

# Cognitive enhancement vs. Plagiarism: A quantitative study on the attitudes of an Italian sample

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# Abstract

Irrespective of the presence of formal norms, behaviours such as plagiarism, data fabrication and falsification are commonly regarded as unethical and unfair. Almost unanimously, they are considered forms of academic misconduct. Is this the case also for newer behaviours that technology is making possible and are now entering the academic scenario?

In the current paper we focus on cognitive enhancement (CE), the use of drugs to enhance cognitive skills of an otherwise healthy individual. At present, there are no formal rules forbidding its use in the academic setting. However, it is not clear whether there is a general public sentiment that CE should be considered as a modern form of academic misconduct.

By means of the Contrastive Vignette Technique, we collected quantitative data from 284 online surveys to directly compare the attitude of the general public towards CE and plagiarism across different ethically relevant aspects. Our aim was to understand whether the use of prescription drugs to enhance a healthy person's cognitive skills is perceived similarly to a more common form of cheating, specifically plagiarism.

Results show that our participants do not endorse CE. At the same time, however, their opinion on the ethical issues related to its use is not negative: rather, their attitude is more positive towards CE compared to plagiarism. This seems to pose against the idea that, at present, the use of cognitive enhancers in academic environments is regarded as a form of cheating.

## Keywords

Academic misconduct; Plagiarism; Cognitive enhancement; Cheating; Public attitudes.

# Introduction

Violations of academic integrity represent a serious concern for research and educational institutions. Universities or other competent authorities can vary in the specific set of rules they enforce to define academic misconduct and contrast it. Irrespective of the presence of formal norms, however, some behaviours are commonly regarded as unethical and unfair and are almost unanimously considered forms of cheating. These are: fabrication (making up data or results), falsification (manipulating research materials, equipment or changing data) and plagiarism (appropriation of another person's ideas, results or words) [1]. Unfortunately, these conducts are not uncommon. Wells (2008) investigated the prevalence of misconduct in a sample of scientists: among the respondents, 7.4% reported having observed or having direct evidence of suspected research misconduct occurring in their departments in the previous three years. Moreover, 36% of those misconducts were not reported to institutional offices [2]. A meta-analysis conducted on 18 different studies reported that almost 2% of the scientists admitted serious misconduct such as falsification or plagiarism, while almost 1 out of 3 practiced other forms of questionable research conducts, such as dropping data from analysis based on gut feeling [3]. Academic misconducts are not uncommon also among students. For instance, the International Center for Academic Integrity (ICAI) reported that 43% of graduates and 68% of undergraduates admitted cheating during an exam [4]. Moreover, questionable behaviours such as collaborating with others on an individual assignment are considered acceptable by a significant percentage of students [5]; while others fail to recognise certain dishonest behaviours (e.g., handing in an assignment rewritten by a colleague) as cheating [6].

While traditional forms of academic misconduct, such as those described above, are a long-standing threat to scientific integrity and meritocracy, the rise of (relatively) recent technologies may present new challenges. Our intent is to discuss whether pharmacological cognitive enhancement (CE) represents a modern form of academic misconduct.

## Cognitive Enhancement: a new form of academic misconduct?

Bostrom and Sandberg defined CE as “the amplification or extension of core capacities of the mind through improvement or augmentation of internal or external information processing systems” [7]. This definition is rather broad and includes many different methods and means to enhance a person’s cognitive skills. For the purpose of this paper, we will define CE as the usage of prescription drugs by healthy people with the aim of improving cognitive skills such as memory, attention or concentration. Even though evidence exists that certain prescription drugs (e.g. methylphenidate, modafinil) [8–12] can be used to improve cognition in the non-clinical population, it is not entirely clear whether they affect healthy people’s cognition directly or are, in fact, boosting cognitive abilities indirectly, for example by enhancing non-cognitive states (e.g. mood) [13–15]. In any case, the possibility that cognition might be altered using drugs for purposes different from the treatment of a clinical condition has risen several medical and ethical concerns that have been thoroughly described elsewhere [see, e.g., 7, 16–19].

