The Effects of Scarcity on Cheating and In-Group Favoritism*

Billur Aksoy† Marco A. Palma‡

November 11, 2018

Abstract

We study the impact of scarcity on cheating and in-group favoritism using a two-stage lab-in-the-field experiment with low-income coffee farmers in a small, isolated village in Guatemala. During the coffee harvesting months, farmers in this village experience a significant income boost from selling their coffee beans. However, during the non-harvesting months, they experience a substantial decline in income, inducing a pronounced state of scarcity, while other factors remain similar. Using this distinctive variance in income, we first conducted our experiment before the coffee harvest (*Scarcity* period). We then repeated the experiment—with the same group of subjects—during the harvest season (*Abundance* period). First, using the Fischbacher and Föllmi-Heusi (2013) die-roll paradigm, we find that subjects cheat at high levels in both periods when they are the beneficiaries of the cheating. Scarcity does not impact this cheating behavior. Secondly, using subjects' natural village identity, we find significant in-group favoritism for cheating in the Abundance period, which disappears during the Scarcity period. Finally, using a dictator game, we show that this finding holds when the cost of favoring an in-group member is monetary rather than moral.

Keywords: dishonesty, lab-in-the-field experiment, pro-social cheating, scarcity, social identity.

JEL Classifications: C93, D63, D64.

Funding: This project was funded by a grant from the College of Agriculture and Life Sciences, Texas A&M University. The funding source had no involvement in this study.

*We would like to thank Catherine Eckel, Michelle Segovia, Natalia Valdez, Taya Brown, Daniel Dubon, Juan Charuc, Wilson Ordoñez, Mario Turcios, Shawna Campbell, Agne Kajackaite, Joanna Lahey, and conference participants at the 2018 Texas Experimental Association Symposium, 2018 World ESA meeting in Berlin, SABE in London. Declarations of interest: none.

†Department of Economics, Texas A&M University. College Station, TX 77843. E-mail: billuraksoy@tamu.edu

‡Department of Agricultural Economics, Texas A&M University. College Station, TX 77843. E-mail: mapalma@tamu.edu

"Poverty is the parent of revolution and crime." Aristotle.

1 Introduction

Over 10% of the world's population lives under extreme poverty.[1] Even in developed countries, a significant proportion of the population suffers from scarcity of resources. For example, in the United States, 41.2 million people (12.3% of the population) were food insecure in 2016, meaning they did not have enough money or other resources to buy sufficient food to meet the needs of all their household members (Coleman-Jensen et al., 2017). In addition to obvious detrimental effects—such as poor nutrition intake and health—an emerging literature proposes that living under a prolonged state of scarcity impairs decision-making (Mani et al., 2013; Haushofer and Fehr, 2014; Shah et al., 2012; Mullainathan and Shafir, 2013). Individuals living in poverty engage in suboptimal behavior, such as excessive borrowing at high interest rates (Bertrand and Morse, 2011; Dobbie and Skiba, 2013), playing lotteries (Haisley et al., 2008a,b), bad management of personal finances and low saving rates (Barr, 2012). They are also less productive at work (Kim et al., 2006), more impatient (Lawrance, 1991; Carvalho, 2010), more risk averse (Gloede et al., 2015) and have lower self-control (Banerjee and Mullainathan, 2010; Spears, 2011; Bernheim et al., 2015).

There is a considerable amount of literature that connects poverty and crime, although causality has not been robustly established (Sharkey et al., 2016; Ellis and McDonald, 2001). Notorious criminals, from Al Capone to Pablo Escobar, use a lack of resources to justify initiating a lifetime of illegal activities. For decades, the economic environment has been recognized as a critical factor in criminal behavior (Sharkey et al., 2016). It should be noted, however, that recent literature suggests a potential genetic predisposition to antisocial behavior and crime (Raine, 2008, 2013; Joseph, 2001; van Gelder and de Vries, 2014; Mead et al., 2009). The question of whether criminal behavior is rooted in individual traits or influenced by scarcity is important to understand in order to reduce criminal behavior.

In general, economic models that study criminal behavior suggest that an individual commits a crime if the benefits outweigh the costs (i.e., potential punishments). In his seminal work, Gary Becker (1968) argues that those who engage in criminal behavior do so not because their motivations differ from those of noncriminals but because their benefits and costs differ. Although crime is more generally associated with violent felonies, the same economic rationale applies to other types of lesser misconduct, such as cheating.

Cheating has recently received a considerable amount of interest from economists. Using

[1] According to the World Bank, 766 million people live in extreme poverty with less than $1.90 per day. http://www.worldbank.org/en/publication/poverty-and-shared-prosperity

incentivized games, researchers have shown that people cheat far less than standard economic theoretical predictions (e.g., Gneezy, 2005; Mazar et al., 2008; Hurkens and Kartik, 2009; Sutter, 2009; Fischbacher and Föllmi-Heusi, 2013; Jiang, 2013).[2] In these games, subjects have the opportunity to increase their own monetary payoff by cheating. However, people do not cheat maximally and exhibit an aversion to lying (Dufwenberg and Gneezy, 2000; Charness and Dufwenberg, 2006; Mazar and Ariely, 2006; Lundquist et al., 2009; Battigalli et al., 2013; Erat, 2013). Many factors impact dishonesty, including self-image (e.g., Mazar et al. 2008), anonymity of decisions (Fischbacher and Föllmi-Heusi, 2013; Gneezy et al., 2018), size of the stakes and incentives (Fischbacher and Föllmi-Heusi, 2013; Kajackaite and Gneezy, 2017; Martinelli et al., 2018; Rahwan et al., 2018), and fairness (Houser et al., 2012). Furthermore, research shows that cheating behavior in the laboratory correlates with cheating behavior in the real world (Dai et al., 2018; Gächter and Schulz, 2016; Potters and Stoop, 2016).

In this paper, we study the extent to which scarcity—in the form of a substantial reduction in available resources—impacts cheating. We investigate this question by implementing a two-stage lab-in-the-field experiment with poor coffee farmers from a small and relatively closed community in Guatemala. Our participants derive their income almost exclusively from harvesting coffee beans. As such, a sharp decline in their income during non-harvesting months provides a natural variation in scarcity levels while other observables remain similar. We conducted our experiment in two stages by using this distinctive variance in income. The first stage took place before the coffee harvest started (*Scarcity* period). We then repeated the same experiments, with the same group of subjects, at the peak of the coffee harvest season (relative *Abundance* period).

We study differences in cheating behavior between the Scarcity and Abundance periods by using the die-roll game (Fischbacher and Föllmi-Heusi, 2013). Similar to the die-under-cup paradigm (Shalvi et al., 2011), we place a fair six-sided die in a cup with a closed lid. Subjects roll the six-sided die by shaking the cup and are asked to report the outcome to determine their earnings. The experiment is designed such that it is not possible to detect cheating behavior at the individual level; thus, no retribution can be pursued, and the full cost of cheating is exogenously borne by the experimenters. Thus, if individual characteristics are the main driving force behind cheating, there should be no change in the cheating behavior across periods. However, if the economic environment influences cheating behavior, then we expect higher levels of cheating during the Scarcity period.

Although standard economic theory suggests otherwise, people may also cheat to help

[2]See Rosenbaum et al. (2014); Abeler et al. (2016); Capraro (2017); Jacobsen et al. (2018) for a more comprehensive literature review.

others. A student taking an online exam or writing an essay in place of his/her friend, a person taking the blame for a minor traffic accident because his/her friend does not have insurance, a teenager lying to his/her friend's parents to help with his/her cover up story could be examples of such behavior. The motives behind this kind of dishonesty may be due to generosity or could be driven by past or expected reciprocity. In this paper, we also study the impact of scarcity on cheating for others by using the same die-roll game. We ensure that reciprocity cannot be a driving force by keeping the identities of the beneficiaries anonymous.

According to the social identity theory (Tajfel and Turner, 1979), individuals place themselves and others into groups, such as female, Caucasian, American, economists, poor, and so on. People also show favoritism (i.e., bias or preferential treatment) toward others within their group. This is called in-group favoritism (or in-group bias). In-group favoritism has been studied in the psychology and economics literature mainly by using people's natural identities (e.g., Klor and Shayo 2010; Ockenfels and Werner 2014; Cadsby et al. 2016) or by experimentally inducing identities (i.e., minimal group paradigm) (e.g., Eckel and Grossman 2005; Buchan et al. 2006; Chen and Li 2009; Chen and Chen 2011; Harris et al. 2015). In this paper, we use the subjects' natural village identities to study how scarcity impacts in-group favoritism in terms of cheating.

