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Can Moral Reminders Curb Corruption? Evidence from an Online Classroom Experiment

Abstract

Using an incentivized online classroom experiment, we assess the effectiveness of deontological vs. consequentialist moral reminders. Participants were told that they are the responsible public servant for acquiring a Covid-19 vaccine, providing them with the opportunity to generate some extra private income by accepting a bribe. Our findings indicate that a deontological moral reminder (“corruption is immoral”) leads to a significant reduction in accepting bribes. A consequentialist moral reminder, pointing out that bribes are costly to taxpayers, shows no significant effect. Furthermore, we do not find any empirical support that male participants are more corrupt in comparison to female participants. Students majoring in economics or business/management show more corrupt behavior than students studying to become economics school teachers, but the difference is not statistically significant. A person’s disposition towards risk appears to have a strong dissuading effects. Our experiment was conducted before and after the unexpected announcement by pharmaceutical companies BioNTech and Pfizer on November 9th, 2020, that they will be able to provide an effective Covid-19 vaccine. This announcement does not correlate with a changed level of bribe-taking.

JEL-Codes: A200, C910, D730, H120, I200.

Keywords: moral reminder, ethics, corruption, dishonesty, economics students, experiment, Covid-19.

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1 Introduction

‘Atypical’ circumstances generate profitable opportunities (Collier and Hoeffler, 2004, p. 564). What is evident when it comes to legal market activities in cases of external shocks such as major demand shifts, is even more relevant for illegal activities. Many of these activities are particularly profitable when—unexpectedly—existing rules or institutional settings are challenged, enforcement turns more difficult or information exchange is confined. Examples for these activities include some types of white collar crime (such as broker embezzlement) and bribe-taking.¹ Less transparency and higher urgency of actions facilitate illegal, morally questionable behavior. In our paper, we take the recent, unexpected outbreak of the Covid-19 pandemic as a starting point for asking whether reminding people of moral obligations may help to reduce corrupt behavior in the form of bribe-taking that suddenly becomes viable. Of course, even under more ‘typical’ circumstances, the question arises naturally how to fight illegal activity.

At least in its beginning, the Covid-19 pandemic was an atypical situation of major uncertainty, in which public support for health measures as well as for workers and firms facing layoffs or bankruptcy, respectively, was granted abundantly and with little control. For instance, generous public payments for Covid-19 rapid tests by private test centers lead to extensive fraud in Germany² (Connolly, 2021). Against this backdrop, the pandemic appeared like a particularly interesting testing ground for the functioning of two different reminders to not engage in morally questionable activities despite the apparent profitable opportunities that come with them. In our paper, in which we conducted an incentivized classroom experiment with university students, this opportunity came as a bribe from a producer to a public servant who is responsible for buying Covid-19 vaccine doses for the domestic population.

More specifically, we assess the effectiveness of deontological versus consequentialist moral reminders. In ethics, deontology refers to a theory assuming that the morality of an action is based on whether that action itself is right or wrong given certain rules. These rules, which may, e.g., be derived from a set of personal or cultural values, imply a moral obligation. For instance, bribe-taking or, more generally, corruption is usually seen as wrong for various reasons and an individual may want to avoid it because of its immorality. In contrast, consequentialist ethics judges an act as right and moral if it generates a greater good than any other alternative. Hence, corruption may be deemed acceptable if it ‘greases

¹In their original paper, Collier and Hoeffler (2004) provide a greed-based explanation of rebellions using this argument.

²German Covid-19 rapid test centers received €18, plus material costs, for each test carried out. Neither a careful documentation nor strict quality controls regarding the testing procedure were required by the government.

the wheels' in, e.g., an institutionally weak country and unacceptable if it 'sands the wheels' (e.g., Méon and Weill, 2010; Heo et al., 2021).³

While most individuals strive—more or less successfully—for ethical behavior in their everyday life, we nevertheless hypothesize that it makes a difference whether or not a decision-maker is reminded of basic ethical rules before actually making a decision. The participants in our experiment were told to be the responsible public servant in the German federal health administration for acquiring Covid-19 vaccines from one of two producers. A decision had to be made whether to buy the vaccine at the regular price, thereby keeping expenditures low and saving taxpayers' money, or at a higher price where part of the money paid is actually channelled back to the participant as a bribe. It was brought to the participants' attention that 'corruption is immoral' through a deontological moral reminder, while the consequentialist moral reminder pointed out the negative consequence that bribes are costly for taxpayers. The control condition received no reminder at all.

To preview our main result, we find that the deontological moral reminder leads to a significant reduction in accepted bribes compared to the control group, if there is a risk of being detected, and the consequentialist treatment. In contrast, the consequentialist moral reminder has no statistically significant effect on bribe-taking. Further interesting results include that we do not find any empirical support that males behave generally more corrupt than females. Among our participants, economics and business majors do not appear to be more corrupt than future economics school teachers. This result depends, however, on personal attitudes toward risk and morality.

Coincidentally, we conducted our online classroom experiment before and after the announcement of the collaborating vaccine producers BioNTech (Germany) and Pfizer (USA) on November 9, 2020, that they will be able to provide a highly effective Covid-19 vaccine within a few weeks of time (conditional on national health authorities' approval). This announcement hit the global news and made shares by Pfizer and BioNTech jump up by 11% and 12% (Jolly and Wearden, 2020) on that day alone. From one day to the next, our experimental setting was no longer an abstract and hypothetical exercise but favorable coverage in the media suggested that vaccine production would be a very realistic, multi-billion dollar business. This reality shock can also be observed in our data. The BioNTech/Pfizer announcement indeed correlates with a higher average, albeit not significant, level of bribe-taking behavior among students who participated in our experiment after November 9. Our explanation for this finding is that the more realistic setting helped participants to better put themselves into the situation of the public servant who was said to be responsible for acquiring vaccine doses. Given the financial dimension of

³Farzanegan and Hofmann (2021) find that countries with higher levels of public corruption were less successful in the vaccination of their populations; that is, corruption actually sanded the wheels of the vaccination process.

the vaccine business that became visible through the enormous media coverage, it might in fact be the case that some participants started to imagine dirty deals around the acquisition of—initially extremely scarce and valuable—vaccines.

Our study relates to several strands of literature. First, it is related to the economics of crime literature (Becker 1968) with a special focus on the economics of corruption (for recent surveys, see, e.g., Dimant and Schulte 2016; Dimant and Tosato 2018). Second, we refer to those studies that investigate individual responses to situations presenting an opportunity to behave illegally and to benefit from such behavior. Here, the literature on self-image theory and self-concept maintenance (Aronson 1969) indicates that individuals try to avoid illegal behavior like cheating, lying or bribery in order to keep up a certain level of morality (e.g., Fein and Spencer 1997; Mazar et al. 2008; Shalvi et al. 2015).

Third and as one novelty of our paper, we are—to the best of our knowledge—among the first to examine the effect of moral reminders on bribe-taking and corrupt behavior. There is a related strand of the literature dealing with moral reminders and dishonesty as well as cheating (e.g., Mazar et al. 2008; Pruckner and Sausgruber 2013; Grym and Liljander 2016). Our paper is, fourth, related to the literature on whether economics and business students behave differently than students in other disciplines when it comes to, e.g., selfishness, rationality or—in this case of particular interest—corruption (Frank and Schulze, 2000; Schulze and Frank 2003). Fifth and finally, we resort to the literature on gender effects on corruption (Swamy et al. 2001; Rivas 2013; Alatas et al. 2009; Arnantier and Boly 2011).

