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When Incentives Beat Nudges But Not Bounded Rationality: Partial Effects of Incentives on Academic Cheating*

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Abstract

The paper explores the effect of nudges on dishonest academic behavior in a 3x4 factorial treatment design. Subjects had to throw a physical die 50 times, report the outcome and were given partial credit for their participation. 435 students were assigned to the following conditions: a) a nudge presenting an authoritarian instruction; 2) a nudge referring to the college code of honor; 3) a nudge that presented reasons for not cheating; and 4) a condition presenting no instruction at all. Additionally, within each condition, the partial credit incentive obtained from participating in the study varied. Some did not have it (n=166), others had a partial credit that represented 15% of the final grade (n=145), and, lastly, some of them had a partial credit that represented 2% or less of the final grade (n=124). Our results showed a significant difference between the group that had an academic incentive and the group that did not: $t(433) = -2.35$, $p = 0.0190$. However, we did not find any significant difference between any of the nudge conditions. Among students who could obtain academic credit, the incentive's magnitude did not have an effect on the results of the task: $t(267)=-0.90$, $p=0.3651$. This indicates that the presence of incentives increases dishonest behavior, but their magnitude does not. These results suggest that when given an academic incentive to cheat, students will be dishonest, and they shed light on Colombian culture and on the effects of the education grading system. Finally, the study showed that the nudges that are reported in the literature are not as effective as they are said to be. In fact, more research should be dedicated to the effectiveness of nudges in different cultures and it should be done to look for effective nudges on academic settings.

Keywords: Academic dishonesty, bounded rationality, authority, behavioral economics, honor code, nudge, self-concept.

JEL: C91, D91, Z13.

1. Introduction

A nudge is, in essence, "a small feature in the environment that attracts our attention and influences behavior" (Thaler, 2015, p. 326). Several studies show that the use of nudges has a considerable impact upon people's lives (Bhargava & Lowenstein, 2015; Kolodko, Read, & Taj, 2016; Lowenstein, Bryce, Hagmann, & Rajpal, 2014; Thaler & Sunstein, 2008, 2013). Nudges are effective in decision making because they acknowledge human biases (for example, optimism, loss aversion, status quo bias, inertia) and human heuristics (for example, anchoring, availability, representativeness; Hausman & Welch, 2010). Nudges change the way people process information and, by doing it, they channel human behavior to improve their lives at a very low cost.

Small behavioral interventions reduce dishonesty and cheating, particularly in academic contexts by using people's tendency to maintain a positive self-concept (Bénaud & Tirole, 2004; Mazar, Amir, & Ariely, 2008). This is so, because making the self-concept salient reduces cost-benefit analyses based on pure incentives (Shu, Mazar, Gino, Ariely, & Bazerman, 2011), which contradicts models of academic dishonesty based on pure cost-benefit calculations (William & Hosek, 2003). However, most of those studies have been conducted in first world countries, characterized by high levels of human capital and development and low levels of corruption (Green, 2014; PNUD, 2010).

The Human Development Index (IDH, by its Spanish acronym) is a national multi-dimensional indicator of human development. It considers economic, educational and life expectancy variables (PNUD, 2010). This index ranges from 0 to 1, where 0 represents a country with low levels of education, GDP and life expectancy whereas 1 represents a country with very high in these dimensions. So, this index presents: cultural variables such as education levels; economic variables such as wealth and, vitality variables such as life expectancy. The IDH index compares countries as a whole: an economic, cultural and vital country. The IDH index for Colombia (where this study was held) and the USA is 0,689 and 0.902 respectively.

In a global ranking (where the first place is the country with the highest index) Colombia represents the 79th place whereas the USA represents the 4th place (PNUD, 2010). Therefore, this study

aimed at evaluating the effects of different types of nudges on academic cheating in a country with low IDH and high levels of corruption. Another objective was to observe the effects of the incentives' magnitude on this type of behavior. We believe that nudges don't have the same effects as in previous studies, given that culture and social norms shape beliefs and behaviors about cooperation, altruism and reciprocity (Ariely, 2012; Ariely, García-Rada, Hornuf, & Mann, 2015; Cárdenas, 2011; Mockus, 1994).

An authoritarian nudge, for example, would reduce academic cheating in a greater magnitude than an honor code nudge. The goal of this research is to evaluate whether or not three different types of nudges impact the levels of cheating in a task associated to academic incentives. Furthermore, the study aims to evaluate whether the presence and size of incentives influences the nudges' effects on the levels of cheating in such task. Therefore, our hypotheses are:

H1: An authoritarian nudge has a greater effect on academic cheating than other type of nudges (that is, honor code, reason nudge and no nudge at all), in Colombia.

H2: The magnitude of the incentive influences academic cheating (that is, the bigger the incentive, the bigger the cheating will be).

We conducted an experiment where we analyzed the effect of different types of nudges and magnitude of incentives on cheating behaviors in a die-rolling task in which participants could lie without any direct possible verification by the experimenters. As an incentive, we gave students partial credit on a college course they were attending at the moment of the experiment. Some were given a partial credit that stood for 15% of their final grade, some had a partial credit that stood for less than 2% and the others were not given the incentive (i.e. they did not have the partial credit). It must be noted that this partial credit was real (there was no deception involved and students actually were given the partial credit at the end of the semester).

2. Literature Review

2.1. Nudges Based on Heuristics and Biases

Nudges work by using biases, heuristics and intuitive judgments to help people make better decisions (Thaler & Sunstein, 2008). Nudges act through several mechanisms, but there are two that are particularly important for the purposes of this study: priming and the use of social norms and prestige.

2.1.1 Priming

In cognitive psychology, priming has been defined as an unconscious triggering of specific memories or behaviors by a specific cue (Reber, Allen, & Reber, 2008). This type of strategy has been used to promote honest and prosocial behavior. For example, Vinski & Watter (2012) primed honesty by making subjects choose a synonym for the word "honest", which made participants' self-reports more accurate (i.e., more honest). Primes can also increase generosity and the quantity of money people give to anonymous receivers in a Dictator Game (Shariff & Norenzayan, 2007). Similarly, asking people to sign at the beginning rather than at the end of self-report sheets, as it is usually the case, increases honest behavior, even when people can obtain gains by lying (Shu et al., 2011).

