

Do Outcome-Based Payments Fuel Cheating? An Experimental Study

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Abstract

This study investigates cheating behavior among Muslim students on Ramadan's first day compared to a non-Ramadan day, using Fischbacher and Föllmi-Heusi's (2013) dice-rolling experiment, and examines perceptions of others' cheating. Conducted at Istanbul University with 165 students (146 Muslims), the experiment was performed on Ramadan's first day and a non-Ramadan day, with each participant receiving a six-sided die and a response sheet with instructions. Results, analyzed using ordered probit regression, show participants reported higher-paying dice outcomes during Ramadan, indicating increased cheating in this period. Additionally, most participants believed others would misreport results for higher payoffs. This suggests that awareness of unpunished cheating may increase cheating likelihood, potentially reducing trust in others. The homogeneous sample and simple religiosity measure limit generalizability. Future research could explore these dynamics using diverse samples, detailed religiosity measures, and religious priming methods.

1. Introduction

Cheating can have detrimental consequences for individuals, organizations, and governments. The behavioral and experimental economics literature has explored this issue through various experiments in recent years. In most studies, the cost of cheating is influenced by the likelihood of detection and the associated penalties. Recent research in behavioral and experimental economics indicates that many individuals are prone to cheating (Ariely,

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2012; Gneezy, 2005). Studies by Gneezy, Rockenbach, and Serra-Garcia (2013), Gneezy, Kajackaite, and Sobel (2018), and Lundquist, Ellingsen, Gribbe, and Johannesson (2009) formalize the concept of cheating aversion, while others investigate deviations from this behavior and propose strategies to promote honesty (Rosenbaum, Billinger, & Stieglitz, 2014). Honesty has been examined in relation to various socioeconomic factors, with evidence suggesting that individuals in democratic countries tend to be more honest (Ariely, Garcia-Rada, Gödker, Hornuf, & Mann, 2019).

A meta-analysis by Gerlach, Teodorescu, and Hertwig (2019) found that dishonest behavior correlates with reward size. Additionally, in dice-rolling experiments, individuals who cheat tend to lie more (Gerlach et al., 2019). Previous studies on integrity often focus on tasks such as dice-rolling, coin flips, exams, or lost items. For example, an experiment involving a chocolate reward across countries, including Türkiye, found no differences in self-reported honesty between verbal and written reports without experimenter interaction (Pascual-Ezama et al., 2015). In this experiment, conducted with 90 participants in Türkiye, some were asked to report coin-toss results verbally and others in writing. Written reports were associated with more cheating, possibly due to reduced fear of detection through body language (Pascual-Ezama et al., 2015). In another study, over 17,000 wallets containing varying amounts of money were placed in cities across 40 countries, and their return rates were observed. People were more likely to return wallets with larger sums, suggesting consistent honesty across cultures (Cohn, Maréchal, Tannenbaum, & Zünd, 2019). A dice-rolling experiment across five countries revealed that participants expected cheating to vary by country, yet observed cheating was similar across nations, with no significant link between dishonesty and corruption ratings or cultural values (Mann, Garcia-Rada, Hornuf, Tafurt, & Ariely, 2016).

In an experiment comparing random and real-effort tasks, participants cheated more in the random task, suggesting that cheating about luck is less psychologically costly than cheating about performance (Kajackaite, 2018). A coin-toss experiment across 15 countries found significant variation in honesty, positively correlated with GDP and Protestantism, indicating a long-term relationship between honesty and economic development (Hugh-Jones, 2016). Participants' expectations of honesty also revealed cognitive biases, partly attributed to self-reflection (Hugh-Jones, 2016).

Among Malaysian Muslim students, subjective norms were found to support cheating intentions (Mustapha, Hussin, Siraj, & Darusalam, 2016). In another study, only 16% of Muslim students cited religious or moral

reasons for not cheating (Habiburrahim et al., 2021), suggesting that religion has limited influence on moral behavior in this context. Similarly, no significant relationship was found between Islamic religiosity and academic cheating, possibly due to religious concerns (Uyun, 2020). Beyond religion, cultural figures such as mystics and philosophers can influence moral behavior. An experiment on honesty in five countries found that East Asian participants cheated less than those in Western countries, with Confucian cultures showing greater honesty (Huynh, Rieger, & Wang, 2022). While some studies suggest religion reduces cheating, others find no such effect.

