two groups should allow further studies to be devised with more caution. This is a long and dense discussion in Psychology and Logic fields but, however interesting, goes outside the scope of this work.

Secondly, *priming* is thought to work on the unconscious parts of memory and the mechanics of that memory are different from those that operate within consciousness (Molden, 2014). Thus, experiments that use priming and then observe subjects' unconscious behavior record significant effects. Bargh et al. (1996) is a common reference in the literature in this regard, since the primed subjects altered their walking speed and underlying attitude when exposed to *priming* related to old people and more aggressive key-words, respectively. This might be the reason why priming is not working in this setting, because decisions on this experiment fall on the conscience realm while the *priming* makes its effects on the unconscious one. Perhaps other types of *priming* that rely on perceptual cues rather than conceptual ones would prove more effective, or simply stronger priming strategies such as differently naming the games (Lieberman et al., 2004). Further studies

should try to grasp the workings of *priming* and the impact of those subtleties in the different implementations. There is an intrinsic difficulty, within this type of experimental setting, in dealing with slight unconscious cues and to separate causal effects into their respective true treatments. But the advent of neuroeconomics should bring great advantages in discerning those subtler patterns and modeling what today is regarded as an unpredictable error term.

The two experiments find, consistent with the literature, that cooperation rates diverge great lengths from self-interest model predictions. And the online-survey points once more into the direction that those subjected to a Business/Economics education and those with prior Game Theory knowledge are more prone to defecting behavior. Yet, this only applied to the classic prisoner's dilemma (4) game and not the Photo dilemma (5), which is illustrative that those teachings are not necessarily (and perhaps fortunately) shifting the mental models of their students but only biasing them towards certain answers in a specific context. With all likelihood, students from economics have heard of the prisoner's dilemma and may well be embedded with what is the "right answer", i.e. the Nash-Equilibrium. Economic majors will argue it is the only rational choice to be made, and as *common people* deviate from that answer, we might be tempted to dismiss their choice as pure ignorance (Kahneman et al., 1986). It is here economics commits a capital sin.

From its foundations, modern economics' object of study was a conceptually severed human being: one that «(...) [did] not pretend to explain every action but only those associated with "acquiring and consuming wealth"» (Hurtado & Mick, 2011; Mill 2002: [1843]). That conceptual severance was the blossom of the *Homo Economicus*. Now that economics does not shy away from a theory of human action, it is unavoidable to confront the philosophical fundamentals behind that stance. A conception of human behavior is needed such that theories' predictions are not mere fables disconnected from reality, but instead are capable of producing a being closer to a *Homo Integrum*. And for that to happen, a rethinking of the very notion of rationality is required.

In the present setting, rationality is defined as internal consistency within a being capable of thought. With no doubt that the Prisoner's dilemma Nash-equilibrium is a rational procedure and that humans are driven by their own senses and thoughts to attain maximized states of equilibria; but a species filled with rational individuals that are confronted with enough prisoner's dilemma-like events will inevitably succumb to extinction, while a not so intelligent one will thrive. Ethics and morality came to avoid the collapse of that intelligent species. They are not the traces of a rudimentary society, are instead the sign of a matured one; if an individual incorporates, within its mental processes, the fate of his species, that must be seen as a sign of progress. Rationality should, therefore, be deeply rooted with how Darwin defined intelligence: "*how efficient a species became doing the things they need to survive*".

Economics does not have to forgo its analytical tools or its efforts in attaining an impartial view of the science's subject; after all, those are elementary pieces of the scientific method. But if any social scientist aims at pretending there is not a philosophical stance behind their scientific pursue, they will be, at best, just pretending. As Keynes so famously put it "*Practical men who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back*". Having a scientific attitude is knowing the priors that fundament each perspective and being honest enough to update them at the pace reality unveils.