Economic research on pro-social dishonesty is fairly new (Lewis et al., 2012; Gino et al., 2013; Okeke and Godlonton, 2014; Cadsby et al., 2016; Lupoli et al., 2017). Cadsby et al. (2016) ask whether people cheat for an in-group member at the expense of an out-group member and report significant cheating behavior. However, in-group favoritism in the absence of an externality to an out-group member has not been studied. In our study, the cost of favoring an in-group member is entirely borne by the experimenters. Furthermore, we compare in-group favoritism in cheating across Scarcity and Abundance periods.

The geographical location and sample population of the experiment were carefully selected. First, the residents of the village derive most of their yearly income from seasonal coffee harvest. This ensures that participants experience a financially worse situation in Scarcity relative to the Abundance period. Second, coffee is a perennial crop continuously harvested and sold weekly or biweekly. As such, the coffee harvest provides steady income during the harvest season. Finally, the village is relatively isolated. With limited transportation options, participants' mobility for the purposes of procuring outside income is impaired. All of these factors ensure that available resources are indeed scarce during the Scarcity period relative to the Abundance period. Meanwhile, other factors such as stress level, number of recent celebratory events attended, interactions with others outside of the village, level of physical activity, and so on remain similar. We confirm this by comparing survey measures across the two periods.

We contribute to the literature by studying how scarcity impacts dishonesty and in-group favoritism in terms of cheating using a lab-in-the-field experiment; to the best of our knowledge, we are the first to study these questions.[3] Our results show that subjects cheat the most for themselves and that this cheating behavior is not impacted by scarcity. We find that subjects also cheat for the in-group member (although less) and that this cheating is also not impacted by scarcity. Subjects do not cheat for the out-group member in the Abundance period. Thus, we find in-group favoritism in terms of cheating in the Abundance period.

However, in-group favoritism disappears in the Scarcity period. Although scarcity does not impact the cheating behavior for oneself and for the in-group member, it significantly increases cheating for the out-group member. In the Scarcity period, subjects cheat for the out-group member just as much as they do for the in-group member.

We also contribute to the literature by studying the impact of scarcity on in-group favoritism in terms of generosity. In our cheating game, the cost of favoring an in-group member is purely moral. We also investigate the effects of scarcity on in-group favoritism when the cost of the preferential treatment is monetary. We do this by using a dictator game where the recipient is either an in-group member or an out-group member. In line with recent research (e.g., Ben-Ner et al. 2009; Whitt and Wilson 2007; Chen and Li 2009; Chen and Chen 2011; Balliet et al. 2014), we also find in-group favoritism, but only in the Abundance period. While subjects send significantly more money to the in-group member in the Abundance period, the difference vanishes during the Scarcity period. In the Scarcity period, subjects are significantly more generous towards the out-group member which abolishes the in-group favoritism.

Earlier papers studying the correlation between scarcity and other-regarding preferences have mixed findings (e.g., Piff et al. 2010; Haushofer and Fehr 2014; Andreoni et al. 2017). Bartos (2016) exploits a shock in income similar to ours during an agricultural harvest season, and he finds that the amount sent to an in-group member in a dictator game remained unchanged during scarcity and abundance periods. This is in line with our findings. We contribute to the literature by studying the *causal* impact of scarcity on other-regarding preferences as well as in-group favoritism.

The rest of the paper is organized as follows. Section 2 first presents the selection and recruitment procedures, then the details of the experimental design. Section 3 presents the results. We conclude with a short discussion in Section 4.

[3]While we were in the process of writing this paper, we became aware of a working paper, Boonmanunt et al. (2018), that studies poverty, social norms, and cheating. Their experiments were conducted around the same time as ours; however, they focus on the impact of social norms on cheating and how this changes due to poverty.

2 Experimental Design and Procedures

2.1 Selection of Participants and Recruitment Procedure

The experiment was conducted in a small and relatively isolated village in Guatemala. The village is home to about 190 families whose main source of income is derived from harvesting coffee beans. Coffee is a perennial crop that is continuously harvested and sold during a period of five to six months (depending on the amount of rain and general climate conditions). In this part of Guatemala, harvesting normally occurs between late September and early March. A few studies have used agricultural harvest to separate scarce and abundant periods (e.g., Bartos 2016; Mani et al. 2013; Boonmanunt et al. 2018). However, they use annual crops (such as sugar cane and rice), which means there is a one-time harvest and a single lump sum payment. In our case, our subjects sell their coffee beans to their local cooperative and receive steady weekly or bi-weekly payments during the five to six months long harvest season.

The selection of coffee farmers in this isolated community is crucial for identification purposes. During the non-harvesting months, participants live mainly on accumulated savings made during the harvest season. During this time, they also work on subsistence crops planted for self-consumption and the maintenance of the coffee plants such as pruning, weeding, and fertilizing. This is mostly a self-sustaining community. The closest settlement is about 45 minutes away by car. However, villagers have limited transportation options since most of them do not own motor vehicles. Thus, their mobility for the purposes of procuring outside income is severely impaired. About 95% of our subjects derive the majority of their income from harvesting coffee, and their interaction with people outside of their village is fairly constant across harvesting and non-harvesting months. All of these factors provide an ideal environment to study our research questions.

We employed five local assistants from the vicinity of the community to help recruit participants to our study. During the recruiting process, the assistants informed potential participants that the study consisted of economic decision-making and that they would be compensated with 20Q (Quetzales, about $3) for their participation. Prospective participants were also informed that they would have the opportunity to earn more money based on their decisions, the decisions of others, and luck. However, they were not provided with any details about the experimental procedures. Although Spanish is the most commonly used language in Guatemala, people in the rural areas also speak other languages such as K'iche' and Kaqchiquel. Thus, we instructed our study assistants to only recruit people who could understand and speak Spanish. The assistants were also instructed to recruit people who were at least numerate.

Our decision sheets, script, and experimental procedures were prepared so that people with low education levels could understand all parts of the experiment. Our decision sheets included visual illustrations and were prepared based on de Oliveira et al. (2012, 2016).[4] We used large, poster-size laminated copies of each page in the booklets. While one of the experimenters was reading the instructions from a script, an assistant illustrated examples and instructions on the large laminated copies using a dry erase-marker. This helped the participants become familiar with each page in the booklet and ensured that all participants understood how the game worked and where they were supposed to indicate their decisions. Other study assistants were trained regarding the experimental procedures and were available to go around and privately help participants with any questions.

The experiment was conducted in two stages using a lab-in-the-field framework. The first stage took place in mid-September 2017, before the coffee harvest season (*Scarcity* period). The second stage took place in early December 2017, during the harvest season (*Abundance* period). In both periods, subjects played a sequence of games in the same order.[5] Because of the limitations that we faced in the field, we did not control for the potential order effects. However, Abeler et al. (2016), in their meta analysis, show that playing the cheating game repeatedly does not significantly change the cheating behavior. Additionally, our main research interest is the comparison of scarcity and abundance periods. Thus, we do not think that order is an issue for this paper. In this paper, we only use the data collected from two games: cheating games and dictator games. Below, we provide the experimental design and details of each game.

2.2 Cheating Game

We used the Fischbacher and Föllmi-Heusi (2013) die-roll paradigm. In this game, subjects are provided with an opaque cup with a closed lid, containing a fair six-sided die (similar to the Shalvi et al. (2011) die-under-cup game). The cup is designed to ensure privacy. The only person who can see the die (and the number rolled) inside the cup is the person holding it. This process guarantees to participants that not even the experimenters would know the

[4]The decision sheets and the script used in the experiment (both Spanish and English translation) can be found in the online supplementary materials.

[5]This project is part of a larger study we conducted in the field. The same subjects played a sequence of games without feedback in the same order across all sessions in both periods. The games and the exact order is as follows: trust game with an in-group member (game 1), trust game with an out-group member (game 2), dictator game with an in-group member (game 3), dictator game with an out-group member (game 4), Eckel and Grossman (2002, 2008) risk elicitation task (game 5), time preference elicitation task (game 6), and finally three Fischbacher and Föllmi-Heusi (2013) cheating game treatments (games 7–9)(see Section 2.2. for details), and a survey. At the end of the experiment, one game out of the first six games was randomly chosen to be the paying game. The payment details for cheating games 7–9 are provided in Section 2.2.

actual number rolled. Subjects are instructed to shake the cup (thus roll the six-sided die) twice but to report only the outcome of the *first* shake. The number reported determines the payment for completing a survey. Table 1 reports the payment scheme used in this game.