Research on honesty among Muslims in Türkiye is limited, possibly due to the Islamic assumption that Muslims act honestly. In one study, Muslims were found to view opportunism as unfair, independent of their degree of religiosity (Kamilçelebi, 2019a; Kamilçelebi 2019b). This study investigates whether a religious day like Ramadan promotes honesty. It aims to determine if Muslims cheat more to earn money during Ramadan and explore their perceptions of others' cheating. Ramadan, a sacred month for Muslims involving fasting, prayer, and moral conduct, is expected to deter dishonest behavior (Buhârî, 2018). However, evidence suggests religiosity may sometimes increase cheating (Childs, 2013; Christie, 2019). In an experiment, participants primed with God-related concepts before a dictator game donated more than those who were not primed (Shariff & Norenzayan, 2007).

Festinger and Carlsmith (1959), Bandura, Barbaranelli, Caprara, and Pastorelli (1996), and Mazar, Amir, and Ariely (2008) found that verbal reports are less prone to dishonesty than written reports. We hypothesize that self-reporting without experimenter interaction increases the temptation to cheat. Participants also exhibit more dishonest behavior in experiments without oversight (Mazar et al., 2008). For example, in one experiment, students asked to write a religious sentence before a test showed no difference in honesty compared to those writing a non-religious sentence. However, in another experiment, those who heard the call to prayer behaved slightly more honestly (Aveyard, 2014). Mazar et al. (2008) suggest that individuals tolerate small-scale cheating unless it affects their self-concept. For instance, cheating decreased when participants recalled the Ten Commandments before an experiment. However, Gino, Ayal, and Ariely (2009) found that unethical behavior increased within the same group over time. Korbel (2017) found that friendship ties do not significantly influence cheating, but younger groups cheat more than older individuals. Mazar et al. (2008) and Fischbacher and Föllmi-Heusi (2013) suggest that the marginal cost

of lying increases with the size of the lie, leading individuals to lie modestly rather than extensively.

2. Experimental Design

Our study adopted an experimental design previously used with Muslim participants in Türkiye. The experiment was conducted on the first day of Ramadan and on a non-Ramadan day. Ramadan, the ninth month of the Islamic (Hijri) calendar, is determined by the lunar cycle and is a sacred period for Muslims characterized by fasting, worship, and spiritual reflection. This study examines whether variable payments drive cheating among Muslim students, using a dice-rolling experiment where participants receive 0 TRY to 10 TRY based on self-reported outcomes. The effect of Ramadan on economic behaviors has been demonstrated in prior studies; for instance, Białkowski, Etebari, and Wisniewski (2012) found that stock returns in Muslim-majority countries increase during Ramadan, reflecting changes in investor sentiment. The influence of Ramadan on economic behaviors, driven by enhanced social interactions and positive mood, has been evidenced in prior research; for instance, Gavriilidis, Kallinterakis, and Tsalavoutas (2016) found that Ramadan fosters significant herding behavior in Muslim-majority countries' stock markets, reflecting heightened investor optimism. Drawing on these insights, we employed a comparative approach to investigate cheating behavior among Muslims during Ramadan and non-Ramadan periods, using the dice-rolling experiment by Fischbacher and Föllmi-Heusi (2013) with 165 students (83 females and 82 males) at Istanbul University's Department of Economics. The experimenters ensure that the classroom maintains consistent temperature, lighting, and ambiance for both experiments. The experiment was not scheduled to coincide with exam dates. It was conducted with similar and different groups of second-year students to avoid experiential learning. Of the 165 participants, 146 identified as Muslims, while the remaining 19 were either non-Muslims or identified as non-religious.

Our analyses focus on the 146 participants who identified as Muslims. Religiosity was assessed using questions from the World Values Survey Wave 6 Questionnaire (Türkiye, 2011): "Do you belong to a religion or religious denomination? If yes, which one?" and "Regardless of whether you attend religious services, would you say you are a religious person, not a religious person, or an atheist?" The average age of participants in both experiments was 21. The first experiment was conducted on the first day of Ramadan, and the second on a non-Ramadan day. The experiment was paper-based. Each participant received a six-sided dice and a response sheet with

instructions. They were asked to roll the dice privately and record the result on the response sheet. Participants were informed that the dice's outcome would determine their payoff (see Table 1) and were not monitored during the process. Table 1 shows the payoffs corresponding to dice outcomes: 1 = 2 TRY, 2 = 4 TRY, ..., 6 = 0 TRY. The experiment's instructions indicated that the highest payoff would be earned if the dice showed five.