This brief empirical work, although supporting the hypothesis that the simple teaching of economics seems to be biasing students into anti-moral behavior, gives some hope in two senses: ethical decisions seem to be offer resilience over unconscious forces, at least with the *priming* used; and high cooperation rates point to an actual human being far from the exclusively self-interested. Further studies should try to understand the factors, within the types of games played here, that influence cooperation/defection (e.g. if lives are being played or only monetary incentives). Parallely, efforts should be made to better understand the workings of the different types of

*priming* - which *priming* techniques are more effective in a highly conscious decision making and if *priming* remains effective outside experimental controlled environments. Lastly, the briefly presented redefinition of rationality should allow a different approach within microeconomic theory to be explored: finding a social maximizing optimum in a given circumstance (i.e. the one which maximizes likelihood of survival in the long-run) and then defining individual utility functions that fit such optimum, as well as understanding how individual preferences have to change in order to attain that social equilibrium.

This is a chance for economics to move away from its reputation as a *dismal science* and devote its efforts not only in understanding how and what drives our resourced-based subsistence but also what should; as well as recognize there are forces outside market scopes that have and continue to sustain our civilization (Polanyi, 2013: [1944]). I believe present tools, when grounded with philosophical substance, are capable of smoothening market and social norms into virtuous, materially satiated societies; doing that by understanding (1) how humans behave, (2) how present forces influence that behavior and (3) how to use those forces into a path of sustainable existence. This does require economists to have a wider and deeper conceptualization of reality, but to do anything less would be to fail the whole scientific endeavor.

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## APPENDIX

### Questionnaire 1. Laboratory setting

Q1 Please fill below with your information.

\*Note that all this information is anonymous and it cannot be traced back to you. So please answer everything as truthfully as possible for the benefit of science. Thank you.

Q2 Age

---

Q3 Gender

Male (1)

Female (2)

Q4 Nationality

▼ Afghanistan (1) ... Zimbabwe (197)

Q5 What is the average income of your family aggregate?

[0; 600[ € (1)

[600; 1000[ € (2)

[1000; 1500[ € (3)

[1500; 2500[ € (4)

[2500; 4000[ € (5)

More than 4000€ (6)

Q6 Professional Occupancy

- Student (1)
- Employed (2)
- Unemployed looking for work (3)
- Unemployed not looking for work (4)
- Retired (5)
- Disabled (6)

Q7 What is the highest degree or level of school you have completed?  
If currently enrolled, highest degree received.

- Below High-School (1)
- High-School (2)
- Bachelor's Degree (3)
- Master's Degree (4)
- Doctorate Degree (5)

Q8 Please choose below the option closest to your main field of studies.

- Business/Economics (1)
- Science Oriented degree (e.g. Mathematics, Engineering, Technology) (2)
- Arts Oriented degree (e.g. Architecture, History, Social Studies) (7)
- Psychology (4)
- Law (6)
- Other (8)

*Display This Question:*

*If Professional Occupancy = Student*

Q9 GPA (Grade average of your current study program) on a scale 0-20

---

Q10 What is the highest degree or level of school one of your parents has completed?

- Below High-School (1)
- High-School (2)
- Bachelor's Degree (3)
- Master's Degree (4)
- Doctorate Degree (5)

Q11 Having to decide where you would lie in the political spectrum, please choose one of the below:

- Left (1)
- Center (2)
- Right (3)



Q12 Do you have any religious beliefs?

- Yes (1)
- No (2)

*Display This Question:*

*If Do you have any religious beliefs? = Yes*

Q13 Please specify which religion you feel more affinity

- Hinduism (1)
- Judaism (2)
- Buddhism (3)
- Christianity (4)
- Islam (5)
- Other (6)

**End of Block: Prior**

---

**Start of Block: Priming - Homo Economicus**

Q14 Write the following sentence in the correct order.