Our experiment with some 1,400 participants is set up to not only capture the different framing of moral reminders, where participants were primed using either a consequentialist or deontological moral reminder before they had to choose to (not) take a bribe and thus (not) be corrupt. The risk of getting caught after taking the bribe was furthermore introduced in some treatments. We employ a moral and risk self-assessment, age, gender, and the field of study as controls. The experiment was conducted at the Universities of Freiburg and Siegen, both located in Germany, during eleven lectures of varying sizes for economics majors and minors as well as students aiming to become economics school teachers. It is noteworthy that when a person studies to become a school teacher in Germany, he or she has to choose a second subject, ranging from PE over foreign languages to STEM; however, we do not find the second subject to hold a significant influence on bribe-taking in itself.⁴

The remainder of our paper will proceed as follows. In section 2, we will provide a more thorough discussion of the literature and derive hypotheses for our experiment. The design of the online classroom experiment will be provided in section 3. Section 4 provides the results and discusses them, followed by concluding remarks in section 5.

⁴This is why results are not reported in the remainder of the paper; they are available from the authors upon request.

2 Related Literature and Hypotheses

Corruption is a complex social phenomenon with severe negative effects on society, politics, and the economy. Academic research has investigated its roots as well as its consequences extensively in order to provide a scientific foundation for effective anti-corruption policies. The results of this research in the field of economics have been summarized in various survey articles by, *inter alia*, Tanzi (1998), Rose-Ackerman (1999), Jain (2001), Aidt (2003), Lambsdorff (2006), Treisman (2007), Lambsdorff and Schulze (2015), Dimant and Schulte (2016), and Dimant and Tosato (2018).

Our paper relates to the question how effective anti-corruption policies ought to be designed. We are less interested in grand corruption at the macro level, but more in everyday situations in which opportunities for agents open up to take bribes or embezzle money. Whether or not these opportunities are used depends to some degree on social norms, culture or values that shape individual behavior at the meso level (Dimant and Schulte, 2016). More specifically, we start at the presumption that the influence of norms within groups in addition to individual norms shape the decision process towards or away from choosing morally questionable outcomes (Dimant and Schulte, 2016). Against this backdrop, we argue that existing norms may not always be salient but can be evoked through moral reminders.

Recently, moral reminders and moral suasion have attracted an increasing interest of researchers in the social sciences. The literature considers various dimensions of the issues with respect to, e.g., the type of behavior to be induced (e.g., ‘do’ vs. ‘don’t do’), the type of underlying norm (e.g., social, religious), the way of delivery (e.g., written vs. verbal), and the type of reminder or message (e.g., descriptive vs. injunctive). Our analysis relates to the latter, i.e., the type of reminder which may be deontological vs. consequentialist. To the best of our knowledge, this question has rarely been considered in the literature so far and, in particular, not in connection with corrupt behavior and bribe-taking, as we will show in the following.

While parts of the literature deal with ‘doing the right thing’ after a moral reminder (e.g., Dal Bó and Dal Bó, 2009), our focus is on social norms and moral reminders in cases of potentially illegal behavior, such as theft, fraud, corruption and tax evasion,⁵ which is sought to be reduced. Experiments in both the field and the lab provide important insights on whether reminders work and, if they do, which reminders work best. Typically, ‘priming’

⁵Moral reminders and related concepts, such as self-image theory, have also been applied to prison inmates and criminals in order to investigate whether they have a different set of norms and possibly cheat more than other groups in society (e.g., Fein and Spencer, 1997; Cohn et al., 2015; Bryan et al., 2013). Findings show that most people try to avoid being grouped together with criminals, leading to more honest behavior, unless someone already is a criminal in which case amoral behavior was strengthened.

of participants is used in these experiments, i.e., a treatment group is exposed to a message containing the reminder before a decision task has to be performed (Welsh and Ordóñez, 2013).

Cialdini et al. (2006) provide evidence that theft of petrified wood in Arizona's Petrified Forest National Park can most successfully be reduced by reminding visitors not to take the minerals with them through negatively framed and injunctive normative messages ("Please don't remove the petrified wood from the park"). In contrast, any descriptive message ("Many visitors have...") tends to result in undesired outcomes because it normalizes theft. In a similar vein, once bribe-taking was displayed to participants in a lab experiment as a common behavior by Köbis et al. (2015), they engaged in more corrupt behavior themselves. In contrast, Hallsworth (2017) finds that social norm messages containing descriptive norms had a bigger effect than injunctive norms when it came to tax compliance, suggesting that effects differ depending on the situation.

Torgler (2004), using normative moral appeals in cases of tax filings and compliance, in addition to Fellner et al. (2012), who consider a moral reminder to register for the compulsory TV license fees in Austria, find little to no support that these reminders are effective. In a field experiment, Puckner and Sausgruber (2013) find moral reminders to increase the amount paid for a newspaper at self-service newspaper stands, but not to reduce the number of newspapers taken without paying.

Abstracting from the societal level and actual criminal activity, experimental studies have also been conducted on incentives for individuals to cheat or take low-value goods. A number of lab experiments finds that cheating in a university context is reduced once student participants signed an honor code (e.g., Grym and Liljander, 2016; Shu et al., 2011; Bing et al., 2012). Furthermore, after reciting the Ten Commandments as a religious moral reminder, participants stopped cheating altogether in an experiment by Mazar et al. (2008). By exposing participants to either a relativist or absolutist moral argument against female genital mutilation, Rai and Holyoak (2013) observe that those treated with the latter argument were less inclined to petty theft. Reminding participants of the relativity of morality increases immoral behavior.

Even closer with respect to the type of moral reminder used in our analysis is Bos et al. (2020). They explicitly applied consequentialist vs. deontological moral reminders, however, not in the context of curbing illegal but encouraging pro-social behavior. Using an online survey to check the compliance to public health measures with the goal of reducing the spread of Covid-19 in Germany, the authors primed participants with either a consequentialist reminder, which highlighted the beneficial consequences of social distancing and washing hands for the health of others, or a deontological reminder, calling upon one's moral duty to prevent spreading Covid-19. Both reminders showed significant effects in case of planned hand-washing, but only the deontological reminder affected social

distancing significantly and in the desired direction.

By examining neural activity during moral dilemmas on a personal or utilitarian level, Greene et al. (2004) found that parts of the brain associated with social-emotional functions become more (less) active for deontologist (consequentialist) moral judgments, and vice versa for information drive and cognitive areas. Situations that violated one's personal set of moral rules but were still deemed preferable considering their outcomes elicited longer response times than situations with impersonal characteristics, hinting towards active (sub)conscious evaluations when potentially digressing from one's engrained moral preferences. Both facts strongly suggest that moral judgements are not only depending on the applied moral philosophy and context, but also the neurological processes evoked during the decision making.

While the above presented evidence does not provide a uniform picture, it nevertheless appears that on average, moral reminders seem to affect individual behavior. Furthermore, there is some evidence that moral reminders, if at all, are effective primarily when they appeal to personal norms and values, i.e., if they are deontological moral reminders. Summarizing these findings, we state our first hypothesis in the following.

Hypothesis 1 *(a) Reminding individuals of the immorality of corrupt behavior makes them more likely to refrain from behaving corruptly.*

(b) Deontological moral reminders reduce corrupt behavior more than consequentialist moral reminders.

According to Becker (1968), rational utility-maximizing individuals carefully weigh the benefits against the (opportunity) costs of conducting a crime. Comparative-static analysis predicts that an increasing detection probability will raise the expected cost of crime, thereby ceteris paribus changing the individual cost-benefit calculus in a way that makes criminal activity less likely. Empirical data support Becker's model (Almer and Goeschl, 2010; Nagin, 2013), showcasing that stronger sentencing or a higher probability to be caught deters potential criminals. Fisman and Miguel (2007) find that parking tickets for diplomats were linked to the corruption levels in their home country, and that issuing them decreased such parking violations by 98% in New York City. This leads us to our second hypothesis.

Hypothesis 2 *The probability of corruption being detected leads to less corrupt behavior.*

In addition to our two main hypotheses, we have three auxiliary hypotheses which we will test as well.