Table 1. Payoffs Corresponding to Dice Outcomes

Dice number	1	2	3	4	5	6
Payoff (TRY)	2	4	6	8	10	0

After the decision sheets were collected, participants completed a short follow-up questionnaire, received their payments (including a show-up fee of 3 TRY), and left the room. On average, participants earned 10 TRY, and the entire protocol lasted 20 minutes. This experiment was conducted in 2018 during Ramadan and on a day outside of Ramadan.

At the time the experiment was conducted, the hourly net wage in Türkiye was approximately 7.5 TRY, and 1 USD was equivalent to about 4.5 TRY. The protocol and payments were conducted with complete anonymity. Although the highest number on the dice is 6, the experiment was designed so that this number yielded no payoff. The choice of 5 as the highest payoff number aligns with Fischbacher and Föllmi-Heusi (2013), as participants often assume 6 would yield the highest reward.

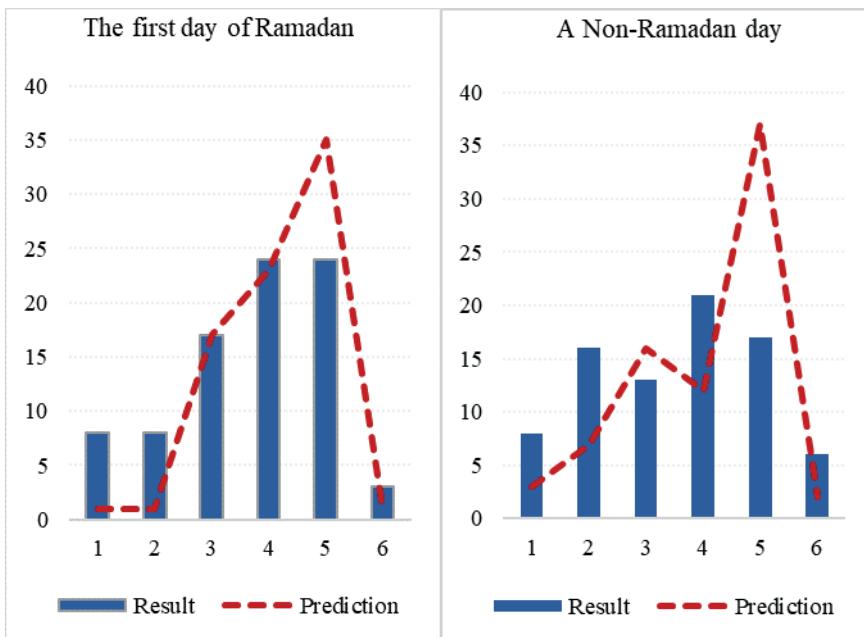
Participants were asked to report the number rolled on their third dice roll to the experimenter. It was predicted that even if the third roll resulted in a low number, participants might report a higher-paying number, influenced by higher numbers from the first two rolls. For instance, even if the dice result corresponded to 0 or 2 TRY, participants were expected to report 8 or 10 TRY on their sheets. Since participants were informed that the experimenters would not monitor their rolls, they were more likely to engage in minor cheating.

3. Results

To further explore the extent of dishonest reporting, we examined the dice outcomes among participants who identified as Muslim in both the Ramadan and non-Ramadan experiments. The columns Figure 1 illustrate the dice outcomes and other participants' dice outcomes prediction reported by Muslim participants in experiments conducted on Ramadan's first day and a non-Ramadan day. In the Ramadan experiment, participants more

frequently reported higher-paying numbers (4 and 5). In the Ramadan experiment, among the 73 participants who identified as Muslim, 36 reported high-paying dice outcomes (4 or 5), corresponding to a proportion of 49.32%. In contrast, in the non-Ramadan experiment, among the 73 participants who identified as Muslim, 30 reported high-paying dice outcomes (4 or 5), yielding a proportion of 41.10%.