**was ago. Glass 3600 years invented**

- \_\_\_\_\_ was (1)
- \_\_\_\_\_ ago. (2)
- \_\_\_\_\_ Glass (3)
- \_\_\_\_\_ 3600 (4)
- \_\_\_\_\_ years (5)
- \_\_\_\_\_ invented (6)

Page Break

---

Q15 Write the following sentence in the correct order.

**moved Rationality forward. mankind**

- \_\_\_\_\_ moved (1)
- \_\_\_\_\_ Rationality (2)
- \_\_\_\_\_ forward. (3)
- \_\_\_\_\_ mankind (4)

Page Break

---

Q16 Write the following sentence in the correct order.

**A utility. no has without man objectives**

- \_\_\_\_\_ A (1)
- \_\_\_\_\_ utility. (2)
- \_\_\_\_\_ no (3)
- \_\_\_\_\_ has (4)
- \_\_\_\_\_ without (5)
- \_\_\_\_\_ man (6)
- \_\_\_\_\_ objectives (7)

Page Break

---

Q17 Write the following sentence in the correct order.

**be won. to Games are**

- \_\_\_\_\_ be (1)
- \_\_\_\_\_ won. (2)
- \_\_\_\_\_ to (3)
- \_\_\_\_\_ Games (4)
- \_\_\_\_\_ are (5)

Page Break

---

Q18 Write the following sentence in the correct order.

**is capable analytical only Human of species the thought.**

- \_\_\_\_\_ is (1)
- \_\_\_\_\_ capable (2)
- \_\_\_\_\_ analytical (3)
- \_\_\_\_\_ only (4)
- \_\_\_\_\_ Human (5)
- \_\_\_\_\_ of (6)
- \_\_\_\_\_ species (7)
- \_\_\_\_\_ the (8)
- \_\_\_\_\_ thought. (9)

Page Break

---

Q19 Write the following sentence in the correct order.

**life, In strategy key. is**

- \_\_\_\_\_ life, (1)
- \_\_\_\_\_ In (2)
- \_\_\_\_\_ strategy (3)
- \_\_\_\_\_ key. (4)
- \_\_\_\_\_ is (5)

**End of Block: Priming - Homo Economicus**

---

**Start of Block: Priming - Homo Moralis**

Q20 Write the following sentence in the correct order.

**was ago. Glass 3600 years invented**

- \_\_\_\_\_ was (1)
- \_\_\_\_\_ ago. (2)
- \_\_\_\_\_ Glass (3)
- \_\_\_\_\_ 3600 (4)
- \_\_\_\_\_ years (5)
- \_\_\_\_\_ invented (6)

Q21 Write the following sentence in the correct order.

**Ancient Ethics stems Greece. from**

- \_\_\_\_\_ Ancient (1)
- \_\_\_\_\_ Ethics (2)
- \_\_\_\_\_ stems (3)
- \_\_\_\_\_ Greece. (4)
- \_\_\_\_\_ from (5)

Page Break 

---

Q22

Write the following sentence in the correct order.

**glue of the societies. Morality is**

- \_\_\_\_\_ glue (1)
- \_\_\_\_\_ of (2)
- \_\_\_\_\_ the (3)
- \_\_\_\_\_ societies. (4)
- \_\_\_\_\_ Morality (5)
- \_\_\_\_\_ is (6)

Page Break 

---

Q23 Write the following sentence in the correct order.

**problem a of modern Lack world. of is goodwill**

- \_\_\_\_\_ problem (1)
- \_\_\_\_\_ a (2)
- \_\_\_\_\_ of (3)
- \_\_\_\_\_ modern (4)
- \_\_\_\_\_ Lack (5)
- \_\_\_\_\_ world. (6)
- \_\_\_\_\_ of (7)
- \_\_\_\_\_ is (8)
- \_\_\_\_\_ goodwill (9)

Page Break 

---

Q24 Write the following sentence in the correct order.