First, our analysis allows to compare the behavior of men and women. There is large but inconclusive literature on the gender-dishonesty nexus as well as the gender-corruption

nexus. In the gender-dishonesty literature, inter alia, Houser et al. (2012), Bersoff (1999), Dreber and Johannesson (2008) and Lewis et al. (2012) find a tendency of males to behave more anti-social by cheating and lying more. No significant differences between sexes have been found by, inter alia, Cappelen et al. (2013), Childs (2012), Gylfason et al. (2013), and Lundquist et al. (2009), while Erat and Gneezy (2012) even find that women lie more once it is an altruistic lie that benefits other actors.

A similar picture can be found in the literature on the gender-corruption nexus that asks which sex is more tolerant to corruption. While Frank and Schulze (2000), Breen et al. (2017), Chaudhuri (2012), Rivas (2013), Swamy et al. (2001), Torgler and Valev (2010), Stensöta et al. (2015), and Lambsdorff and Frank (2011) find a stronger tendency of males to behave more anti-social by accepting and/or offering bribes, Armentier and Boly (2011) found no difference between sexes. Alatas et al. (2009) assume a dominance of cultural over gender explanations for corrupt behavior. Given this mixed evidence, we remain agnostic about the expected sign of our gender variable on bribe-taking in our experiment.

Second, the vast majority of participants of our experiments are either *economics and business* students or *economics education* students. We will compare these two groups with one another. In fact, there is a large literature suggesting that economics students behave differently from other students in terms of being more self-interested and, arguably, more open to dishonest behavior if they benefit from it. For instance, Lundquist et al. (2009) and Childs (2013) find that economics majors have a significantly higher probability of lying about their private information when this provides them with an advantage compared to others. In an experiment that is reminiscent of ours by putting a participant in a situation in which she has to decide whether or not to take a bribe, Schulze and Frank (2003) and Frank and Schulze (2000) provide evidence for more corrupt behavior of economics students. According to Ruske (2015), members of US Congress with an economics degree have an almost two-times higher corruption rate (13 percent) than those with a non-economics background (6,9 percent). In a dice-in-a-cup experiment by Lewis et al. (2012), economics students lied significantly more often than psychology students. Interestingly, in an experiment by Muñoz-Izquierdo et al. (2019), economics students behaved completely honest when choosing between an altruistic punishment in the form of a donation or cheating, and even returned ‘lost’ money more frequently (Yezer et al., 1996). Based on these findings, we expect economics students in our experiment to be more likely to take the bribe (at least as long as there is no positive detection probability) than students with a different background.

Third, during our experiment (and surprising for us), vaccine producers BioNTech and Pfizer announced that they will be able to provide an effective Covid-19 vaccine in the near future. Since our experimental setting included the—initially purely hypothetical—situation of a public official being in charge of ordering Covid-19 vaccines, the announcement by

BioNTech/Pfizer, which was accompanied by extensive global media coverage, made our setting much more realistic. This may have helped participants to more realistically and precisely gauge the decision at stake. For instance, they may have become aware of the enormous potential for making profits from vaccine production or concerned about the resulting market power of the producers, esp. of a global player like Pfizer⁶, in the production of highly important vaccines as well as their grip on IPRs related to *messenger ribonucleic acid* (mRNA) technology.⁷ We cannot exclude the possibility that the vaccine announcement may not only have had an effect on participants' decisions but could also have affected bribe-taking behavior. However, the underlying decision-making processes are difficult to predict and even if we understood their complexities, our experiment cannot capture them fully because it was not set up to test respective hypotheses in the first place. Nevertheless, we will compare pre- and post-announcement decisions by the participants.

3 Experimental Design

During eleven economics, business and economics education lectures at the Universities of Freiburg and Siegen, Germany,⁸ students had the opportunity to participate in our experiment on a voluntary basis. All lectures were held online, giving students the choice not to participate and instead use the allotted 15-minute time-slot at will. Even so, almost all present students chose to participate. The experiment was run using ClassEx (Giamattei and Lambsdorff, 2019), which facilitates economic experiments in a classroom setting. Students were provided with a direct link to the experiment as well as a QR code to maximize accessibility. All participants who finished the described tasks were automatically entered into a lottery with two simultaneous draws where they could, depending on their choice, win €20 (which corresponds to the amount of the supposed bribe per vaccine dose in our experimental instructions).

The experiment started with a questionnaire, collecting information about age, gender, the participant's subject of study, the number of terms studied, a moral self-assessment, a risk self-assessment, and a unique, non-identifiable student code.

In the moral self-assessment, we asked students how much they agreed or disagreed with the statement that “[n]owadays one often has trouble deciding which moral rules are

⁶Compared to Pfizer, the small German co-producer BioNTech was basically unknown to the public before the pandemic.

⁷This technology is still mostly experimental. Its first major commercial use was indeed during the Covid-19 pandemic when mRNA-based vaccines (by producers BioNTech/Pfizer and Moderna) received restricted authorisation and were rolled out around the world.

⁸A list of all classes and dates is provided in Appendix A.

the right ones to follow” on a scale from 0 (= *I totally agree*) to 10 (= *I totally disagree*).⁹ This question was chosen to assess the participant’s moral salience and to be able to control for their attitude towards moral dilemmas. For the risk assessment, students had to describe their risk-taking behavior (e.g., Stensöta et al., 2015), ranging from 0 (= *I am very willing to take risks*) to 10 (= *I am very risk averse*).

Students were able to indicate that they study multiple subjects. Since the experiment took place in lectures that are cross-listed for economics and business as well as economics education students at both the bachelor and master level, almost all participants who were not on the education track were pursuing a regular major or minor in either economics or business/management. In Germany, students who are on the education track aiming to become school teachers typically have to choose two subjects. Therefore, all students who chose the education track were asked to provide information on their second school subject.

After filling out the questionnaire, participants were asked to put themselves into the following hypothetical situation: Serving as a high-ranking member in the German Federal Ministry of Health, they are responsible for choosing from which company to order a Covid-19 vaccine. Only they (and neither politicians nor the public) know the true offered price for said vaccine. There were two offers to choose from. Company 1 offered the vaccine at a price of €20 per dose, which corresponds to the (eventual) market price. Company 2 offers the vaccine at €40, which included a commission of €20 that would be transferred into the civil servant’s private bank account. This was the amount of money that participants could actually earn from the experiment. Under current German anti-corruption legislation and commonly known in the German population, keeping these €20 is considered an unlawful acceptance of money for personal gain by a public official. The participants thus had to make a choice whether or not to engage in corrupt behavior, without corruption being explicitly named in the experiment’s instructions.

In the baseline treatment, participants were only given the previously described decision task of whether or not to accept the €20 bribe. Two further treatment dimensions were added to the experiment. First, we allowed for two types of moral reminders, leaving us with three dimensions with respect to moral reminders: *No moral reminder*, a *deontological moral reminder*, and a *consequentialist moral reminder*. Moral reminders were given to the participants directly before their decision on whether or not to take the bribe.¹⁰ For the deontological moral reminder, we chose the line “Corruption is immoral”, and for the consequentialist moral reminder, we issued the warning that “[d]epending on how you decide, corruption can be at the expense of taxpayers.”

⁹This question is taken from the 2017-2020 World Value Survey (Wave 7, Q176; see Haerpfer et al., 2020).

¹⁰More specifically, the respective line which included the reminder was displayed right above the selectable choices.

Second, we introduced a risk, set at 25%, of getting caught by the German Federal Audit Office while taking the bribe. If a participant got caught, he or she could not keep the bribe, meaning that the payoff was zero. No further punishment was administered. We administered this risk treatment to half of the students in each moral reminder treatment as well as the control group. Hence, we employ a 2x3 experimental design with six treatment groups.

