Academic Dishonesty and COVID-19: A Biological Explanation

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One of the many changes the COVID-19 pandemic brought was the shift to online learning. From pre-school to university and all around the world, education systems found themselves in a need to quickly set up a functioning remote learning system and make their faculty members and students adjust to it. A lot has been said about the pros and cons of learning online, and a lot will be said once the education world returns to its former state. But one of the side effects that has yet to be thoroughly discussed is the increase in academic dishonesty among college students who study online. A lot of universities around the world have been reporting substantially increased rates of cheating and academic dishonesty since the shift to online learning (Baskin, 2020). What might cause a drastic and global spike in academic dishonesty? Although scholars have produced numerous studies on cheating in higher education, the literature has not yet addressed the problem (or potential solutions) in the context of the current global pandemic. As a result, new questions need to be asked: what other factors can explain the increase in cheating rates? And what measures can or should be taken to decrease those rates? When the future of education is still unclear, and it appears that a component of virtual learning will continue to be a part of students' life, understanding the reasons behind the increase in cheating might help solve the new problem. One explanation that could appear obvious is that far away from the teachers' eyes students are less likely to get caught cheating, which essentially encourages cheating. However, research shows that this reasoning alone cannot account for the substantial increase observed by universities. What could cause such an increase? When we examine the biological literature, two less obvious factors emerge that can explain the increased cheating rate: stress and fear of loss. These factors, which are known for increasing dishonest behavior, come together at the time of a global pandemic and cause a spike in academic cheating.

I will argue that rather than an expected psychological explanation like a decrease in the probability to get caught cheating, the increase in cheating in academia during the COVID pandemic is more deeply influenced. It is specifically influenced by hormonal and cognitive changes that students went through with the outburst of the pandemic, changes that were due to a combined increase in pressure and fear of loss.

According to the internet newspaper *Times Higher Education*, Universities all over the world have reported a significant increase in students cheating since the beginning of the COVID-19 pandemic and the shift to online learning. The University of Waterloo in Belgium reported an increase of 146% cheating cases in the last year and the University of Calgary in Canada reported a 269% increase, while Queensland University of Technology in Australia reported that test cheating quadrupled, and the University of Houston in the USA reported doubled rates (Baskin, 2020). These are just four examples and there are many more. The *Kansas City Star* reports an increase in cheating at the University of Missouri, North Carolina State University, Georgia Tech, Boston University, and more (Williams, 2020). The statistics show that higher-education institutions have been struggling with increasing cheating rates since the beginning of the pandemic.

Online learning is not a new concept. Even before COVID-19 spread, universities all over the world, like the University of Phoenix in the United States and the Open University of Israel, have been offering courses online. Cheating while learning online is also not a new concept. Research published in 2008 (Watson & Sottile, 2010) surveyed both undergraduate and graduate students about cheating habits they have when they take classes online vs. when they take in-person classes. The results showed that students tend to cheat more when they are being tested in person rather than when they are tested online. These results show that it is not online

learning itself that encourages students to cheat, proving that the increase in cheating was caused as a result of the pandemic and was not due to the shift to online learning. What might be a possible cause for such a substantial increase in cheating rates? It is reasonable to assume that with the increase in the physical distance from the professor and the classroom, students feel like they are less likely to get caught. Social Economist Dan Ariely (2012) tested whether the probability of getting caught influences students' drive to cheat. In the experiment, students were asked to solve a series of mathematical puzzles. The more puzzles they solved, the bigger the monetary reward they received. Some of the participants handed their results to the proctor and were rewarded accordingly, while others were asked to grade their performance themselves and then report their scores to the proctor. When the scholars then compared the results of the students who could not cheat to the results of the students who could cheat without getting caught, they found that given the opportunity, many participants chose to cheat. The results are consistent with the assumption that cheating during online learning increased since it became less detectable. Another experiment (Kajackaite & Gneezy, 2017) testing this idea asked participants to think of a number and roll dice. If the number on the dice matched the number in their head they were rewarded. Predictably, participants chose to lie in order to be rewarded. Both experiments support the assumption that students might be more inclined to cheat during exams they are taking online if they feel like they are less likely to get caught. Despite being supervised through a web camera, the teachers cannot control the surroundings or the computer screens of the students. In class, students are regularly monitored and watched and thus are less free to consult sources of information, but with the physical distance, those odds decrease, and so cheating increases.

However, the assumption that cheating increased because of a decreased cheating-detecting ability alone cannot explain the considerable increase detected by schools, as shown in another experiment that asked students to solve mathematical puzzles (Ariely, 2012). This time, the students were instructed to shred their work and take the money they deserve from a jar filled with change. Some of the students were proctored by a blind supervisor while others were proctored by a seeing one. The students who were proctored by the blind supervisor were able to take more money than they deserved without being caught, but the results of the experiment show that they cheated way less than was predicted by the researchers. These results suggest that while a smaller probability of getting caught might contribute to cheating rates, it does not solely account for the substantial increase in cheating rates during online learning.