Cognitive enhancement has received increasing attention by the scientific community in the last decades, raising the issue of whether the use of cognitive enhancing drugs should be regarded as a form of academic misconduct [7, 20–24]. For instance, the President’s Council on Bioethics has compared CE to plagiarism, stating that a performance influenced by the use of stimulants is “less one’s own and less worthy of our admiration”, hence implying that enhancing cognition is cheating [24]. But why should CE be considered misconduct? At present, CE is not, usually, forbidden by (or even mentioned in) honor codes or rules of colleges and universities (for an exception, however, see the Community Standard at Duke University [25]); so, if we define cheating as the deliberate and purposeful violation of existing rules, CE is not cheating. However, the absence of explicit rules forbidding a certain behaviour does not necessarily imply that this behaviour is, or should be, deemed as acceptable. As a matter of fact, unwritten or implicit social rules are very powerful in defining what should be considered misconduct or cheating. Therefore, if we assume that there are some implicit rules that forbid the use of CE in an academic setting, then we should consider the use of CE as a form of cheating, although

not formalised. As Schermer says: “cheating is primarily a matter of fairness” [21] and, indeed, a study investigating the reasons behind the unacceptability of CE showed that the feeling of unfairness plays a relevant role in people’s attitude towards this technology [26].

## Cognitive enhancement and cheating: contextual factors

But why, and under which circumstances, does a person cheat? What are the factors that increase the probability of a misconduct? While personal factors such as average grades or personality traits play a role in the propensity to cheat, it seems that contextual factors such as the absence or presence of an academic Honor Code and the perceived level of cheating among peers are by far the most important in preventing or encouraging such misbehaviours [27–30]. The attitude of the teachers themselves might constitute a relevant aspect: a survey conducted among university teachers reported that even though almost all of the respondents recognized that plagiarism is a potential issue in their courses and that it is a teachers’ responsibility to check on their students’ behaviour, only 67% of them was actually checking for plagiarism. Moreover, a significant part of the participants (25%) admitted not reporting to the authorities one or more cases of plagiarism [31].

Just as a certain behaviour might be considered cheating or not depending on the context, whether enhancing drugs should be considered a cheat or not may change according to several factors. For example, Schermer argued that the decision as to whether a certain behaviour during an academic test is cheating depends on the focus of the examination. If the purpose of the test is to evaluate students’ memory, the use of a memory-enhancing drug (as well as of books and notes, for that matter) would probably be seen as illegitimate. But if the purpose of the test is to assess students’ comprehension of a problem, then the use of a memory-enhancing drug might be seen as a legitimate study aid, as the use of a calculator or a handbook would be in a math exam when the focus is on testing students’ problem solving, rather than arithmetic, skills [21]. In addition, Roache proposes that enhancement should be considered cheating or not depending on what we value most in education: the achievements and advancement in knowledge by themselves or the fairness of the “playing field” [20]. While fairness is,

generally speaking, a shared and important value, there might be situations in which achievements and performance are much more valuable. To make her point, Roache quotes a very exemplary phrase from Sandberg: “that many of the theorems of the mathematician Paul Erdős were proven under the influence of amphetamines does not diminish their intellectual brilliance or importance” [32].

Another contextual factor that should be taken into consideration when judging whether CE is cheating or not is the level of competitiveness of the environment. When we are competing against someone else, and in particular when there can be only a limited number of winners, like in sports, we are probably much more concerned about fairness and equality of chances than about performance itself. Evidence for this can be found in Dodge et al.’s work [33]. In their research, the Authors asked their participants to rate how much they felt that the use of anabolic steroids in the athletic domain and the use of prescription stimulants in the academic setting is cheating. Their results show that the use of performance-enhancing substances is perceived more like a cheat in the athletic domain, where tasks are zero-sum (i.e., someone’s success implies someone else’s failure), than in academic environments, where tasks are typically not-zero-sum. If we assume that zero-sum tasks and evaluation criteria generate a more competitive environment, this result becomes consistent with qualitative studies in which participants stated that CE might be acceptable only in a not-competitive environment [34], or that the use of Methylphenidate to perform in a competitive setting is the same as using steroids in sport (implying that it is a fraud) [35].

So, similarly to what happens for more traditional forms of academic misconduct, people’s attitude towards CE is influenced by contextual factors such as, e.g., the way the CE works [36, 37] or the competitiveness of the environment [33].