**There is right. no in wrong doing**

- \_\_\_\_\_ There (1)
- \_\_\_\_\_ is (2)
- \_\_\_\_\_ right. (3)
- \_\_\_\_\_ no (4)
- \_\_\_\_\_ in (5)
- \_\_\_\_\_ wrong (6)
- \_\_\_\_\_ doing (7)

Page Break 

---

Q25 Write the following sentence in the correct order.

**Social ties all a for almost humans. are constant**

- \_\_\_\_\_ Social (1)
- \_\_\_\_\_ ties (2)
- \_\_\_\_\_ all (3)
- \_\_\_\_\_ a (4)
- \_\_\_\_\_ for (5)
- \_\_\_\_\_ almost (6)
- \_\_\_\_\_ humans. (7)
- \_\_\_\_\_ are (8)
- \_\_\_\_\_ constant (9)

End of Block: Priming - Homo Moralis

---

Start of Block: Priming - Homo Inscius

Q26 Write the following sentence in the correct order.

**watch sports? he motor frequently Does**

- \_\_\_\_\_ watch (1)
- \_\_\_\_\_ sports? (2)
- \_\_\_\_\_ he (3)
- \_\_\_\_\_ motor (4)
- \_\_\_\_\_ frequently (5)
- \_\_\_\_\_ Does (6)

Page Break 

---

Q27 Write the following sentence in the correct order.

**is winter cloudy. days sky On the**

- \_\_\_\_\_ is (1)
- \_\_\_\_\_ winter (2)
- \_\_\_\_\_ cloudy. (3)
- \_\_\_\_\_ days (4)
- \_\_\_\_\_ sky (5)
- \_\_\_\_\_ On (6)
- \_\_\_\_\_ the (7)

Page Break

---

Q28 Write the following sentence in the correct order.

**denser. smaller however, than Earth, composition is its Mercury is**

- \_\_\_\_\_ denser. (1)
- \_\_\_\_\_ smaller (2)
- \_\_\_\_\_ however, (3)
- \_\_\_\_\_ than (4)
- \_\_\_\_\_ Earth, (5)
- \_\_\_\_\_ composition (6)
- \_\_\_\_\_ is (7)
- \_\_\_\_\_ its (8)
- \_\_\_\_\_ Mercury (9)
- \_\_\_\_\_ is (10)

Page Break

---

Q29 Write the following sentence in the correct order.

**was ago. Glass 3600 years invented**

- \_\_\_\_\_ was (1)
- \_\_\_\_\_ ago. (2)
- \_\_\_\_\_ Glass (3)
- \_\_\_\_\_ 3600 (4)
- \_\_\_\_\_ years (5)
- \_\_\_\_\_ invented (6)

Page Break

---

Q30 Write the following sentence in the correct order.

**a has country door. white house My**

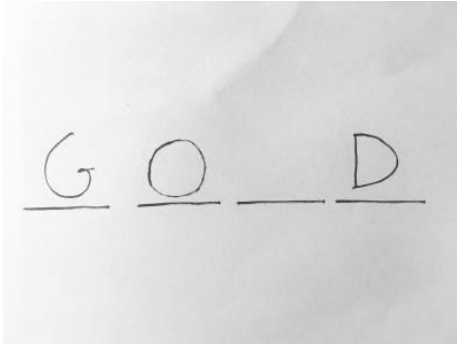
- \_\_\_\_\_ a (1)
- \_\_\_\_\_ has (2)
- \_\_\_\_\_ country (3)
- \_\_\_\_\_ door. (4)
- \_\_\_\_\_ white (5)
- \_\_\_\_\_ house (6)
- \_\_\_\_\_ My (7)

End of Block: Priming - Homo Inscius

---

Start of Block: GO\_D

Q31



Q32 Write a four letter word as the image above hints (GO \_ D).