Figure 1. Numbers Reported During Ramadan and on a Non-Ramadan Day



The dashed line in Figure 1 shows that participants predicted that other participants in the class reported dice outcomes dishonestly to obtain higher payments. We obtained these results by asking participants the following question in our survey: “Which number is most frequently reported in the class for the dice-rolling experiment?” Sixty-nine percent of Muslim respondents indicated that other participants would likely report 4 or 5, the numbers yielding the highest payoffs. The 69% of participants expecting others to report high-paying numbers (4 or 5) aligns with Gino et al. (2009), suggesting that perceived social norms of dishonesty may amplify individual cheating, particularly in the Ramadan context.

Table 2. Comparison of Dice Outcomes (4 or 5) Among Muslim Participants in Ramadan and Non-Ramadan Experiments

Group	Sample Size	Expected 4 or 5	Reported 4 or 5	Proportion (%)	Expected Proportion (%)	χ^2 (p-value)
Ramadan	73	24	36	49.32	33.34	8.37 (< 0.01)
Non-Ramadan	73	24	30	41.10	33.34	1.98 (0.159)

Note: The expected proportion is based on a uniform distribution $\frac{2}{6} = 33.34\%$. The chi-square test assesses the deviation of observed frequencies from the expected uniform distribution.

Table 2 shows that under a uniform distribution, each outcome is expected to occur with a probability of $\frac{1}{6}$, yielding an expected frequency of 12.17 for each number in both groups. A chi-square goodness-of-fit test for the Ramadan experiment revealed a deviation from the uniform distribution ($\chi^2 = 10.91$, $df = 5$, $p = 0.050$), which is marginally significant and suggests a tendency toward higher-paying numbers (4 and 5, totaling 36 participants or 49.32%). In the non-Ramadan experiment, the deviation was not statistically significant ($\chi^2 = 7.32$, $df = 5$, $p = 0.197$), with 4 and 5 reported by 30 participants (41.10%). These observed proportions significantly deviate from the expected theoretical probability of 33.34% for reporting a 4 or 5 under a uniform distribution (i.e., $\frac{2}{6}$). A chi-square goodness-of-fit test revealed a significant deviation in the Ramadan experiment ($\chi^2 = 8.37$, $df = 1$, $p < 0.01$), indicating a higher propensity for dishonest reporting during Ramadan. However, in the non-Ramadan experiment, the deviation was not statistically significant ($\chi^2 = 1.98$, $df = 1$, $p = 0.159$), although the proportion was higher than the expected value.

Table 3. Ordered Probit Regression Results

	(1)	(2)	(3)
<i>ramadan</i>	0.389* (0.181)	0.404* (0.182)	0.329 (0.253)
<i>religious</i>		-0.105 (0.183)	-0.181 (0.256)
<i>ramadan</i> \times <i>religious</i>			0.153* (0.363)
#Observations (N)	146	146	146
Muslims Only	+	+	+

Note: Ordered Probit Regressions. The dependent variable is the reported dice outcome (1 to 6, where 1=2 TRY, 2=4 TRY, 3=6 TRY, 4=8 TRY, 5=10 TRY, 6=0 TRY).

*Ramadan = 1 for the Ramadan experiment, 0 otherwise; Religious = 1 for Muslims, 0 otherwise. Standard errors are in parentheses. * denote significance at 5% level.*

Since the students were from the same class and of similar age, and no significant relationship was found regarding gender, age, or cheating, these were not included in the Table 3.

Ordered probit regression results, presented in Table 3, indicate that participants who identified as Muslims in the Ramadan experiment did not report dice results honestly. Ordered probit regressions show that the probability of reporting higher-paying dice outcomes (e.g., 4 or 5) increased by approximately 15% during Ramadan compared to the non-Ramadan day (), suggesting a significant shift toward dishonest reporting. The significant positive coefficient on the Ramadan dummy variable ($\beta = 0.33$) suggests that the religious context of Ramadan's first day amplified cheating behavior, potentially due to reduced perceived costs of dishonesty in an unmonitored setting. The lack of experimenter oversight likely created an opportunity for participants to lie slightly for personal gain. When payments to participants exceed the costs of cheating (e.g., low risk of detection), individuals are more likely to cheat (Kajackaite & Gneezy, 2017; Abeler, Becker, & Falk, 2014).