We have a 3x2 within-subjects design: 1) Cheating for self (CheatingSelf), 2) Cheating for an in-group member (CheatingInGroup), and 3) Cheating for an out-group member (CheatingOutGroup) during 1) Abundance and 2) Scarcity periods. First, subjects played the cheating game for themselves (CheatingSelf), which determined their earnings for completing the survey at the end of the experiment. Then they played the same game for an anonymous person from the subject's own village (AP-InGroup), which is the CheatingInGroup treatment. Finally, they participated in the CheatingOutGroup treatment and played the same game for an anonymous person from outside of the village (AP-OutGroup). Thus, the only difference among these three treatments is the identity of the beneficiary. The cheating games were played at the end of the experiment and were used to determine the payments for completing the survey, similar to Fischbacher and Föllmi-Heusi (2013).

We used our subjects' naturally occurring village identity to study in-group favoritism. Prior to the experimental sessions, with the help of one of our local contacts, we randomly chose one person from the village to be the AP-InGroup. This person was discretely approached by one of the experimenters and asked to make decisions—not relevant to this paper—and to answer the same survey questions as the participants. The AP-InGroup was informed that it was very important for his/her identity to remain strictly confidential. Hence, he/she was instructed to avoid mentioning anything about our visit to anyone. We followed the same procedure with the AP-OutGroup.

The only information we provided to the subjects about the identity of the AP-InGroup (or AP-OutGroup) was that they were someone from their own village (or another village). The real identities of the AP-InGroup and AP-OutGroup remained unknown to the subjects. We opted to use an anonymous person as the out-group member mainly for the ease of implementation, since traveling across villages is cumbersome. Thus, it was not feasible to bring together subjects from different villages. We used the same procedure for an in-group member (i.e., AP-InGroup) in order to keep the procedure consistent across treatments and to prevent contamination from other potential effects. For example, if subjects knew the identity of the in-group member, then their behavior toward the in-group member might be biased in an unpredictable way based on their personal interaction, experience, and beliefs about this person.

Every participant was paid for their earnings in the CheatingSelf treatment. At the end of the experiment, one subject was randomly chosen, and his/her decision in the CheatingInGroup treatment determined the earnings for AP-InGroup. Similarly, another person was

randomly chosen to determine the payment of the AP-OutGroup.

2.3 Dictator Game

In the Dictator Game, there are two players: a dictator and a recipient. The dictator is given an endowment of 30Q (about $4.2) and asked to decide how much, if any, to send to the recipient. The recipient does not have any endowment.

We employ a 2x2 within-subjects design: 1) In-group recipient (InGroup) and 2) Out-group recipient (OutGroup) during 1) Abundance and 2) Scarcity periods. Subjects were always the dictators, and the only difference between the InGroup and OutGroup treatments is the identity of the recipient. In the InGroup (OutGroup) treatment, the recipient is the AP-InGroup (AP-OutGroup).

As previously mentioned (see footnote 5), subjects played a total of nine games (including two dictator games and three cheating games) and were paid for their decisions in the dictator game only if one of the two dictator games was randomly selected for payment. Thus, if the InGroup or OutGroup treatments were randomly chosen to be the paying game, subjects' earnings were calculated according to their decisions. Furthermore, we randomly chose one subject whose decisions determined the earnings for the AP-InGroup or AP-OutGroup depending on the randomly chosen game. The APs were paid for their total earnings after we finished all the sessions.

3 Results

A total of 109 low-income coffee farmers participated in our experiment.[6] Nearly all participants (95%) derive the majority of their income from harvesting coffee beans, with an average yearly income of 8,399 Quetzales (about 1,120USD). About 41% of participants are female. Additionally, 35% are 18–30 years old, 36% are 30–50 years, and the rest are older than 50. Finally, 28% have no formal education, while 63% hold either an elementary or a middle school diploma, and 9% hold a high school diploma.

In the results presented below, unless stated otherwise, the reported p-values are derived by either McNemar's χ^2 test (for binary variables) or Wilcoxon signed rank test (for non-binary variables).

[6] A total of 144 subjects participated in the first stage (Scarcity period). We exclude 3 subjects from the analysis since they either did not understand Spanish or slept during the experiment. Of the remaining 141 subjects, 109 also participated in the second stage (Abundance period). Table A1 in the appendix compares observables between the 109 subjects who participated in both stages and the 32 subjects who participated in the first stage only. We do not find a systematic difference between these two groups, which suggests that self-selection is not an issue.

3.1 Comparison of Scarcity and Abundance Periods

At the end of the experiment, subjects completed a survey. By comparing self-reported measures, we show that the main difference between the Scarcity and the Abundance periods is purely financial; other observables are fairly constant across the two periods. See Table A2 for the description of the survey measures, and Tables A3 and A4 for a more detailed comparison of these measures across periods. The survey questions are provided in the online supplementary materials.

We asked participants to indicate whether they had experienced lack of money for various needs in the preceding month. By using an index created with answers to these questions, we find that a significantly higher proportion of subjects experienced lack of money in the Scarcity period relative to the Abundance period (p-value = 0.004).[7] While participants reported similar financial conditions relative to others in the village (p-value = 1.000), they also indicated a worse state of finances (p-value = 0.000) in the Scarcity period. This means that our participants experienced harsher financial conditions in the Scarcity period. Additionally, they reported that everyone else in the village was also experiencing similar financial situations. On the other hand, the proportion of participants taking a credit/loan in the preceding six months is not significantly different (p-value = 0.134). (It is important to note that farmers' access to credit is limited.) Furthermore, there is no difference in the frequency of celebratory events attended/organized (p-value = 0.414), and subjects reported similar stress levels (p-value = 0.525) across the two periods. Finally, consistent with the findings of Carvalho et al. (2016), participants' risk preferences—measured by an incentivized gamble (Eckel and Grossman, 2002, 2008)—did not change across periods (p-value = 0.531).

In summary, these findings suggest that participants experienced more financial challenges and hardship during the Scarcity period. However, other observables did not significantly differ across the two periods.

3.2 Cheating Game Findings

Table 2 provides detailed information about the data collected in the cheating game treatments. Columns 4-9 report the frequency of each number reported across all treatments and periods.[8] A visual comparison of these distributions can be found on Figure A1 in the

[7] This index is created by summing the responses to four questions regarding lacking money in the preceding month for the following situations: food, basic expenses (non-food), medical expenses, and farm.

[8] We conducted a simulation analysis to assess the randomness of the sample with 109 subjects. The procedure randomly draws numbers between 1 and 6 (i.e., a virtual die roll) for 109 observations and tests whether the sample differs from a categorical random uniform distribution. When we repeated the procedure 1,000 times and with 109 subjects, we found that our sample size provides a statistically valid random uniform distribution (p-value = 0.046). The details of the simulation procedure are available in the appendix.

appendix. First, we compare the distribution of reported numbers in each treatment to a uniform distribution and report the p-values in the third column. Next, we compare the expected probability of each number occurring (16.7%) to the reported frequencies by using a one-sided binomial test. The resulting p-values are indicated with stars in each cell. Finally in the last column, we report the average number reported in each treatment and period.[9]

Additionally, similar to Wang et al. (2017), we also examine cheating behavior as the high-paying numbers (3, 4, and 5) being reported more often than the random occurrence of 50%. In other words, if the subjects are honest and report the observed outcome, then on expectation, the high payoffs should occur half of the time. Thus, reporting high payoffs more often than 50% represents the prevalence of cheating in order to increase earnings. Figure 1 shows the frequencies of high payoffs reported across all treatments and periods.

Result 1: In the Abundance period, subjects cheat for themselves and for the in-group member but not for the out-group member.