\_\_\_\_\_

End of Block: GO\_D

---

Start of Block: Tale of two cities

Q33

There's been a disease outbreak in a vast region, and the medical community still knows little about its causes. But latest trials show that a combination of two known medicines - **alfa** and **omega** - have the ability to cure or at least mitigate the disease effects. To produce one unit of the cure only **0.5** of alfa and **0.5** of omega is needed.

Your town, Amaurotum, currently has **1000** people suffering from the new disease and its spread seems to be under control. In stock there are around **1500** units of the alfa medicine but nothing more. This medicine alone is also useful to a wide range of other diseases. Amaurotum is quite isolated and the nearest neighbor is another small town, Ademos, where around **1200** people have been affected with the disease. This town has a **1500** unit stock of the omega medicine but nothing more. Just like the alfa medicine, the omega is used for the treatment of several illnesses.

The distances between the two towns are difficult to overcome but once every two or three years a truck leaves with supplies from one town to the other. Fortunately, the time for such is near.

How many units of the alfa medicine will you send to the neighbor town?

---

Page Break

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Q34 How many units of the alfa medicine do you think your colleagues in the room gave?

---

End of Block: Tale of two cities

---

Start of Block: Trust Game

Q35

We are once more in the same town as previously.

Most of previous conditions remain the same. Your town, Amaurotum, still has **1000** people infected with the new disease and there are **1500** units of alfa medicine. The neighbor town, Ademos, also has still **1200** people infected and **1500** units of omega medicine. In Amaurotum, in order to make one unit of the cure we still need **0.5** units of **alfa** and **0.5** units of **omega**.

However, now there is a sudden shift in conditions. The neighbor town Ademos is able to produce 1 unit of the cure with just **0.25** of **alfa** medicine and **0.25** of **omega** medicine. In order to produce at such rate, Ademos needs for you to send your medicine first, wait a couple of days, and only then can they send a batch of the cure to your town.

How many units of the alfa medicine will you send to the neighbor town?

---



Q36 How many units of the alfa medicine do you think your colleagues in the room gave?

---

End of Block: Trust Game

---

Start of Block: 2° Round Priming - Homo Economics

Q37

“If we all make systematic mistakes in our decisions, then why not develop new strategies, tools, and methods to help us make better decisions and improve our overall well-being? That's exactly the meaning of free lunches- the idea that there are tools, methods, and policies that can help all of us make better decisions and as a consequence achieve what we desire.”

Professor Dan Ariely, author of Predictably Irrational

End of Block: 2° Round Priming - Homo Economics

---

Start of Block: 2° Round Priming - Homo Moralis

Q38

“But if all maximizing models are really arguing is that “people will always seek to maximize something,” then they obviously can’t predict anything, which means employing them can hardly be said to make anthropology more scientific. All they really add to analysis is a set of assumptions about human nature. The assumption, most of all, that no one ever does anything primarily out of concern for others; that whatever one does, one is only trying to get something out of it for oneself. In common English, there is a word for this attitude. It’s called “cynicism.” Most of us try to avoid people who take it too much to heart. In economics, apparently, they call it “science.”

Professor David Graeber, author of Toward An Anthropological Theory of Value

End of Block: 2° Round Priming - Homo Moralis

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Start of Block: 2° Round Priming - Homo Inscius

Q39

"U.S. health officials on Thursday reported 1,888 confirmed and probable cases and 3 more deaths from a mysterious respiratory illness tied to vaping, taking the total death toll to 37. Last week, the Centers for Disease Control and Prevention (CDC) reported 1,604 cases and 34 deaths from the illness and said the number of reported cases in the epidemic appears to be leveling off or

declining. However, the CDC said last week it was too early to say whether the outbreak had peaked."