This study examines whether reported dice results indicate cheating compared to potential earnings. In this experiment, participants could earn more by misreporting. This may reflect a situation where small-scale dishonest behaviors are justified during Ramadan. Across all three models, Ramadan increases cheating behavior among Muslim students. This indicates an unexpected increase in the likelihood or extent of cheating during Ramadan. This suggests that Ramadan may have a promoting effect on cheating due to factors such as stress, fatigue, cultural, or social dynamics.

Religiosity has a negative effect on cheating (more religious students tend to cheat less), but this effect is not statistically significant (Models 2 and 3). This indicates no strong evidence that religiosity directly reduces cheating. Ramadan consistently increases cheating behavior among Muslim students. The interaction term, ramadan \times religious, tests for an interaction effect. The interaction term ramadan \times religious indicates a significant effect, suggesting that participants identifying as religious were slightly more likely to cheat during Ramadan (0.153 units). This suggests that Ramadan may promote cheating due to factors such as fasting, fatigue, cultural influences, or social environment. The findings indicate that Ramadan unexpectedly increases cheating behavior, which calls for further investigation into cultural, psychological, or physiological factors.

Interestingly, our results are the opposite of those reported by Rabie, Rashwan, and Miniesy (2024) in Egypt. Employing the same Fischbacher and Föllmi-Heusi (2013) dice task with Egyptian undergraduates, they found that fasting participants cheated significantly less during Ramadan. In contrast to their study, we did not ask participants whether they were fasting. The divergence between the Turkish and Egyptian samples highlights that the effect of Ramadan on honesty is not universal and may depend heavily on cultural, institutional, or socio-religious context - an important avenue for future cross-country comparisons.

4. Limitations and Future Research

This study contributes to behavioral and experimental economics literature by examining cheating behavior in religious contexts. Conducted with a homogeneous group of students from Istanbul University's Department of Economics, averaging 21 years old, the experiment ensures variable control but limits generalizability to broader populations. The sample consists of Muslim second-year students of similar age and socioeconomic status. Gender, age, and cheating were not found to have a significant relationship, so these variables were not included in the table. The experiment was not scheduled to coincide with exam dates and was conducted with different student groups to prevent learning effects. This indicates that cheating behavior was not influenced by biases arising from the experimental design. The sample size ($N = 146$) is relatively small. Religiosity, measured using two World Values Survey questions, provides a practical approach but lacks detailed response distribution, potentially introducing bias.

The unmonitored dice-rolling design, aligned with Fischbacher and Föllmi-Heusi (2013), effectively captures cheating tendencies, though its impact

outside the Ramadan context remains untested. Focusing on Ramadan's first day offers insights into religious influences on ethics, but alternative factors like fasting's cognitive or emotional effects are unexplored. The study's focus on Türkiye's secular-religious societal structure adds contextual relevance, yet cultural influences on cheating are not fully addressed. Future research could address these limitations by incorporating diverse samples, detailed religiosity measures, religious priming methods (e.g., Islamic symbols), and varied incentive or monitoring structures. Additionally, exploring factors like fasting's cognitive effects with control groups could enhance understanding.

Although the proportion of high reports appears higher during Ramadan, the fact that we pooled outcomes 4 and 5 (both of which are relatively attractive) places the observed rates for both sessions well within the normal range commonly reported in the dice-task literature (Gerlach et al., 2019).

5. Conclusion

This study, conducted at Istanbul University's Department of Economics with 146 Muslim students, utilized Fischbacher and Föllmi-Heusi's (2013) dice-rolling experiment to compare cheating behavior on the first day of Ramadan versus a non-Ramadan day. Contrary to expectations that Ramadan's moral and spiritual atmosphere would deter dishonest behavior (McCullough & Willoughby, 2009), participants were more likely to report higher-paying dice outcomes (e.g., 4 or 5) during Ramadan (49.32%) compared to the non-Ramadan period (41.10%). A chi-square test confirmed a significant deviation from a uniform distribution in the Ramadan experiment ($\chi^2 = 8.37$, $p < 0.01$), but not in the non-Ramadan experiment ($\chi^2 = 1.98$, $p = 0.159$).