First, we compare the distribution of reported numbers in each treatment to a uniform distribution (see p-values in the third column of Table 2). Only the CheatingOutGroup treatment in the Abundance period is not significantly different from a uniform distribution. This means that the only treatment in which subjects did not cheat was the CheatingOutGroup treatment during the Abundance period.[10]

We also find supporting evidence for Result 1 when we compare the high payoffs reported across treatments. Figure 1 shows that, in the Abundance period, high payoffs are reported significantly more often than random chance would predict in both CheatingSelf (89%) and CheatingInGroup (73%) treatments (one-sided binomial probability test p-value is 0.000 for both). Moreover, the high payoffs are not reported significantly more than half of the time in CheatingOutGroup (53%) treatment (p-value = 0.2829).

Result 2: In the Abundance period, subjects exhibit in-group favoritism.

Comparing the average number reported across treatments (reported on the last column in Table 2), we find evidence of in-group favoritism in the Abundance period. The average number reported for the in-group member (3.39) is significantly higher than the one reported for the out-group member (2.72) (p-value = 0.0002).

This in-group favoritism is also evident in Figure 1. Subjects favor the in-group member in the Abundance period by reporting high payoffs significantly more often for the in-group

[9]The expected number reported is 2.5 since six is coded as zero.

[10]Although our research questions (thus the experimental design) are different, Cadsby et al. (2016) also found that people cheat not only for themselves but also cheat for an in-group member. However, it is important to note that Cadsby et al. (2016) conducted their study in a lab and did not investigate the role of scarcity. While their environment could be more analogous to our Abundance period, we need to be cautious about a one-to-one comparison of our findings to theirs (or those of other similar papers).

member (73%) than for the out-group member (53%) (p-value = 0.0005). Subjects behave more favorably toward an anonymous person from their own village relative to an anonymous person from another village. This finding in the Abundance period is in line with the social identity theory (Tajfel and Turner, 1979).

Result 3: Scarcity does not impact cheating for oneself or for the in-group member.

The average numbers reported for oneself and the in-group member are 4.15 and 3.39 in the Abundance period, and 4.07 and 3.27 in the Scarcity period respectively. The differences between the Scarcity and the Abundance periods are not significant for neither CheatingSelf (p-value = 0.5492) nor CheatingInGroup (p-value = 0.4641) treatments.

This can also be seen in Figure 1. Participants' cheating behavior for themselves is not statistically different across the two periods (89% vs. 85%) (p-value = 0.4142).[11] Additionally, we also find that cheating behavior for the in-group member is not different across the two periods (73% vs. 74%) (p-value = 0.8618). Although subjects cheat less for the in-group member than for themselves, this behavior is not different across periods, implying that scarcity does not affect participants' cheating behavior for themselves or for the in-group member.

Result 4: In-group favoritism fades in the Scarcity period.

In the Scarcity Period, the average numbers reported for the in-group member and the out-group member are 3.27 and 3.06 respectively and the difference is not statistically significant (p-value = 0.3899).

Figure 1 shows that, in the Scarcity period, participants cheat for the out-group member (68%) (i.e., the frequency of high-paying numbers being reported is significantly different than 50%, p-value = 0.000) as much as they do for the in-group member (74%) (the difference is not significant, p-value = 0.2623). Scarcity sweeps away in-group favoritism. In-group favoritism disappears not because cheating for the in-group member decreases but because subjects cheat for the out-group member at the same rate as they do for the in-group member. In other words, subjects cheat significantly more for the out-group member in the Scarcity (68%) compared to the Abundance period (53%) (p-value = 0.0061). These findings suggest that scarcity produces a general empathy toward out-group members. We further explore this issue in a dictator game context in the following section.

[11] This finding is line with Boonmanunt et al. (2018). In their experiment, when subjects were not reminded of social norms, their cheating behavior was not impacted by poverty.

3.3 Dictator Game Findings

In this section, we study the impact of scarcity on in-group favoritism using the dictator game described in Section 2.3.

Result 5: In the Abundance period, subjects are more generous toward the in-group member relative to the out-group member.

Figure 2 illustrates the average amount sent in the dictator game in each treatment across the Abundance and Scarcity periods. The amount sent to the in-group member (10.13Q) is significantly higher than the amount sent to the out-group member (6.85Q) during the Abundance period (p-value = 0.000). This is in line with the findings in the literature (e.g., Ben-Ner et al. 2009; Whitt and Wilson 2007; Chen and Li 2009; Chen and Chen 2011; Balliet et al. 2014). While the environment in these papers is more analogous to our Abundance period, we need to be cautious about a one-to-one comparison of our findings to others that did not study for scarcity.

Result 6: In-group favoritism fades in the Scarcity period. This change is driven by a significant increase in giving toward the out-group member.

There is no significant in-group bias in pro-social behavior during the Scarcity period. While subjects send about 10.52Q to the in-group member, they send 9.36Q to the out-group member, and the difference is not statistically significant (p-value = 0.1219). Scarcity eliminates the in-group bias in pro-social behavior.

Again, and similar to the results of the cheating game, in-group bias disappears due to an increase in giving to the out-group member rather than a decrease in giving to the in-group member. The amount sent to the out-group member during the Scarcity period (9.36Q) is statistically higher than the amount sent during the Abundance period (6.85Q) (p-value: 0.0069). Meanwhile, there is no difference in the amount sent to the in-group member between the Abundance and Scarcity periods (p-value = 0.5594). The latter finding is in line with Bartos (2016), who also looked at the impact of scarcity on giving behavior in the dictator game and found that scarcity does not impact giving. In his study, the recipient was someone from the same village as the participants. Thus, his findings can be compared to our InGroup treatment findings.

Table 3 presents the OLS regression results of the amount sent in the dictator game. We run the regressions separately for each period. The first two columns report Abundance period results while the last two report Scarcity period results. The dependent variable in all columns is the amount sent in the dictator game. The reference group is the InGroup treatment. Looking at the first column, we see that subjects sent about 3.3Q less to the out-group member compared to the in-group member in the Abundance period. This finding

holds even after we control for some observables. This result indicates that subjects show a clear in-group favoritism in the dictator game by sending significantly less to the out-group member. Furthermore, this in-group favoritism goes away in the Scarcity period. The coefficient for the OutGroup treatment is no longer significant. Thus, in the Scarcity period, we do not find a significant in-group favoritism in dictator giving.

4 Discussion and Conclusion

Previous literature documents that people living under precarious conditions of scarcity tend to make suboptimal economic and financial decisions. Motivated by this emerging literature, we study the impact of scarcity on moral and pro-social behavior. More specifically, we study whether an individual's propensity to cheat originates mostly in individual characteristics or in the surrounding economic environment (i.e., scarcity). In addition, we also study the impact of scarcity on in-group favoritism in cheating and pro-social behavior.

People engage in dishonest behavior in various forms. In this paper, we focus on two types of cheating behavior. The first type results in a personal gain. While the plausible moral cost is borne by the individuals, the monetary cost is entirely assumed by the experimenters. Although this type of cheating does not create a negative externality on another subject, technically it cannot be considered a Pareto improvement since the increase in earnings is compensated by the experimenters from their research budgets. This is relevant in many economic settings. For example, people often misreport their income in order to pay lower taxes (Kettle et al., 2017), business executives misuse corporate accounts and make unnecessary charges (Litzky et al., 2006). In most of these cases, the monetary cost of cheating may not be salient to the individuals since the dishonesty hurts a large corporation or institution rather than another individual (Smigel, 1956).

The second type of cheating studied in this paper is pro-social cheating. Subjects have the opportunity to cheat to increase the payoff of another person—either an in-group or an out-group member—with neither monetary costs nor benefits to the decision maker. In this case, the cheating decision is made by comparing the utility coming from the pro-social act of increasing someone's earnings and the disutility coming from the moral cost of cheating.

Using a lab-in-the-field experiment, we study these two types of cheating behavior across periods of Scarcity and Abundance. A significant increase in our subjects' income during the Abundance period allows us to study the role of scarcity on cheating and pro-social behavior. In order to control for other potential factors changing across Scarcity and Abundance periods, we carefully selected a rural community located in Guatemala that experiences similar conditions across the two periods in terms of stress, risk, and physical activity levels.

We find that scarcity does not affect participants' cheating behavior for themselves. Contrary to Aristotle's quote at the beginning of the paper, our findings suggest that cheating in an effort to increase the participant's own well-being is not impacted by the economic environment. However, we also find that people cheat for others even though they do not directly benefit from it. While people cheat more for the in-group member relative to the out-group member during the Abundance period, this in-group favoritism in cheating vanishes during the Scarcity period. In fact, subjects do not cheat at all for the out-group member during the Abundance period, but they cheat for the out-group member during scarcity.

