Card Games and Economic Behavior

By Leonardo Becchetti, Maurizio Fiaschetti and Giancarlo Marini[†][*]

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Abstract

We wonder whether different game experiences are associated with significant differences in experimental behavior and, more specifically, whether expert bridge players, due to their superior team play habits, are more likely to adopt cooperative behavior than expert poker players. Evidence from trust games shows that bridge players make more polarized choices and choose the maximum trustor contribution significantly more often. Our findings are similar across incentivized and non-incentivized experiments and thereby support the hypothesis that behavior in simulated experiments resembles that in experiments with monetary payoffs.

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[†] Deceased April, 23rd 2013

1. Introduction

A well-established tradition in the literature challenges the old tenet of time-invariant preferences (Becker and Stigler, 1977) and discusses the nexus between frequently practiced (leisure, games, job) activities and individual preferences.[1] The idea that activities may shape individual preferences is the core of the seminal Henrich et al. (2010) experiment on primitive ethnic groups. That research reports that Lamalera whale hunters in Indonesia display an extremely high average contribution (58 percent) as proposers in ultimatum games,[2] which is the highest among the 15 primitive populations that participated in the research. At the other extreme, the average contribution of Machiguenga, who engage only in family activities without cooperation with other village members, is 27 percent. The interpretation of the Lalamera findings is that their everyday activity (hunting whales in large groups with canoes) cannot be performed in isolation and requires a high degree of cooperation and coordination, which progressively creates and is in turn naturally strengthened by social norms on equitable sharing rules among workmates.

Consistent with the hypothesis of the existence of a nexus between activities and preferences, Akerlof and Shiller (2010) have recently argued that the traders' bad financial practices that led to the global crisis may be a reflection of changes in their leisure activities, notably the decline in popularity of more cooperative games like bridge and the increased diffusion of individualistic games like poker.[3] [4] The authors observe that 44 percent of Americans played bridge in 1941,

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[1] See among others Loewenstein and Angner (2003) and Malmendier and Nagel (2011).

[2] As is well known, if the offer of the proposer in the ultimatum game is not accepted by the receiver (i.e., because it is not considered fair) the payoff is nil for both.

[3] What the authors imply is that the financial crisis and the related scandals that occurred in the same period in leading financial institutions were caused by a deterioration of social skills and an increase in self-regarding attitudes of financial traders (see Akerlof and Shiller, 2010, p. 40).

which was a game "*recommended as a means of learning social skills.*" By contrast, bridge is currently considered a game for the elderly[5] and is in strong decline while poker is becoming increasingly popular. [6] Akerlof and Shiller's implicit argument is that a professional or often practiced activity may shape individual preferences, exactly as in Henrich et al. (2010): although poker players are individualistic, bridge players act in teams and develop their cooperation skills consistently with the characteristics of their preferred game practice, which is analogous to the behavior of whale hunters. To provide support in favor of their argument, Akerlof and Shiller (2010 p.40) remark that poker is always played for money, which differs from what usually occurs in bridge, and has the characteristics that "deception" (*variously called bluffing and keeping a "poker face*") is one of the most important tactics followed to maximize the players' payoff[7].

Card games and particularly bridge and poker have always been an issue of great curiosity, inspiration and interest for academics. For example, Borel's (1938) and Von Neumann's analysis of bluffing in poker (Von Neumann and Morgenstern, 1944) contributed to the foundations of information and game theory. Borel's model of poker (called "la relance") finds the optimal

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[4] Such a reduced propensity to play team games is consistent with the well-known parallel evidence provided by Putnam (2000) that shows a decrease in the number of people who bowl in leagues despite the increase of bowling players in the last 20 years.

[5] The average age of English Bridge Union members was 55 in 2006 (The Independent (2006)), but the average age was 67 for members of the American Contract Bridge League in 2005 (Moore (2005)).

[6] It is hard to find updated and reliable data about the relative diffusion of the two games. About bridge, the WBF (World Bridge Federation) states that "*…The WBF has shown strong and steady growth and its membership now comprises 124 National Bridge Organizations (NBOs) with approximately 1,000,000 affiliated members who participate actively in competitive bridge events (locally, nationally and internationally)…*" (see the WBF website). Reliable data on poker diffusion are even harder to find given its tight regulation in some countries. Therefore, we refer to the statistics of one of the major online cardrooms, PokerStars, which had over 50 million active players at the beginning of 2012 (see PokerScout online traffic report (2012)).

[7] The reasoning of the authors ends with the following question: "*Of course there may be no link between what is taking place at the card table and what is taking place in the economy. But if card games played by millions of people shift the role of deception, wouldn't be so naïf simply to assume that such shifts do not occur also in the word of commerce?*" (p. 40).

player's strategies (including bluff) by differentiating the cases of plain game and pot-limit poker[8]. Bridge has elicited similar interest among academics and has greatly contributed to the development of probability theory[9] even though it still poses a great challenge for game theorists due to its complexity [10].

Two of the most influential billionaires in the world, Warren Buffett and Bill Gates, have been advocating bridge qualities for years and have argued for the importance of teaching bridge starting in the lower school grades. They have recently financed million dollar programs to introduce bridge at school because they are convinced that "*anyone's good in bridge is gonna be great in a lot of things*"[11] and that in bridge "*You have to look at all the facts. You have to draw inferences from what you've seen, what you've heard. You have to discard improper theories about what the hand had as more evidence comes in sometimes. You have to be open to a possible change of course if you get new information. You have to work with a partner, particularly on defense.*"[12] Although poker actually shares most of the rationality enhancing characteristics of bridge described in this statement, a qualifying difference among the two games is that bridge players are accustomed to working with a partner but poker players do not work with partners. This is one of the reasons we are interested in testing whether bridge players behave differently than poker players in trust game experiments, which typically test participants' cooperative attitudes.

[8] Von Neumann finds new implications by only limiting losses for players. A further extension of Borel's model is given by the work of Bellman and Blackwell (1949), Bellman (1952) and Karlin and Restrepo (1957).

[9] Borel and Cheron (1940) explain how bridge has greatly helped in developing an understanding of the practical implications of probabilistic laws and theorems through the analysis of hand distributions and the design of playing strategies. A new statistical method for evaluating bridge hands has been proposed by Cowan (1987).

[10] There is no comparable literature on game theory models of bridge. To our knowledge, there are only Binmore's suggestions of classifying bridge as either a game of imperfect information and perfect recall or as a two player, zero-sum game, in which case it would be a game of imperfect recall (Binmore 1992, 2007).

[11] Bill Gates in ACBL news archive (2009)

[12] Warren Buffett interviewed by A. Crippen on the CNBC website (2008).

The investigation of bridge and poker player preferences is an issue so far unexplored in the literature that falls into the broader and more investigated branch that studies how field experts behave in lab experiments. Along this line, Becker et al. (2005) study how game theory experts play in the traveler's dilemma, Palacios-Huerta and Volij (2009) document that professional chess players are closer than students to the subgame perfect equilibrium in the centipedes game, and Palacios-Huerta (2003) and Palacios-Huerta and Volij (2008) investigate how professionals play zero sum, two person strategic games. As a general result, this literature confirms that professional activities do affect experimental behavior, which is consistent with what we find in our research.

To test whether this also happens in our case, we formulate the hypothesis that bridge players are more likely to adopt team reasoning vis-à-vis standard purely self-regarding behavior and thereby send a significantly higher amount of the endowment received in trust games and produce Pareto superior outcomes given the game structure.[13] This should occur even though the analogy between the bridge partnership and the trust game partnership is not perfect. Both trustors and bridge partners may increase their payoffs if they cooperate with their partners (the trustee in the case of the trust game, the teammate in the case of the bridge game). However, the bridge teammate unlike the trustee cannot derive any benefit from an opportunistic behavior against her teammate. For this reason, our focus is on trustors. In spite of these dissimilarities, it is of great interest to test whether the role differences of bridge and poker players may affect their decisions in well-known game theoretic benchmarks such as incentivized and non-incentivized trust games. More specifically, one half of the participants in bridge matches are partners, but all of the participants of poker matches

[13] As is well known, the optimal strategy of a *homo economicus* (that is, of an individual with standard purely self-regarding preferences) trustee in a trust game is to give back nothing, and that of a trustee following team reasoning is to give back half of the money received. As a consequence, in the presence of common knowledge of *homo economicus* players' characteristics (both players are fully self-interested consistently follow the strategy of maximizing their own payoff and believe that their counterpart will also do so), the optimal strategy for the Nash maximizing trustor would be to give nil. However, in presence of common knowledge of a team reasoning players' characteristics, the optimal strategy will be to give everything.

are rivals. What we conveniently assume in our paper is that rivals play as homo economicus (maximize their own payoff) and that partners adopt a team reasoning or a we-thinking approach[14] in attempt to devise strategies that maximize the team payoff.

Our research strategy includes an online simulated experiment (OSE) without monetary payoffs and a monetary payoff experiment (MPE). Given this original structure of our empirical work, a second related contribution of our research is testing whether findings from non-incentivized experiments are good predictors of those in incentivized experiments.

In the first non-incentivized experiment, we compare the preferences of 1,414 bridge and 836 poker players when they play as trustors in simulated experiments with an original dataset built in cooperation with the Italian Bridge Federation and the poker online section of Snai S.p.a., the most important Italian betting agency[15]. In the second incentivized experiment, we repeat our test on a smaller sample of expert bridge and poker players to check whether evidence from the simulated experiment corresponds with that from experiments with monetary payoffs.

Our findings do not reject our main hypothesis as they provides evidence that bridge players contribute significantly more than poker players as trustors in both experiments. This is mainly accounted for by an 11 percent higher share of players sending all of their game endowment in the OS experiment and an 8 percent higher share of players sending all of their game endowment in the MP experiment, which is consistent with the optimal strategy when team rationality is common knowledge. In addition to this, in the incentivized experiment where we can control for the years of bridge and poker experience, we document that any additional year of bridge practice significantly increases the probability of team reasoning choice. The superior giving of bridge players does not seem to be motivated by risk aversion, pure altruism or inequity aversion (factors which we control for by extracting them with side experiments).