## Public attitude towards cognitive enhancement

The question on the acceptability of CE is particularly relevant since some researchers highlighted that illicit stimulant drugs usage is already a reality in some colleges [38, 39] and among academic staff [40]. One of the most exhaustive polls available was conducted on over ten thousand students from 119

different US colleges. Of these students, 12% reported the usage of prescription drugs for non-medical purposes [39]. A more recent survey of 3,693 US undergraduates showed that only 6% of them reported using prescription stimulants for nonmedical use in the past year. However, most of them were occasional users and only 1% reported using such drugs more than 10 times a year [41]. Unfortunately, these polls do not distinguish between students using stimulants for CE and students using stimulants for recreational purposes. Lucke and colleagues [14] suggest an estimate of the prevalence of stimulant users for CE purpose around 3-6% of the US college population, most of which probably are not regularly using stimulants. For what concerns Italy, a recent survey shows that more than 6% of students used stimulants (both methylphenidate and/or amphetamines) in the past six months without a prescription and for cognitive enhancing purposes (e.g. to improve concentration and performance at exams) [42; see also 43].

One aspect we are particularly interested in is to investigate the point of view of stakeholders and laypeople on the issue. Since the perspectives, ideas and models proposed by those who work on bioethics usually have consequences on institutions, rules and laws, the debate on controversial topics such as cognitive enhancement cannot (and should not) avoid taking into account laypeople's attitudes and opinions. A very comprehensive review of public attitude towards CE is the one published by Schelle in 2014 [44]. Generally, it seems that laypeople raise or endorse the same concerns about CE that can be found in the theoretical scientific literature. The central concerns shown by nonusers seem to be related to medical safety, meaning that people are worried that such drugs might pose a threat to the users' health (e.g., unwanted side-effects, or the risk of developing an addiction [45]), or to the fact that there is no need to enhance [37]. However, laypeople are sensitive to other concerns, e.g. the fairness of the advantage gained or the risk that social pressure to use could prevail over personal freedom. In an interesting study Fitz and colleagues found that even though people are generally prone to accept CE, they are indeed sensitive to the concerns raised by the neuroethicists, they recognize the potential perils of CE and endorse values such as hard work and meritocracy. For instance, one of the findings of Fitz et al. is that people generally feel that CE is less unfair only when both the source of wealth that is used to buy the enhancer and the enhancer itself requires hard work. So, if an enhancer

that allows the user to study for more hours is paid with funds obtained with hard work, people will think that the advantage gained is somehow fairer. The Authors conclude that “public attitudes towards enhancement are sufficiently sophisticated to merit inclusion in policy deliberations, especially if we seek to align public sentiment and policy” [36].

## The present study

The evidence presented in the previous sections show that analogies and differences exist between academic misconduct and CE. But how does the attitude towards CE compare to the attitude towards more typical means of cheating? The only piece of evidence in this direction comes from Dubljević et al. [46]. In their study, they asked students to rate the level of acceptability of cognitive enhancers use and cheating in the academic environment. Results showed that mean moral acceptability of CE is lower than that of cheating on exams, fabricating data and plagiarizing, which in turn are considered moderately acceptable.

Acceptability, however, potentially entails different dimensions. For instance, people may find CE not acceptable because they are unwilling to take drugs in general, or because they assume the drug would be obtained in illicit ways. Hence, it is difficult to attribute low acceptability scores to specific ethical concerns such as fairness and cheating. In addition, although Dubljević and colleagues provided a first direct comparison between CE and academic misconduct, they probed acceptability for the two expedients using different questions. In the case of CE participants had to provide an impersonal evaluation of the expedient in different temporal contexts (i.e., “before an examination”, “during the examination”, or “in general for university studies”), with ratings ranging from “absolutely moral” to “absolutely not moral”. In contrast, for plagiarism participants had to switch to a more personal perspective, to rate to what extent they agreed with statements such as “[plagiarism] gives me a bad conscience”, “It is against my moral beliefs”, and “For me, such behavior is reprehensible” [46]. This raises the possibility that differences in acceptability ratings for the two expedients could result, at least



in part, from how the question was posed. To overcome these limitations, in the present paper we directly compared people's attitude towards CE and towards a typical academic misconduct (namely, plagiarism) probing specific ethically relevant aspects (i.e., authenticity, moral judgement, cheating, fairness, and hypothetical behaviour) with the same questions for both.