Priming also has important consequences for people's behavior in everyday situations. For instance, Sherman (1980) showed that asking people to predict their behavior in the future could lead them to change it significantly. Likewise, measuring the intent of engaging in a certain behavior makes people more likely to get involved in it (Thaler & Sunstein, 2008). This effect has also been proved in the voting domain. If people are asked, the day before an election, to predict their behavior on election day, they will be more likely to vote (Greenwald, Carnot, Beach, & Young, 1987). A similar procedure can be used to induce people to change their behavior and to purchase different goods (Morwitz, Johnson, & Schmittlein, 1993) or even to floss their teeth (Levav & Fitzsimons, 2006).

2.1.2 Nudges based on social norms and prestige

Thaler and Sunstein (2008) argue that social dynamics and social norms can be used to nudge people. In this context, individuals seek to maintain social prestige and compare themselves with

others. Therefore, people can be nudged by being informed of what others are doing. Making social norms explicit can also be an effective procedure to nudge people. Bond et al. (2012) found that people would vote more if they received, on their Facebook page, a post telling them which of their friends had already voted.

In the same line, research has shown that a norm-based framework is more effective than an information-based message (Slaunwhite, Smith, Fleming, & Fabrigar, 2009). Social nudges have also proved to be effective at making people pay taxes (Coleman, 1996), preventing visitors of a national park to take souvenirs (Cialdini, Reno, & Kallgren, 1990), and reducing alcohol abuse (Perkins, 2003). This type of nudges has also helped reduce loitering (Kolodko, et al., 2016) and decrease energy consumption in households by putting smiley faces in energy receipts (Schultz, Nolan, Cialdini, Golstein, & Griskevicius, 2007).

2.2. Honesty and Cheating

Economic theory has proposed that behavior comprises a rational analysis in which individuals weight the possible gains of cheating against the probability and costs of being caught (Allingham & Sandmo, 1972; Becker, 1968; Edgeworth, 1881; Julián & Bonavida, 2017). Although, some authors acknowledge the limitations that those economic models present (González, 2016). Ariely (2012) proposes that cheating goes beyond a cost-benefit analysis, and depends on a set of complex psychological processes including the lack of self-control (Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009), the influence of social contagion (Mann, Garcia-Rada, Houser, & Ariely, 2014), the maintenance of a positive self-concept (Mazar et al., 2008), and the presence of negative signals to the self, such as using counterfeit objects (Gino, Norton, & Ariely, 2010).

Core to Ariely's explanation (Ariely, 2012; Mazar et al., 2008) is the idea that individuals try to maximize their payoffs, but they also strive to maintain a positive self-concept (Mazar et al., 2008; Ariely, 2012; Shu et al., 2012). In this sense, most people cheat given a low probability of being caught, but they do not exceed a certain limit, beyond which their self-concept as a good person is threatened (Mazar et al., 2008). This phenomenon has been observed both for monetary and non-

monetary incentives (Chance, Norton, Gino, & Ariely, 2011; Mazar & Ariely, 2006; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009).

Some techniques to make people cheat less have been proposed. For example, students cheat less if they are reminded of the Ten Commandments or if the college's honor code is reminded before a test (Mazar et al., 2008). Similarly, people were more honest when they had to sign at the beginning of a tax form than when they had to sign at the end (Shu et al., 2011). In this context, honor codes or signing at the beginning of a form can be viewed as nudges because they are environmental cues that shape people's behavior and offer them the possibility of making a better choice *as judged by themselves*.

2.2.1. Academic Cheating

Regarding academic cheating, an extended phenomenon among high school and college students, research shows that it is influenced both by individual and contextual factors (Davis, Grover, Becker, & McGregor, 1992). At the individual level, research shows that low achieving students cheat when they do not feel identified with their school, and high achieving students cheat when they have low self-efficacy (Finn & Frone, 2010). At the contextual level, peer behavior seems to play a central role: if students see other people cheat, they tend to cheat more and, interestingly, those who do not cheat feel as outsiders. Consistently with experimental evidence, observational research shows that colleges' code of honor and a school's academic integrity policy change student's behavior towards cheating (Arnold, Martin, Bigby, 2007; McCabe & Treviño, 1993). Importantly, McCabe and Treviño (1993) and Mazar et al., (2008) report that the honor code is more effective at reducing dishonest behavior in institutions that do not have an honor code than in institutions that do have it.

2.3. The Role of Culture on Honesty and Dishonesty

Our work follows prior research on cheating in different cultures and social contexts, and aims at extending it to the field of nudges. Regarding the first topic, Ariely et al. (2015) showed that individuals with an East German family background tend to be more dishonest than those coming

from a West German family background. According to these authors, this finding is related to the greater exposure to scarcity and bureaucratic institutions in which it was seldom necessary to cheat in order to access basic goods. In a related line, Cárdenas (2011) has robust evidence that social norms shape behavior in the commons, defined as the dilemma that arises when individuals strive to obtain individual gain from a public resource that is not centrally controlled. In this context, the dilemma is that if individuals try to maximize their private gains, they can end up exhausting the resources and affecting their own individual gains - in many cases, their own self-preservation - in the long term.

This finding implies that, in cases in which people face the dilemma between self-interest and group interest, their behaviors and elections are driven by social norms. Cárdenas and Carpenter (2008) have an extensive review on the use of economic games (e.g., Prisoner's dilemma, Voluntary contribution mechanism, Dictator game, etc.) in different cultures showing two important results. Firstly, there is a tendency in developing communities to cooperate in social dilemmas. Secondly, there is a correlation between trust and reciprocity and Gross Domestic Product (GDP), fraction of the population in poverty, and unemployment. In other cross-cultural experiments, it has been found that cooperative behavior changes depending on how much a community participates in market transactions, and on its level of religious beliefs (Henrich et al., 2010).