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[14] We use the two terms as synonyms.

[15] An online questionnaire was proposed to bridge and poker affiliates in the summer 2012. See Appendix A for a detailed description of the modalities of the experiment.

This paper is divided into five sections (introduction and conclusions included). The second section outlines our theoretical hypothesis. The third section describes our simulated experiment and provides evidence on its descriptive findings, parametric and non-parametric tests, econometric analysis and sensitivity analysis. The fourth section describes our incentivized experiment, which provides the same type of empirical evidence, and compares it with the evidence from the simulated experiment. The final section concludes the paper.

2. Theoretical hypothesis

Individual utility maximizing behavior is the standard assumption about players' preferences. An alternative view (Hodgson (1967), Regan (1980), Kramer, Roderick and Brewer (1984), Gilbert (1989), Hurley (1989), Sugden (1993, 2000 and 2003), Tuomela (1995), Hollis (1998), Bacharach (1997, 1999 and 2006), Gold (2008)) takes into account that individuals may use a we-mode instead of an I-mode attitude or, in other terms, wonder whether "it would be good for us if we did…" instead of the classic, purely self-regarding behavior reasoning that "It would be good for me if I did…" (Becchetti, Degli Antoni and Faillo (2010)).

Beyond the above mentioned hypothesis of a social preference foundation of team reasoning, a "strategic" factor that could facilitate its adoption in social dilemmas is the "common reason to believe" (Sugden (2003)). The main idea is that team reasoning has a conditional nature. Group members are not committed to reason as a team unless there is a common (reciprocal) motive to believe that other members are doing the same.[16]

Team thinking may be stimulated by the specific features of the game structure. The game we use in our simulated experiment, the trust game, has the property of "strong interdependence" (Bacharach (2006)), that is, of a game in which (as in Prisoners' dilemmas and Traveler's games)

[16] *"The internal problem is that, from the viewpoint of any individual, the validity or acceptability of team reasoning, narrowly defined, may be conditional on his confidence that other members of the team are reasoning in a similar way"* (Sugden (2003), p.168).

there exists an outcome that is preferred by both partners and that can be achieved with we-thinking, which is Pareto superior with respect to the outcome that would be attained with standard individual rationality.

Our experiment tests the hypothesis that bridge players have a higher predisposition for we-thinking than poker players. We argue that such a higher predisposition is given by their regular practice of a game in which success may be obtained by using we-thinking with their playing partners.

Note that we do not specify whether the counterpart of the trust game is another bridge/poker player in either of the experiments to avoid framing effects that could per se lead to the rejection of the null hypothesis. In this sense, we created weaker conditions for our test because the information on the counterpart game experience does not reinforce the "common reason to believe" (Sugden (2003)).

3. The survey and the simulated experiments

The trust investment game is a well-known sequential game that illustrates an important social dilemma: trusting others (in an economic environment, which is typically characterized by asymmetric information and incomplete contracts because it is implicit in the game rules) may be rewarding because it produces super-additive outcomes, but it is also a "social risk" because the counterpart's opportunism may lead the trusting player to a result that is inferior to that obtained with the non-cooperative strategy. Berg, Dickhaut and McCabe (1995) develop this idea in their sequential two-player game in which a trustor, who is the first mover, has to decide the share of her endowment that she wants to transfer to an anonymous counterpart (the trustee). The amount sent by the trustor is tripled[17] due to the game rules. After this choice, the trustee moves and may return to the trustor a share of what she received (including all or nothing).[18]

In the Nash equilibrium of the game in which both players adopt purely self-regarding rationality and this purely self-regarding rationality is common knowledge (that is, each player expects that their counterpart will adopt purely self-regarding rationality), both the trustor and trustee transfers are zero, and the individual and aggregate payoffs are suboptimal. By contrast, if the two players adopt a we-thinking attitude and this we-thinking is common knowledge (that is, each player expects that her/his counterpart will adopt the same we-thinking attitude), both players do their best to maximize the aggregate outcome and divide it in equal parts.[19] That is, the trustor will send all, and the trustee will receive it tripled and return half of it.

In our non-incentivized trust game experiment, the trustor is told to receive 100 euros and has to decide the amount of her endowment to give to another anonymous player (the trustee) knowing that the amount will be tripled and that the trustee will choose how much of the amount to return to the trustor. The game is only simulated and no real money is at stake. Beyond the trust game, our design also includes a dictator game and a risk aversion simulated experiment to measure the participants' risk attitudes and other regarding preferences separately.

In the dictator game, a sender is told to receive an amount of money (100 euros in our case) and has to decide how much to transfer to a second anonymous player (receiver). After this decision, the

[17] One of the rationales for the trust game rule of tripling the trustor contribution hinges on the assumption of the superadditive effects of trust and trustworthiness. With high levels of trust, individuals share information and knowledge and cooperate, which generates outcomes that go beyond the sum of their stand-alone contributions.

[18] The success of the trust game in the behavioral literature stands in its capacity to stylize some crucial elements of "social dilemmas" in real life interactions: asymmetric information, incomplete contracts, superadditivity (see footnote 17) in case of cooperation and the fact that cooperation is profitable if reciprocated by the counterpart but unprofitable if the trust is abused. Trust-game-like interactions typically characterize relationships among individuals, organizations, companies, states and workers within productive organizations. For a survey of experimental findings on trust games, see the meta-paper of Johnson and Mislin (2011) and Fehr (2009).

[19] Assuming that we-thinking players are also inequality averse, they will maximize and divide the team outcome in equal parts.

game ends. Because there is no reply from the receiver, the sender does not send anything if she follows a purely self-regarding strategy. Therefore, deviations from the Nash equilibrium (non-zero transfers) are generally explained in terms of altruism or inequity aversion. Lastly, our risk aversion test is based on the mean preserving spread principle. It asks the participants to choose among six different lotteries that have distributions with the same mean value but ranked in ascending order of variance.[20]

The dictator game and the risk aversion simulated experiments are proposed to extract variables that can be used as controls when trying to provide a rationale for trustors' transfer in the simulated trust game experiment. The experiment is presented through an online survey. For bridge players, it is managed by the official website of the Italian Bridge Federation, and it is managed by the Snai S.p.a. through a registration process for poker players. The respondents in both cases are affiliated regular players[21].

3.1 Database and descriptive evidence

The OS experiment sample comprises 1,414 poker and 836 bridge players who participated online to our mini-survey and simulated experiment.[22] The properties of the two groups are not balanced because the bridge players are 15-year older on average (approximately 56 years old vs. 41 years old for poker players) and contain a larger share of females players (26 vs. 7 percentage points) (see Table III). The observed age difference is consistent with evidence from the UK and the US (see footnote 5) and the observation by Akerlof and Shiller (2010) that bridge is becoming a game for the elderly.

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[20] In the literature, the test is traditionally considered to be the most easily understandable alternative to more complex experimental schemes that elicit risk and time preferences such as those of Andersen et al. (2008) and Holt and Laury (2002).

[21] See Appendix A for a detailed description of the modalities of the experiment.

[22] The variable legend and descriptive statistics for the variables used in the empirical analysis are provided in Tables I and II, respectively.

Due to the imbalanced socio-demographic characteristics of our respondents, the robustness of the results from the standard parametric and non-parametric tests (section 3.2) will be checked with an econometric analysis by controlling for the influence of such factors (section 3.3) and a sensitivity analysis that tests the robustness of our findings for departures from the assumption of conditional independence of potential outcomes and treatment assignment given observables (Conditional Independence Assumption, henceforth also CIA) (section 3.4).

3.2 Hypothesis testing

We test the following three null versus alternative hypotheses:

i)	*Trust*	H_{0A}: $TR^{Poker} = TR^{Bridge}$	*vs.*	H_{1A}: $TR^{Poker} < TR^{Bridge}$
ii)	*Risk aversion*	H_{0B}: $RA^{Poker} = RA^{Bridge}$	*vs.*	H_{1B}: $RA^{Poker} > RA^{Bridge}$
iv)	*Altruism*	H_{0C}: $Al^{Poker} = Al^{Bridge}$	*vs.*	H_{1C}: $Al^{Poker} > Al^{Bridge}$

Both the parametric and non-parametric tests document that the first null hypothesis is strongly rejected in the expected direction. The bridge players exhibit a significantly higher level of trust than the poker players in both the parametric (t-stat -4.00, p-value 0.000) and non-parametric tests (z-stat -2.63 p-value 0.008). In terms of magnitude, the difference is 7 points because the bridge players send on average 48 vs. 41 experimental units, that is, 17 percent more than the poker players' on average (see Table IV).

If we look at the distribution of choices, we find that most of the difference depends on what happens at the two extreme transfer choices (Figure IA). A far higher share of the bridge players follows team rationality by sending all (31 percent vs. 20 percent of poker players), but somewhat surprisingly, a higher share of the bridge players also sends zero even though the distance here is smaller (30 percent vs. 24 percent). This implies a strong rejection of the hypothesis that the share of team rational players is the same among bridge and poker players (non-parametric test z-stat -34.55, p-value 0.000 and parametric test t-stat -5.92, p-value 0.000) but also that the share of zero contributors is the same among bridge and poker players (z-stat 11.65 and p-value 0.003 in non-parametric test, t-stat -3.44 and p-value 0.002 in parametric test).[23] This evidence also indicates that bridge players' choices are much more polarized than poker players' choices (61 percent vs. 44 percent). As expected, the rejection of the null is even sharper in this case (z-stat 64.64 and p-value 0.000 in the non-parametric test, t-stat 8.15 and p-value 0.000 in the parametric test). Beyond polarized choices, the tendency of the bridge players to give more is reinforced by what happens in next-to-polarized choices where the bridge players chose transfers of 80 and 90 euros in a higher proportion than poker players and transfers in the range from 10 to 70 euros in a lower proportion (see Figure IA).

