

# NEW FRONTIERS IN SOCIAL, HUMAN AND ADMINISTRATIVE SCIENCES

**Editors:**

**Assoc. Prof. Enis Baha BİÇER**

**Dr. Orhan ŞANLI**



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**Chapter 29**

**Using Nudges to Reduce Cheating in Exams: A Randomized-field Experiment**

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**Abstract**

Cheating behavior is a significant problem within the education system. This study aims to mitigate cheating behavior through the implementation of various nudges. A randomized field experiment was conducted at a Turkish state university, involving a control group and three treatment groups. Students in the treatment groups were exposed to different nudges. The first treatment involved kindly discouraging cheating, while the second prompted students to consider whether cheating was fair to their friends and society. The third treatment asked a question to encourage reflection on the negative consequences of cheating. The results indicate that merely instructing students not to cheat had no impact on their behavior. However, the prevalence of cheating was lower when students were encouraged to recognize the unfairness of cheating to their peers and society. Furthermore, cheating was reduced in the third treatment, although the nudge's effect was less pronounced than in the second treatment in average however the difference is not statistically significant.

**Key Words:** Cheating, dishonesty, nudge theory, field experiments

## **1. INTRODUCTION**

People often behave dishonestly to further their self-interests (Grolleau et al., 2016, p. 1). One common manifestation of dishonest behavior is cheating during exams. Numerous studies have indicated that over 50% of students across different degree programs engage in exam cheating (McCabe and Trevino, 1997; Mustaine and Tewksbury, 2005; Vandehey et al., 2007; Staats et al., 2009; Kerkvliet and Sigmund, 1999). Clearly, assessments play a crucial role in the education system, and cheating poses a significant challenge to impartial student evaluations. Firstly, students who cheat are able to attain better grades unfairly, even though they do not genuinely deserve them. Secondly, cheating contradicts one of education's goals: fostering moral values and attitudes in students (Cizek, 1999 as cited in Dodeen, 2012). Thirdly, although students may perceive cheating as advantageous to their self-interests, engaging in such morally questionable acts can elicit feelings of shame and guilt, adversely affecting their psychological well-being (Tangney et al., 2007; Dodeen, 2012). Lastly, it impacts the reputation of educational institutions, as these establishments are supposed to maintain fair assessment standards (Noorbehbahani et al., 2022).

Students claim that they cheat because they believe they won't get caught, and indeed, they often evade detection (Diekhoff et al., 1999; Kerkvliet and Sigmund, 1999). Conversely, instructors are reluctant to continually address cheating incidents and the subsequent process (Keith-Spiegel et al., 1998; Volpe et al., 2008). Consequently, addressing cheating becomes an increasingly pressing concern. This leads us to a pivotal question: What if we attempt to influence students not to cheat, rather than focusing on catching them?

The purpose of this study is to employ nudges as a means to reduce or prevent cheating during exams. The concept of nudges gained prominence through the book "Nudge: Improving Decisions about Health, Wealth, and Happiness" by Thaler and Sunstein (2008). They define nudges as "any aspect of choice architecture that predictably alters people's behavior without forbidding options or significantly changing their economic incentives" (Thaler and Sunstein, 2008, p. 6). Nudges have been successfully employed in various domains, such as promoting tax compliance (Brockmeyer et al., 2019; De Neve et al., 2021), influencing energy consumption (Allcott and Rogers, 2012; Costa and Kahn, 2013), encouraging payment of traffic fines (Dusek et al., 2022; Migchelbrink and Raymaekers, 2023), and improving healthcare practices (Last et al., 2021). Nudges can take the form of messages, SMS or email reminders, images, or additional information related to the study's objective.