We also use a dictator game to study in-group favoritism in pro-social behavior. This allows us to study the impact of scarcity on in-group favoritism when the cost of this preferential treatment is monetary rather than moral. We find a similar pattern of behavior. While subjects send significantly more to the in-group member during the Abundance period, this gap is no longer statistically significant in the Scarcity period. Furthermore, the in-group favoritism in pro-social behavior is swept away by an increase in giving to the out-group member rather than a reduction in giving to the in-group member. Looking at the findings from both experimental games, we conclude that scarcity eliminates in-group bias in terms of pro-social and moral behavior.

One limitation of our study is that we do not study the mechanism behind these results. One potential explanation for our findings could be that scarcity may change and shift people's social identities. Future research can study how scarcity may impact social identity.

References

Abeler, J., D. Nosenzo, and C. Raymond (2016). Preferences for truth-telling.

Andreoni, J., N. Nikiforakis, and J. Stoop (2017). Are the rich more selfish than the poor, or do they just have more money? a natural field experiment. Technical report, National Bureau of Economic Research.

Balliet, D., J. Wu, and C. K. W. De Dreu (2014). Ingroup favoritism in cooperation: A meta-analysis. *Psychological Bulletin 140*(6), 1556–1581.

Banerjee, A. and S. Mullainathan (2010). The shape of temptation: Implications for the economic lives of the poor. Report, National Bureau of Economic Research.

Barr, M. S. (2012). *No slack: The financial lives of low-income Americans*. Brookings Institution Press.

Bartos, V. (2016). Seasonal scarcity and sharing norms. *Working Paper*.

Battigalli, P., G. Charness, and M. Dufwenberg (2013). Deception: The role of guilt. *Journal of Economic Behavior & Organization 93*, 227–232.

Becker, G. S. (1968). Crime and punishment: An economic approach. *Journal of Political Economy 76*(2), 169–217.

Ben-Ner, A., B. P. McCall, M. Stephane, and H. Wang (2009). Identity and in-group/out-group differentiation in work and giving behaviors: Experimental evidence. *Journal of Economic Behavior & Organization 72*(1), 153–170.

Bernheim, B. D., D. Ray, and S. Yeltekin (2015). Poverty and self-control. *Econometrica 83*(5), 1877–1911.

Bertrand, M. and A. Morse (2011). Information disclosure, cognitive biases, and payday borrowing. *The Journal of Finance 66*(6), 1865–1893.

Boonmanunt, S., A. Kajackaite, and S. Meier (2018). Poverty negates the impact of social norms on cheating. *Working Paper*.

Buchan, N. R., E. J. Johnson, and R. T. A. Croson (2006). Let's get personal: An international examination of the influence of communication, culture and social distance on other regarding preferences. *Journal of Economic Behavior & Organization 60*(3), 373–398.

Cadsby, C. B., N. Du, and F. Song (2016). In-group favoritism and moral decision-making. *Journal of Economic Behavior & Organization 128*, 59–71.

Capraro, V. (2017). Does the truth come naturally? time pressure increases honesty in one-shot deception games. *Economics Letters 158*, 54–57.

Carvalho, L. S. (2010). Poverty and time preference. *RAND Working Paper Series WR 759*.

Carvalho, L. S., S. Meier, and S. W. Wang (2016). Poverty and economic decision-making: Evidence from changes in financial resources at payday. *American Economic Review 106*(2), 260–84.

Charness, G. and M. Dufwenberg (2006). Promises and partnership. *Econometrica 74*(6), 1579–1601.

Chen, R. and Y. Chen (2011). The potential of social identity for equilibrium selection. *American Economic Review 101*(6), 2562–89.

Chen, Y. and S. X. Li (2009). Group identity and social preferences. *American Economic Review 99*(1), 431–57.

Coleman-Jensen, A., C. Gregory, and A. Singh (2017). Household food security in the united states in 2016. *Economic Research Service Report 237*.

Dai, Z., F. Galeotti, and M. C. Villeval (2018). Cheating in the lab predicts fraud in the field: An experiment in public transportation. *Management Science 64*(3), 1081–1100.

de Oliveira, A. C. M., C. Eckel, and R. T. A. Croson (2012). The stability of social preferences in a low-income neighborhood. *Southern Economic Journal 79*(1), 15–45.

de Oliveira, A. C. M., T. C. M. Leonard, K. Shuval, C. S. Skinner, C. Eckel, and J. C. Murdoch (2016). Economic preferences and obesity among a low-income african american

community. *Journal of Economic Behavior & Organization 131*, 196–208.

Dobbie, W. and P. M. Skiba (2013). Information asymmetries in consumer credit markets: Evidence from payday lending. *American Economic Journal: Applied Economics 5*(4), 256–82.

Dufwenberg, M. and U. Gneezy (2000). Measuring beliefs in an experimental lost wallet game. *Games and Economic Behavior 30*(2), 163–182.

Eckel, C. C. and P. J. Grossman (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and Human Behavior 23*(4), 281–295.

Eckel, C. C. and P. J. Grossman (2005). Managing diversity by creating team identity. *Journal of Economic Behavior & Organization 58*(3), 371–392.

Eckel, C. C. and P. J. Grossman (2008). Forecasting risk attitudes: An experimental study using actual and forecast gamble choices. *Journal of Economic Behavior & Organization 68*(1), 1–17.

Ellis, L. and J. N. McDonald (2001). Crime, delinquency, and social status. *Journal of Offender Rehabilitation 32*(3), 23–52.

Erat, S. (2013). Avoiding lying: The case of delegated deception. *Journal of Economic Behavior & Organization 93*, 273–278.

Fischbacher, U. and F. Föllmi-Heusi (2013). Lies in disguise—an experimental study on cheating. *Journal of the European Economic Association 11*(3), 525–547.

Gächter, S. and J. F. Schulz (2016). Intrinsic honesty and the prevalence of rule violations across societies. *Nature 531*, 496.

Gino, F., S. Ayal, and D. Ariely (2013). Self-serving altruism? the lure of unethical actions that benefit others. *Journal of Economic Behavior & Organization 93*, 285–292.

Gloede, O., L. Menkhoff, and H. Waibel (2015). Shocks, individual risk attitude, and vulnerability to poverty among rural households in thailand and vietnam. *World Development 71*, 54–78.

Gneezy, U. (2005). Deception: The role of consequences. *American Economic Review 95*(1), 384–394.

Gneezy, U., A. Kajackaite, and J. Sobel (2018). Lying aversion and the size of the lie. *American Economic Review 108*(2), 419–53.

Haisley, E., R. Mostafa, and G. Loewenstein (2008a). Myopic risk-seeking: The impact of narrow decision bracketing on lottery play. *Journal of Risk and Uncertainty 37*(1), 57–75.

Haisley, E., R. Mostafa, and G. Loewenstein (2008b). Subjective relative income and lottery ticket purchases. *Journal of Behavioral Decision Making 21*(3), 283–295.

Harris, D., B. Herrmann, A. Kontoleon, and J. Newton (2015). Is it a norm to favour your own group? *Experimental Economics 18*(3), 491–521.

Haushofer, J. and E. Fehr (2014). On the psychology of poverty. *Science 344*(6186), 862–867.

Houser, D., S. Vetter, and J. Winter (2012). Fairness and cheating. *European Economic Review 56*(8), 1645–1655.

Hurkens, S. and N. Kartik (2009). Would I lie to you? On social preferences and lying aversion. *Experimental Economics 12*(2), 180–192.

Jacobsen, C., T. R. Fosgaard, and D. Pascual-Ezama (2018). Why do we lie? a practical guide to the dishonesty literature. *Journal of Economic Surveys 32*(2), 357–387.

Jiang, T. (2013). Cheating in mind games: The subtlety of rules matters. *Journal of Economic Behavior & Organization 93*, 328–336.

Joseph, J. (2001). Is crime in the genes? a critical review of twin and adoption studies of criminality and antisocial behavior. *The Journal of Mind and Behavior 22*(2), 179–218.

Kajackaite, A. and U. Gneezy (2017). Incentives and cheating. *Games and Economic Behavior 102*, 433–444.

Kettle, S., M. Hernandez, M. Sanders, O. Hauser, and S. Ruda (2017). Failure to captcha attention: Null results from an honesty priming experiment in guatemala. *Behavioral Sciences 7*(2), 28.