According to the literature on trust games (section 2), superior transfers of trustors have been interpreted in terms of lower risk aversion, higher pure or strategic altruism and higher inequity aversion. Our separate test of risk aversion shows that the bridge players are slightly less risk averse (non-parametric test z-stat 4.13, p-value 0.000 and parametric test t-stat -2.90, p-value 0.002). Furthermore, our test on "other regarding preferences" documents that the bridge players give significantly less in the dictator game where giving may be interpreted in terms of pure altruism or inequity aversion, but only the non-parametric test rejects the null at high levels of significance (non-parametric test z-stat 3.95, p-value 0.000 and parametric test t-stat 1.83, p-value 0.067). Here again, the result is strongly influenced by the fact that the bridge players' choices are much more polarized, and the bridge players also have a higher share of zero contributors.

[23] We approximate trustor giving with a continuous variable and therefore test the between-subject difference with the Mann-Withney test. For all the other dichotomous variables in Table 4, we test the differences in proportions with a Chi-square test. The difference between the poker and bridge players remains highly significant if we remove the simplifying assumption of continuity on trustor giving and test the difference of distributions.

A first conclusion from these tests is that the bridge player trustors give significantly more but not because they are more altruistic or inequity averse. The econometric analysis that follows may help us to check whether our findings on trustor transfers are robust to confounding factors (older people and women are over-represented among the bridge players compared to the poker players as shown in Table III) and whether they are more or less significant once we control for risk aversion and dictator giving.

3.3 Econometric analysis

Our benchmark specification is

$$TrustorG_i = \alpha_0 + \alpha_1 DBridge_t + \sum_i \beta_i X_{it} + \varepsilon_i \tag{1}$$

where *TrustorG* is a measure of trustor giving, *DBridge* is a dummy that takes a value of one if the survey respondent is a bridge player (which implies that the respondent is a poker player when it is zero) and X are controls that include a gender dummy, age classes and (accordingly to the various specifications) a dummy for early responses,[24] our experimental measures of risk aversion and dictator giving, regional and province dummies and/or proxies of education and social capital.[25]

The relevant additional contribution of the regression analysis is in the possibility of controlling for factors that affect differences in the trustors' transfers after controlling for the impact of risk aversion, pure altruism and inequity aversion. In Table V, the dependent variable is the trustor's giving, and the specifications are estimated using ordered logit. Standard errors are clustered at the province level. We first include only gender and age as controls (column 1) then add experimental

[24] The survey for bridge players was launched on July 2012 and remained online until the end of September. The dummy gives a value of one to those answering before the midterm.

[25] Details on the construction of the age classes and the regional and province dummies are provided in Table 1.

measures of risk aversion and dictator giving (column 2), (20-1) region or province dummies[26] (columns 3 and 4) and experimental measures plus region or province dummies as additional regressors (columns 5 and 6). We finally replace the province dummies with proxies of human and social capital at the province level (column 7).[27]

The findings illustrated in Table V document that the bridge dummy variable is always significant. This implies that the bridge effect is larger once we control for risk aversion and dictator giving (the latter presumably captures both pure altruism and inequity aversion). This is consistent with our original hypothesis that bridge players are more trained to we-thinking and team-thinking, that is, they do not give more due to higher altruism, inequity aversion or lower risk aversion. Regarding the significance of other regressors, note that our proxy of social capital at the province level in column 7 (the number of social cooperatives) is positive and significant, which is consistent with what can be assumed on theoretical grounds about the relationship between social capital and trustor giving. Human capital is also shown to affect our dependent variable because the provincial share of those with higher than an intermediate education is positive and significant.

In Table VI, we take our test on the relationship between bridge and team rationality as a reference. Therefore, we estimate a probit model where the dependent variable is a dummy that takes a value of one if the trustor follows team rationality (gives all) and zero otherwise. The controls are arranged as in Table I in the seven specifications. Our findings document that playing bridge raises the probability of being a team maximizer by 10-11 percentage points, which is consistently with what was found descriptively, and the same probability is increased by 14-15

[26] In Italy, there are 20 administrative regions that encompass 110 provinces (smaller administrative areas that roughly coincide with the biggest urban areas).

[27] We use the province population's share of inhabitants with higher than an intermediate school degree as a proxy of human capital and the number of cooperatives and the number of donations in the province as a proxy of social capital.

percentage points when we control for risk aversion and dictator giving (Table VI, columns 2, 5 and 6).

In Table VII, we replace the dummy that picks up the top extreme choice with a *Polarized* dummy that picks up both (top and down) extreme choices. As expected, the *Bridge* dummy grows both in significance and magnitude (adding 19 percent to the probability of making polarized choices).

In summary, our empirical analysis highlights three strong results that are robust in both the parametric tests, non-parametric tests and regression analysis once we controlled for additional confounding factors: i) bridge players choose the top extreme choice, which is the optimal choice when both players follow team rationality (and assume that also the counterpart will do so), in a significantly higher proportion; ii) bridge players are significantly more polarized on the two extreme choices (maximum or zero contribution). These findings support our hypothesis that the bridge game is associated with a significantly higher amount of we-thinking or team rationality. However the findings also show some apparently counterintuitive evidence by documenting that the poker players are zero contributors at a significantly lower rate. Hence, the poker players do not seem to behave like irresponsible gamblers or to act more selfishly than the bridge players, but they act less cooperatively, as is the nature of the game.

3.4 Discussion of our results and sensitivity analysis

The absence of an ex ante random selection of participants to the two bridge and poker player groups prevents us from knowing whether our results depend on the impact of the game characteristics on the players' preferences or on a selection bias that brings individuals with higher social capital to become bridge rather than poker players. In such a case, the shift in the share of bridge to poker players should not be considered the cause but a signal of a change in preferences (reduction of team or we-reasoning), which may be caused by other factors. To clarify this point, we propose a sensitivity analysis to see whether the observed correlation is robust when we remove the conditional independence assumption and simulate the effect of a confounder that is correlated with both the treatment and the outcome.

A key assumption for the validity of our main result in identifying a causality nexus from the (poker or bridge) activity to individual preferences relies on the CIA. This means that what leads individuals to become bridge or poker players must be independent from the outcome we intend to observe (trustor transfer). We are aware that this is not necessarily the case in our empirical analysis. There may be factors, such as family education, that drive both the decision to become a bridge player and the observed outcomes of our simulated experiment.

To evaluate whether and to what extent the observed difference between the bridge and poker players is robust to deviations from the CIA, we perform the Ichino et al. (2008) sensitivity analysis[28]. This can be done by modelling a "confounder" (an additional unobservable binary variable) and, more specifically, the probabilities of the effect of such a variable on our data when it is used as an additional covariate in the matching regression[29].

This approach requires the transformation of our outcome variable into a dichotomous variable. Given that our two sharper results are on the share of trustors giving all (team or we-thinking trustors) and on the trustors making polarized choices, we decide to perform our sensitivity analysis on the polarized dummy variable. The baseline effect of the bridge dummy on polarized choices is 0.175 and is highly significant (WSE: 0.022, t-stat 8.01).

Our findings document that the bias is small and the simulated Average Treatment Effect on Treated (ATT) remains positive and significant in all of the performed simulations (Table VIII). The ATT remains strongly significant for any simulated confounder even under the extreme

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[28] See also Rosenbaum and Rubin (1983), Imbens (2004) and Blatmann and Annan (2010).

[29] See Appendix B for further details on the sensitivity analysis.

assumption that the probability of coming from a highly educated family is 50 percent higher for bridge players who follow polar strategies than for those who do not follow them (*maximum simulated outcome effect for the treated*). Our main findings remain robust even when we remove the assumption that the confounder does not modify the odds for the poker players. Under the most unfavorable scenario, we assume that the probability of coming from a highly educated family is 30 percent higher for poker players who follow polar strategies than for those who do not follow polar strategies (*maximum simulated outcome effect for the control*). The robustness of our results is also confirmed when there is a 30 probability point difference between being a bridge player and being a poker player when coming from a highly educated family (p1.-p0.) (*maximum simulated effect of the confounder on selection into treatment*).

The probability differences assumed for our killer confounders are by far larger if compared with the same conditional probabilities for observables (male gender, age above median, dummy for early respondents), which therefore produce even smaller biases (Table VIII, first three rows)[30]. This gives us additional confidence in the robustness of our findings for reasonable deviations from CIA.

4. The incentivized experiment

We wonder whether the results from the online simulated experiment are reliable and correspond to what would have happened in an experiment with monetary payoffs. To test this, we build an additional experiment with monetary payoffs where both the trustors and trustees are endowed with 10 euros. The goal of our additional experiment with monetary payoffs is twofold: i) testing whether the results of our null hypotheses of no difference between the bridge and poker players (which was rejected in the simulated experiment) are confirmed; ii) testing whether behavior in the

[30] Under this assumption, the largest difference in terms of maximum simulated outcome for the treated or the control group (d1 or d0) is slightly less than .10, but for our killer confounders we consider a much wider difference (up to 0.6 percent).

online simulated experiment is a good predictor of behavior in the experiment with monetary payoffs.

To implement the incentivized experiment, we plan two different sessions for bridge and poker players and adopt the same protocol as in the non-incentivized experiment (with the exception of the monetary payoff and a proportionally reduced endowment). We introduce the monetary payoffs explicitly by informing the respondents that they would collect one of the realized payoffs randomly at the end of the session. The questionnaire is administered after the experiment to avoid framing effects and coincide with that of the non-incentivized experiment (with questions in the same order) with the exception of the additional final questions on the years of bridge and poker experience.

We run the experiment on 150 experimental units for each card game (poker and bridge) group, and within each group we split the sample into 75 trustor and 75 trustee participants.

Expert bridge players were selected during the Italian national championship in March 2013 at Salsomaggiore Terme (Parma). The experiment session was organized in the hall of the building in a setting in which the respondents had the possibility to sit down without looking at each other's answers. The session took place during the registration procedures, before the beginning of the matches; it started at 9 AM and lasted until 2 PM. The players were solicited to participate in the experiment, provided with the experiment instructions and, answered the questionnaire after they played. The overall amount of liquidated payoffs was € 1,531, and a participant earned €10.21 on average.