Furthermore, Gächter and Schultz (2016) conducted an experiment in 23 countries in which they measured the levels of norm violation and corruption with a self-report die-rolling task. They concluded that countries with high levels of norm violation and corruption have also high levels of dishonesty. A similar pattern has been found regarding academic cheating, with studies showing significant differences in the frequency of copying during exams. Latin American countries display higher cheating averages (Teixeira & Rocha, 2010).

The debate on the effect of culture on behavior, and, particularly, on honest behavior remains unresolved. Despite the differences found among cultures, global patterns related to social norms and economic behavior have also been found. For example, costly punishment, defined as the tendency to punish undesirable behavior of a community member, seems to be enforced cross-

culturally in order to maintain cooperation (Henrich et al., 2006a). In the Dictator Game, which sheds light on the participant's views on fairness and altruism, some communities reject high offers, regarding them as unreasonable (Henrich et al., 2006b).

In this line, Mann et al. (2016) found no differences among countries in cheating levels in a die rolling-task. They found that people have a home country dishonesty bias (i.e., people think that their home country is more dishonest than it really is). Nevertheless, the result that stands out is that every country presents, more or less, the same levels of dishonesty. They interpret these results as a universal tendency to be dishonest while maintaining a positive self-concept (Mazar et al., 2008). Similarly, Pascual-Ezama et al. (2015) found that there were no differences among 16 countries in a die rolling-task in which chocolates were given as incentives.

The debate is still open because, on the one hand, there are different measures of dishonest behavior and cheating with experimental evidence and, on the other hand, there are reports of cheating in actual settings including institutional honesty and academic cheating (Pascual-Ezama, et al., 2015; Teixeira & Rocha, 2010). In this context, we propose that it is important to explore whether the corrective effect of nudges is different in countries with high levels of institutional corruption, contrasting with first world countries in which most studies have been conducted.

2.4. How is Colombia Different

Much of the research on nudges and honesty has been conducted in the US, England, and other first-world countries. The problem with this 'limited' population is that the results cannot be generalized because first world countries have assets that other countries do not (e.g., Colombia). For example, Colombia scores 70.69/100 on the Social Progress Index (SPI), whereas the USA scores 84.78/100 (Green, 2014). The SPI is a measure that evaluates a country's wellbeing, its basic human needs and its opportunities. This measure indicates that Colombia has a lower level, not only of income, but also of education and life expectancy.

Additionally, Colombia is different not in its appropriation of social norms and corruption. In fact, Colombia has high levels of corruption and low levels of social capital, when compared with

developed countries, ranking 96th out of 180 or, equivalently, scoring 37/100 in the total transparency index, where 100 means there is no corruption at all (Transparency International, 2018). Additionally, high corruption produces high levels of distrust among citizens (Transparency International, 2018; Uslaner & Badescu, 2004). Colombia also has high levels of moral disengagement associated to a long history of armed violence (De Posada, Flórez, & Espinel, 2018; Gamba-Collazos & Navia, 2017; Ramirez et al., 2016), despite big efforts from civil society to build basic social ties and peace agreements (Cuenca, 2016; Vargas & Toro, 2016).

In the field of moral development, Martínez and Posada (2014) showed that Colombians use social norms that focus on obedience to authority and to punishment, instead of comprehension of the moral principles underlying honest behavior, which indicates low levels of moral development. In a related line, Mann, Garcia-Rada, Hornuf and Tafurt (2016) analyzed self-reported questions about crime and dishonest tasks in five countries (China, Colombia, Germany, Portugal and USA), and concluded that, in all five countries, internal factors (i.e., to feel guilty about oneself) is a deterrent effect on crime. Colombia was the only country in which there was not a significant effect of legal sanctions on the deterrence of crime. This study shows that, in Colombia, people do not react to sanctions as expected.

In the context of academic cheating, cross-country comparisons show that Colombia has very high levels of copying during academic tests (Teixeira & Rocha, 2010). In fact, Colombian students believe that at least 40% of their classmates have cheated (Martínez & Ramírez, 2018).

Colombia's particularities create an excellent space for testing predictions regarding the effects of incentives and nudges on honest and dishonest behavior in contexts of high corruption and low human capital. Given this context, the goal of this research is to evaluate whether or not three different types of nudges impact the levels of cheating in a task associated to academic incentives. Furthermore, the study aims to evaluate whether the presence and size of incentives influences the nudges' effects on the levels of cheating in such task.

3. Method

The main goal of this research is to explore dishonest academic behavior and methods to reduce it in a context of high corruption, in order to contrast it with results in first-world countries. The method is summarized on figure 1. To do so, we conducted a 3x4 factorial treatment design experiment where we analyzed the effect of three different magnitudes of incentives and four types of nudges on cheating behaviors in a die-rolling task in which participants could lie without any direct possible verification by the experimenters. That is, participants could not be caught lying, which prevented the consideration of possible losses by punishment in a cost-benefit analysis.

In this context, the expectation of a rational actor model would be cheating until exhausting all possible gains. Nevertheless, the task allows self-deception because participants were instructed to mentally choose a side of the die (up or bottom) before knowing the results. A participant could, for instance, alter unconsciously his or her memory of the chosen side, in order to obtain a higher result. Following Shu et al. (2012), we consider that the instruction of the task is a nudge because it modifies the way people make decisions regarding honesty through a very light behavioral intervention.

In fact, in our experiment, participants had to sign the instruction sheet at the beginning of the task. In this way, we studied whether introducing nudges in the instruction modifies the levels of honest or dishonest behavior in a task in which participants could easily cheat. Moreover, students where offered three different incentives: a partial credit that represented 15% of their final grade (high incentive), a partial credit that represented less than 2% of their final grade (low incentive) and no partial credit at all (no incentive). This partial credit was, in fact, given to the students at the end of the semester.