The unmonitored experimental design and payments facilitated cheating, with most participants opting for moderately high payoffs (4 or 5) rather than the maximum (6, yielding 0 TRY), aligning with Fischbacher and Föllmi-Heusi's (2013) finding that individuals engage in partial lying to balance financial gain with self-image preservation. Notably, 69% of participants believed others would report high-paying numbers, suggesting that perceptions of peer dishonesty may normalize cheating (Gino et al., 2009). This widespread expectation of dishonesty indicates a feedback loop where distrust fuels dishonest behavior, potentially undermining economic trust in settings where religious norms are expected to prevail.

These findings challenge the assumption that religious contexts inherently foster honesty and question the cost-benefit framework of cheating (Kajackaite & Gneezy, 2017), as religious settings may lower the perceived

psychological cost of dishonesty. The study highlights ethical considerations for researching dishonesty in religious contexts, particularly in societies where religion is sensitive. The unexpected increase in cheating during Ramadan suggests that individuals may justify dishonest actions in environments where religion is perceived as a tool for manipulation. This underscores the need for further research to explore why cheating rises during religious periods, using Ramadan and non-Ramadan days as reference points.

In conclusion, this study contributes to behavioral economics and morality by demonstrating that cheating is shaped by a complex interplay of situational, economic, and social factors, even in religious contexts. The findings challenge simplistic assumptions about religiosity and ethical behavior, suggesting that economic incentives and societal perceptions of distrust may outweigh religious influences. By illuminating the drivers of cheating, this study paves the way for future research to explore the nuanced effects of religion, culture, and economics on ethical decision-making, deepening our understanding of human morality.

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Appendix

1. General Protocol

Before the experiment begins, students are provided with brief information about the dice-rolling experiment and the survey duration. They are informed that participation is voluntary and involves two stages: rolling the dice and completing the survey.

All participating students receive an attendance fee. Their names and surnames are recorded on a form to confirm receipt of the fee upon leaving the classroom. Students are instructed that the experiment involves rolling a six-sided dice and recording the result of the third roll on a provided form. The forms and questionnaires, on which students record the dice results, are distributed simultaneously.

The instruction sheet states that earnings depend on the dice's outcome. The first page of the questionnaire form assures students that their information will not be shared with third parties or institutions. It also includes the author's contact information and the study's purpose. Students are instructed to roll the dice twice to verify its functionality and record the third roll on the form. Forms and dice are collected randomly in a box. Students are paid based on the number they report on the form. Their names, surnames, attendance fees, and payments received are recorded on a payment form, which they sign.

2. Protocol

a) Stages of the Experiment

Before the experiment starts, the experimenter announces that students wishing to participate must remain in the classroom, while those who do not wish to participate should leave. One experimenter provides a general explanation of the experiment.

Both experimenters distribute a six-sided dice, a questionnaire form, an instruction sheet, and a decision sheet to each student. Students are asked to read the instruction sheet simultaneously. After everyone has finished, one experimenter reads the instructions aloud and addresses any questions. The experimenter then signals the start of the experiment. Forms are collected in a box. Students are informed that there are no correct or incorrect answers in the questionnaire, that their individual decisions are crucial for the study, and that they should not share information or ideas with others. To avoid influencing decisions, participants are asked to remain silent until they leave

the classroom. They are also informed that they can discuss any questions with the experimenters after the experiment.

Students roll the dice three times and record the third roll's result on the decision sheet. They then complete the questionnaire. Students submit their forms, receive their payments individually, sign a document confirming receipt of payment, and leave the classroom.

b) Materials

- Instruction sheet
- Decision sheet and questionnaire form
- Six-sided dice
- Coins and 5 Turkish Lira banknotes
- Pens
- Proof-of-payment document

Team: One person per 40 participants, two people for 80 participants, and one person for the general explanation (three people total).

The following descriptions apply to one experiment only. The same budget and time estimates apply to the second experiment.

- **Estimated Average Time:** 35 minutes
- **Estimated Average Earnings:** 3 TRY (attendance fee) + amount earned from the experiment (Max: 13 TRY, Min: 3 TRY, Average: 8 TRY)
- **Estimated Total (n=80):** Max: 1040 TRY, Min: 240 TRY, Average: 640 TRY