There is no official national (or regional) poker competition in Italy. The poker events that are most similar to an official championship are tournaments organized by the largest private clubs in which the best players usually participate. Private tournaments follow the standard rules of the game, with real monetary stakes and a participation fee. Given the private nature of the tournament, the entry fee and the monetary stakes, the probability that an occasional player would participate in our experiment was extremely low. The poker players' experiment was run in two distinct sessions, which were organized in two of the largest poker rooms in Rome[31]: the "*Mirage*" on April, 20th 2013 and the "*Cotton Club*" on July, 5th 2013. The experiment took place outside the playing room in the hall of the two clubs and started at 10 PM. before the beginning of the tournament and lasted until 1 AM. Players were solicited to participate in the experiment during the registration procedure[32]. At the end of the sessions, all of the payoffs were liquidated for an overall amount of € 1,277; a participant earned € 8.18 on average.

4.1 The monetary payoff experiment (MPE) sample

The characteristics of the MPE sample are quite similar to those of the OSE sample. As in the OSE sample, the bridge players are older (57.6 against 41.3) and more gender balanced than the poker players (53.3 percent male players against 87.3 percent) (Tables IX-X). The average years of bridge experience was 25.2 for the bridge players, and the average years of poker experience was 11.6 for the poker players. Approximately 7 percent of the bridge players also play poker, and their average poker experience is approximately 26.29 years. On the contrary, only 8.67 percent of the poker players also play bridge, and their average bridge experience is 6.15 years. The impact of game "fuzziness" (that is, the fact that the bridge and poker player's identities are not mutually exclusive) and the years of game experience on our findings will be dealt with in our econometric analysis.

4.2 Players' behavior and hypothesis testing in the MPE

Even though the number of observations in the MPE sample is far smaller, we observe results that are strikingly similar to those of the OSE sample (Figure IB). That is, we find a significant

[31] Rome and Milan are the two largest and most important cities in which poker is played in Italy. Hence, players go there from all over the country to compete with the best Italian players.
[32] As in the bridge tournaments, the registration in private poker rounds is when the entry fees are paid and (unlike bridge) the monetary stakes (fiches) are bought.

difference in terms of the trustor giving polar attitudes as a sum of the share of zero and maximum contributors (those following self-regarding rationality with self-regarding rationality being common knowledge or those following team rationality with team rationality being common knowledge) (Table XII). More specifically, we find that 34.6 percent of the bridge players (vs. 26.6 percent of the poker players) follow team rationality. This 8 percent difference is strikingly similar to the 11 percent difference found in the OSE experiment, and shares of team players in the two subgroups are also not so distant in absolute value from those of the MPE (31 and 20 percent, respectively). The bridge players also lead in terms of share of zero contributors in the MP experiment as in the OS experiment (22.7 vs. 12 percent). Note, that the distance was slightly smaller in the OS experiment (6 vs. 10 points), with the use of real money reducing the total share of zero contributors by more than 10 percent in both the bridge and poker subsamples. The far lower number of observations we have in the MP experiment prevents the difference in zero and maximum contributors from being statistically significant in the parametric and non-parametric testing. However, the difference in terms of polar attitudes (sum of zero and maximum contributors) is much more remarkable (57.3 vs. 38.7) and statistically significant (non-parametric test z-stat 5.24, p-value 0.02 and parametric test t-stat -2.31, p-value 0.02).

4.3 Econometric findings in the MPE

In the MP experiment and like in the OS experiment, the poker players are younger and are males to a higher proportion, which reflects the respective differences of the populations in the two games. A further test on the significance of the behavioral differences between the bridge and poker players will be provided by an econometric analysis that controls for the influence of such factors and for the players' "fuzziness" and game experience.

We start our econometric analysis with the following specification:

$$Y_i = \alpha_0 + \alpha_1 DBridge_t + \sum_i \beta_i X_{it} + \varepsilon_i$$

where the dependent variable Y_i is, in three different probit specifications, a 0/1 dummy that takes a value of one if the trustors i) send the maximum contribution, ii) send zero or iii) play polar (either choice i or ii). In a fourth and final ordered probit specification, the dependent variable is a qualitative discrete variable that measures the amount sent by the trustor.

The X vector of controls in the specification includes a Male dummy, Age class dummies calculated as in the non-incentivized experiment, *Dictator* (a variable that measures the amount sent by the player in the dictator game) and *Riskav* (our experimental measure of risk aversion). The province fixed effects are controlled for and the standard errors are clustered at the province level.

In a first simpler specification, we add the bridge player dummy (*Dbridge*), which takes a value of one if the participant is a bridge player, to this set of regressors. The empirical findings document that being a bridge player significantly raises the probability of choosing a polar strategy as a trustor (Table XII, column 1). In terms of magnitude, the result is stronger than what was found descriptively. Being a bridge player also significantly raises the probability of choosing a team strategy (on which being male and the amount sent in the dictator game both have positive and significant effects) (Table XII, column 3).[33] The bridge dummy is also positive and significant in the final ordered probit estimate in which the dependent variable is trustor giving (Table XII, column 4). Additionally, male gender and dictator giving also have a positive impact. As already mentioned, information collected in the MPE allows us to control (differently from what happened in the OSE) for "game fuzziness." Therefore, we estimate a second specification in which we add a dummy for bridge players who also play poker (7.3 percent of the sample). The dummy is not significant and the significance of our main finding is substantially unchanged with the magnitudes becoming slightly larger and the significance of the impact on trustor giving becoming stronger

[33] The gender and age effects contribute to explain the different magnitude of the impact of the bridge dummy in the parametric (non-parametric) testing and in the econometric estimates: once we control for the fact that young and male trustors are more likely to be maximum contributors, the impact of bridge player (where males are significantly less and players are older) on the same dependent variable is stronger. We further check whether our magnitudes are affected by multicollinearity by calculating the VIF factor (Marquardt, 1970) of the estimate and find that this is not the case with VIF always being below 5.

(Table XII, columns 5-8). In our final specification, we finally fully account for game fuzziness and game experience problems by replacing our dummies with two variables that measure years of bridge experience and years of poker experience, respectively. With these new estimates, we find that one year of bridge experience significantly raises the probability of becoming a polar player by approximately 3.6 percent and the probability of becoming a team player by approximately 2.2 percent (Table XII, columns 9-12).

The significant relationship between bridge experience and polar strategies seems to indicate that the nexus we observe cannot be solely explained by a causality link that goes from preferences to game selection. In a final robustness check on our main findings, we find that our main results are unchanged when we modify our benchmark specifications from Table XII by i) introducing regional dummies, ii) replacing the age classes with a continuous age dummy without regional dummies, iii) replacing the age classes with a continuous age dummy with regional dummies, or iv) replacing the regional and provincial dummies with the social and human capital variables used in Tables V-VII, column 7.[34]

We repeat the sensitivity analysis on the polar dummy using exactly the same simulation criteria reported in section 3.4. Again, the effect of the polar dummy remains strongly significant as documented by the ratio between the ATE and the WSE (i.e., 0.90 and 0.025, respectively, when the confounder is calibrated based on the male dummy correlation), which is far larger than the 99 percent significant threshold in all of the simulations (Table XIII). As with the OSE, the bias simulated with killer confounders is much larger than that calibrated on observables, and the main finding remains robust under the more extreme perturbations considered in the simulation exercise. Significance is confirmed in all of the sensitivity analyses.

5. Conclusions

[34] The results are omitted for reasons of space but are available upon request.

Our research provides new evidence for the nexus between game experience and preferences. We show with an online simulated experiment (OSE) and a second experiment with monetary payoffs (MPE) that bridge players choose significantly more polar (and team) strategies than poker players when playing as trustors in trust games. Our findings are significant when controlling for "game fuzziness" (a few bridge players also play poker and vice versa) and years of game experience in the MPE. The results are reinforced by finding in the MPE that any additional year of bridge experience significantly raises the probability of choosing team strategies. A related important finding of our research is that results from the OSE predict the results from the MPE reasonably well in terms of our main finding providing interesting evidence on the usually questioned issue (see Rubinstein, 2007 among others) of the unbiasedness/biasedness of non-incentivized experiments.

Our findings may partially shed light on the argument set forth by Akerlof and Shiller (2010) (an argument that inspired our research) about whether the switch from playing bridge to playing poker in the US may be related to a reduction in social skills and to the shift in financial agents' practices, which lie at the root of recent financial crises and scandals. The paper's results are mixed in this respect. We find confirmation that bridge practice is (and years of bridge experience are) significantly associated with more cooperative behavior. However, we also find that bridge play is significantly associated with purely self-regarding behavior (even though not significantly so in the econometrics of the incentivized experiment). The combination of these two findings is that bridge players choose markedly more polar strategies, which is the stronger result and encompasses the previous two. The reason bridge players are more "aut-aut" players (that is, they stick to an extreme cooperative or purely self-regarding behavior) calls for future research and discussion.

Appendix A: – The simulated experiment and the questionnaire

The following questionnaire was proposed to the bridge players over the period of July 15 – September 30, 2012 via the official web site of the Italian Bridge Federation (FIGB), which counts 24,900 affiliates, all of whom are identified by a code number that is necessary to play official competitions at the club, national and international level. Such a code is also necessary to play in the bridge tournaments that organized online daily by the American Contract Bridge League. The total number of respondents was 843.

The questionnaire was proposed to the poker players from July 9th to July 31st 2012 by SNAI via a secure system developed for them by the specialized firm Problem Free Limited.

Registered poker players, all of whom are identified by their social security number, could see the popup that proposed the questionnaire once they logged into the secure playing platform. The sample of respondents was 1,401.