Fear of loss

One explanation that could account for the increased cheating rates is an elevation in loss aversion. When we think about cheating, what comes to mind might be one's unfair gain of advantage over another. Lying about your financial/medical situation in order to keep receiving welfare assistance is a common example of a situation that is perceived this way—people lying in order to gain benefits they do not deserve. Another example is thinking of corruption among politicians as their attempt to gain support and status. One famous example that was perceived as gaining an unfair advantage was the discovery that cyclist Lance Armstrong was using prohibited substances during his entire career (Thomsen & Anderson, 2015). All of these examples are perceived as the cheaters' attempt to gain money, status, power, etc. unfairly and undeservingly. However, a different perspective shows that in contrast with conventional wisdom, some of these scenarios do not stem from the desire to gain an advantage, but rather from a fear of losing an existing one. In fact, Grolleau et al. (2016) show that fear of loss might

be a more powerful driving force for cheating than a potential gain. According to them, people who lie to welfare agencies or tax officials about an improved economic state do it to avoid losing the welfare assistance they qualified for in the past. This reaction stems from a fear of losing the already existing financial benefit and not from the will to gain a non-existing advantage. Politicians do not lie to gain status; they lie in order to avoid losing a status they already possess. World-renowned cyclist Lance Armstrong used dopamine to improve his performance because of fear of losing his reputation, his career, and his world status. The researchers established that when people are facing potential loss, they are more likely to behave dishonestly than they are when they are facing a potential gain.

An experiment by Grolleau et al (2016) also quantified the assumption that fear of loss is a stronger driving force than a potential gain when it comes to cheating. Participants were asked to solve a series of mathematical puzzles. Some participants were informed that they will be earning money for every puzzle they solve correctly, while others were given the maximum amount of money and were told that for every wrong answer money will be taken away from them. The results showed that when facing a potential loss, participants were twice as likely to cheat than participants who were earning money for their work. Furthermore, the researchers discovered that when participants believed they were not being monitored, the rates of cheating among both groups increased. The truly significant difference, however, was between the post-paid and pre-paid participants rather than the proctored and unproctored participants. The experiment shows that a fear of loss is a strong motive when it comes to dishonest behavior. During non-pandemic days, academic misconduct could potentially be driven by a desire to gain something: a good grade, a professor's appreciation, etc., but during the global pandemic, when potential loss is amplified, the dishonest behavior will likely stem from a fear of loss rather than

the desired gain. The results of the experiment show that when cheating stems from loss, the rates are substantially bigger than when cheating stems from gain. These results strengthen the assumption that fear of loss plays a key role in the substantial increase in cheating cases during COVID-19.

In order to understand why loss aversion causes such an increase in dishonest behavior, a basic understanding of the amygdala has to be established. The amygdala is found in the temporal lobe of the brain, and one of its main functions has to do with processing fear (Neurosci, 2014). When humans experience fear, the amygdala becomes active. It sends signals to other areas of the brain which can even trigger (under severe anxiety and fear) "fight or flight mode." The amygdala is also involved in generating fear-based memories and consequently, precautions based on those memories and fear reactions. Equipped with this knowledge, a group of researchers tested the idea "that the amygdala plays a necessary role in generating loss aversion during human decision making" (Martino et al., 2010, p. 3789). The participants of the study were a group of females with amygdala lesions and a group of females without amygdala lesions. All participants were given money and were asked to play gambling games. The results showed that the participants with the amygdala lesions had a strong absence of loss-aversion, and were significantly less afraid to gamble bigger amounts of money (Martino et al., 2010). These results suggest that the amygdala and loss aversion are tightly linked, and if a correlation can be found between the amygdala and cheating, it will be possible to explain why fear of loss could potentially increase cheating rates in general and increase online academic cheating in particular.

Such a correlation has been researched by several scientists. One of the experiments was conducted by Abe and al. (2007). Participants in the experiment were asked to respond truthfully

and deceptively to an interrogator's questions. The participants also went through PET scans in order to determine their brain functions. The results showed that when the participants were deceiving the investigator, the left amygdala appeared to be active on the PET scan, drawing the researchers to the conclusion that "the left amygdala showed a significant main effect of dishonesty" (Abe et al., 2007, p. 291). These results are significant because they tie the fear of loss to dishonest behavior. It appears that dishonest behavior occurs when people experience anxiety: in this scenario, the anxiety was triggered by a sudden instruction to behave deceptively, which in turn triggered the amygdala, but as was established earlier, the amygdala can also be triggered due to an increased fear of loss. Combining the results of both experiments (Martino et al., 2010, Abe et al., 2007) shows a biological correlation between loss aversion and dishonest behavior, proving that an increase in potential loss among college students could be a factor in an increase in cheating rates.