For this study, a randomized-field experiment was conducted at a Turkish state university. The experiment was administered using Google Forms as an online

test containing ten multiple-choice general knowledge questions (10 points for each question). Participants were unaware of their participation in an experiment. They were informed that they had the option to take an additional exam for a bonus, with the grade being added to their final scores. The experiment comprised one control group and three treatment groups, with students being randomly assigned to each group. While the test questions and their order remained consistent for all students, different messages were presented to each group at the top of the exam sheet. The control group received the message "Good luck!", while the first treatment group was told "Good luck! Please do not cheat!" For the second treatment group, the message was "Good luck! Please do not cheat! Do you think cheating is fair to your classmates and society?" The third treatment group received the message "Good luck! Please do not cheat! How would you feel if operated on by a doctor who graduated by cheating?"

Since the exam was conducted online, students had the opportunity to cheat freely. As participants were randomly assigned to treatments, any disparity in average scores among groups could be attributed to cheating. The results indicate no significant difference in average scores between the control group and the first treatment. Kindly asking not to cheat had no discernible impact on students' cheating behavior. Conversely, participants in the second treatment group exhibited the lowest average scores among all groups, suggesting that invoking the fairness norm had the most pronounced effect compared to other nudges. However, the differences in average scores between the second treatment and the first two groups are statistically significant whereas the difference between the second and the third treatment groups is not statistically significant. Finally, the average test score for the third treatment group was also lower than the first two groups, indicating that prompting students to contemplate the long-term consequences of cheating also affected students' cheating behaviour.

This study is structured as follows: The next section reviews relevant literature, while Section 3 elucidates the experimental design and procedure. Section 4 presents the results, and finally, Section 5 summarizes the study and discusses its findings.

## **2. LITERATURE REVIEW**

Cheating behavior in exams has been studied from various aspects due to its importance as an issue that requires resolution. For example, age is one of the determinants of cheating behavior in exams. Franklyn-Stokes and Newstead (1995), Jensen et al. (2002), Vandehey et al. (2007), and Klein et al. (2007) found that younger students are more likely to cheat than older students. Although gender might also appear to be another determinant of cheating, the literature

presents mixed results. However, most studies indicate that males cheat more than females (Lim and See, 2001; Kobayashi and Fukushima, 2012). Controversial findings also exist concerning the relationship between cheating behavior and students' GPA (Jordan, 2001; Klein et al., 2007; Vandehey et al., 2007).

Another research area related to cheating in exams concerns the type of exams (online vs. face-to-face). Online examinations have become a significant tool for assessing students, especially with the onset of the Covid-19 pandemic. Given that this study's experiment was conducted as an online exam, the literature in this research area holds importance. The primary purpose of selecting online exams for this experiment was to provide students with the opportunity to cheat if they so desired, as online exams could potentially facilitate cheating. Fask et al. (2014), Bilen and Matros (2021), and Elsalem et al. (2021) found that students do indeed cheat more in online exams, which aligns with the objectives of this study. Additionally, King et al. (2009) discovered that 73.6% of their sample reported that cheating was easier in online exams.

All of the aforementioned studies strive to comprehend the factors influencing cheating behavior. However, this paper aims to identify strategies that could help reduce cheating behavior with nudges. This constitutes a crucial distinction between this study and the previously mentioned ones. Conversely, some studies in the literature also attempt to decrease or prevent cheating in exams by employing nudges. For instance, Corrigan-Gibbs et al. (2015) conducted a similar experiment to this study, employing nudges to diminish cheating behavior in online exams. They discovered that 26–34% of students cheated in online exams. The nudges they used included an honor code and warning messages, which were displayed to the students. However, they failed to observe significant effects of these nudges on cheating behavior. Similarly, Klijn et al. (2022) used the reminder of the university's code of ethics in their experiment however they could not find any significant effect of the remainder on cheating behavior either. On the other hand, Zhao et al. (2020) also employed nudges to address cheating behavior. They conducted an experiment with 5 to 6-year-old children, presenting them with five problems and an answer sheet on a nearby table. After explaining the task, the experimenter instructed the children not to look at the answer sheet and then left the room. In the first treatment, a metal frame covered by a transparent plastic sheet was placed between the two tables. Despite the presence of the frame, students could see the answer sheet without standing up due to the transparency of the plastic sheet. The other treatments involved frames with and without transparent films, placed in various positions instead of between the tables. The results indicated that students cheated less when the frame was

positioned between the tables. Although these studies also revolve around cheating behavior and nudges, the experimental setups and types of nudges used differ significantly from those in this research.