Kim, J., B. Sorhaindo, and E. T. Garman (2006). Relationship between financial stress and workplace absenteeism of credit counseling clients. *Journal of Family and Economic Issues 27*(3), 458–478.

Klor, E. F. and M. Shayo (2010). Social identity and preferences over redistribution. *Journal of Public Economics 94*(3), 269–278.

Lawrance, E. C. (1991). Poverty and the rate of time preference: Evidence from panel data. *Journal of Political Economy 99*(1), 54–77.

Lewis, A., A. Bardis, C. Flint, C. Mason, N. Smith, C. Tickle, and J. Zinser (2012). Drawing the line somewhere: An experimental study of moral compromise. *Journal of Economic Psychology 33*(4), 718–725.

Litzky, B. E., K. A. Eddleston, and D. L. Kidder (2006). The good, the bad, and the misguided: How managers inadvertently encourage deviant behaviors. *Academy of Management Perspectives 20*(1), 91–103.

Lundquist, T., T. Ellingsen, E. Gribbe, and M. Johannesson (2009). The aversion to lying. *Journal of Economic Behavior & Organization 70*(1), 81–92.

Lupoli, M. J., L. Jampol, and C. Oveis (2017). Lying because we care: Compassion increases prosocial lying. *Journal of Experimental Psychology: General 146*(7), 1026.

Mani, A., S. Mullainathan, E. Shafir, and J. Zhao (2013). Poverty impedes cognitive function. *Science 341*(6149), 976–980.

Martinelli, C., S. W. Parker, A. C. Pérez-Gea, and R. Rodrigo (2018). Cheating and in-

centives: Learning from a policy experiment. *American Economic Journal: Economic Policy 10*(1), 298–325.

Mazar, N., O. Amir, and D. Ariely (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research 45*(6), 633–644.

Mazar, N. and D. Ariely (2006). Dishonesty in everyday life and its policy implications. *Journal of Public Policy & Marketing 25*(1), 117–126.

Mead, N. L., R. F. Baumeister, F. Gino, M. E. Schweitzer, and D. Ariely (2009). Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology 45*(3), 594–597.

Mullainathan, S. and E. Shafir (2013). *Scarcity: Why having too little means so much*. Macmillan.

Ockenfels, A. and P. Werner (2014). Beliefs and ingroup favoritism. *Journal of Economic Behavior & Organization 108*, 453–462.

Okeke, E. N. and S. Godlonton (2014). Doing wrong to do right? social preferences and dishonest behavior. *Journal of Economic Behavior & Organization 106*, 124–139.

Piff, P. K., M. W. Kraus, S. Côté, B. H. Cheng, and D. Keltner (2010). Having less, giving more: The influence of social class on prosocial behavior. *Journal of Personality and Social Psychology 99*(5), 771–784.

Potters, J. and J. Stoop (2016). Do cheaters in the lab also cheat in the field? *European Economic Review 87*, 26–33.

Rahwan, Z., O. P. Hauser, E. Kochanowska, and B. Fasolo (2018). High stakes: A little more cheating, a lot less charity. *Journal of Economic Behavior & Organization*.

Raine, A. (2008). From genes to brain to antisocial behavior. *Current Directions in Psychological Science 17*(5), 323–328.

Raine, A. (2013). *The psychopathology of crime: Criminal behavior as a clinical disorder*. Elsevier.

Rosenbaum, S. M., S. Billinger, and N. Stieglitz (2014). Let's be honest: A review of experimental evidence of honesty and truth-telling. *Journal of Economic Psychology 45*, 181–196.

Shah, A. K., S. Mullainathan, and E. Shafir (2012). Some consequences of having too little. *Science 338*(6107), 682–685.

Shalvi, S., M. J. Handgraaf, and C. K. De Dreu (2011). Ethical manoeuvring: Why people avoid both major and minor lies. *British Journal of Management 22*, S16–S27.

Sharkey, P., M. Besbris, and M. Friedson (2016). Poverty and crime. In *The Oxford handbook of the social science of poverty*.

Smigel, E. O. (1956). Public attitudes toward stealing as related to the size of the victim

organization. *American Sociological Review 21*(3), 320–327.

Spears, D. (2011). Economic decision-making in poverty depletes behavioral control. *The BE Journal of Economic Analysis & Policy 11*(1).

Sutter, M. (2009). Deception through telling the truth?! experimental evidence from individuals and teams. *The Economic Journal 119*(534), 47–60.

Tajfel, H. and J. C. Turner (1979). An integrative theory of intergroup conflict. *The social psychology of intergroup relations 33*(47), 74.

van Gelder, J.-L. and R. E. de Vries (2014). Rational misbehavior? evaluating an integrated dual-process model of criminal decision making. *Journal of Quantitative Criminology 30*(1), 1–27.

Wang, J., Y. Rao, and D. E. Houser (2017). An experimental analysis of acquired impulse control among adult humans intolerant to alcohol. *Proceedings of the National Academy of Sciences 114*(6), 1299–1304.

Whitt, S. and R. K. Wilson (2007). The dictator game, fairness and ethnicity in postwar bosnia. *American Journal of Political Science 51*(3), 655–668.

5 Tables and Figures

Table 1: Cheating Game Payoffs

Number Reported	Payoff
1	5Q
2	10Q
3	15Q
4	20Q
5	25Q
6	0Q

Note: Q refers to Guatemalan Quetzales.
5 Q is equivalent to 0.70 USD.

Table 2: Proportion of Subjects who Reported the Corresponding Numbers

			Number Reported†						**Average**
		p-values	**0**	**1**	**2**	**3**	**4**	**5**	**Number**
Abundance	**Self**	0.000	2.75***	2.75***	5.50***	8.26***	27.52***	53.21***	4.15
	InGroup	0.000	6.42***	7.34***	12.84	19.27	22.94*	31.19***	3.39
	OutGroup	0.276	11.01*	21.10	14.68	12.84	19.27	21.10	2.72
Scarcity	**Self**	0.000	1.85***	2.78**	9.26**	12.96	19.44	53.70***	4.07
	InGroup	0.000	6.48***	6.48***	12.04*	26.85***	25 **	23.15*	3.27
	OutGroup	0.002	9.26**	12.04*	10.19**	20.37	28.70***	19.44	3.06

† Since reporting a 6 paid nothing, it is coded as 0.
The p-values reported on the third column are obtained by Chi-Square Goodness of Fit test run against a uniform distribution.
* < 0.10, ** < 0.05, and *** < 0.01. The p-values indicated with stars in columns 4-9 are obtained from one-sided binomial probability tests for the proportion being larger (smaller) than 16.67%. See Figure A1 in the appendix for a visual comparison of the distributions of each number reported across treatments and periods.

Table 3: OLS Regression of the Amount Sent in the Dictator Game

Variable	**Abundance**		**Scarcity**	
	(1)	(2)	(3)	(4)
Out-group Member	-3.275***	-3.433***	-1.165	-1.217
	(0.959)	(1.016)	(0.880)	(0.932)
Female		0.518		-2.541***
		(1.066)		(0.969)
Number of People in Household		-0.444**		0.371*
		(0.217)		(0.198)
Coffee Main Source of Income		-0.475		-2.630
		(2.164)		(1.968)
Risk		-0.0458		0.370
		(0.270)		(0.289)
Celebrations		2.112*		-1.788
		(1.195)		(1.190)
Stress		-0.730		-1.978*
		(0.914)		(1.071)
Constant	13.40***	16.36***	11.69***	17.14***
	(1.516)	(3.758)	(1.391)	(3.854)
No. Observations	218	194	218	184
No. people	109	97	109	92

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. The dependent variable is the amount sent in the dictator game.