We decided to use the *Contrastive Vignette Technique* (CVT) with a between-subjects design [47], a method that has already been used with success in earlier studies on public attitude towards CE [36, 37]. In CVT, the experimenter creates a scenario outline, the "master vignette". The independent variables are then manipulated by changing key details in the master vignette. This process generates minimally contrastive versions of the same vignette, each one corresponding to one experimental condition. After reading a randomly chosen version of the scenario, each participant has to answer questions concerning his/her attitude, opinion or judgement towards the moral issues presented in the vignette. Because the questions are the same for every experimental condition, the averages of the responses are then compared between conditions to test how the manipulation of a detail in the content influenced participants. The key measure, then, is the difference between the answers provided by different experimental groups and not the absolute values of their answers. This is a particularly interesting feature since the experimenter can focus on changes in ratings rather than on absolute values, which may be biased by the content of the scenarios. Given that the structure of the scenarios is identical (with the only exception being the experimental manipulation), every undesired effect (e.g. those caused by unwanted ambiguities in the text) should be removed. The CVT method is particularly useful when trying to assess moral attitudes towards ethically or socially delicate themes: since participants are not aware that different versions of the vignette exist, they remain also unaware of the hypotheses under investigation. This is important because it reduces the risk that participants bias their answers in the attempt to comply with perceived social/moral norms, which is a very well-known flaw in common survey-based research and within-subjects designs [48, 49].

Our master vignette describes a scenario in which M., a fictional university student, has to hand in an essay by a very close deadline. Depending on the teacher's evaluation, he may have the chance to gain some additional points in the final exam. The evaluation of the essay will be based either on a

competitive (only the five best essays will be awarded the extra points) or a non-competitive (all the essays that meet certain qualitative threshold will be awarded the extra points) evaluation criterion. In both scenarios, when M. realises that he will not be able to write an essay good enough to aim for the bonus before the deadline, he remembers of an *expedient* he might use to help himself. The expedient is either plagiarism (i.e., copying from a website that provides class notes intended to help students revise before their exams) or pharmacological CE (i.e., taking a drug commercialized for people with attentional deficits that can be used off-label by healthy individuals for enhancement purposes). In the end, he decides either to resort to the expedient or to refrain from using it.

The *evaluation criterion* independent variable was manipulated to check whether the attitude towards CE or plagiarism was more negative in a competitive than a not-competitive environment, as suggested by previous research [33, 34, 50]. To define the competitive and the not-competitive criteria we took inspiration from Goodman [23]. The competitive scenarios were described as a zero-sum situation, where one's success necessarily implies someone else's failure, as it happens in most sport competitions. In contrast, non-competitive scenarios were described as a situation where one's success has no impact over someone else's chances of succeeding as well.

The *expedient* independent variable was created to allow a direct comparison between the use of cognitive enhancement in an academic setting and a typical form of cheating (plagiarism), to investigate differences or similarities between the general public's attitude towards the former and the latter. The two expedients share an important feature: they were both intended for a relatively uncontroversial use, but are now being used in a controversial and potentially fraudulent way. We specifically decided to represent the enhancer as a generic "drug" instead of naming a specific medicine to avoid biasing the answers with participants' previous attitudes or knowledge towards a specific brand.

Finally, the *decision* independent variable (i.e., M.'s decision to either make use of the expedient or refrain from resorting to it) was manipulated to assess whether knowing of someone resorting to a certain expedient or not would change the participants' attitude, for example by making it appear more/less permissible.

As for the dependent variables, we measured participants' attitude or opinion regarding four key aspects. The first was performance *Authenticity*. A performance that has been altered by plagiarism is generally considered "less one's own". Would it be the same also for a performance altered by CE, as the President's Council on Bioethics suggests [24]? The second aspect was *Moral Judgement*. Is a person using cognitive enhancing drugs judged differently from someone who plagiarizes? The third aspect was *Cheating*: a central aim of this paper is to assess to what extent people feel that CE is cheating compared to a commonly recognized form of academic misconduct (plagiarism). The fourth aspect was *Fairness*: whether or not something is considered cheating depends on how unfair is the advantage it gives; hence, we asked our participants to rate the fairness of an advantage gained by either plagiarism or CE. For the four variables described above, we expected more negative ratings when the scenario implies resorting to the expedient, irrespective of which one, compared to not resorting to it. However, it remained an open issue whether there is a difference between the attitude towards a product influenced by CE and one influenced by plagiarism. Finally, with a fifth variable we wanted to investigate not just our participants' attitudes, but also their *Hypothetical Behaviour*, i.e., what they think they would do in a similar situation.