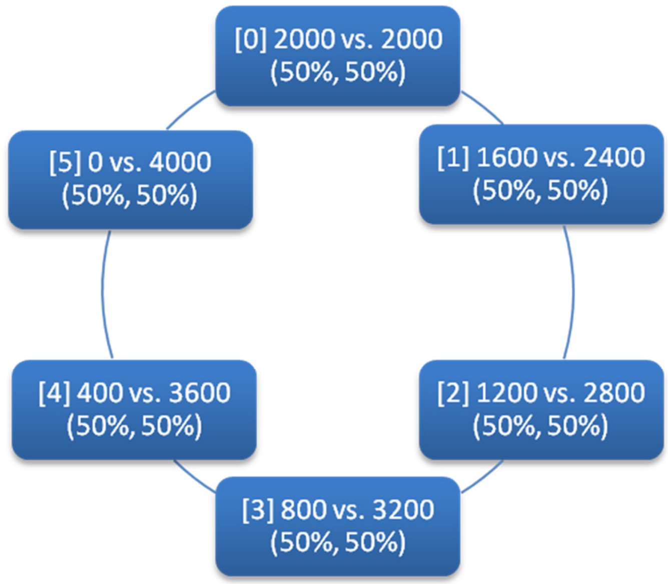
The questionnaire:

1. Sex M F

2. Age

3. Choose which of the "head or tail" lotteries shown below you prefer to participate in [indicate the number in square brackets]

   For each lottery, we indicate in round brackets the probability of the above indicated win. This is a "head or tail" lottery, where each of the two outcomes has a 50 percent probability of occurring (i.e., lottery [3] indicates that, by choosing this lottery, you have a 50 percent probability of winning 800 euros and a 50 percent probability of winning 3200 euros).



4. Assume you are given 100 euros and you can choose how much of this amount (between 0 and 100) you will give to an anonymous player. The amount sent will be multiplied by 3 (i.e., if you send 10, it will become 30; if you send 100, it will become 300) and given to the anonymous player. At this point, the anonymous player will decide how much to send back to you. He will not know your identity. After this choice, the game ends.

   How much would you give? Please choose one among the following:

   0 – 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 90 – 100

5. Assume you are given 100 euros and you can choose how much of this amount (between 0 and 100) you will give to an anonymous player. After this choice, the game ends.

   How much would you give? Please choose one among the following:

   0 – 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 90 – 100

Appendix B: – Sensitivity analysis

The sensitivity analysis allows us to assess the extent to which our baseline ATT (see section 3.4) is robust to the exclusion of a potential confounder that might have different characteristics.
The distribution of the confounder *U* is then described on the basis of four choice-parameters:

$$p_{ij} = Pr(U = 1|T = i, Y = j) = Pr(U = 1|T = i, Y = j)$$

with $i, j = \{0, 1\}$, where Y is the outcome (that is, the binary transformation of the outcome for continuous outcomes, which is the probability of team or polarized rationality in our case) and T is the binary treatment (T=1 equals being a bridge player).

In this way, we can model each simulation parameter p_{ij} as representing the probability that U=1 if T=i and Y=j.

We conveniently conceive our potential confounder as a trait that makes individuals more likely to become bridge players (T=1) and, at the same time, more likely to make polarized choices in the trust game (Y=1). An example of this is family education which could increase both the probability of selection into treatment (becoming a bridge player) and outcome (behaving as a polarized player, that is, choosing the maximum or the minimum). If we define our outcome variable as *POLARIZED*, a reasonable way to model the distribution of the confounder is by setting

i) $p_{11} > p_{10}$, so that $Pr(U = 1|\ Bridge = 1|Polarized = 1) > Pr(U = 1|\ Bridge = 1|Polarized = 0)$, which implies that the probability of coming from a highly educated family is higher for bridge players who follow polarized choices than for bridge players who do not follow polarized choices;

ii) $p_{01} = p_{00}$, so that $Pr(U = 1|\ Bridge = 0\ |Polarized = 1) = Pr(U = 1|\ Bridge = 0|Polarized = 0)$, which implies that the probability of coming from a highly educated family is the same for poker players who follow polarized choices as for poker players who do not follow polarized choices;

iii) $p_{1.} > p_{0.}$, so that $Pr(U = 1|Bridge = 1) > Pr(U = 1|Bridge = 0)$, which implies that the probability of coming from a highly educated family is higher for bridge players than for poker players. In other words, the confounder has a positive effect on the treatment assignment.

Following Ichino et al. (2008), we define $d_1 = p_{11} - p_{10}$, $d_0 = p_{01} - p_{00}$ and $s = p_{1.} - p_{0.}$ to characterize the sign of the bias when estimating the baseline ATT (i.e., computed when U is not in the matching set). In our framework, we look at cases in which $d_1 > 0$ and $d_0 = 0$ (*positive effect of U on treated outcome and no effect of U on the untreated outcome*) and $s > 0$ (*positive effect of U on selection*). In this way, it is possible to identify the levels of d_1 and s that produce an estimated ATT substantially different from the baseline ATT and discuss the extent to which the existence of a "killer" confounder with these characteristics is plausible.

The results are reported in Table VIII for the online simulated experiment and in Table XII for the experiment with monetary payoffs, and they include simulations where the maximum d_1 is 0.6 and the maximum d_0 is 0.3.

All of the tables report values for s, the new ATT, the percent bias (calculated as the difference between the baseline ATT and the simulated ATT scaled on the original ATT), and the within estimated standard error (WSE).

TABLE I.

VARIABLE LEGEND

Male	Dummy that takes a value of one if the respondent is male
Trustor transfer	Amount sent by the trustor in the simulated trust game
Dictator giving	Amount sent by the sender in the simulated dictator game
Risk aversion	Lottery chosen in the risk aversion test based on the mean preserving spread principle (see Appendix A). The six lotteries have the same mean and are ranked on the basis of ascending order of variance (i.e., 0=lowest risk aversion,..,5= highest risk aversion)
Early response	Dummy for early respondents (responses before midterm) in the online survey
Above intermediate education	Share of inhabitants above 15 years old with more than an intermediate school degree at the province level
Donations	Total amount of officially registered donations in the province (thousands of euros)
Social cooperatives	Number of social cooperatives created at the province level

TABLE II. DESCRIPTIVE STATISTICS – SIMULATED EXPERIMENT

Variables	N. of obs.	Mean	S.Dev.	Min.	Max.
Male	2250	0.861	0.346	0	1
Age	2249	46.319	14.129	18	100
Risk aversion	2250	4.711	1.714	1	6
Trustor giving	2250	43.462	38.113	0	100
Early response	2250	0.537	0.499	0	1
Above intermediate education	2232	44.742	6.604	35.206	57.17
Donations	2232	16.995	5.871	6.8	31.9
Social cooperatives	2232	21.147	21.285	0	65

Variable legend: see Table I

TABLE III.
CHARACTERISTICS OF BRIDGE AND POKER PLAYERS – SIMULATED EXPERIMENT

Variables	Bridge Players (1) (Means)	Poker Players (2) (Means)	Non parametric test* H_0: (Poker) = (Bridge) (P-value)	Parametric test T- test H_0: (Poker) = (Bridge) (P-value)
Male	74.2	93.21	159.60 (0.00)	13.10 (0.00)
Age	55.75	40.73	-25.11 (0.00)	-28.39 (0.00)

*For continuous variables (Age) we test - through nonparametric statistics - between-subject differences by using the Mann-Whitney test. For dichotomous variables (Male) we use the Chi square test to analyse the differences in proportions

TABLE IV. HYPOTHESIS TESTING (DIFFERENCES BETWEEN GROUPS) – SIMULATED EXPERIMENT

Variables	Bridge Players (1) (Means)	Poker Players (2) (Means)	Non parametric test* H_0: (1) = (2) (P-value)	Parametric test T- test H_0: (1) = (2) (P-value)
Trustor giving	47.63	41.00	-2.63 (0.008)	-4.00 (0.000)
Maximum contributors (%) (a)	30.98	20.01	-34.55 (0.000)	-5.92 (0.000)
Zero contributors (%) (b)	30.26	23.69	11.65 (0.000)	-3.44 (0.002)
Polarized (%) (a+b)	61.24	43.60	64.64 (0.000)	8.15 (0.000)
Risk aversion	4.838	4.01	4.13 (0.000)	-2.896 (0.002)
Dictator giving	18.82	21.31	3.95 (0.000)	1.83 (0.067)

*For (approximated) to continuous variables such as trustor giving we test - through nonparametric statistics – between subject differences by using the Mann-Whitney test. For dichotomous variables (all the other variables) we use the Chi square test to analyse the differences in proportions.

TABLE V.

TRUSTOR GIVING (ORDERED PROBIT ESTIMATE) – SIMULATED EXPERIMENT*

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.0162	0.139***	0.0230	0.0287	0.139***	0.136**	0.144***
	(0.0540)	(0.0528)	(0.0536)	(0.0601)	(0.0528)	(0.0573)	(0.0526)
30-40 age class	0.167*	0.149	0.168*	0.178*	0.141	0.141	0.146
	(0.0872)	(0.0942)	(0.0889)	(0.0931)	(0.0961)	(0.101)	(0.0962)
40-50 age class	0.259***	0.208***	0.262***	0.279***	0.202***	0.215***	0.198***
	(0.0671)	(0.0655)	(0.0654)	(0.0674)	(0.0654)	(0.0684)	(0.0643)
50-60 age class	0.221***	0.0894	0.225***	0.231***	0.0869	0.0801	0.0809
	(0.0718)	(0.0778)	(0.0714)	(0.0735)	(0.0776)	(0.0824)	(0.0782)
60-70 age class	0.181*	0.0533	0.179*	0.174*	0.0500	0.0389	0.0417
	(0.0926)	(0.0903)	(0.0938)	(0.0949)	(0.0921)	(0.0933)	(0.0902)
70-80 age class	-0.0421	-0.274*	-0.0429	-0.0523	-0.264*	-0.279*	-0.277*
	(0.135)	(0.149)	(0.135)	(0.136)	(0.149)	(0.150)	(0.151)
Above 80 age class	0.0533	-0.103	0.0580	-0.0174	-0.102	-0.135	-0.129
	(0.400)	(0.275)	(0.401)	(0.441)	(0.264)	(0.296)	(0.266)
Bridge	0.108**	0.265***	0.122**	0.130**	0.269***	0.269***	0.261***
	(0.0546)	(0.0512)	(0.0567)	(0.0583)	(0.0523)	(0.0550)	(0.0511)
Early response			-0.0419	-0.0323	0.0180	0.0234	0.0197
			(0.0407)	(0.0431)	(0.0453)	(0.0480)	(0.0450)
Risk aversion					-0.0147	-0.0173	-0.0152
					(0.0140)	(0.0142)	(0.0143)
Dictator giving					0.0185***	0.0189***	0.0184***
					(0.000956)	(0.00106)	(0.000944)
Above Intermediate Education							0.00160
							(0.00174)
Donations							0.00423
							(0.00424)
Social cooperatives							0.00223**
							(0.000938)
Province dummies	NO	NO	NO	YES	NO	YES	NO
Region dummies	NO	NO	YES	NO	YES	NO	NO
Observations	2,238	2,238	2,238	2,238	2,238	2,238	2,231

*Intercept cut coefficients and standard errors are omitted for reasons of space and available upon request

TABLE VI.