Up to this point, the experimental design resembles what we planned to investigate originally. Unexpectedly, the announcement of the first Covid-19 vaccine by BioNTech/Pfizer was made after we had collected the bulk of our observations in the large introductory economics and business/management classes in Freiburg and Siegen. Four groups of students, making up approximately two-thirds of all observations, had already participated in the experiment when the announcement was made. Two further runs of the experiment were already scheduled for the days after the announcement. We added another five smaller lectures to collect additional post-announcement observations to allow for more substantiated comparisons with pre-announcement decisions. For a more detailed timeline and cohort composition by lecture type, please refer to Appendix A. It should be noted that participants in the later added classes might not have been novices in economic reasoning because some of these classes were also open to students in higher semesters. While we control for first-semester students in our empirical analysis, we cannot exclude the possibility that comparability is limited.

Taken together, 1,406 students participated in our experiment. However, not all participants finished the experiment. We dropped all observations that were incomplete attempts, economics and business minors, as well as students from other fields of study, e.g., engineering students, who participate for elective credits. Thanks to the unique student code, students participating in multiple lectures could be identified and only the first participation was counted. In fact, many students made a second or even third attempt possibly to increase the likelihood of being drawn as a winner in the €20 lottery. In total, close to 200 observations were re-runs of the online experiment. While we dropped these observations, too, because we were interested in analyzing the behavior of first-time participants only, the fact that there were so many re-runs makes us confident that the experiment was clearly understood and well-incentivized.¹¹ After excluding all of these students, we were left with a total of 1,044 viable observations.

¹¹We consider the group of students with multiple participations in the experiment in a separate analysis in sub-section 4.3 below.

4 Results

4.1 Descriptive analysis

Table 1: Summary statistics.

Variable	Mean	Std. Dev.	N
Corruption	0.216	0.412	1044
No Reminder	0.325	0.468	1044
Deontologist Tr.	0.324	0.468	1044
Consequentialist Tr.	0.352	0.478	1044
Detection Tr.	0.506	0.5	1044
Econ./Bus. Stud.	0.297	0.457	1044
Teachers	0.706	0.456	1044
Econ./Bus.-Teach.	0.701	0.458	1044
STEM-Teachers	0.103	0.305	1044
SocScience-Teach.	0.161	0.368	1044
Languages-Teach.	0.436	0.496	1044
Male	0.449	0.498	1044
Freshmen	0.517	0.5	1044
Moral Asses.	0.476	0.262	1044
Risk Asses.	0.492	0.244	1044
Age	21.817	3.111	1044
Post-Vaccine Ann.	0.325	0.468	1044

Note: All values except for *Age*, *First-Term*, and the *Moral and Risk Assessments* were coded binary with the default (1) being true and (0) false.

Before we turn to the results of our experiment, let us briefly discuss some descriptive statistics. The respective summary statistics can be found in Table 1. Most importantly, 21 percent of the 1,044 students (average age 21.8 years, half of the students being freshmen) chose to accept the €20 bribe. Students were almost exactly evenly distributed across all six treatments, i.e., the consequentialist, deontologist and control treatments, with and without the risk of being detected, respectively. The sample is slightly skewed towards female participants (55 percent) and education students (70 percent), which together can be explained by a generally higher popularity among women to become a school teacher. There were 421 female students but only 313 male students who studied with this goal in mind. For non-teachers, the gender distribution was almost even. Finally, out of the

education students with economics as their first subject, 15 percent studied another social science (e.g., politics) as their second subject, 62 percent a foreign language (e.g., English), and 23 percent a STEM subject (e.g., chemistry, mathematics).

Our main result is presented in Figure 1, which illustrates the average treatment effects of the experimental and control conditions. The bars in the lower two rows show the control treatment (no moral reminder) with and without the risk of getting caught. The bars in the two rows in the middle refer to consequentialist treatment effects, again without and without a detection risk, while the upper two bars of Figure 1 indicate analogous results for deontological moral reminders.

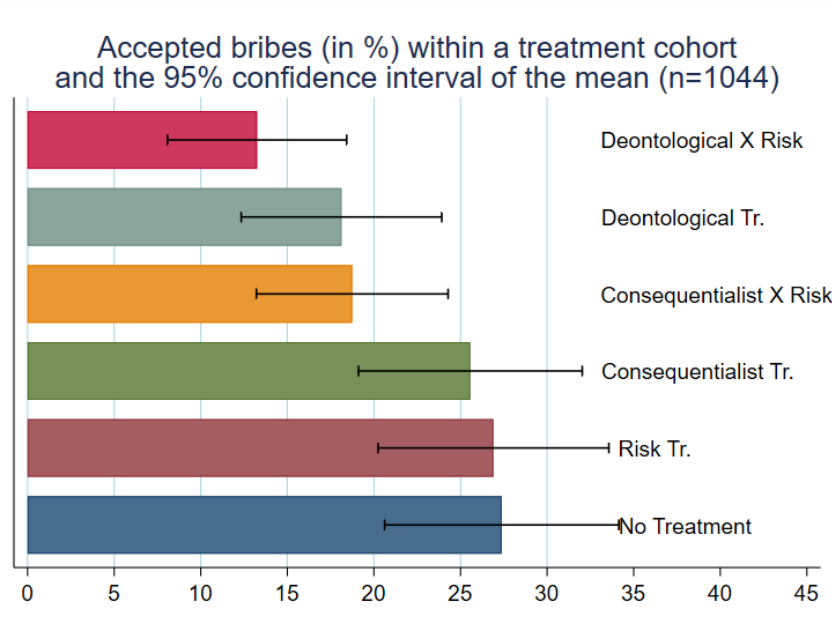


Figure 1: Baseline and treatment cohort's average choice of being corrupt (1) or not (0) with an even distribution of participants across all cohorts.

A first important observation is that the level of corrupt behavior is high in the control treatment and well above the average level of 21 percent, regardless of whether there is a risk of being caught or not. The fact that the additional risk has no effect on corrupt behavior is somewhat surprising.

Interestingly, in the consequentialist treatment without risk a comparably high level of bribe acceptance is achieved. Apparently, reminding participants of the negative consequences of corruption to taxpayers does not affect their behavior. However, once the risk of getting caught is added to the consequentialist moral reminder (see row 3), bribe taking occurs less often. One possible explanation is that the consequentialist reminder

makes participants aware of the illegality of corrupt behavior, thereby evoking a fear of negative personal consequences (although they were not part of the experiment). Hence, the reminder does not affect moral sentiments but leads to a re-evaluation of the risk involved in this situation.

The second main result of our experiment is that deontological moral reminders strongly reduce the observed level of corruption compared to the control treatment. This drop is, however, significantly different from the control treatment only in the case of the deontological treatment with risk. Here, the moral reminder seems to work particularly well. Note that we do not observe a statistically significant difference between the consequentialist moral reminder with risk on the one hand and the deontological moral reminders on the other hand.

Hence, we find support for hypothesis H1(a) that reminding individuals of the immorality of corrupt behavior makes them more likely to refrain from corrupt behavior conditional on the type of moral reminder in use. At the same time, our results do not lend sufficiently strong support to hypothesis H1(b) that deontological reminders reduce corrupt behavior more than consequentialist reminders.

Figure 2 depicts the average treatment effects of the treatment and control conditions for female and male participants, respectively.¹² It can be observed that male participants react differently to the treatments compared to female participants. Female participants show a more pronounced reaction to moral treatments when those are combined with a detection risk, whereas male participants are less responsive to an increase of this risk, except for the interaction of the risk self-assessment and the risk treatment. Here, male participants reacted more strongly in their risk aversion. At the same time, men are on average somewhat more willing to take bribes than women, although the difference is not statistically significant (with $\tilde{\chi}^2 = 0.2753$, $p = 0.600$). For both the general and the gender-specific effects we can conclude that a higher probability of being detected leads to less corrupt behavior conditional on a moral reminder, the risk assessment and sex of the person who is treated. Hence, hypothesis 2 cannot generally be confirmed but only for specific settings.