[Figure 1]

3.1. Participants

435 Colombian college students (232 men and 203 women) participated in this experiment. 269 of them were offered partial credit for the participation in the experiment and 166 of them were not. Table 1 shows the total of subjects in each of the 3x4 experimental treatment design. The partial

credit varied among the students [145 of them had a partial credit that represented 15% (*high partial credit*) of the final grade, and 124 of them had a partial credit that represented 2% or less (*low partial credit*) of the final grade]. Participants were assigned randomly to one of 4 conditions.

The first group (n=107; 70 with partial credit and 37 without) had an *authoritarian instruction* in which we quoted the college's student code stipulating that any form of fraud or dishonest behavior would be punished (Appendix A). This is a slight variation of Mazar's et al. (2008) honor code but emphasizing punishment instead of honor. The second group (n=113; 72 with partial credit and 41 without) was presented a traditional colleges' *code of honor*, as in the study of Mazar et al. (2008) (Appendix B). The third group (n=111; 61 with partial credit and 50 without) was *the control group* and did not have an instruction. Finally, the fourth group (n=104; 66 with partial credit and 38 without) had an instruction highlighting the *reasons not to cheat* (Appendix C).

In this instruction, the text explained that if they conducted the task in a coherent and concentrated fashion, they would improve their working memory and cognitive capacities. The different types of instruction were designed to test the reactivity to different theoretical assumptions. For the punishment group (Group 1), emphasis was placed on the idea of punishment, as opposed to an honesty self-concept maintenance group, as in traditional code of honor instructions (Group 2; Mazar et al., 2008).

Emphasis on punishment, as opposed to a comprehension of moral principles, is additionally a typical element on the reasoning of people with low-moral development levels (Posada & Waynrib, 2008) and also a strong element in the moral reasoning of Colombians (De Posada et al., 2018). Group 4's instruction focused on reasons to do the right thing not for abstract moral reasons, or punishment, but for long-term personal benefits, which is consistent with prior literature showing that personal growth improves motivation, processing, performance and persistence in educational settings (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). This manipulation allowed us, additionally, to explore the relationship between low-term incentives via cheating, or long-term benefits via honesty, a core motivational dilemma for students (Kibler, 1993).

In our view, nudges framed under extrinsic motivators (punishment; Group 1) should be more effective at preventing cheating than those base on intrinsic motivators (moral and personal growth; Group 2). We did not have a directional hypothesis regarding the effects of self-concept maintenance (Group 2) in comparisons with personal growth (Group 4). All the participants gave written informed consent before participating in the task and were assured, if asked, that the partial credit will be given at the end of the semester.

[Table 1]

3.2. Procedure

The task used in this study was designed by Ariely et al. (2015) to evaluate cheating. In this task, every student had to throw a physical die 50 times. Before each throw, they had to choose, in their mind, a side of the die (top or bottom), and then to throw it and report the outcome of the side they memorized in a sheet of paper. For example, if a student chose the bottom side of the die and threw a 4, they had to write "3", because the number 3 is on the opposite side of 4, and therefore, in the bottom side of the die. On the contrary, if they would have chosen the top side, they would have reported a "4". Subjects could cheat if they claimed that they chose the side that gave the highest outcome or if they misreported an outcome. We gave 269 students partial credit for their participation, and credit depended proportionately on their results in the die task[a]. Students who had a *high academic incentive* were told that their participation in the experiment would have a partial credit and it would equate to a class exam (roughly 15% of their class grade). On the other hand, students who had a *low academic incentive* were told that their participation in the experiment would equate to a class quiz (roughly 2% of their class grade). While doing the task, students were given a general instruction that explained how they would earn the partial credit. They were told that when they finished the 50 rolls, they had to apply this formula: $320 + (0.6 * x)$ where x

[a] It must be noted that students were actually given this partial credit at the end of the semester, there was no deception regarding the incentive nor the magnitude of it. This type of incentive is usually utilized in the psychology department at the National University of Colombia, so students believed they were going to be rewarded with the partial credit and acted as such. Naturally, this means that if a student cheated then he would have a greater grade.

represents the sum of the 50 outcomes they reported in the paper. Note that x ranges from 50 (a sum of 50 outcomes of "1") to 300 (a sum of 50 outcomes of "6"). Therefore, the result of the formula ranges from 350 (when x is 50) and 500 (when x is 300). This score was then translated to the standard grade scale in the country (min=1, max=5) by dividing it by 100 (e.g., a score of 350 equates to 3.5 in a scale of 5). This means that each student could receive at least a partial credit of 3.5/5 and a maximum of 5/5. The formula was built as such so that no student could be penalized for having bad luck (e.g., the average score in the class at that moment was about 3.2). In this context, students had an academic incentive to cheat in the task because this type of incentive is common in these experiments at Universidad Nacional so students knew the partial credit was real and there was no deception. The other 166 students did not have this incentive because they did not receive any benefit from participating in the study. After the task was finished, partial credit was included in the students' grade sheet and, if requested, additional information about the study and about its scope was given (e.g., a debriefing of the study was given).

In this task, it is not possible to know whether an individual student cheated or not. In fact, as noted by Mann and colleagues (2016), with this method, the participants cheat under conditions of plausible deniability. Nonetheless, when the data is aggregated in groups, it can be analyzed and compared with chance and with the results of other groups. In fact, participants could cheat in two ways: misreporting the outcome of the side that was chosen or making up a roll outcome. That is why most of the analysis was done as follows: we compared the mean outcome of the die task of each group. This mean outcome is the sum of the 50 results divided by 50, as from now we will refer at it as "mean of the task" and it is the independent variable. The expected value of this task is 3.5, which is the expected value of throwing a die. We analyzed, additionally, reported high rolls (rolls between 4 and 6). These analyses were done following Ariely et al. (2015). All the analyses were done with SPPS, Stata, and plots were generated in R. The data and scripts are available at: https://data.mendeley.com/datasets/nsvbbkpbyc/1

4. Results

Participants reported the results of each individual dice roll and the sum and the average of whole task (Appendix D). We conducted a within-subjects analysis comparing the aggregated average

reported by participants with the average of dice rolls. We did not find significant differences between both averages. Therefore, we will use only the reported average in our analysis (mean of the task). Interestingly, this result indicates that if participants altered their results, they did so by changing the report of the individual dice rolls and not the aggregated report. Descriptive analyses (Table 2) show that participants reported added scores that were far from the maximum possible payoff. That is, participants were far from the maximum level of cheating (when the average of the variable mean of the task is 6) and far from the maximum expected payoff (a partial credit of 5). They had an average of 3.6 and a payoff of 4.25/5 in the grading scale.