The COVID pandemic essentially amplified a feeling of potential loss among college students. College students might be afraid of losing social connections, falling behind in class, losing money (in the form of on/off-campus employment), losing internship and career opportunities, etc. With the outburst of the pandemic, students were quickly sent home to continue their studies, and their entire surroundings transformed completely and immediately. Such a change probably caused an increased fear of loss with students being away from their friends and normal social environment, away from the usual learning atmosphere and resources they are used to, and away from their possible form of employment. In s study that surveyed students from all over the US through Instagram (Hoyt et al., 2021) students reported that the loss of income and their social life had a major influence on their mental state during the pandemic. When these results are considered with the established idea that increased fear of loss

can cause a biological reaction that increases dishonest behavior, it can reasonably be assumed that one of the primary reasons colleges all over the world detected abnormally high cheating rates among their students is an increase in a fear of loss.

Stress and cheating

Loss aversion alone does not account for the elevation in cheating rates. Another contributing factor could be an increase in stress levels among students during the COVID pandemic. Stress is often linked to academic misconduct and is the subject of many studies. In one study (Ip et al., 2016) that surveyed pharmacy students in universities in North Carolina, students who admitted to cheating during their studies were asked to rate different motives of cheating. Stress was ranked at the top three motives in a list of 15 possible motives. Another study relating stress and cheating (Vengoechea et al., 2008) was done on medical students in Bogota, Colombia. The students filled a survey in which they had to indicate the level of stress they are experiencing during school. Then they were asked to approve/disapprove with statements about academic misconduct (for example, copying from another student during an exam). The results showed that the students experience above the average levels of stress in their academic environment. An overwhelming majority of the students (97.9%) did not disprove of at least one statement that supported academic misconduct, and 99.8% of the students admitted to at least one dishonest behavior during their studies. Both surveys show that students who perform under extreme pressure are highly inclined to fall into academic misconduct, which strongly supports the theory that an elevated level of stress during the COVID pandemic lead to more cheating cases.

Why does an increase in stress levels equal an increase in cheating? Biology provides multiple explanations. It appears that stress has a significant effect on the temporal lobe of the

brain and, more specifically, on the hippocampus (McEwen & Sapolsky, 1995). These regions are in charge of memory and learning. Research from 1995 (McEwen & Sapolsky) shows that functioning under stress for long periods of time causes regulations in the ability of the hippocampus to retrieve and store information. These changes can be reversible or irreversible, depending on the amount of time a person is under high levels of stress. Damage in memory control due to stress can provide a possible explanation for an increase in cheating rates. Students who are not able to retain information because of increased levels of stress will be more inclined to cheat in order to get satisfactory scores. With more students feeling stressed in the presence of an unfamiliar situation, both health-wise and education-wise, it makes sense to assume they suffered some damage to their hippocampus and so to their ability to retrieve and store information, and thus started cheating more in their schoolwork.

Biology studies also suggest a correlation between the cortisol hormone and cheating. Cortisol is the body's primary stress hormone. Under stress, more cortisol is released into the bloodstream, and its level becomes higher than it usually is ("What Is Cortisol?" 2020). Researchers (Yang et al., 2014) conducted an experiment that examined whether elevated cortisol levels would drive participants towards unethical behavior after treating them unfairly, assuming that unfair behavior is a trigger of stress. In this experiment, some of the participants were treated unfairly by the researcher. All participants had multiple opportunities to behave unethically by taking equipment lying around the lab, taking more lottery tickets than they deserved, etc. Results showed that participants who were treated unfairly tended to cheat more. Moreover, saliva tests that were taken from them before and after participation showed an elevated level of cortisol. This experiment shows a clear correlation between unethical behavior and cortisol levels in the body. Unfair treatment was used in this experiment as a stress trigger in

order to elevate cortisol level, but since high cortisol levels are generated under any stressful situations, the relationship between stress and academic misconduct is clear—an elevated level of stress equals an elevated level of cheating.