Finally, Figure 3 gives an overview of the effects of the BioNTech/Pfizer announcement about the future availability of a Covid-19 vaccine, containing the effects for all six treatments. The aggregate level of corruption increased after the announcement, but not at a significant level. Closer inspection indicates that the driving factor in this increase is the deontological moral reminder in combination with risk. This treatment group more than doubled its corruption rate. However, these results should be taken with a grain of salt, as

¹²Note that we only differentiate between females and males, as we had too few participants (2) for meaningful statistical inference who indicated their sex as “diverse”.

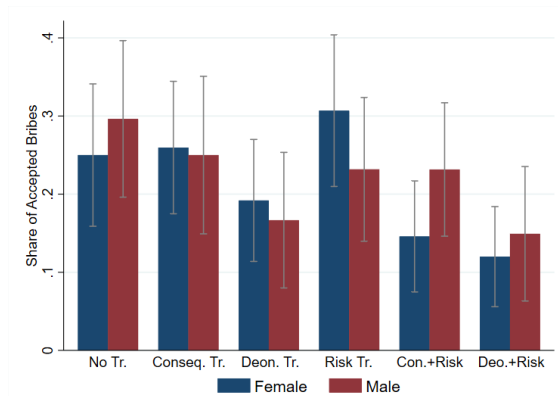


Figure 2: Treatment effects based on gender.

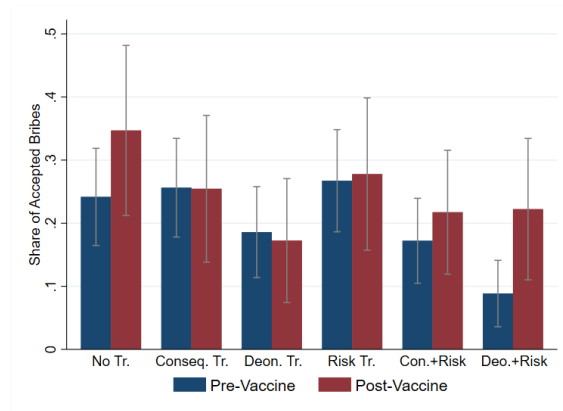


Figure 3: Effects of the vaccine announcement.

the majority of participants (705 vs 339) was treated before the announcement was made.¹³ Nevertheless, the surprising news of a vaccine being found arguably led to the effect that participants perceived the experimental setting more realistic, leading to a more considerate evaluation, as they found it easier to put themselves into the profitable situation of the person responsible for ordering vaccines.

4.2 Regression analysis

The main results from our econometric analysis are displayed in Table 2 and corresponding Figure 4. For all specifications, the deontological moral treatment has a negative and significant effect on corruption (in specification (3), the significance level is somewhat lower at 10% only). As shown above, gender does not correlate with a higher prevalence for corruption. In addition, the consequentialist moral reminder treatment has a negative but insignificant effect on the prevalence of corruption in our experiment, once personal attitudes toward risk and morality are controlled for. Hence, we conclude that a deontologist treatment has a stronger effect of reducing corruption by reminding an individual that it is immoral to accept bribes. In comparison, participants apparently were not impressed by the information that corruption might be at the expense of the tax-payers. In fact, this was—in a certain sense—an externally valid claim since the participants were paid with tax-payers' money through university funds. At the same time, the consequentialist treatment had no significantly different effect compared to the control condition as shown above in Figure 1.

¹³Note that we refrained from further classroom experiments as we had already approached the maximum cohort sizes at the two universities involved in this experiment.

Table 2: Main logit regression results.

Model	(1)	(2)	(3)	(4)	(5)	(6)
Deontological Tr.	-1.207*** (0.211)	-0.700*** (0.247)	-0.700*** (0.250)	-0.492* (0.261)	-0.689*** (0.247)	-0.741*** (0.251)
Consequentialist Tr.	-0.772*** (0.187)	-0.285 (0.219)	-0.285 (0.223)	-0.0673 (0.238)	-0.272 (0.219)	-0.339 (0.222)
Risk Tr.	-0.679*** (0.191)	-0.195 (0.224)	-0.195 (0.228)	0.0291 (0.239)	-0.187 (0.225)	-0.232 (0.224)
Deont. X Risk	0.285 (0.363)	-0.218 (0.391)	-0.218 (0.391)	-0.430 (0.387)	-0.233 (0.391)	-0.200 (0.393)
Conseq. X Risk	0.326 (0.319)	-0.168 (0.337)	-0.168 (0.339)	-0.457 (0.350)	-0.184 (0.337)	-0.153 (0.337)
Male	-0.178 (0.140)	0.0140 (0.148)	0.0140 (0.149)	0.0743 (0.151)	0.0246 (0.148)	-0.0147 (0.149)
First-Term Students	-0.481*** (0.134)	-0.284** (0.144)	-0.284** (0.144)	-0.162 (0.151)	-0.259* (0.148)	-0.300** (0.151)
Moral Assessment		-0.541** (0.259)	-0.541** (0.265)	-0.526 (0.480)	-0.532** (0.259)	-0.624** (0.290)
Risk Assessment		-1.005*** (0.276)	-1.005*** (0.279)	-1.994*** (0.515)	-0.991*** (0.279)	-0.685** (0.306)
Post-Biontech		0.189 (0.162)	0.189 (0.162)	0.296* (0.165)	0.203 (0.163)	0.204 (0.164)
Teachers			-0.000543 (0.147)	-0.802** (0.315)		
Teacher X Moral Assessment				0.309 (0.577)		
Teacher X Risk Assessment				1.773*** (0.638)		
Econ. & Bus.Stud.					-0.139 (0.172)	0.499 (0.425)
Econ. & Bus.Stud. X Moral Assessment						0.0123 (0.630)
Econ. & Bus.Stud. X Risk Assessment						-1.467** (0.708)
Observations	1044	1044	1044	1044	1044	1044
BIC	-6129.714	-6118.354	-6111.952	-6105.829	-6111.872	-6105.965

Logistic regression. Dependent variable: corrupt behavior as indicted by accepting a bribe [0,1].

Robust standard errors in parentheses. Marginal effects for discrete change of dummy variable from 0 to 1 available upon request.

For the average marginal effects of the variables, refer to Table 3 in the Appendix.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

We therefore cannot reject hypothesis H1 above.

Introducing a detection probability that imposes a risk of getting caught (*Risk Tr.*) as well as its interactions with the moral treatments appears to have an insignificant effect only (*Deont. X Risk, Conseq. X Risk*). At the same time, the moral self-assessment (in specifications (2), (3), (5) and (6)) and the risk self-assessment (in specifications (2) to (6)) are (highly) significant. In specification (1), where no self assessments were included, the consequentialist and risk/detection variables display a high significance level. This indicates that personal attitudes and characteristics capture the effect of these treatments.

More specifically, when we ignore moral and risk self-assessments (specifications (3) and (5)) and compare school teachers and business/management students, we do not observe a significantly different behavior of these groups. This picture changes once we include personal attitudes toward risk and morality in specifications (4) and (6). Now, school teachers become significantly less inclined to partake in bribe-taking compared to economics and business students. This effect appears to be driven by the interaction with the risk self-assessment variable but less so by the moral self-assessment, indicating the importance of the respective personal attitudes and characteristics. They seem to dominate outside stimuli for risk-evaluations. It could additionally be attributed to incentivitation not being sufficient and more pronounced in set-ups incorporating loss aversion. To conclude, our classroom experiment shows that deterrence is mostly conditional on individual risk self-assessment.

Briefly discussing the remaining controls, we first find that being a first term student is associated with a prevalence of bribe taking. Thus, non-first term students who are more advanced in their studies tend to be more selfish. This would speak to an indoctrination effect of studying economics, which is, however, disputed in the literature (Frank et al., 1993; Frank and Schulze, 2000).