Reuters

End of Block: 2° Round Priming - Homo Inscius

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Start of Block: Probabilities Game

Q40

There is one individual that fell into a well. The people of this village are trying to help. They have limited resources: **160€**. They estimate that, if all goes well, they need **160€** to take him/her out. But there is an **80%** chance there is a storm and they will need more resources. If there is a storm, then there's **12,5%** probability that the storm is so strong that they will not be able to help at all, such that resources expended will be wasted plus all the external help that came to the village (total loss of **200€**). If the storm does occur, with probability **37,5%** they will be able to save him but the cost increases to **165€** (which is more than what they have) - but if they would pay extra 5€ to borrow extra 5€ (total cost of **170€**), and with **50%** probability the cost increases to **190€** (all included). The decision of saving or not saving is taken before knowing if there is a storm and is irreversible for political reasons.

If the individual is saved, he/she is expected to produce **199,45€** in the future with probability **20%** and **80€** with probability **80%**.

If they decide not to save the individual, with probability **75%** they will lose **100€** because the village collapses morally, and with **25%** they just loose **80€** due to grief process.

Should they try to save the individual?

- Yes (1)
- No (2)

End of Block: Probabilities Game

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Start of Block: classic prisoner

Q41

You and other person committed a crime and got caught by the police. They have kept you in different cells with no chance to communicate and are offering you the following deal:

If you give the information necessary to prove the other person is guilty, they let you go without serving time. If you don't, you will be in prison for six months. However, the other person has the same choice, and if he/she decides to provide evidence of your part in the crime you will be imprisoned for two years. If both give evidence on one another, both will serve two years.

What will you decide?

- Give the information on the other person (1)
- Not give the information and remain silent (2)

End of Block: classic prisoner

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Start of Block: Last Questions

Q42 What do you think was the purpose of this experiment?

- To see how fast people decide and how it relates to performance (1)
  - To evaluate people's ability to do tasks in an experimental context (2)
  - To check if is possible to predict choices based on personal information (3)
  - I don't know (4)
  - Other (5) \_\_\_\_\_
- 

Q43 Have you ever attended a *Game Theory* course?

- Yes (1)
- No (2)

Q44 Thank you for your collaboration!

If you please write your email address below, we will be kind enough to share with you what this experiment brought to science (hopefully something!).

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## Questionnaire 2. Online setting

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### Start of Block: Intro

Q1 All this information is anonymous and it can not be traced back to you. So please answer everything as truthfully as possible for the benefit of science.

Thank you for collaborating in the pursuit of knowledge.

For the first exercise just drag and drop the words in the right position.

### End of Block: Intro

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### Start of Block: Priming - Homo Economicus

Q2 Write the following sentence in the correct order.

**was ago. Glass 3600 years invented**

\_\_\_\_\_ was (1)

\_\_\_\_\_ ago. (2)

\_\_\_\_\_ Glass (3)

\_\_\_\_\_ 3600 (4)

\_\_\_\_\_ years (5)

\_\_\_\_\_ invented (6)

Page Break

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Q3 Write the following sentence in the correct order.

**moved Rationality forward. mankind**

- \_\_\_\_\_ moved (1)
- \_\_\_\_\_ Rationality (2)
- \_\_\_\_\_ forward. (3)
- \_\_\_\_\_ mankind (4)

Page Break

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Q4 Write the following sentence in the correct order.

**A utility. no has without man objectives**

- \_\_\_\_\_ A (1)
- \_\_\_\_\_ utility. (2)
- \_\_\_\_\_ no (3)
- \_\_\_\_\_ has (4)
- \_\_\_\_\_ without (5)
- \_\_\_\_\_ man (6)
- \_\_\_\_\_ objectives (7)

Page Break

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Q5 Write the following sentence in the correct order.

**be won. to Games are**

- \_\_\_\_\_ be (1)
- \_\_\_\_\_ won. (2)
- \_\_\_\_\_ to (3)
- \_\_\_\_\_ Games (4)
- \_\_\_\_\_ are (5)

Page Break

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Q6 Write the following sentence in the correct order.