### **3. EXPERIMENTAL DESIGN**

A randomized-field experiment was conducted on an online platform (Google Forms) for this study. The experiment took place at a Turkish state university that offered lectures entirely in English. Students who participated in the experiment took a bonus quiz at the start of a lecture. They were not informed that the quiz was related to an academic study; they were simply told that taking the test could increase their final grades.

The quiz comprised 10 multiple-choice questions and took 10 minutes to complete. These questions covered various general knowledge topics (e.g., cinema, music, geography, history, etc.), requiring specific information for accurate answers.<sup>1</sup> I aimed to ask questions that were challenging to answer directly but could be easily found through a Google search. Given that the study's goal was to observe cheating behavior, I aimed to provide sufficient motivation for participants to potentially cheat. It is important to note that students were aware that they could not be caught cheating since the quiz was online through Google Forms, and their cameras were turned off as usual.

A specific course was selected for conducting the experiment, and students enrolled in this course participated. There were several reasons for choosing this specific course. First, it was a mandatory course for all second-year students, ensuring a potentially high number of participants. Second, the course was conducted on the Zoom platform<sup>2</sup>, which could increase the likelihood of cheating. Third, the quiz needed to appear relevant to the course content and seem natural to avoid raising suspicion among students. This course, unlike a conventional academic course, involved students in activities such as social media campaigns, surveys, interviews, and blog posts. Hence, it was deemed suitable for the quiz. Additionally, I aimed to mitigate any potential impact of students' prior academic knowledge on the experiment's results.

Students' final grades would be determined based on the evaluation criteria outlined in the syllabus at the beginning of the semester. The score obtained from the bonus quiz would be added to their final grades. In other words, not participating in

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<sup>1</sup> The questions were like “Which of the following is the best-selling music album in history?”, “Which is the 3rd highest mountain in the world?”, “When did the French Revolution take place?” etc.

<sup>2</sup> The experiment was conducted in May, 2021. Most of the courses were taught face-to-face in classes at the time. However, this course was taught online course for the whole semester since there were many students taking it.

the quiz or scoring 0 on the test would not negatively affect the students' final grades, as per the evaluation criteria explained in the syllabus. However, if a student answered all questions correctly, their final grade would be increased by 5 points.

The experiment consisted of one control group and three treatment groups. A total of 118 students from various departments participated simultaneously in the experiment. At the start of the lecture, the quiz link was shared, and all participants commenced the quiz simultaneously. There were 28 students in the control group, 29 students in the first treatment, 28 students in the second treatment and 32 students in the third treatment.

The questions, their order, and the order of answer choices were standardized across all groups. The control group received the message "Good Luck!" at the beginning of the quiz. Since this was the control group, no message explicitly related to cheating was included. In contrast, the first treatment group received the message "Good luck! Please do not cheat!" Students receive messages (verbally or in writing) regarding the importance of not cheating in their exams on many occasions during their education. The aim was to understand the effect of this simple and fundamental message, acting as a nudge, on cheating behavior.

In the second treatment, the message shown to the students was "Good luck! Please do not cheat! Do you think cheating is fair to your classmates and society?" In this treatment, an attempt was made to analyze the effect of using fairness, one of the most important social norms, as a nudge. Treating others unfairly is generally not morally accepted in societies. Reminding or prompting people to think about moral issues can influence people's behaviors (Capraro et al., 2019).

Lastly, the third treatment group received the message "Good luck! Please do not cheat! How would you feel if operated on by a doctor who graduated by cheating?"<sup>3</sup> It's possible for a student to perceive that cheating could offer short-term benefits. However, the collective act of cheating by all students might not yield long-term benefits for any individual. The intention was to convince them that cheating is detrimental to society and to encourage them to reflect on the negative aspects of cheating.