A closer examination of the behavioral gender differences brings to light that male participants appear to be more receptive to the deontological moral reminder. On the other hand, female participants respond more strongly to the consequentialist and deontological reminders with risk. Also, female participants display a more corrupt behavior after the vaccine announcement compared to their male counterparts, but neither showed a significant increase in bribe-taking. The female first-term students behaved apparently less corrupt. However, as the confidence intervals overlap substantially (see Figure 5), these findings have only limited explanatory power and do not allow a clear-cut distinction in their behaviors. The same issue arises in Figure 6, displaying the effects of the control variables before and after the vaccine announcement. The preemptive effect of the deontological treatment is increased from the 10% to the 5% significance level, and the overall corruption rate increases significantly.¹⁴

¹⁴The main regression results of specification (5) for the respective sub-samples can be found in Appendix

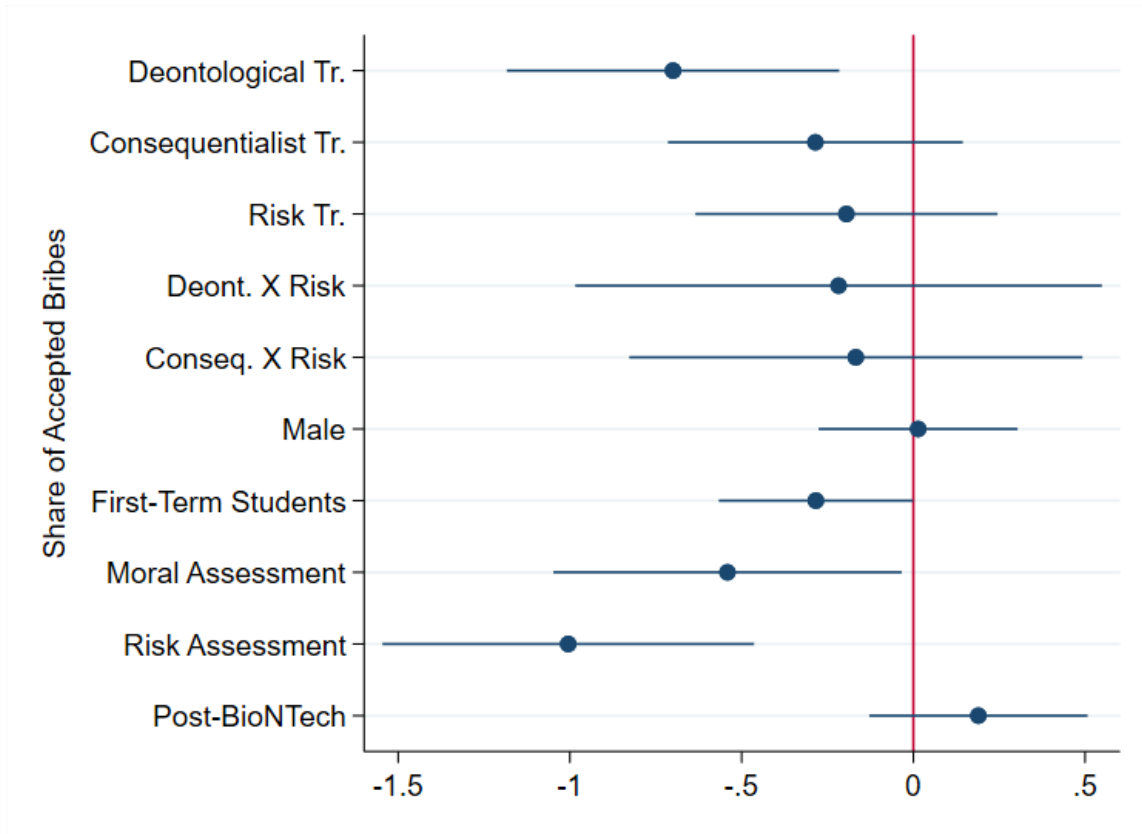


Figure 4: Coefficient plot of the logit main regression results.

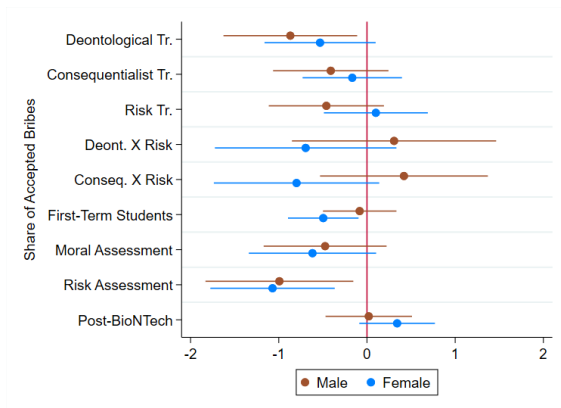


Figure 5: Gender effects.

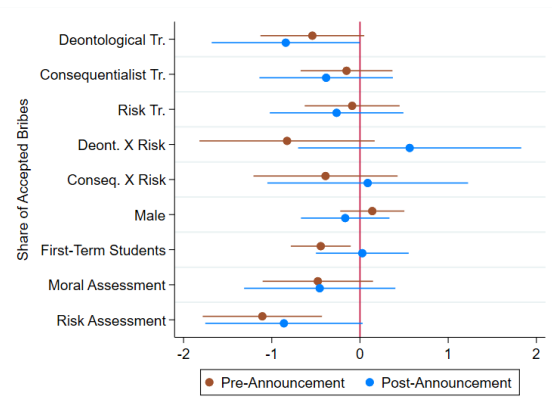


Figure 6: Vaccine announcement effects.

4.3 Behavior of students with multiple participations in the experiment

In order to examine the effect of multiple exposures to our treatments, 208 observations of students' second and sometimes even third participation were used in a sub-sample analysis. This opportunity arose as many students attended more than one class we ran the experiment in, with their unique student ID allowing for such tracking. The average corruption rate among these students sharply increased to 0.306 compared to the 0.211 of the exclusively first-time participants (please refer to Appendix C for regression output). Direct inference from these findings is, however, challenging because the sample composition changed drastically; e.g., almost all re-runners of the experiment (92,8%) were students who selected the education track to become school teachers.

Nevertheless, one interesting observation is that moral self-assessment is significant across all models, indicating that the stronger a participant's moral salience was, the less corrupt he or she was, displaying stronger moral convictions against corruption without the need of a(nother) moral reminder. In line with the main results, first-term students kept refraining from bribe-acceptance more often. The insignificance of the deontological treatment, combined with the overall higher corruption rate, suggests that students learned to maximize their individual utility, especially economics education students. This is evidence that rationality is quickly learned and that moral reminders lack a lasting effect.

5 Concluding Remarks

Our experiment asks whether deontological or consequentialist moral reminders better keep participants away from corrupt behavior in the form of bribe-taking. This question is of both academic and practical interest. On the one hand, the functioning of moral reminders in various everyday situation is not sufficiently well understood yet; on the other hand, research may inform policymakers whether moral reminders may be a promising measure to curb illegal behavior.

The findings of our incentivized classroom experiment with close to 1,050 participants provide new and important insights. Although we provided only a small financial incentive (in expected values), we find that a deontological moral reminder (stating that corruption in the context of the Covid-19 pandemic is immoral) is quite effectively—although not completely—preventing individuals' engagement in corrupt behavior. In comparison, the consequentialist treatment, stating that corruption would be at the expense of taxpayers, is not significantly keeping participants away from corruption in our experiment. When the risk of getting caught after taking a bribe is introduced, corruption rates do not fall at significant levels. This can be observed for treatments including both moral reminders

and detection risk. Female participants show a stronger reaction to moral reminders when they are combined with a detection risk, while male participants appear to be more risk taking and more corrupt overall, with neither being significant. Furthermore, we observe that moral reminders may wear off when participants re-run the experiment.

Further results indicate that economics and business students were not particularly selfish compared to other students, such as future school teachers who combine, e.g., economics with politics as their second subject. Participants who study to become school teachers were less prone to corruption than regular economics and business students, who are often seen as ‘role models’ for self-interested behavioral responses. This effect, however, becomes relevant only after controlling for risk self-assessment, suggesting—especially considering the strong effects of moral salience—that personal attitudes play a fundamental role. Economics and business students were not per se inclined to more bribe-taking. Self-interested and rational behavior was somewhat intensified after participants experienced a reality shock through the public announcement of a new Covid-19 vaccine, but not at a statistically relevant level.