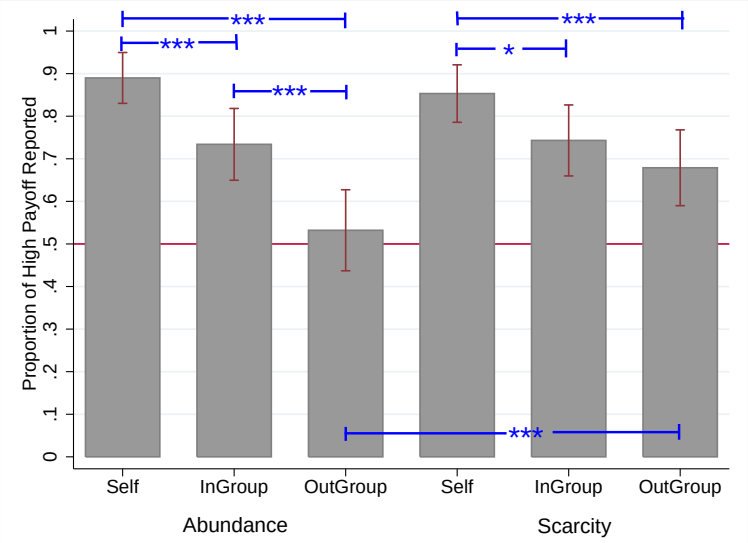


Figure 1: **Proportion of subjects who reported high payoffs across treatments.**
The proportion of subjects who reported 3, 4 or 5 (high paying numbers) are shown across six treatments. The horizontal red line indicates the random probability of reporting a high payoff (50%). Vertical red lines on bars are the bootstrapped 95% confidence intervals. Stars indicate the McNemar's Chi-Square test p-values ($*p < 0.10$, $**p < 0.05$, and $***p < 0.01$) with the blue horizontal lines indicating which treatments are being compared.

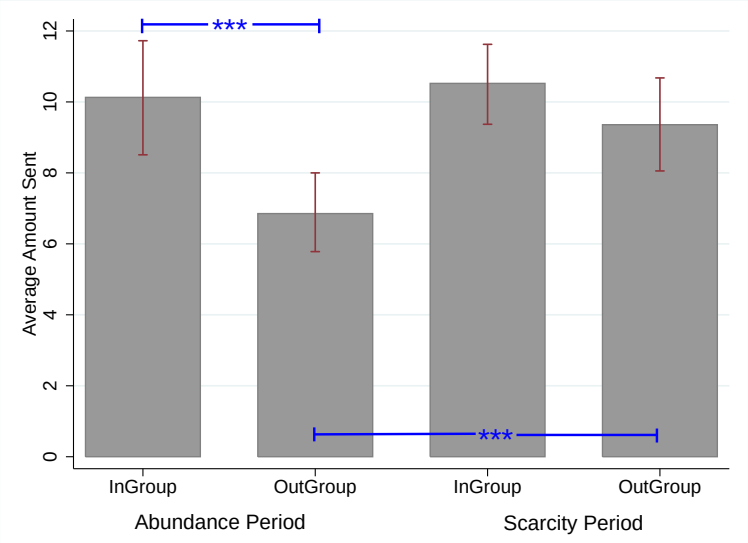
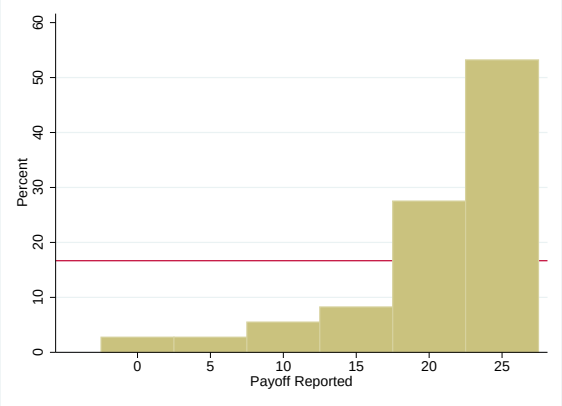


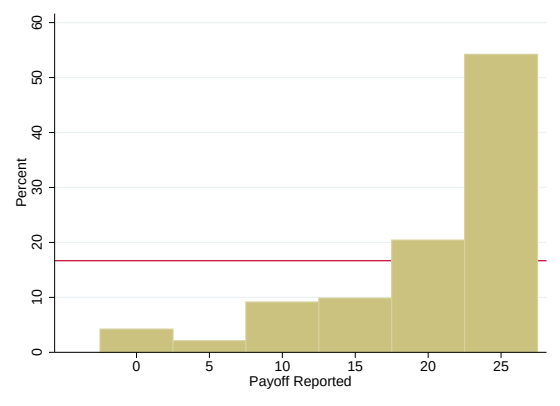
Figure 2: **Average dictator giving across treatments**
Average amount sent out of 30Q across all treatments are presented here. Vertical lines on bars are the bootstrapped 95% confidence intervals. Stars indicate the Wilcoxon signed rank test p-values ($*p < 0.10$, $**p < 0.05$, and $***p < 0.01$) with the blue horizontal lines indicating which treatments are being compared. See Figure A2 in the appendix for the distributions of amounts sent across treatments and periods.