THE DETERMINANTS OF THE MAXIMUM TRUSTOR GIVING CHOICE

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.0589***	0.0630***	0.0691***	0.0877***	0.0889***	0.0935***	0.0894***
	(0.0217)	(0.0204)	(0.0215)	(0.0189)	(0.0178)	(0.0182)	(0.0180)
30-40 age class	0.104**	0.0995**	0.111**	0.0903**	0.0842**	0.0944**	0.0899**
	(0.0406)	(0.0403)	(0.0448)	(0.0434)	(0.0425)	(0.0476)	(0.0443)
40-50 age class	0.118***	0.113***	0.131***	0.0912***	0.0838**	0.103***	0.0900***
	(0.0356)	(0.0343)	(0.0382)	(0.0346)	(0.0335)	(0.0374)	(0.0345)
50-60 age class	0.127***	0.119***	0.129***	0.0757**	0.0678*	0.0724*	0.0731*
	(0.0347)	(0.0342)	(0.0378)	(0.0369)	(0.0366)	(0.0401)	(0.0377)
60-70 age class	0.102**	0.0894**	0.0949**	0.0523	0.0406	0.0428	0.0460
	(0.0408)	(0.0395)	(0.0426)	(0.0401)	(0.0391)	(0.0418)	(0.0396)
70-80 age class	0.0399	0.0311	0.0206	-0.0270	-0.0299	-0.0400	-0.0304
	(0.0478)	(0.0459)	(0.0480)	(0.0519)	(0.0500)	(0.0505)	(0.0512)
Above 80 age class	0.0471	0.0456	-0.0313	-0.0128	-0.0171	-0.0631	-0.0210
	(0.134)	(0.131)	(0.103)	(0.0829)	(0.0802)	(0.0679)	(0.0781)
Bridge	0.110***	0.117***	0.124***	0.154***	0.158***	0.164***	0.155***
	(0.0201)	(0.0211)	(0.0235)	(0.0191)	(0.0195)	(0.0218)	(0.0195)
Early response		-0.0277	-0.0285		-0.0127	-0.0147	-0.0128
		(0.0183)	(0.0199)		(0.0187)	(0.0204)	(0.0189)
Risk aversion				-0.000242	3.65e-05	-0.00166	-0.000104
				(0.00538)	(0.00509)	(0.00527)	(0.00538)
Dictator giving				0.00404***	0.00399***	0.00419***	0.00403***
				(0.000281)	(0.000293)	(0.000329)	(0.000288)
Above Intermediate Education							0.00189**
							(0.000891)
Donations							0.00274
							(0.00194)
Social cooperatives							0.00111**
							(0.000432)
Province dummies	NO	NO	NO	YES	NO	YES	NO
Region dummies	NO	NO	YES	NO	YES	NO	NO
Constant	-1.312	-6.966	-7.026	-1.701	-7.459	-7.492	-2.187
	(0.12)	(0.23)	(0.16)	(0.16)	(0.17)	(0.18)	(0.29)
Observations	2,238	2,238	2,166	2,238	2,238	2,166	2,231
Pseudo_R-squared	0.0218	0.0307	0.0541	0.1108	0.1192	0.1455	0.1133
Log pseudolikelihood	-1209.70	-1198.71	-1150.57	-1099.57	-1089.27	-1039.33	-1094.81

Notes: Dependent variable is 1 if transfer=100 or zero otherwise .

Variable legend: see Table I. Standard errors in parentheses are clustered at province level . *** p<0.01, ** p<0.05, * p<0.1. Age class: the omitted benchmark is the age class below 30.

TABLE VII.

THE DETERMINANTS OF THE TRUSTOR POLARIZED CHOICES – SIMULATED EXPERIMENT

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.135***	0.140***	0.149***	0.134***	0.139***	0.148***	0.134***
	(0.0282)	(0.0275)	(0.0283)	(0.0282)	(0.0276)	(0.0282)	(0.0275)
30-40 age class	0.0701*	0.0639*	0.0678*	0.0706*	0.0647*	0.0685*	0.0674*
	(0.0384)	(0.0387)	(0.0412)	(0.0388)	(0.0391)	(0.0416)	(0.0387)
40-50 age class	0.0561*	0.0476	0.0554	0.0556*	0.0473	0.0548	0.0544*
	(0.0326)	(0.0325)	(0.0346)	(0.0329)	(0.0329)	(0.0351)	(0.0331)
50-60 age class	0.0742**	0.0610*	0.0655*	0.0762**	0.0631*	0.0673*	0.0729**
	(0.0343)	(0.0341)	(0.0374)	(0.0342)	(0.0341)	(0.0372)	(0.0349)
60-70 age class	0.0524	0.0409	0.0446	0.0533	0.0418	0.0452	0.0461
	(0.0393)	(0.0392)	(0.0419)	(0.0402)	(0.0401)	(0.0427)	(0.0403)
70-80 age class	0.0548	0.0472	0.0357	0.0572	0.0492	0.0370	0.0518
	(0.0701)	(0.0697)	(0.0735)	(0.0714)	(0.0712)	(0.0749)	(0.0718)
Above 80 age class	0.0364	0.0264	-0.0499	0.0335	0.0234	-0.0549	0.0282
	(0.156)	(0.162)	(0.165)	(0.153)	(0.159)	(0.162)	(0.158)
Bridge	0.192***	0.193***	0.196***	0.189***	0.190***	0.194***	0.187***
	(0.0257)	(0.0269)	(0.0293)	(0.0260)	(0.0272)	(0.0294)	(0.0268)
Early response		-0.0191	-0.0209		-0.0207	-0.0222	-0.0235
		(0.0234)	(0.0245)		(0.0231)	(0.0241)	(0.0230)
Risk aversion				0.00582	0.00593	0.00555	0.00588
				(0.00550)	(0.00536)	(0.00558)	(0.00552)
Dictator giving				-0.000290	-0.000290	-0.000231	-0.000303
				(0.000377)	(0.000370)	(0.000390)	(0.000372)
Above Intermediate Education							0.000954
							(0.00104)
Donations							0.00284
							(0.00208)
Social cooperatives							0.000639
							(0.000531)
Province dummies	NO	NO	YES	NO	NO	YES	NO
Region dummies	NO	YES	NO	NO	YES	NO	NO
Observations	2,238	2,238	2,214	2,238	2,238	2,214	2,231
Pseudo_R-squared	0.0218	0.0307	0.0541	0.1108	0.1192	0.1455	0.1133
Log pseudolikelihood	-1209.70	-1198.71	-1150.57	-1099.57	-1089.27	-1039.33	-1094.81

Notes: Dependent variable is 1 if transfer=100 or zero otherwise .

Variable legend: see Table I. Standard errors in parentheses are clustered at province level . *** p<0.01, ** p<0.05, * p<0.1. Age class: the omitted benchmark is the age class below 30.

TABLE VIII.

SENSITIVITY OF THE *POLARIZED* EFFECT TO DEPARTURES FROM THE CIA ASSUMPTION – SIMULATED EXPERIMENT

Assumptions	p_{11}	p_{10}	p_{01}	p_{00}	$p_{1.}$	$p_{0.}$	S	d_0	d_1	Bias %	ATE	Selection effect (Odds)	Outcome Effect (Odds)	WSE
Confounders calibrated on observables														
Male	0.79	0.75	0.95	0.93	0.77	0.94	-0.17	0.04	0.02	-0.0857	0.19	0.226	1.505	0.025
Ageabmedian	0.82	0.82	0.41	0.32	0.82	0.36	0.46	0	0.09	0.2514	0.131	8.22	1.484	0.028
Early response	0.7	0.66	0.5	0.56	0.68	0.53	0.15	0.04	-0.06	-0.0514	0.184	1.906	0.793	0.022
Killer confounders														
Killer confounders	0.6	0.5	0.5	0.2	0.56	0.33	0.23	0.1	0.3	0.434	0.099	2.589	4.016	0.024
	0.7	0.5	0.5	0.2	0.62	0.33	0.29	0.2	0.3	0.549	0.079	3.344	4.023	0.025
	0.8	0.5	0.5	0.2	0.68	0.33	0.35	0.3	0.3	0.669	0.058	4.408	4.026	0.026
	0.6	0.4	0.5	0.2	0.52	0.33	0.19	0.2	0.3	0.366	0.111	2.221	4.056	0.024
	0.7	0.4	0.5	0.2	0.58	0.33	0.25	0.3	0.3	0.480	0.091	2.86	4.031	0.025
	0.8	0.4	0.5	0.2	0.64	0.33	0.31	0.4	0.3	0.600	0.07	3.692	4.045	0.026
	0.6	0.3	0.5	0.2	0.48	0.33	0.15	0.3	0.3	0.291	0.124	1.902	4.026	0.023
	0.7	0.3	0.5	0.2	0.54	0.33	0.21	0.4	0.3	0.406	0.104	2.426	4.043	0.024
	0.8	0.3	0.5	0.2	0.61	0.33	0.28	0.5	0.3	0.057	0.165	3.133	4.054	0.025
	0.6	0.2	0.5	0.2	0.44	0.33	0.11	0.4	0.3	0.217	0.137	1.625	4.044	0.023
	0.7	0.2	0.5	0.2	0.51	0.33	0.18	0.5	0.3	0.331	0.117	2.077	4.014	0.023
	0.8	0.2	0.5	0.2	0.57	0.33	0.24	0.6	0.3	0.446	0.097	2.653	4.046	0.024
	0.6	0.5	0.5	0.5	0.56	0.50	0.06	0.1	0.0	0.000	0.175	1.284	1.000	0.022
	0.7	0.5	0.5	0.5	0.62	0.50	0.12	0.2	0.0	0.000	0.175	1.656	1.004	0.022
	0.8	0.5	0.5	0.5	0.68	0.50	0.18	0.3	0.0	0.000	0.175	2.172	1.012	0.023
	0.6	0.5	0.5	0.4	0.56	0.44	0.12	0.1	0.1	0.063	0.164	1.612	1.503	0.022
	0.7	0.5	0.5	0.4	0.62	0.44	0.18	0.2	0.1	0.097	0.158	2.079	1.508	0.023
	0.8	0.5	0.5	0.4	0.68	0.44	0.24	0.3	0.1	0.137	0.151	2.733	1.516	0.023
	0.6	0.5	0.5	0.3	0.56	0.39	0.17	0.1	0.2	0.206	0.139	2.035	2.345	0.023
	0.7	0.5	0.5	0.3	0.62	0.39	0.23	0.2	0.2	0.274	0.127	2.618	2.340	0.024
	0.8	0.5	0.5	0.3	0.68	0.39	0.29	0.3	0.2	0.343	0.115	3.424	2.333	0.024