The quiz for the experiment was prepared in the form of a questionnaire using Google Forms. Different links were generated for each group (a total of four links), but all students accessed the same link. To prevent suspicion due to different links, a procedure was employed to randomly assign each student to one of the four links. Upon clicking the link, students were directed to the website <https://allocate.monster/>.

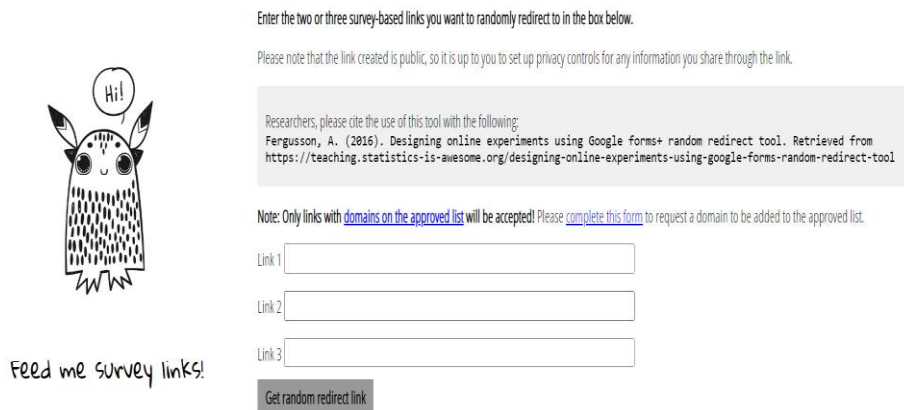
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<sup>3</sup> This inspiration stemmed from Brian Harvey's speech on YouTube about why students should not cheat. He stated, "I do not want to fly in an airplane that was programmed by somebody who cheated in this class." I chose to refer to doctors instead of programmers due to the ongoing pandemic, as I believed it could be more impactful.

This website allocated each student to one of the four quiz questionnaires randomly. Importantly, students were unaware of this procedure and interacted directly with the quiz questionnaire on Google Forms.

A screenshot of the allocate.monster website is provided below. As depicted, when you have 3 (or 2) links, entering these links in the specified areas and pressing the relevant button generates a single link. Anyone who clicks on this link will be assigned to one of the 3 (or 2)<sup>4</sup> links with equal probability. For this experiment, involving 4 links (one for the control group and three for the treatment groups), and with participants equally likely to be assigned to these 4 groups, the following procedure was adopted: Link1 was generated using the Control group and Treatment-1 links, Link2 was generated using the Treatment-2 and Treatment-3 links, and finally, Link3 was generated using Link1 and Link2. Link3 was then shared with the students. When a student clicked on their assigned Link3, the allocate.monster system randomly assigned the student to either Link1 or Link2, and subsequently, randomly assigned them to either the Control and Treatment-1 group or the Treatment-2 and Treatment-3 group, depending on whether Link1 or Link2 was chosen. After the experiment concluded, the data collected from the Google Forms website were analyzed.

Figure 1: Screenshot of the allocate.monster Website



#### 4. RESULTS

As mentioned above, there was one control group and three treatment groups. Since the students were randomly assigned to one of these groups, there should not be any significant difference between the average scores of the groups if there were no nudges. However, if there were any differences in the average scores

<sup>4</sup> One can use three different links at once.



among the groups, it could be attributed to the effects of the specific nudge used in each treatment.

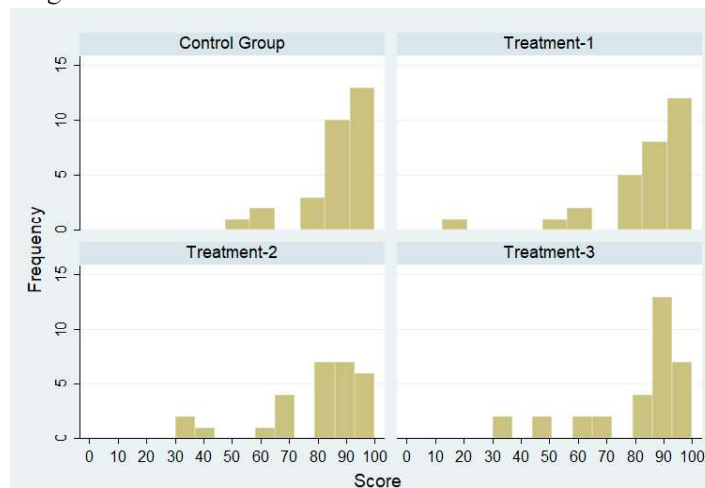
The exam consisted of 10 questions, and the questions as well as their order were identical across all groups. The table below provides the number of correct answers for each question within the different groups:

Table 1: The Number of Correct Answers for Each Question

Question	Control Group (29 Students)	Treatment-1 (29 Students)	Treatment-2 (28 Students)	Treatment-3 (32 Students)
1	29	26	23	28
2	28	29	26	31
3	29	29	26	29
4	27	27	23	24
5	28	27	21	26
6	15	16	14	13
7	27	28	22	29
8	26	24	20	26
9	29	27	25	27
10	26	22	23	28

Each question was worth 10 points, meaning that a student who provided correct answers to all questions would score a total of 100 points. 5% of the score would be added to students' final grades for the course. The distribution of scores for each treatment can be observed in the graphs below.

Figure 2: Distribution of the Score Values Across Treatments



The average value of the scores in the control group is 91.03. On the other hand, the value is 87.93 for the first treatment. Although the mean value of the first treatment is lower than that of the control group, there is no statistically significant difference between these two groups, according to the Mann-Whitney (M-W) test result, with a p-value of 0.557. This can be interpreted as the message "Please do not cheat!" having no effect on students' cheating behavior.

On the other hand, the mean value of the score variable for the second treatment is 79.64. This value is much lower than the average score of the control group. The M-W test result also shows that the grades are significantly lower in the second treatment compared to the control group, with a p-value of 0.010. The difference in the average score between the first and the second treatments is also statistically significant with a p-value of 0.056 according to M-W test result.

Lastly, the average score value in the third treatment is 81.56. M-W test results show that the difference between the third treatment and the control group is also statistically significant, with a p-value of 0.03. These results indicate that both the social norm message in the second group and the awareness message reminding the harm of cheating have indeed decreased cheating behavior. However, there is no statistically significant difference between the second and third treatments, according to the M-W test result, with a p-value of 0.53.<sup>5</sup>

## **5. DISCUSSION and CONCLUSION**

Student assessment is a pivotal aspect of education, and cheating poses a severe threat to the fairness of this process. The repercussions of cheating extend to both students and academic institutions. Consequently, educators strive to identify instances of cheating during exams, but an alternative approach is to prevent cheating from occurring.

This study seeks to assess the efficacy of nudges in reducing cheating behavior. A randomized field experiment was conducted with university students, employing various types of nudges aligned with the study's objectives. In addition to a control group without a cheating-related nudge, one treatment group was instructed not to cheat, another emphasized social norms by posing a fairness question, and the third presented an awareness question about the potential harms of cheating. The findings reveal that instructing students not to cheat directly had no impact on their behavior. However, inducing contemplation about the unfairness of cheating to friends and society, or about the long-term consequences of cheating, led to a reduction in cheating behavior.

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<sup>5</sup> I was unable to acquire any additional data regarding student demographics, GPAs, and other relevant information from the university. Consequently, I was unable to run econometric models to gather more insights into the determinants of cheating behavior.

This study holds potential for addressing a critical issue in the education process and contributes to the literature on nudges. Nonetheless, it has certain limitations. The field experiment collected a limited number of observations, suggesting the need for broader future studies involving a larger student population. Furthermore, the lack of additional participant information from the university where the experiment was conducted limits the inclusion of explanatory variables, which could enhance the understanding of nudge effects. Lastly, the temporal sustainability of nudge effects, a common concern across studies (Migchelbrink and Raymaekers, 2023), including this one, could be explored by conducting the experiment at different intervals to assess the persistence of nudge effects over time.

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