Appendix

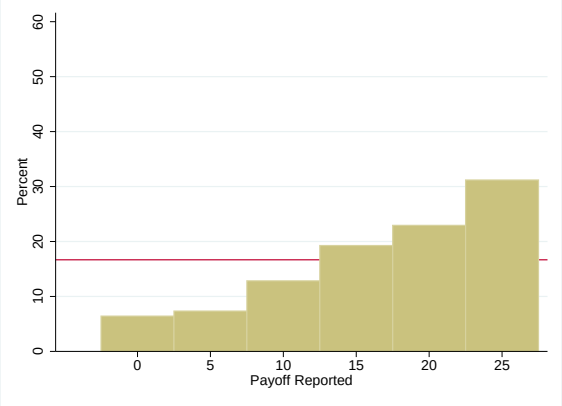
Figures



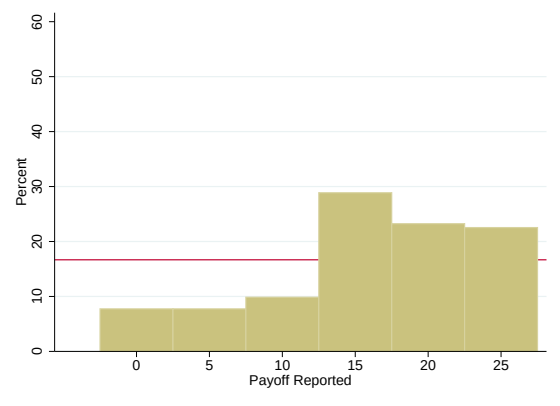
(a) Self Abundance



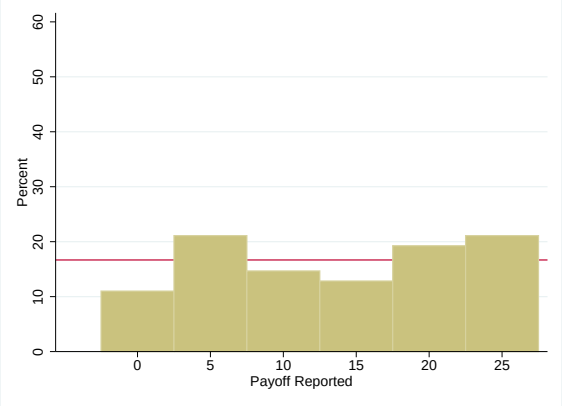
(b) Self Scarcity



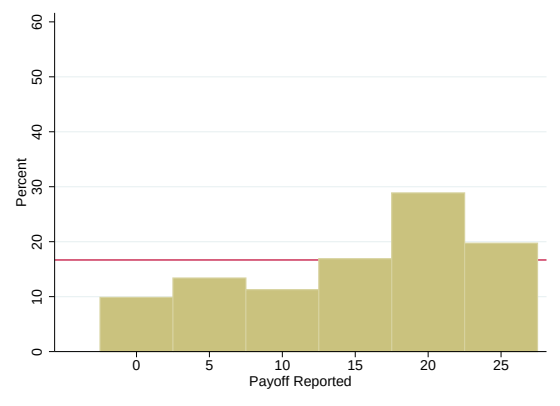
(c) In Group Abundance



(d) In Group Scarcity

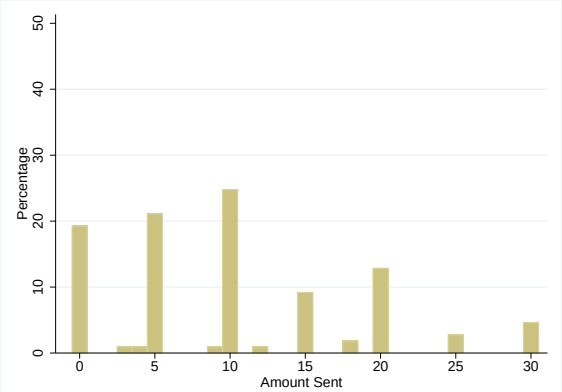


(e) Out Group Abundance

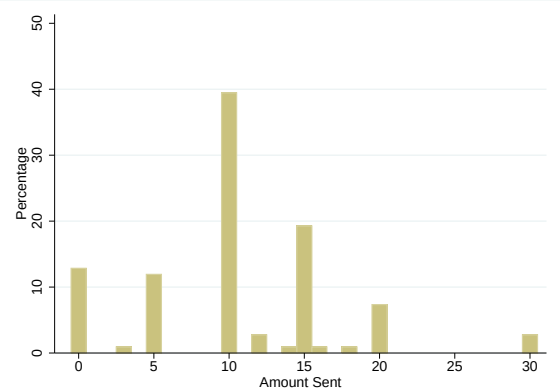


(f) Out Group Scarcity

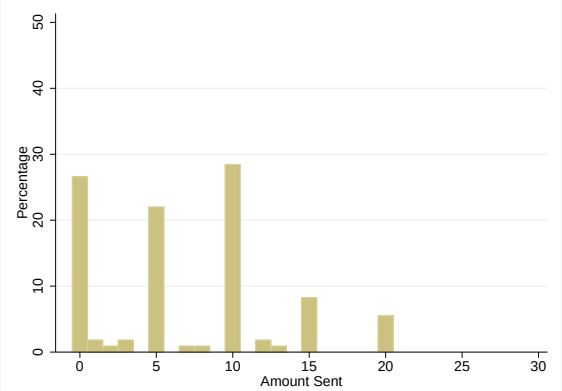
Figure A1: Distributions of Payoffs Reported in Cheating Game Treatments



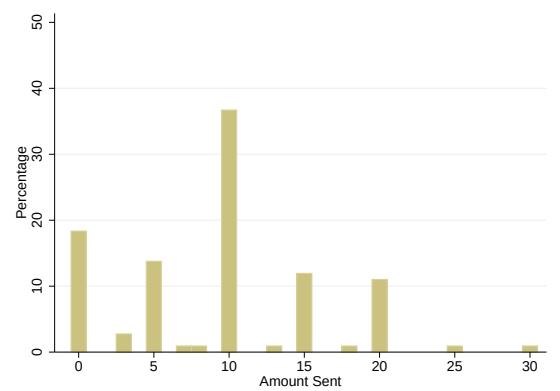
(a) In Group Abundance



(b) In Group Scarcity



(c) Out Group Abundance



(d) Out Group Scarcity

Figure A2: Distributions of Amount Sent in Dictator Game Treatments

Tables

Table A1: Comparing Subjects who Participated in Scarcity Only vs. Both Periods

Variable	**Scarcity Only**	**Both Periods**	p-value
Female	0.27 (0.45)	0.41 (0.50)	0.1463†
Yearly Income	9,174 (7,906)	8,242 (7,794)	0.5531‡
Main Source of Income Coffee	0.97 (0.18)	0.94 (0.23)	0.5732 †
Finances Relative to Others	2.23 (0.43)	2.19 (0.57)	0.8219‡
Household Financial Situation	2.69 (0.65)	2.87 (0.61)	0.1595‡
No Money Index	2.22 (1.41)	2.17 (1.35)	0.9599 ‡
No Money for Food	0.41 (0.50)	0.40 (0.49)	0.9791 †
No Money for Basic Needs (non-food)	0.38 (0.49)	0.57 (0.50)	0.0536 †
No Money for Medical Expenses	0.56 (0.50)	0.48 (0.50)	0.3954 †
No Money for Farm	0.88 (0.34)	0.73 (0.45)	0.0807 †
Credit	0.19 (0.40)	0.17 (0.38)	0.8002†
Risk	3.16 (1.80)	2.91 (1.58)	0.5886 ‡
Stress Index	1.89 (0.48)	1.92 (0.46)	0.6019 ‡
Celebratory Events	0.78 (0.42)	0.82 (0.39)	0.6165 †
Cheating for Self	0.82 (0.39)	0.85 (0.36)	0.6261 †
Cheating for In Group	0.76 (0.44)	0.74 (0.44)	0.8672 †
Cheating for Out Group	0.58 (0.50)	0.68 (0.47)	0.2748 †
Dictator Giving -In Group	11.34 (7.38)	10.52 (6.38)	0.5758‡
Dictator Giving -Out Group	11.47 (6.22)	9.36 (6.61)	0.0969‡

†Two-sample test of proportions.

‡Two-sample Wilcoxon rank-sum (Mann-Whitney) test.

Standard deviations are in parentheses. This table includes 33 participants who participated in the first period only and 109 participants who participated in both periods. However, not all participants provided an answer to all questions. Thus, the number of observations ranges between 31-33 for "Scarcity Only" and 97-109 for "Both Periods" columns.

Table A2: Description of the Survey Measures and Risk Preferences

Variables	Description
Finances Relative to Others	1-Better, 2-Similar, 3-Worse
Household Financial Situation	1-Excellent, 2-Good, 3-Not so good, 4-Poor
No Money Index	Summation of the following four
No Money for Food	1-Experienced this situation in the last month, 0-otherwise
No Money for Basic Needs (non-food)	1-Experienced this situation in the last month, 0-otherwise
No Money for Medical Expenses	1-Experienced this situation in the last month, 0-otherwise
No Money for Farm	1-Experienced this situation in the last month, 0-otherwise
Credit	1- took a credit/loan in the last 6 months 0- otherwise
Stress Index	Average of answers to ten stress related questions (Cohen et al., 1983)
Celebratory Events	1- attended/organized a wedding or a celebratory event in the last month, 0- otherwise
Risk	Scale: 1 (risk averse) -6 (risk lover) Incentivized Eckel and Grossman (2002, 2008) Gamble Task

Table A3: Survey Measures of Financial Situation Across Abundance and Scarcity Periods

Variable	**Abundance**	**Scarcity**	p-value
Finances Relative to Others	2.19 (0.55)	2.19 (0.57)	1.0000‡
Household Financial Situation	2.58 (0.78)	2.87 (0.61)	0.0002‡
No Money Index	1.71 (1.46)	2.17 (1.35)	0.0041 ‡
No Money for Food	0.26 (0.44)	0.40 (0.49)	0.0061†
No Money for Basic Needs (non-food)	0.44 (0.50)	0.57 (0.50)	0.0433†
No Money for Medical Expenses	0.41 (0.50)	0.48 (0.50)	0.2623†
No Money for Farm	0.60 (0.49)	0.73 (0.45)	0.0348†

†McNemar's Chi Square test.

‡Wilcoxon matched-pairs signed-ranks test.

Standard deviations are in parentheses.This table includes all 109 participants who participated in both periods. However, not all participants provided an answer to all questions. Thus, the number of observations ranges between 97 and 109 depending on the period and the question.

Table A4: Other Survey Measures and Risk Across Abundance and Scarcity Periods

Variable	**Abundance**	**Scarcity**	p-value
Stress Index	1.91 (0.60)	1.92 (0.46)	0.5251‡
Credit	0.92 (0.28)	0.83 (0.38)	0.1336†
Celebratory Events	0.77 (0.43)	0.82 (0.39)	0.4142†
Risk	3.10 (1.93)	2.91 (1.58)	0.5311‡

†McNemar's Chi Square test.

‡Wilcoxon matched-pairs signed-ranks test.

Standard deviations are in parentheses.This table includes all 109 participants who participated in both periods. However, not all participants provided an answer to all questions. Thus, the number of observations ranges between 97 and 109 depending on the period and the question.

Simulation Procedure to Assess the Accuracy of the Sample Size to Generate Random Distribution

The Simulation Procedure:[†]

- Step 1: Given our sample size of 109 subjects, we first draw 109 random integers between 1-6 (i.e., virtual die roll).
- Step 2: We test whether the distribution of the random draws differs from a categorical random uniform distribution using the Chi Square Goodness of Fit test.
- Step 3: We repeat the procedure in Steps 1 and 2 1000 times.
- Step 4: We record the number of times out of 1000 simulations that the distributions were indeed categorical random uniform.
- Step 5: We compute a statistical inference measure which is the number of simulations resulting in non-random distributions divided by the total number of simulations.

[†] The Stata code is available from the authors upon request.