Our results have some implications for policymakers, although one should not overstate the external validity of our experimental exercise. At least, the changed behavior of participants after the BioNTech/Pfizer announcement suggests that participants did not consider the experiment as entirely artificial exercise. Together with a small but growing new literature on the effectiveness of moral reminders, our findings indicate that moral reminders help to reduce illegal behavior by reminding people of its immorality. The type of moral reminder seems to play a role as well: In our case, deontological reminders seem to be preferable, but it remains an open question whether this finding is driven by our specific experimental setting. Hence, while our findings point to a relevant effect of moral reminders, more research in more extensive lab and field experiments will be needed to fully understand which moral reminders work and to which degree they need to be employed to achieve long-lasting effects.

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Appendix

Appendix A: Timeline and list of classes the experiment was run in

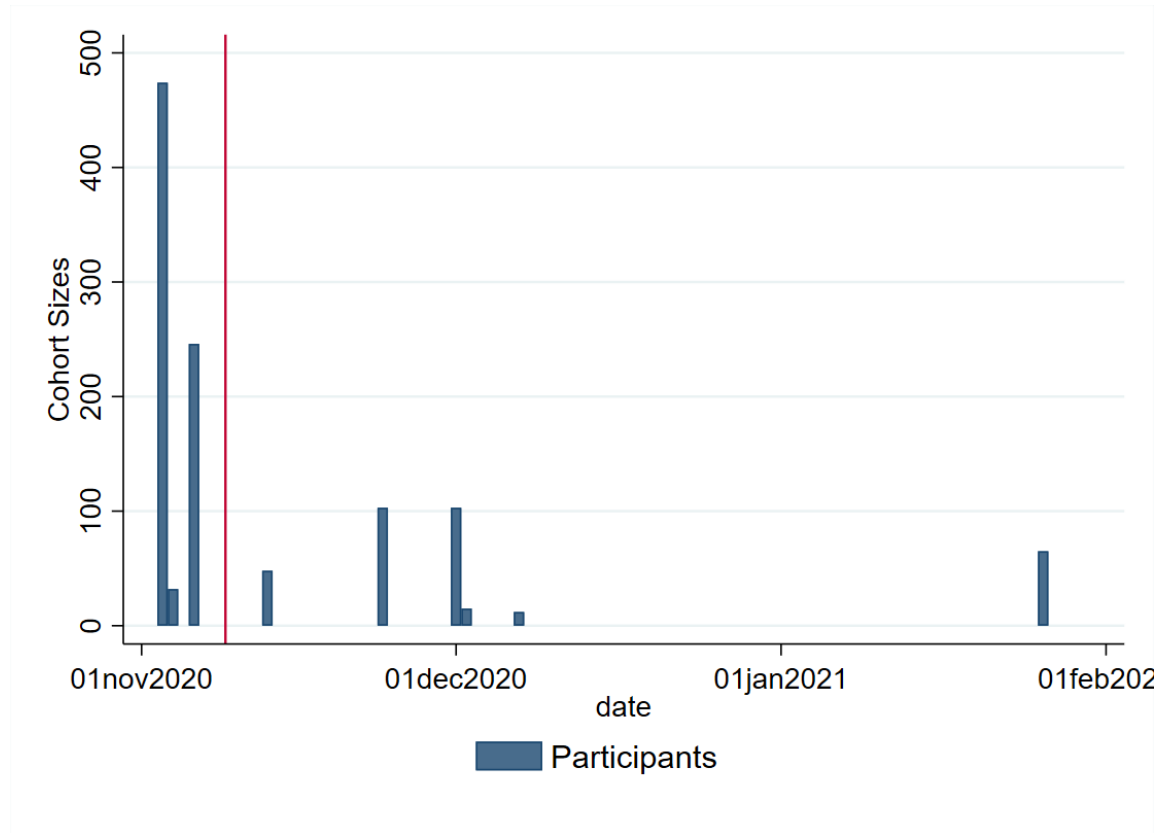


Figure 7: Timeline of all cohorts and their viable observations by summarized by date. The red line marks the announcement of the Covid-19 vaccine candidate.

List of all participants by cohort, lecture, student education level and location, including re-runs and incomplete questionnaires.

- November 3, 2020: First cohort, Introduction to Economics, Bachelor-level, University of Siegen, 281 participants
- November 3, 2020: Second cohort, Microeconomics I, Bachelor-level, University of Siegen, 278 participants

- November 4, 2020: Third cohort, Didactics, Bachelor-level, University of Siegen, 58 participants
- November 6, 2020: Fourth cohort, Introduction to Economics, Bachelor-level, University of Freiburg, 252 participants
- November 13, 2020: Fifth cohort, Behavioral Economics, Master-level, University of Freiburg, 51 participants
- November 24, 2020: Sixth cohort, Introduction to Business Administration, Bachelor-level, University of Siegen, 210 participants
- December 1, 2020: Seventh cohort, Econometrics I, Bachelor-level, University of Siegen, 98 participants
- December 1, 2020: Eighth cohort, School Management, Master-level, University of Siegen, 50 participants
- December 2, 2020: Ninth cohort, New Institutional Economics, Bachelor-level, University of Freiburg, 16 participants
- December 7, 2020: Tenth cohort, History of Economics, Master-level, University of Freiburg, 15 participants
- January 26, 2021: Eleventh cohort, Consumer Policy, Bachelor-level, University of Freiburg, 79 participants

Appendix B: Questionnaire and treatment texts

Questionnaire

Please state your gender.

What is your age in years?

What do you study?

If you are studying to become a teacher, please select your fields of study.

Which semester of your current studies are you in?

Please read the following statements and decide how much you agree or disagree with them. The scale ranges from 0 to 10, where '0' = *I completely agree* and '10' = *I completely disagree*.

How much do you agree or disagree with the statement that nowadays one often has trouble deciding which moral rules are the right ones to follow?

In general, are you a risk-taking person or are you trying to avoid risk? The scale ranges from 0 to 10, where 0 = very willing to take risks and 10 = very averse to taking risks.

Please enter your code. The code consists of: Second letter of your first name (A-Z), third letter of your last name (A-Z), birthday day (01-31), number of older siblings (00-99) and month of birth of your biological mother (01-12, or 00 if unknown).

Instructions

In this experiment, you need to make a decision that is very important to the general public. Depending on your decision, you can win 20 EUR in this experiment. Two participants have this chance. They will be randomly selected through a lottery.

The federal government needs a vaccine against Covid-19 as soon as possible.

The Federal Ministry of Health must select a company to produce the vaccine.

The cost of the vaccine is going to be paid from the federal budget. You are in charge of the procurement of vaccines in the German Federal Ministry of Health. Only you know the true prices for the Covid vaccines. You have to make a choice between two offers: The options differ in what price the Ministry has to pay for the vaccine and what commission you receive aside privately.

Option 1: You order the vaccine from company 1. The vaccine costs 20 EUR.

Option 2: You order the vaccine from company 2. The vaccine costs 40 EUR. Of these EUR 40, the company pays you a commission of EUR 20, which will be paid into your private bank account.

Risk Treatment (only Option 2): You order the vaccine from company 2. The vaccine costs 40 EUR. Of these EUR 40, the company pays you a commission of EUR 20, which will be paid into your private bank account. If this is revealed, you will not receive a commission. The probability that the Federal Audit Office will detect you is 25%.