[Table 2]

4.1. Did Participants Cheat?

To see if there is an incentive effect, we first examined whether the aggregated values of the groups differed or not from the values that would be expected by chance. That is, we analyzed whether or not the mean of the task for each group was close to 3.5. We found, with a 95% significance level, that, among all the participants that were given any percent of partial credit, three of the experimental nudge conditions were significantly different from the expected value: the authoritarian instruction group, $t(69)=4.07$, $p=0.0001$, the code of honor group, $t(71)=3.78$, $p= 0.0003$, and the reasons group, $t(65)=2.43$, $p= 0.0176$. The control group presented a non-significant result. On the other hand, we found that, among the participants that were not given partial credit, the mean of the authoritarian instruction group was significantly different from the expected value, $t(36)=2,21$, $p=0.0328$.

Overall, we found that both groups with and without incentive were significantly different from the expected value (with incentive: $t(268)=5.84$, $p=0.0000$; without incentive: $t(165)=2.11$, $p=0.0362$). Furthermore, we found a significant difference with the expected value for the groups that had a high and a low incentive (high incentive: $t(144)=4.91$, $p=0.0000$; low incentive: $t(123)=3.29$, $p=0.0013$. These results, overall, indicate that it is highly likely that participants modified their scores to obtain higher academic credit. Differences with chance were larger in the

group with any magnitude of incentive than in the group without them. In the following section, we explore this effect.

4.2. Did Incentives Influence Participants' Levels of Cheating?

The participants that had incentives to cheat reported better results than those that did not have incentives, $t(394)= 2.45$, $p=0.015$. This means that, overall, participants who had the academic incentive to cheat, had higher results than the participants who did not have the academic incentive to cheat. They also reported a higher number of high rolls (between 4 and 6) than the non-incentive group, $t(422)= 3.32$, $p=0.0009$. In this case, the homogeneity of variances assumption was not fulfilled, Levene's test$(1,432)=6.17$, $p=0.013$, therefore the result was doubled checked using a Welch correction, $F(1, 422.13)=11.079$, $p=0.000$. Additionally, given that the students that had an incentive were more dishonest, we analyzed how the magnitude of the incentive could vary dishonesty levels. If students were reacting to the presence of incentives, they should be reacting also to their magnitude. Therefore, we compared the group with a high incentive and the one with a low incentive, finding no significant differences (Figure 2).

[Figure 2]

4.3. Do Nudges Reduce Cheating?

When we examined the effects of the nudge conditions on the levels of cheating, we found no significant effect of the different types of nudges included in this study. We did so by conducting two-way ANOVAs in which the incentive condition (with or without incentives) and the experimental groups were entered as between-participants factors. No differences were found between any of the conditions, including the control group. Same results were found when evaluating the condition's effects using one-way ANOVAs: when running the one-way ANOVAs, we did not find significant differences for the experimental nudges neither for the incentive participants (those who were given high or low partial credit), $F(3,265)=0.97$, $p=0.409$, nor for the non-incentive participants, $F(3,162)=0.22$, $p=0.883$.

Given that these results contradicted established theories of cost-benefit analysis in the field, we conducted exploratory analyses regarding the effect of the different types of nudges. Within these analysis, we only found one significant effect. It was an interaction between the type of nudge and the magnitude of the incentives, for the participants that were given a partial credit, $F(3, 261)=2.86$, $p=0.038$. Figure 3 shows that, for this population, an authoritarian nudge produces higher cheating scores in low incentive conditions, and a reasons-based nudge seems to increase the levels of cheating in high incentive conditions. A similar but marginal effect was found for the calculated mean in the dice rolling task, $F(3, 261)=2.288$, $p=0.079$.

[Figure 3]

5. Discussion

The primary objective of this investigation was to evaluate whether academic dishonesty could be influenced by nudges and the effects of different magnitude of incentives. Four types of instructions were analyzed: an authority nudge (group 1), a code of honor nudge (group 2), a nudge that provided logical reasons to conduct the task (group 4) and, finally, no instruction at all (group 3). There was a also a variation in the magnitude of the incentive (some students were given a high academic incentive, others a low academic incentive or no academic incentive at all).

This design was selected to introduce psychologically important variations in the nudges' design. These variations were inspired by moral reasoning research in which the dependence on authority and the autonomous consideration of reasons are important factors in the decision-making process (Martinez & Posada, 2014; Sarmiento & Yañez, 2019). Additionally, some participants had academic incentives to cheat (they were given partial credit that depended proportionately in their task performance), whereas others did not.

Overall, we found that the presence of incentives influenced the levels of cheating. That is, participants that were given an academic incentive (high or low) had higher levels of cheating than the participants that were not given incentive. However, we found no effect of the magnitude of

the incentives. In other words, although participants were conducting cost-benefit analysis because they reacted to possible gains, they did not include the size of gains in their calculations.

Additionally, the levels of cheating were far from the maximum possible gain. In this sense, this article presents a nuanced version of cost-benefit analysis, in which participants strive to obtain gains, but do not take into account all the information in this process -in which case the magnitude of incentives should influence the levels of cheating-, or depend fully in gain maximization -in which case they should cheat until the maximum possible level-. We did not find a significant effect of the types of nudges used in this study.