Note: Ageabmedian: dummy taking value 1 if age of the respondent is above sample median. Bias % = (ATE baseline-ATE)/ATE baseline - NB: Baseline ATE (no confounders) = 0.175 (WSE:.022, t-stat 8.01). $d_1 = p_{11} - p_{10}$ *(outcome effect of U for the treated);* $d_0 = p_{01} - p_{00}$ *(outcome effect of U for the controls);* $s = p_1 - p_0$ *(effect of U on the selection into treatment*

Selection effect (odds) $= \frac{\Pr(T=1|U=1,W)}{\Pr(T=0|U=1,W)} / \frac{\Pr(T=1|U=0,W)}{\Pr(T=0|U=0,W)}$; *Outcome effect (odds)* $= \frac{\Pr(Y=1|T=0,U=1,W)}{\Pr(Y=0|T=0,U=1,W)} / \frac{\Pr(Y=1|T=0,U=0,W)}{\Pr(Y=0|T=0,U=0,W)}$; *T and W being the treatment indicator and the observable set of covariates respectively.* WSE = "within-imputation standard errors". For further details see Ichino et al., (2008).

TABLE IX.

DESCRIPTIVE STATISTICS (OVERALL SAMPLE) - INCENTIVIZED EXPERIMENT

Variable	Obs	Mean	Std. Dev.	Min	Max
Trust game	150	5.433	3.701	0	10
Maximum contributors	150	0.307	0.463	0	1
Zero contributors	150	0.173	0.380	0	1
Polar	150	0.480	0.501	0	1
Male	300	0.703	0.458	0	1
Bridge experience (years)	150	25.213	11.764	2	50
Poker experience (years)	149	11.557	10.844	0	50
Age	299	49.455	14.068	18	79
Dictator giving	299	3.712	2.947	0	10
Risk aversion	299	3.983	2.208	1	6
Future discounting	289	10.329	4.274	1	17
Experience in poker for a bridge player (years)	21	26.285	14.926	3	50
Experience in bridge for a poker player (years)	13	6.15	5.800	1	16

TABLE X.

DESCRIPTIVE STATISTICS

Variables	Bridge Players (1) (Means)	Poker Players (2) (Means)	Non parametric test* H_0: (Poker) = (Bridge) (P-value)	Parametric test T-test H_0: (Poker) = (Bridge) (P-value)
Male (%)	53.30	87.33	41.55 (0.000)	6.921 (0.000)
Age	57.63	41.33	-10.229 (0.000)	-12.277 (0.000)
Game experience	25.21	11.56	-9.482 (0.000)	-10.434 (0.000)
Playing also the other game (%)	14.00	8.77	2.123 (0.145)	1.457 (0.146)

TABLE XI

Variables	Bridge Players (1) (Means)	Poker Players -(2) (Means)	Non parametric test* H0: (1) = (2) (P-value)	Parametric test T-test H0: (1) = (2) (P-value)
Trustor giving	5.560	5.306	0.1067 (0.7870)	-0.418 (0.6765)
Maximum contributors (%) (a)	34.66	26.66	1.1288 (0.2880)	-1.059 (0.2912)
Zero contributors (%)(b)	22.66	12.00	2.9777 (0.0840)	-1.731 (0.0855)
Polarized (%) (a+b)	57.33	38.66	5.235 (0.0220)	-2.313 (0.0221)
Risk aversion	3.993	3.973	-0.3650 (0.7150)	-0.078 (0.0937)
Dictator giving	3.664	3.760	0.1320 (0.8950)	0.280 (0.7797)

*For (approximated) to continuous variables such as Risk aversion, we test - through nonparametric statistics – between subject differences by using the Mann-Whitney test. For dichotomous variables (all the other variables) we use the Chi square test to analyse the differences in proportions.

TABLE XII. ECONOMETRIC FINDINGS – INCENTIVIZED EXPERIMENTS

VARIABLES	POLAR	ZERO C.	TEAM	TRUST	POLAR	ZERO C.	TEAM	TRUST	POLAR	ZERO C.	TEAM	TRUST
Male	0.153	-0.0384	0.179**	0.497*	0.149	-0.0340	0.173**	0.478*	0.0158	-0.0530	0.0704	0.377
	(0.1016)	(0.0434)	(0.0624)	(0.2141)	(0.1001)	(0.0401)	(0.0658)	(0.2266)	(0.0885)	(0.0420)	(0.0824)	(0.2184)
Below 30 age class	0.288*	-0.0456	0.186*	-0.106	0.294*	-0.0540	0.181*	-0.0602	0.522***	-0.0314	0.399*	-0.00773
	(0.1223)	(0.0595)	(0.0823)	(0.2462)	(0.1232)	(0.0561)	(0.0855)	(0.2524)	(0.0961)	(0.1043)	(0.1752)	(0.3748)
30-40 age class	0.134	-0.0979***	0.398***	0.946**	0.143	-0.102***	0.400***	1.004***	0.413**	-0.0942**	0.593***	1.067***
	(0.1426)	(0.0244)	(0.0918)	(0.2965)	(0.1448)	(0.0310)	(0.0922)	(0.2819)	(0.1356)	(0.0321)	(0.1036)	(0.2981)
40-50 age class	-0.0777	-0.279*	0.285***	0.942***	-0.0728	-0.297*	0.277***	0.984***	0.173	-0.262	0.502***	1.133***
	(0.1227)	(0.1093)	(0.0708)	(0.2066)	(0.1235)	(0.1352)	(0.0732)	(0.1982)	(0.1335)	(0.1342)	(0.0857)	(0.2149)
50-60 age class	0.0160	-0.121	0.119	0.313	0.0230	-0.134	0.120	0.368	0.204	-0.116	0.272*	0.471
	(0.1300)	(0.0723)	(0.0985)	(0.3325)	(0.1298)	(0.0907)	(0.0996)	(0.3395)	(0.1423)	(0.0843)	(0.1159)	(0.3388)
60-70 age class	-0.397**	-0.0992***	-0.169	0.246	-0.397**	-0.101***	-0.180	0.277	-0.456**	-0.103***	-0.149	0.508
	(0.1443)	(0.0280)	(0.1555)	(0.4851)	(0.1385)	(0.0295)	(0.1496)	(0.5036)	(0.1741)	(0.0286)	(0.1676)	(0.4427)
70-80 age class	-0.445***	-0.0725***		0.0394	-0.447***	-0.0721***		0.0379	-0.500***	-0.0757***		0.0716
	(0.0771)	(0.0117)		(0.3275)	(0.0745)	(0.0105)		(0.3423)	(0.0133)	(0.0116)		(0.3127)
Dictator giving	0.00764	-0.0341***	0.0586***	0.249***	0.00792	-0.0340***	0.0593***	0.250***	0.00915	-0.0335***	0.0621***	0.247***
	(0.0106)	(0.0086)	(0.0081)	(0.0455)	(0.0103)	(0.0092)	(0.0080)	(0.0440)	(0.0095)	(0.0075)	(0.0086)	(0.0409)
Bridge	0.563***	0.0170	0.555***	0.884***	0.573***	0.00779	0.578***	0.934***				
	(0.1125)	(0.0333)	(0.0990)	(0.2084)	(0.1242)	(0.0419)	(0.0907)	(0.1862)				
Risk aversion	-0.0416**	-0.00796	-0.0211*	-0.0111	-0.0415**	-0.00744	-0.0214*	-0.0116	-0.0456**	-0.00845	-0.0265**	-0.0131
	(0.0134)	(0.0050)	(0.0090)	(0.0281)	(0.0132)	(0.0052)	(0.0088)	(0.0285)	(0.0148)	(0.0053)	(0.0097)	(0.0296)
Province dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region dummy	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Both games played					-0.0797	0.0370	-0.139***	-0.333				
					(0.1622)	(0.1544)	(0.0398)	(0.4885)				
Bridge experience									0.0359***	0.00169	0.0222***	0.0190
									(0.0065)	(0.0024)	(0.0045)	(0.0121)
Poker experience									0.00907	0.00118	0.00275	0.00130
									(0.0050)	(0.0009)	(0.0041)	(0.0061)
Observations	112	108	104	148	112	108	104	148	112	108	104	148

Zero C.= Zero contributors. * p<0.05 ** p<0.01 *** p<0.001"

TABLE XIII.