**is capable analytical only Human of species the thought.**

- \_\_\_\_\_ is (1)
- \_\_\_\_\_ capable (2)
- \_\_\_\_\_ analytical (3)
- \_\_\_\_\_ only (4)
- \_\_\_\_\_ Human (5)
- \_\_\_\_\_ of (6)
- \_\_\_\_\_ species (7)
- \_\_\_\_\_ the (8)
- \_\_\_\_\_ thought. (9)

Page Break

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Q7 Write the following sentence in the correct order.

**life, In strategy key. is**

- \_\_\_\_\_ life, (1)
- \_\_\_\_\_ In (2)
- \_\_\_\_\_ strategy (3)
- \_\_\_\_\_ key. (4)
- \_\_\_\_\_ is (5)

End of Block: Priming - Homo Economicus

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Start of Block: Priming - Homo Moralis

Q8 Write the following sentence in the correct order.

**was ago. Glass 3600 years invented**

- \_\_\_\_\_ was (1)
- \_\_\_\_\_ ago. (2)
- \_\_\_\_\_ Glass (3)
- \_\_\_\_\_ 3600 (4)
- \_\_\_\_\_ years (5)
- \_\_\_\_\_ invented (6)

Q9 Write the following sentence in the correct order.

**Ancient Ethics stems Greece. from**

- \_\_\_\_\_ Ancient (1)
- \_\_\_\_\_ Ethics (2)
- \_\_\_\_\_ stems (3)
- \_\_\_\_\_ Greece. (4)
- \_\_\_\_\_ from (5)

Page Break

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Q10

Write the following sentence in the correct order.

**glue of the societies. Morality is**

- \_\_\_\_\_ glue (1)
- \_\_\_\_\_ of (2)
- \_\_\_\_\_ the (3)
- \_\_\_\_\_ societies. (4)
- \_\_\_\_\_ Morality (5)
- \_\_\_\_\_ is (6)

Page Break

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Q11 Write the following sentence in the correct order.

**problem a of modern Lack world. of is goodwill**

- \_\_\_\_\_ problem (1)
- \_\_\_\_\_ a (2)
- \_\_\_\_\_ of (3)
- \_\_\_\_\_ modern (4)
- \_\_\_\_\_ Lack (5)
- \_\_\_\_\_ world. (6)
- \_\_\_\_\_ of (7)
- \_\_\_\_\_ is (8)
- \_\_\_\_\_ goodwill (9)

Page Break

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Q12 Write the following sentence in the correct order.

**There is right. no in wrong doing**

- \_\_\_\_\_ There (1)
- \_\_\_\_\_ is (2)
- \_\_\_\_\_ right. (3)
- \_\_\_\_\_ no (4)
- \_\_\_\_\_ in (5)
- \_\_\_\_\_ wrong (6)
- \_\_\_\_\_ doing (7)

Page Break

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Q13 Write the following sentence in the correct order.

**Social ties all a for almost humans. are constant**

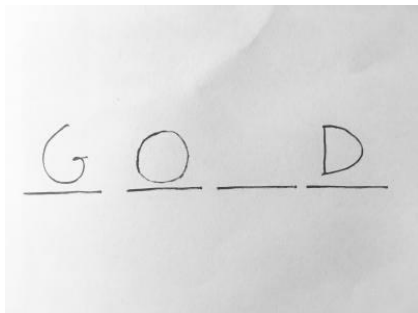
- \_\_\_\_\_ Social (1)
- \_\_\_\_\_ ties (2)
- \_\_\_\_\_ all (3)
- \_\_\_\_\_ a (4)
- \_\_\_\_\_ for (5)
- \_\_\_\_\_ almost (6)
- \_\_\_\_\_ humans. (7)
- \_\_\_\_\_ are (8)
- \_\_\_\_\_ constant (9)

End of Block: Priming - Homo Moralis

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Start of Block: GO\_D

Q14



Q15 Write a four letter word as the image above hints (GO \_ D).