The lack of effect of nudges can be produced by the fact that we used academic incentives, instead of monetary incentives, as in prior research evaluating cheating and dishonest behavior (Gino et al., 2010; Mann, Garcia-Rada, Houser, & Ariely, 2014; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009; Utkial & Fischbacher, 2013). Mazar et al. (2008) report that if one increases the distance to the payment (they used tokens as an intermediate step for participants to claim the money they earned), people tend to cheat more. In this sense, academic incentives should produce more cheating than monetary incentives, preventing the effect of nudges. Our results can also be interpreted as an effect of the particular context of a high corruption and low human development country, such as Colombia.

Some authors have proposed that in Colombia there is a divorce between law, morality and culture, and that cheating behavior is culturally accepted (Mockus 1994, 1999). In fact, there is a popular saying that stipulates that *the world belongs to the clever ones ("el mundo es de los vivos").* The saying suggests that the route to success is to be a clever one, a *vivo*. "Vivo" means "alive", and it is an expression referring to someone who, regardless of the means, moral or not, gets what he wants and takes advantages of opportunities.

Consequently, many Colombians have been raised in a culture where the end justifies the means and renouncing to gains on moral grounds is seen as foolish. In this context, the effect of nudges can be undermined by the possible gains, and, more generally, by the incentive system of the

experiment. Despite this fact, students did not cheat to the maximum, which also points the possible effect of self-concept maintenance mechanisms (Mazar et al., 2008), even in this population.

Our results prove that incentives beat nudges but not bounded rationality meaning that, in contexts of high corruption, the effect of nudges is undermined by the presence of incentives. However, people behave irrationally in the sense that they do not take into account the magnitude of possible gains. In other words, the students were rational agents up to a certain point, reacting to possible gains, but they did not conduct a thorough cost-benefit analysis. They cheated equally when they could earn high or low partial credit. Additionally, the fact that students did not cheat to the maximum, means that our students are rationally bounded and they want to protect their positive self-concept.

In closing, our study has some weaknesses that should be addressed. While having a 3x4 treatment design study, each group (of the 12 resulting groups) can be underpowered, and this could affect our results and statistical analyses. Moreover, the design and instructions of the experiment are hard to assimilate. This would imply that students did not internalize the instruction so, the priming of the nudge would not work. This could be corrected by making students answer a question regarding the instructions to evaluate if it is understood.

Generalization of the results cannot be done as our population consists of college students in Bogota (Colombia's capital) so the effect of culture in the response to nudges must be further evaluated (by making a representative sample of students in Colombia, for example). Nevertheless, this study sheds information on the effect of incentives regarding grades and it addresses the effectiveness of nudges in different cultures, and research should aim at designing effective nudges in academic settings in contexts of high corruption and low human development.

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Figure 1

Diagram and explanation of the experimental method

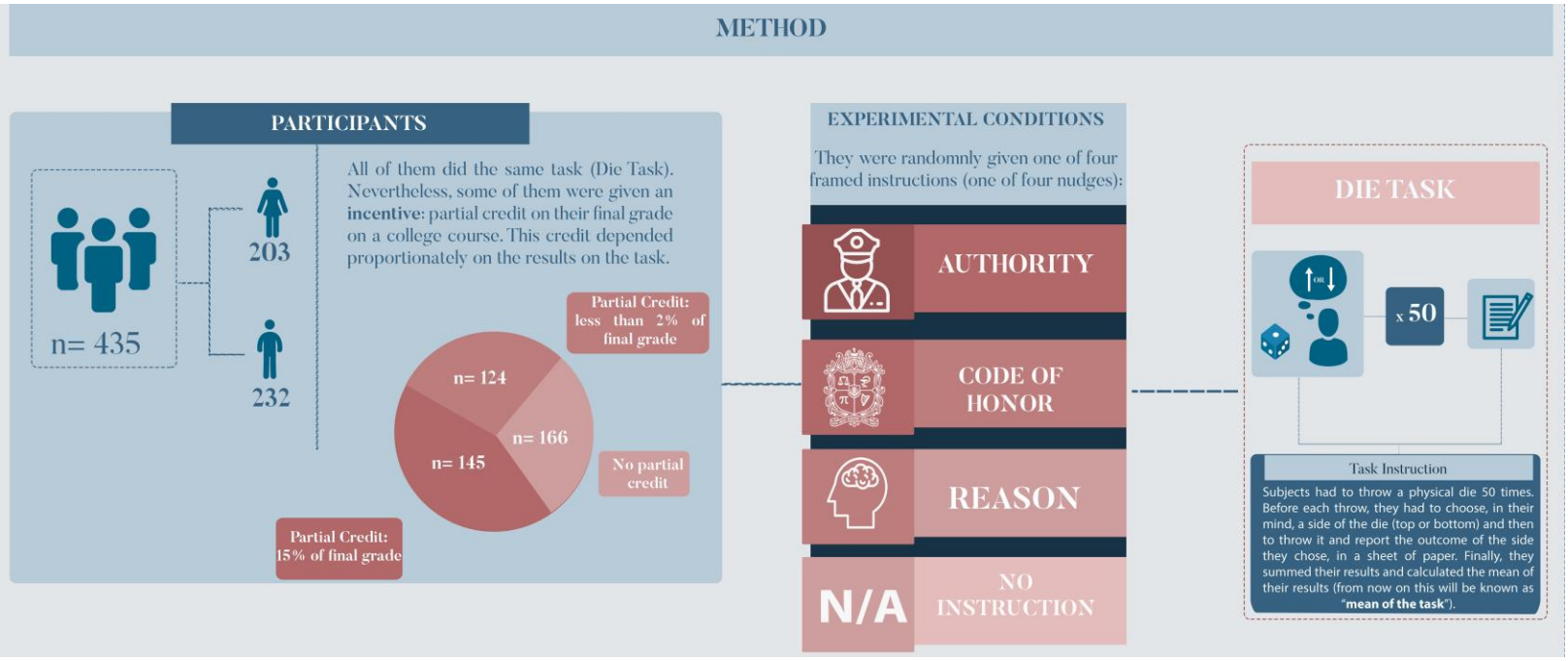


Table 1

Number of participants in each group

	Authoritarian (Group 1)	**Code of Honor (Group 2)**	**Control Group (no nudge) (Group 3)**	**Reason (Group 4)**	**Total**
High Incentive: Partial Credit (15% of final grade)	39	37	35	34	145
Low Incentive: Partial Credit (less than 2% of final grade)	31	35	26	32	124
Total with incentive	70	72	61	66	269
No Incentive: No Partial Credit	37	41	50	38	166
Total	107	113	111	104	435