Another study that supports this theory also correlates cheating to high cortisol and testosterone levels (Lee et al., 2015). The influences of testosterone on the mind include a drive to achieve status and/or resources. This drive tends to result in a variety of behaviors, among which are power/reward-seeking, risk-taking, and rule violation. Since academic cheating often includes rule violation and risk-taking, it is reasonable to assume that high testosterone levels are correlated with unethical behavior. However, it is believed that testosterone does not drive unethical behavior alone. It is the combination of testosterone and high levels of cortisol that cause such behavior. Similar to Dan Ariely's experiment, participants in this study were asked to solve mathematical problems, report their scores, and discard their worksheets. However, this time the researchers had a way of tracking the reported results of the participants vs. their actual performance. The participants were tested for testosterone and cortisol levels and the results showed "that the association between testosterone and unethical behavior was amplified by the presence of high levels of cortisol" while "Under low cortisol, testosterone did not predict unethical behavior" (Lee et al., 2015, p. 893). It was also found that "testosterone was a marginally significant predictor of unethical behavior under high cortisol" (Lee et al., 2015, p. 893), meaning that cortisol levels are mainly in charge of the unethical behavior rather than testosterone level. This research strengthens the assumption that high levels of stress lead to high levels of cheating, strengthening the assumption that increased levels of stress among students during the pandemic could have caused such a substantial increase in academic dishonesty.

Multiple evidence proves that stress often leads to misconduct, and in a global pandemic atmosphere, stress levels are inclined to increase. The unexpected change that happened, the fear of the unknown, and the intense lockdown the students experienced, all while still handling the college workload, now in an unknown setting, were bound to elevate stress levels among students, consequently leading to an increase in academic misconduct. A survey sent to university students in Texas (Wang et al., 2020) showed that 71% of the students feel that their stress level increased during the COVID pandemic. Moreover, in her paper on academic integrity during COVID-19, Sarah Elaine Eaton (2020) from the University of Calgary in Canada, claims that "when students are under extreme stress … they can make poor choices that lead to academic misconduct." A study conducted by Hoyt et al. (2020) surveyed random students via Instagram and concluded that students all over the United States have been reporting an increase in anxiety and stress levels. The typical levels of stress students were under during the coronavirus pandemic were further escalated as they were moved to emergency remote learning (pp. 272-73). Connecting all of the evidence shows that stress among students is a common phenomenon, and stress during the pandemic is an even more common phenomenon. Moreover, since cognitive and hormonal responses in the body that are elicited by stress ultimately drive cheating, a clear correlation can be made between all of the factors and a conclusion can be drawn: elevated stress levels among students during COVID-19 is a probable cause for increased academic dishonesty while studying remotely.

It appears that stress and fear of loss are both tightly connected when it comes to the COVID pandemic. Anxiety can lead to an increased fear of loss and an increased fear of loss can cause an increase in stress levels. Hassien et al. (2020) established that stress enhances fear by testing the reactions of mice to possible stressors, like footshocks. They also correlate their

results to humans by explaining the similarity between the reaction mechanism the mice develop throughout the experiment and the symptoms people with PTSD (post-traumatic stress disorder) exhibit. Since they established a stress-enhanced fear mechanism, it is reasonable that stressed students will be more inclined to experience fear of loss. The same logic applies the other way around, as shown by the Instagram survey conducted by Hoyt et al. (2020). Surveyed college students indicate that fear of financial instability caused by loss of their student jobs and loss of social connections deeply affected their stress levels since the outbreak of the COVID pandemic. Consequently, it can be assumed that students who might experience loss will become more stressed in the face of the potential loss. This means that when we examine increased cheating rates in students during the COVID-19 era, stress and fear of loss are practically interchangeable, or at the very least have a compound effect. Both factors separately are shown to have strong effects on dishonest behavior, and together they could account for the substantial increase in academic misconduct registered in universities all over the world.

Understanding that fear of loss and stress are the factors responsible for the big spike in cheating rates among students in the COVID-19 era can be the first step in fixing the problem. An initial instinct might drive us to think that increased cheating rates were due to a decrease in supervision, but scientific studies show that this is not the case. Instead, the answer lies within our biological mechanisms. Showing that the increased cheating rates stem from cognitive and hormonal changes takes some of the blame for the academic misconduct off the students. Showing that cheating is not influenced by aspects of morality (or lack thereof), but by biological reactions that happen in every human body, proves that some of the cheating cases were inevitable. In this light, it can be seen that cheating is not the real problem. Rather, cheating is the surface manifestation of a deeper problem: the elevated levels of stress and fear of loss.

Consequently, solutions like increased enforcement or increased supervision might cause a further increase in already elevated stress levels which, in turn, could further increase cheating rates. Alternative solutions that might be efficient in decreasing academic misconduct during online learning will need to be related to decreasing stress levels and fear of loss levels. Possible solutions could enable students to work in groups or take open-book exams. Such solutions are likely to take some of the stress off the student while also eliminating chances of cheating. Similar to medical conditions, a true solution to the problem will come from treating the underlying disease instead of the surface symptoms.

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