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End of Block: GO\_D

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Start of Block: classic prisoner

Q16

You and other person committed a crime and got caught by the police. They have kept you in different cells with no chance to communicate and are offering you the following deal:

If you give the information necessary to prove the other person is guilty, they let you go without serving time. If you don't, you will be in prison for six months. However, the other person has the same choice, and if he/she decides to provide evidence of your part in the crime you will be imprisoned for two years. If both give evidence on one another, both will serve two years.

What will you decide?

- Give the information on the other person (1)
- Not give the information and remain silent (2)

End of Block: classic prisoner

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Start of Block: 2° Round Priming - Homo Economics

Q18

Please read the following quote:

"A rational man is guided by its thinking - a process of Reason - not by his feelings or desires."

Ayn Rand

End of Block: 2° Round Priming - Homo Economics

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Start of Block: 2° Round Priming - Homo Moralis

Q19

Please read the following quote:

"Emotions make us human. Denying them make us beasts"

Victoria Klein

End of Block: 2° Round Priming - Homo Moralis

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Start of Block: Different prisoner's dilemma

Q20

You and a stranger are in the jungle on a tour and a rare exotic bird just rested in the perfect spot for a photograph. You each want to get an amazing photo that will last a lifetime, but have only seconds to react.

If just one of you moves to take the picture, that person will capture the shot, and after the bird will fly away.

If both of you move to take the picture the bird will get startled and fly away before anyone takes a picture, leaving you with nothing.

If neither of you move, the bird will eventually fly away, but you will have a minute to at least savor the moment.

Remember the stranger is also making the same decision.  
Do you try to take the picture or not?

- No, I do not try to take the picture (4)
- Yes, I try to take the picture (3)

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End of Block: Different prisoner's dilemma

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Start of Block: Prior

Q21 Please fill below with your information.

\*Note that all this information is anonymous and it cannot be traced back to you. So please answer everything as truthfully as possible for the benefit of science. Thank you.

Q26 Age

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Q27 Gender

- Male (1)
- Female (2)

Q28 Nationality

▼ Afghanistan (1) ... Zimbabwe (197)

Q29 What is the average net monthly income of your family aggregate?

- [0; 600[ € (1)
- [600; 1000[ € (2)
- [1000; 1500[ € (3)
- [1500; 2500[ € (4)
- [2500; 4000[ € (5)
- More than 4000€ (6)

Q30 Professional Occupancy

- Student (1)
- Employed (2)
- Unemployed looking for work (3)
- Unemployed not looking for work (4)
- Retired (5)
- Disabled (6)

Q31 What is the highest degree or level of school you have completed?  
If currently enrolled, highest degree received.

- Below High-School (1)
- High-School (2)
- Bachelor's Degree (3)
- Master's Degree (4)

Doctorate Degree (5)

Q32 Please choose below the option closest to your main field of studies.

Business/Economics (1)

Science Oriented degree (e.g. Mathematics, Engineering, Technology) (2)

Arts Oriented degree (e.g. Architecture, History, Social Studies) (7)

Psychology (4)

Law (6)

Other (8)

Q33 Have you ever attended a *Game Theory* course?

Yes (1)

No (2)

*Display This Question:*

*If Professional Occupancy = Student*

Q34 GPA (Grade average of your current study program) on a scale 0-20

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Q35 What is the highest degree or level of school one of your parents has completed?

- Below High-School (1)
- High-School (2)
- Bachelor's Degree (3)
- Master's Degree (4)
- Doctorate Degree (5)

Q36 Having to decide where you would lie in the political spectrum, please choose one of the below:

- Left (1)
- Center (2)
- Right (3)

Q37 Do you have any religious beliefs?

- Yes (1)
- No (2)

*Display This Question:*

*If Do you have any religious beliefs? = Yes*

Q38 Please specify which religion you feel more affinity

- Hinduism (1)
- Judaism (2)
- Buddhism (3)
- Christianity (4)
- Islam (5)
- Other (6)