Note: The grey row is added to for explanatory purposes. It does not represent cells in the 3x4 treatment design

Table 2

Descriptive statistics of the independent variable "Mean of the Task" for all the groups (standard deviations (SD) are in parentheses)

		Authoritarian Code of Honor		Control Group (no nudge)	Reason	Total
High Incentive: Partial credit (15% final grade)	Average (SD)	3.62 (0.28)	3.66 (0.28)	3.61 (0.42)	3.69 (0.44)	3.65 (0.36)
	Min	3	3.14	2.76	3.08	2.76
	Max	4.4	4.34	4.38	5.14	5.14
Low Incentive: Partial credit (less than 2% of final grade)	Average (SD)	3.74 (0.44)	3.61 (0.33)	3.53 (0.36)	3.53 (0.24)	3.61 (0.36)
	Min	2.94	2.19	2.76	3.06	2.2
	Max	4.96	4.14	4.3	4.02	4.96
Total with incentive	Average (SD)	3.68 (0.37)	3.64 (0.30)	3.58 (0.39)	3.61 (0.36)	3.63 (0.36)
	Min	2.94	2.2	2.76	3.06	2.2
	Max	4.96	4.43	4.38	5.14	5.14
No Incentive	Average (SD)	3.58 (0.22)	3.55 (0.34)	3.53 (0.34)	3.53 (0.26)	3.55 (0.3)
	Min	3.06	2.7	2.94	3	2.7
	Max	3.94	4.46	5.08	4.12	5.08
Total	Average (SD)	3.65 (0.33)	3.61 (0.32)	3.56 (0.37)	3.58 (0.33)	3.6 (0.34)
	Min	2.94	2.2	2.77	2.98	2.2
	Max	4.96	4.46	5.08	5.14	5.14

Figure 2

Distribution of the dependent variable "Mean of the task" depending on the magnitude of the incentive (error bars representing standard errors)