## Materials and Methods

### *Participants*

We registered responses from 284 participants: 195 students, 60 workers, 5 teachers and 24 people in retirement or unemployed. Most participants (65%) were female and their age ranged from 18 to 63 years ( $M=27.5$ ,  $SD=8.5$ ). According to the regulation of the Ethics Committee of the University of Trento, no ethical approval is required for studies that collect anonymous data (such as the responses to the online questionnaire in the present study). All procedures followed the WMA Declaration of Helsinki (1964 and its more recent amendments).

## Stimuli

Starting from a scenario outline, we manipulated three independent variables (the competitive or not-competitive *evaluation criterion*, the type of *expedient* and the *decision* of the protagonist) to obtain eight different vignettes (see Table 1). Please note that the study was conducted in Italy, therefore all materials were in Italian. For ease of understanding, significant parts have been included in the manuscript translated by the Authors. To see a translation of the full text of the vignettes and questions, see the Supplementary Materials. To make sure that the text of the vignettes was easily readable and not ambiguous, a cognitive pre-test was conducted [51]. A small group of independent participants (N=8) was asked to read the vignettes and answer the same questions used in the experiment in the presence of the experimenter. They were asked to “think loud” to assess how they interpreted each scenario and to identify possible misunderstandings and ambiguities. Participants’ answers did not highlight any issue with the text and the questions. Furthermore, participants were asked an additional question, not present in the experimental session, on how competitive they deemed the scenario they were presented with. Responses showed that zero-sum scenarios were considered as more competitive than not-zero-sum ones

		<b>M., a university student, has to write a short essay to deliver to his professor by a certain deadline.</b>
Criterion	Competitive	Students know that the professor, based on his evaluation of the essays, will assign to the best five a bonus of some additional points; the other students will receive no bonus, regardless of the quality of their work.
	Non-competitive	The professor informs the students that, based on his evaluation of the essays, he will decide which students deserve to get a bonus of some additional points at the final exam and which ones do not. He does not set a maximum number of students who can get the bonus, as long as their essays are well written and argued.
		<b>At the time of starting work, M. realizes that it requires much more time than he had estimated: as a result he fears that he will not be able to deliver a well-made essay in time.</b>
Expedient	Plagiarism	M. remembers reading on a students’ blog about a website that, though intended to help students revise for exams, allows them to download short essays on various topics that he could copy and pass off as his own.

	Cognitive Enhancement	M. remembers to have read on a medical blog about a drug that, even though commercialized with the purpose of helping people with a deficit of attention, if taken by a healthy person -as M. is- allows to stay focused longer and to be, in general, much more productive than usual.
Decision	Use	Driven by the close deadline, M. decides to resort to this expedient.
	Not-use	Despite the close deadline, M. decides not to resort to this expedient.
		<b>M. manages to deliver the essay in time.</b>

**Table 1** Table 1 shows the structure of the vignettes, highlighting the contrastive versions of each independent variable. Text in bold was identical in all eight vignettes.

### *Sampling and procedure*

Participants were conveniently sampled using mailing lists and social networks. By clicking the URL present in the e-mail or message, participants were directed to the online survey page where they could read a short description of the study and provide informed consent by pressing the “accept” button. Informed consent was obtained from all individual participants included in the study. At this point they were randomly redirected to one of the eight possible questionnaires created on the *Google Modules* platform. They were totally unaware that other versions of the same questionnaire existed and were specifically instructed not to take the survey twice.

After reading the instructions and the scenario, participants answered five questions about the key points described above. Answers were collected on 7-points Likert items, from “1= Absolutely not” to “7= Absolutely yes”, except for the question on Authenticity. This was collected on a 5-points Likert item, from “1=Not at all (0%)” to “5= Completely (100%)”, with equally spaced intermediate values (i.e., 25%, 50%, 75%).

An optional free-response text box was also provided for each question to allow respondents to provide an explanation for their answer. Please note that questions about Cheating, Fairness and Hypothetical Decision aimed to test participants’ opinion irrespective of M’s actual behaviour: even in the experimental conditions where M. was described as refraining from using the expedient, we asked our participants to imagine that he did so.

After answering the five questions, participants were asked to provide a few demographic data and were thanked for their collaboration.