Consequentialist Moral Reminder: The following text was displayed right before both options: *Depending on how you decide, corruption can be at the expense of taxpayers.*

Deontological Moral Reminder: The following text was displayed right before both options: *Corruption is immoral!*

Appendix C: Robustness tests and further information

Table 3: Average marginal logit regression results

Model	(1)	(2)	(3)	(4)
Deontological Tr.	-0.186*** (0.0281)	-0.133*** (0.0299)	-0.114*** (0.0311)	-0.138*** (0.0298)
Consequentialist Tr.	-0.107*** (0.0256)	-0.0602** (0.0274)	-0.0463 (0.0282)	-0.0677** (0.0277)
Risk Tr.	-0.0855*** (0.0235)	-0.0514** (0.0244)	-0.0403 (0.0249)	-0.0555** (0.0244)
Male	-0.0307 (0.0239)	0.00232 (0.0245)	0.0122 (0.0247)	-0.00242 (0.0245)
First-Term Students	-0.0827*** (0.0225)	-0.0471** (0.0238)	-0.0266 (0.0247)	-0.0495** (0.0249)
Moral Assessment		-0.0897** (0.0426)	-0.0491 (0.0449)	-0.103** (0.0429)
Risk Assessment		-0.167*** (0.0447)	-0.115** (0.0493)	-0.179*** (0.0451)
Post-Biontech		0.0314 (0.0269)	0.0484* (0.0270)	0.0336 (0.0271)
Teachers			0.0282 (0.0279)	
Econ. & Bus.Stud.				-0.0276 (0.0291)
Observations	1044	1044	1044	1044

Average marginal regression results. Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Main logit regression results of second- and third-time participants .

Model	(1)	(2)	(3)	(4)
Deontological Tr.	-0.239 (0.380)	0.241 (0.517)	0.175 (0.558)	0.258 (0.526)
Consequentialist Tr.	0.368 (0.400)	0.761 (0.487)	0.724 (0.524)	0.801 (0.492)
Risk Tr.	-0.542 (0.383)	-0.222 (0.470)	-0.298 (0.525)	-0.205 (0.477)
Deont. X Risk	0.0218 (0.653)	-0.440 (0.730)	-0.384 (0.771)	-0.467 (0.738)
Conseq. X Risk	-0.717 (0.738)	-1.104 (0.804)	-1.012 (0.823)	-1.098 (0.810)
Male	-0.168 (0.294)	-0.0932 (0.306)	-0.164 (0.317)	-0.129 (0.311)
First-Term Students	-0.741*** (0.285)	-0.692** (0.321)	-0.698** (0.331)	-0.673** (0.325)
Moral Assessment		-1.431** (0.619)	-1.407 (2.853)	-1.430** (0.625)
Risk Assessment		0.157 (0.610)	1.389 (1.963)	0.0154 (0.637)
Post-Biontech		0.201 (0.343)	0.185 (0.356)	0.225 (0.334)
Teachers			0.234 (0.680)	
Teacher X Moral Assessment			-0.111 (2.910)	
Teacher X Risk Assessment			-1.494 (2.119)	
Econ. & Bus.Stud.				-0.321 (2.024)
Econ. & Bus.Stud. X Moral Assessment				0.0528 (3.385)
Econ. & Bus.Stud. X Risk Assessment				1.666 (3.261)
Observations	208	208	208	208

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

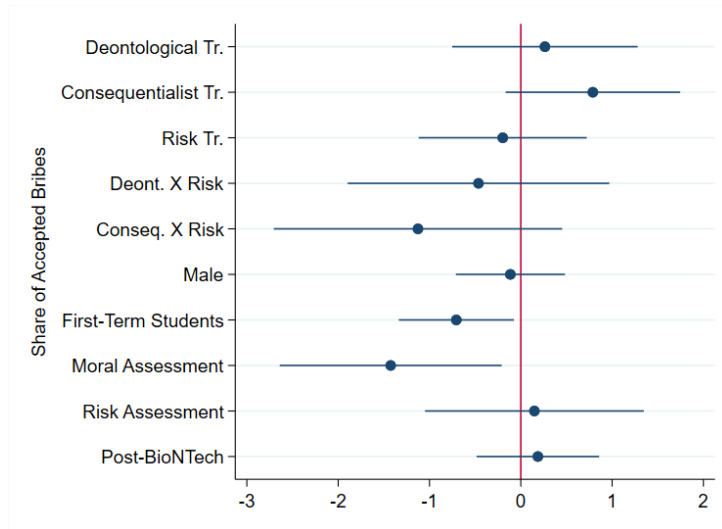


Figure 8: Main results of participants running the experiment for a second or third time.

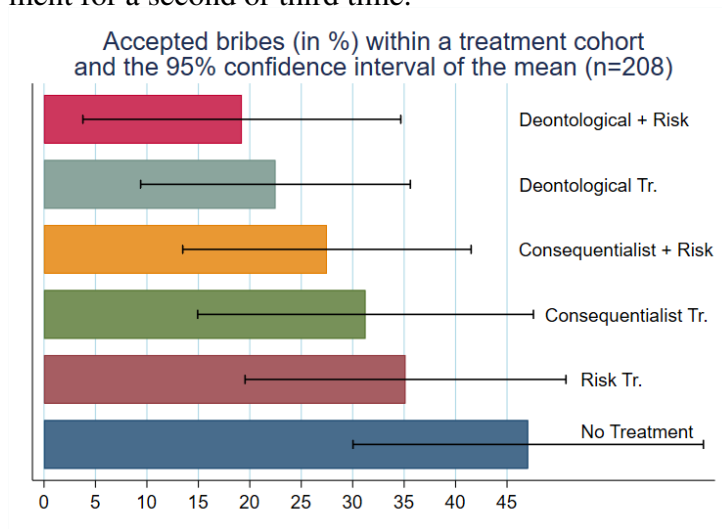


Figure 9: Average treatment effects of participants running the experiment for a second or third time.

Table 5: Summary statistics of second- and third-time participants

Variable	Mean	Std. Dev.	N
Corruption	0.306	0.462	208
No Reminder	0.344	0.476	208
Deontologist Tr.	0.368	0.484	208
Consequentialist Tr.	0.287	0.453	208
Detection Tr.	0.507	0.501	208
Econ./Bus. Stud.	0.067	0.251	208
Teachers	0.928	0.259	208
Econ./Bus.-Teach.	0.215	0.412	208
STEM-Teach.	0.129	0.336	208
SocScience-Teach.	0.746	0.436	208
Languages-Teach.	0.455	0.499	208
Male	0.407	0.492	208
Freshmen	0.574	0.496	208
Moral Asses.	0.458	0.256	208
Risk Asses.	0.499	0.225	208
Age	21.536	3.122	208
Post-Vaccine Ann.	0.684	0.466	208

Note: All values except for age were coded binary with the default (1) being true and (0) false.

Table 6: Logit regression results for male and female participants, as well as before and after the vaccine announcement.

	(1)	(2)	(3)	(4)
	Male	Female	Pre-Ann	Post-Ann
Deontological Tr.	-0.869** (0.387)	-0.532* (0.321)	-0.540* (0.300)	-0.841** (0.428)
Consequentialist Tr.	-0.410 (0.334)	-0.167 (0.288)	-0.152 (0.266)	-0.384 (0.386)
Risk Tr.	-0.460 (0.333)	0.101 (0.301)	-0.0888 (0.275)	-0.265 (0.386)
Deont. X Risk	0.307 (0.591)	-0.695 (0.525)	-0.827 (0.507)	0.563 (0.645)
Conseq. X Risk	0.419 (0.485)	-0.798* (0.478)	-0.391 (0.417)	0.0876 (0.580)
First-Term Students	-0.0828 (0.212)	-0.496** (0.204)	-0.445** (0.173)	0.0266 (0.268)
Moral Assessment	-0.475 (0.356)	-0.618* (0.368)	-0.478 (0.319)	-0.457 (0.437)
Risk Assessment	-0.993** (0.428)	-1.071*** (0.360)	-1.107*** (0.345)	-0.862* (0.455)
Post-Biontech	0.0203 (0.250)	0.342 (0.219)		
Male			0.139 (0.185)	-0.167 (0.256)
Observations	469	575	705	339

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$