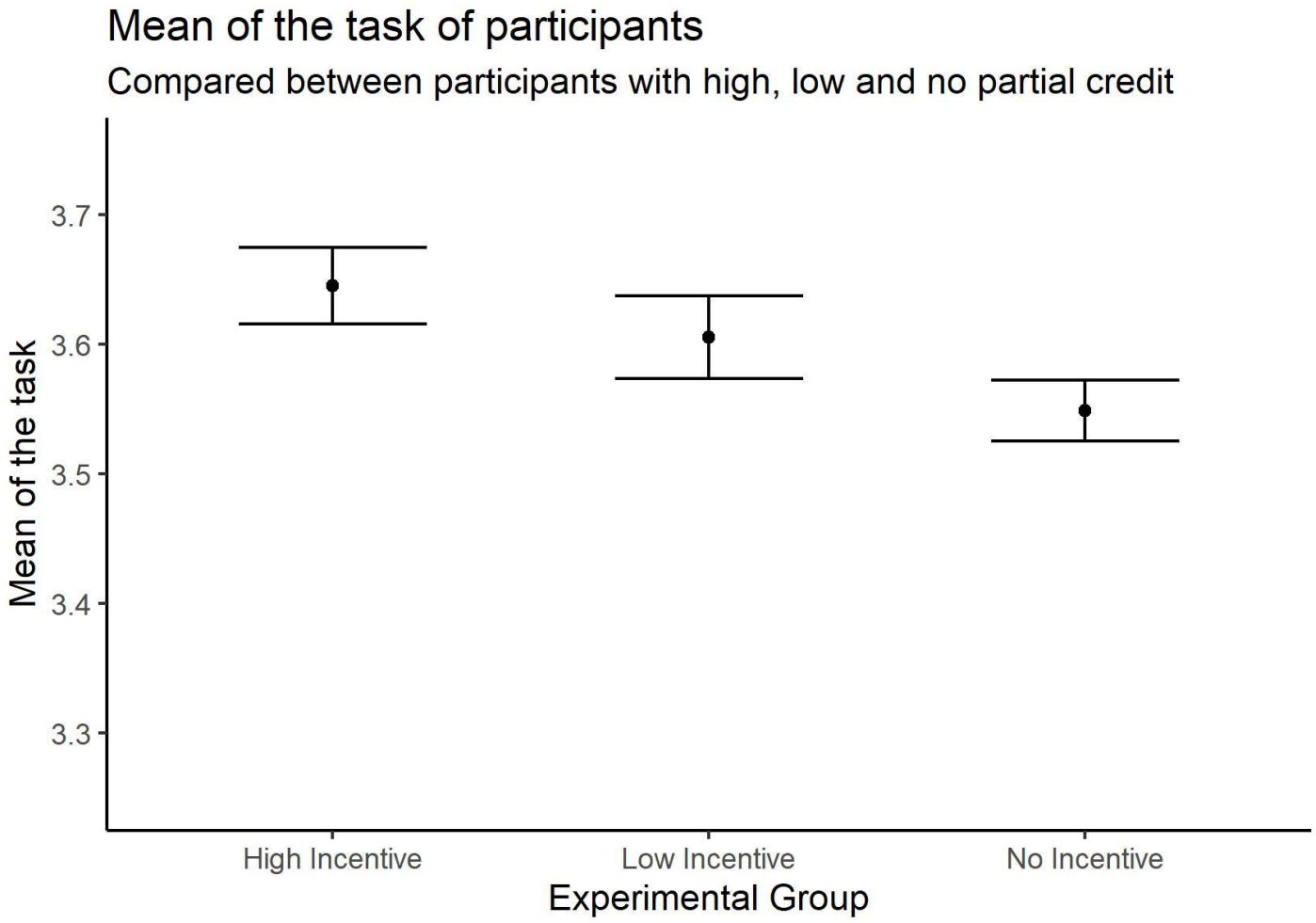
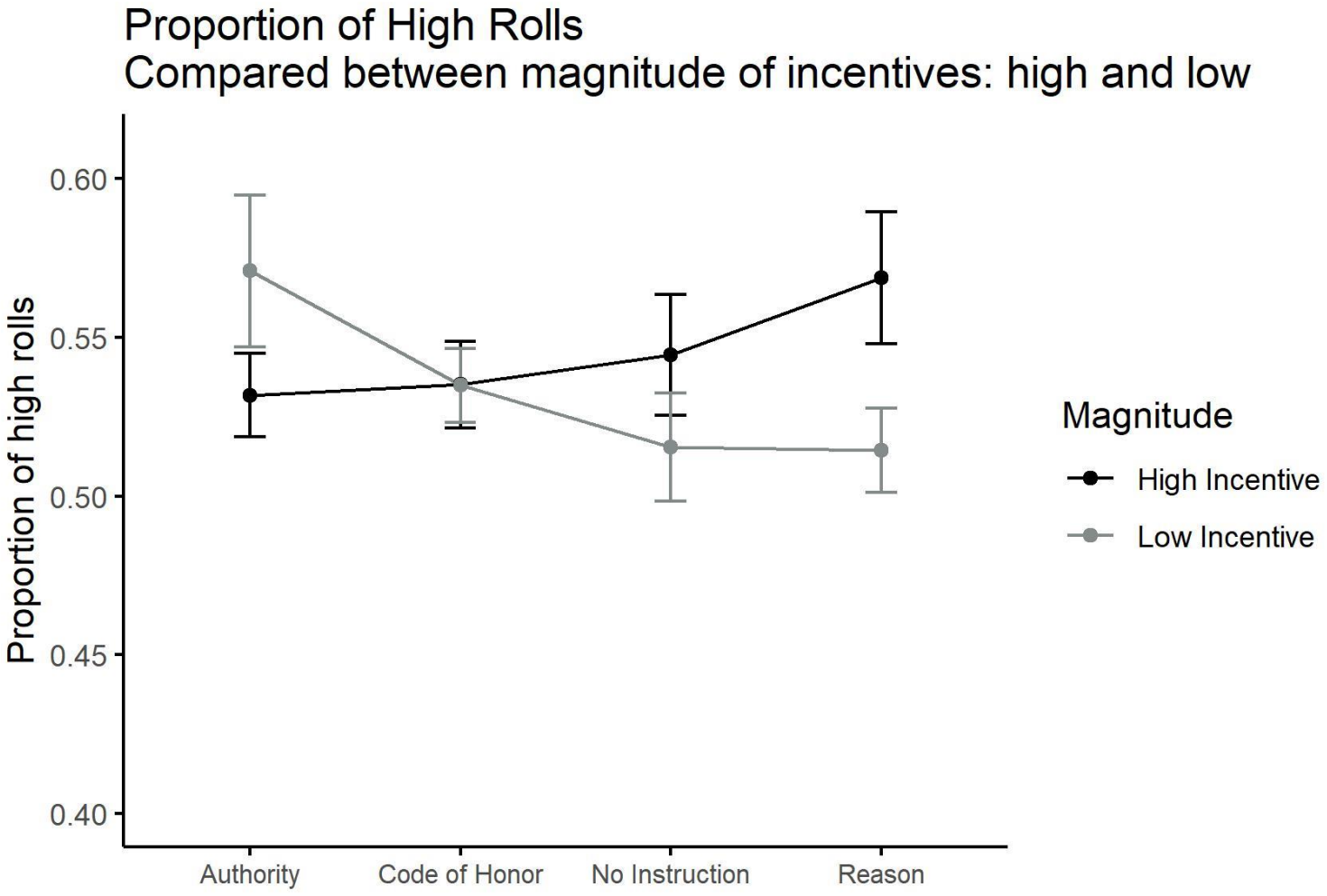


Figure 3

Interaction between magnitude of the incentive and the type of nudge

(error bars represent standard errors)



Appendix A

Group 1: authoritarian instruction

Name and Last Name: _____

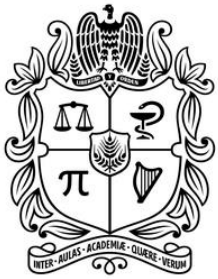
Course:

The chapter VII (DISCIPLINARY ASPECTS) of the agreement 044 of 2009 of the Consejo Superior Universitario (CSU) stipulates in articles 25 and 27 that a sanction will be imposed on a student that commits one of the violatory conducts of the disciplinary aspects of the University. For example, one of the violatory conducts is to alter or to fake documents that are a support for the elaboration of evaluations. If one of those acts should be committed by a student, without prejudice any committed fraud will be sanctioned with a grade of cero point cero (0.0) in the respective assignment. Additionally, any cheating attempt will entail to disciplinary sanctions which could lead to the expulsion of the student (Agreement 044 of 2008, article 44).

Appendix B

Group 2: college's honor code

Name and Last Name: _____



Course:

With my signature, I declare that I understand that this task is ruled by the honor code of the Universidad Nacional de Colombia.

Signature_____

T.I. o C.C:

Appendix C

Group 4: reason not to cheat argument

Name and Last Name: _____

Course:

Multiple studies have shown that in this type of experiments, the capacity of writing quickly and efficiently the outcome of the die and calculating adequately the total sum, improves one's mental ability (Harrison & Izumi, 1984; Harrison, 1975), improves one's vision (Liberman, 2004) and improves one's ability to discard ambiguous questions in multiple choice exams (Baker, Lee, Ward & García, 2001)

Appendix D

Sheet of paper where participants wrote their die outcomes

Throw	Result	Throw	Result
1		26	
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Space for calculation

Total sum (x) : _____ Result of the formula $[\,320 + (0.6 * x)]$: _____