SENSITIVITY OF THE *POLARIZED* EFFECT TO DEPARTURES FROM THE CIA ASSUMPTION ECONOMETRIC FINDINGS- INCENTIVIZED EXPERIMENTS

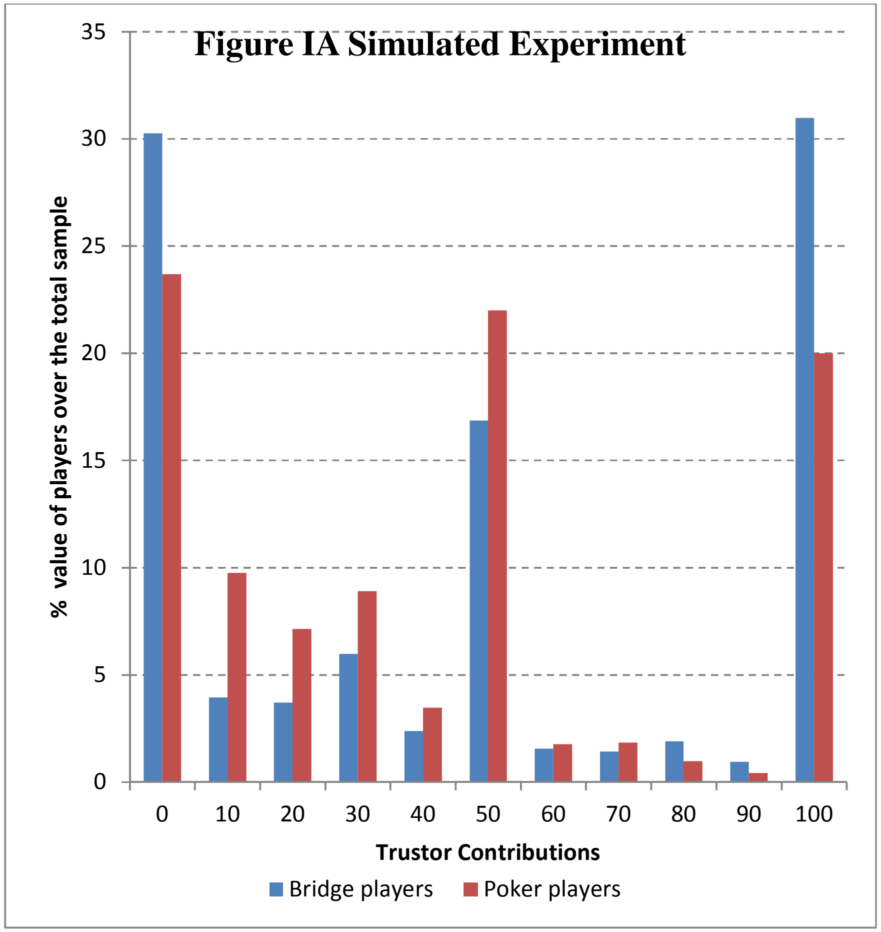
Assumptions	p_{11}	p_{10}	p_{01}	p_{00}	$p_{1.}$	$p_{0.}$	S	d_1	d_0	Bias %	ATE	Selection effect (Odds)	Outcome Effect (Odds)	WSE
							Confounders calibrated on observables							
Male	0.79	0.75	0.95	0.93	0.77	0.94	-0.17	0.04	0.02	-6.95	0.200	0.241	1.444	0.098
Ageabmedian	0.82	0.82	0.41	0.32	0.82	0.35	0.47	0.00	0.09	22.46	0.145	9.258	1.659	0.106
Early response	0.70	0.66	0.50	0.56	0.68	0.54	0.14	0.04	-0.06	-4.28	0.195	1.981	0.891	0.195
							Killer confounders							
	0.60	0.50	0.50	0.20	0.56	0.32	0.24	0.10	0.30	42.78	0.107	2.932	4.81	0.60
	0.70	0.50	0.50	0.20	0.61	0.31	0.3	0.20	0.30	51.34	0.091	3.666	4.755	0.70
	0.80	0.50	0.50	0.20	0.67	0.32	0.35	0.30	0.30	64.71	0.066	4.843	4.988	0.80
	0.60	0.40	0.50	0.20	0.51	0.32	0.19	0.20	0.30	35.29	0.121	2.449	5.010	0.60
	0.70	0.40	0.50	0.20	0.57	0.32	0.25	0.30	0.30	46.52	0.100	3.127	4.941	0.70
	0.80	0.40	0.50	0.20	0.63	0.32	0.31	0.40	0.30	56.68	0.081	3.966	4.967	0.80
	0.60	0.30	0.50	0.20	0.47	0.32	0.15	0.30	0.30	27.81	0.135	2.066	4.862	0.60
	0.70	0.30	0.50	0.20	0.53	0.32	0.21	0.40	0.30	38.50	0.115	2.568	4.947	0.70
	0.80	0.30	0.50	0.20	0.59	0.32	0.27	0.50	0.30	48.13	0.097	3.236	4.933	0.80
	0.60	0.20	0.50	0.20	0.43	0.32	0.11	0.40	0.30	20.32	0.149	1.741	4.967	0.60
Killer confounders	0.70	0.20	0.50	0.20	0.49	0.32	0.17	0.50	0.30	31.02	0.129	2.185	5.034	0.70
	0.80	0.20	0.50	0.20	0.54	0.32	0.22	0.60	0.30	41.18	0.110	2.735	5.036	0.80
	0.60	0.50	0.50	0.50	0.56	0.50	0.06	0.10	0.00	0.00	0.187	1.340	1.108	0.60
	0.70	0.50	0.50	0.50	0.61	0.50	0.11	0.20	0.00	0.53	0.186	1.704	1.131	0.70
	0.80	0.50	0.50	0.50	0.67	0.50	0.17	0.30	0.00	0.00	0.187	2.212	1.137	0.80
	0.60	0.50	0.50	0.40	0.56	0.44	0.12	0.10	0.10	6.42	0.175	1.703	1.711	0.60
	0.70	0.50	0.50	0.40	0.61	0.44	0.17	0.20	0.10	9.63	0.169	2.186	1.753	0.70
	0.80	0.50	0.50	0.40	0.67	0.44	0.23	0.30	0.10	12.83	0.163	2.795	1.731	0.80
	0.60	0.50	0.50	0.30	0.56	0.38	0.18	0.10	0.20	20.32	0.149	2.236	2.750	0.60
	0.70	0.50	0.50	0.30	0.61	0.38	0.23	0.20	0.20	26.74	0.137	2.859	2.706	0.70
	0.80	0.50	0.50	0.30	0.67	0.38	0.29	0.30	0.20	32.62	0.126	3.582	2.806	0.80

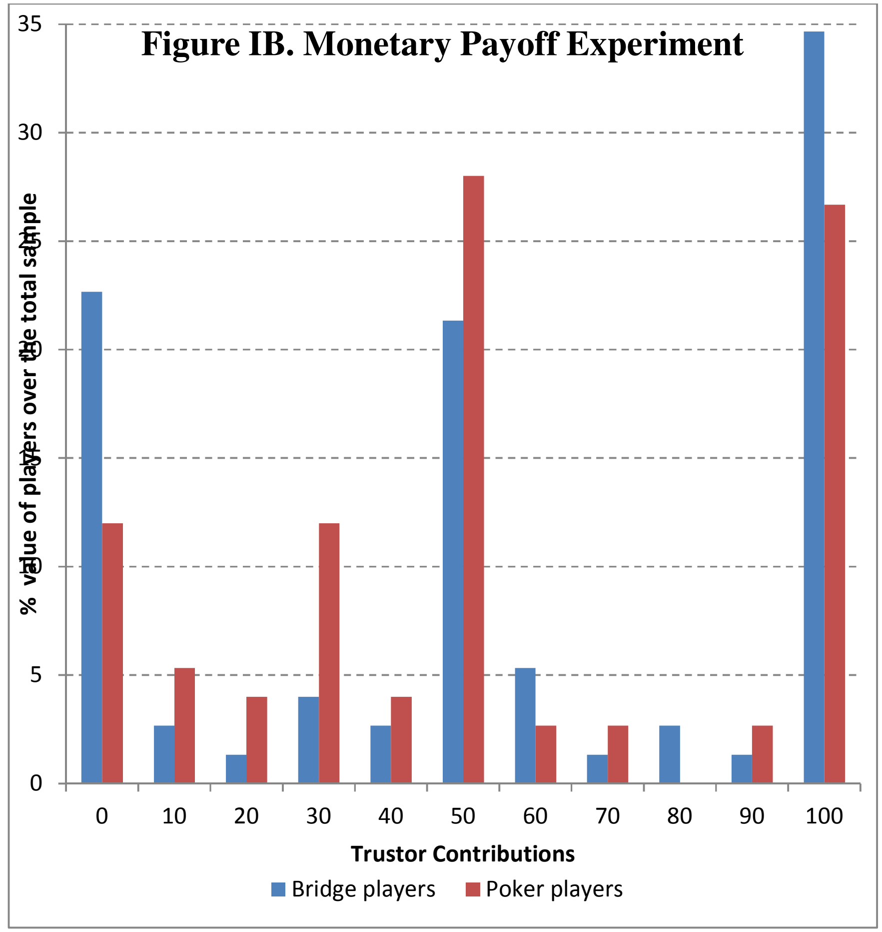
Note: Ageabmedian: dummy taking value 1 if age of the respondent is above sample median. Bias % = (ATE baseline-ATE)/ATE baseline - NB: Baseline ATE (no confounders) = 0. (WSE:.057, t-stat 3.272). $d_1 = p_{11} - p_{10}$ *(outcome effect of U for the treated);* $d_0 = p_{01} - p_{00}$ *(outcome effect of U for the controls);* $s = p_1 - p_0$ *(effect of U on the selection into treatment*

Selection effect (odds) = $\frac{Pr(T=1|U=1,W)}{Pr(T=0|U=1,W)} / \frac{Pr(T=1|U=0,W)}{Pr(T=0|U=0,W)}$ *effect (odds) =* $\frac{Pr(Y=1|T=0,U=1,W)}{Pr(Y=0|T=0,U=1,W)} / \frac{Pr(Y=1|T=0,U=0,W)}{Pr(Y=0|T=0,U=0,W)}$ *eing the treatment indicator and the observable set of covariates respectively.* WSE = "within-imputation standard errors". For further details see Ichino et al., (2008).

FIGURES IA-IB.

TRUSTOR GIVING FOR BRIDGE AND POKER PLAYERS





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