## Results

A set of 2x2x2 ANCOVAs was conducted to determine the effects of Expedient (CE, PL), Evaluation criterion (Competitive, Not-Competitive) and Decision (Use, Not-use) on participants' responses while controlling for age<sup>1</sup>. Significant interactions were followed up with Welch's t-tests. All statistical analyses have been conducted using JASP<sup>2</sup>. Results will be reported for each dependent variable separately. For ease of understanding we report a translation of how the question was posed, with the different alternatives corresponding to the specific experimental manipulation. The raw data are available at [osf.io/tcde9](https://osf.io/tcde9).

### Authenticity

*To what extent do you think that M.'s essay reflects his own actual skills? [1=Not at all (0%); 5=Completely (100%)]*

Participants rated performance as more authentic when the expedient was CE compared to PL [M=3.88 (SD=0.97), M=2.75 (SD=1.34), respectively;  $F_{1, 259}=111.321$ ;  $p<0.001$ ;  $\eta^2=0.203$ ], and also when Decision was Not-Use against Use [M=3.84 (SD=0.90), M=2.69 (SD=1.41), respectively;  $F_{1, 259}=108.028$ ;  $p<0.001$ ;  $\eta^2=0.197$ ]. No significant effect of Evaluation criterion was found [ $F_{1, 259}=0.121$ ;  $p=0.704$ ]. Moreover, the ANCOVA revealed a statistically significant Expedient \* Decision interaction [ $F_{1, 259}=63.903$ ;  $p<0.001$ ;  $\eta^2=0.116$ ; see Fig.1a]. Post-hoc analyses showed that when considering CE

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<sup>1</sup> Assumption evaluation indicated that homogeneity of variance was not satisfactory for all dependent variable (Levene's tests significant, all ps <0.01). However, the same analyses on rank-transformed data, as well as analyses run with Welch and Brown-Forsythe tests, yielded overall similar results.

<sup>2</sup> JASP (Version 0.8.5.1); <https://jasp-stats.org/>

there was no significant difference between the conditions where Decision is Use or Not-Use [ $M=3.72$  ( $SD=1.08$ ),  $M=4.03$  ( $SD=0.82$ ), respectively;  $t_{122.8}=1.897$ ;  $p=0.060$ ]. In contrast, when considering PL the difference between Use and Not-Use was statistically significant [ $M=1.67$  ( $SD=0.86$ )  $M=3.67$  ( $SD=0.94$ ), respectively;  $t_{142.3}=13.38$ ;  $p<0.001$ ;  $d=2.214$ ].

Moreover, performance is deemed as more authentic when considering CE compared with PL when Decision is Use [ $M=3.72$  ( $SD=1.08$ ),  $M=1.67$  ( $SD=0.86$ ), respectively;  $t_{125.5}=12.09$ ;  $p<0.001$ ;  $d=2.090$ ].

## Moral Judgement

*Would you judge a colleague of yours positively if you knew that he/she behaved as M. did? [1= Absolutely not; 7= Absolutely yes]*

Results show a significant main effect of Expedient indicating a more positive judgement in the CE conditions compared to PL [ $M=4.97$  ( $SD=1.68$ ),  $M=4.26$  ( $SD=2.24$ ), respectively;  $F_{1, 259}=20.833$ ;  $p<0.001$ ;  $\eta^2=0.036$ ]. Participants' judgement was also more positive for Not-Use against Use [ $M=5.91$ ; ( $SD=1.30$ ),  $M=3.15$  ( $SD=1.64$ ), respectively;  $F_{1, 259}=267.492$ ;  $p<0.001$ ;  $\eta^2=0.459$ ]. No significant effect of Evaluation criterion was found [ $F_{1, 259}=2.107$ ;  $p=0.148$ ]. Moreover, the ANCOVA revealed that the Expedient \* Decision interaction was statistically significant [ $F_{1, 259}=25.235$ ;  $p<0.001$ ;  $\eta^2=0.043$ ; see Fig.1b].

Post-hoc analyses showed that Moral Judgement is lower for Use when compared to Not-Use for both CE [ $M=3.99$  ( $SD=1.58$ ),  $M=5.89$  ( $SD=1.17$ ), respectively;  $t_{121.1}=8.023$ ;  $p<0.001$ ;  $d=1.369$ ] and PL [ $M=2.31$  ( $SD=1.22$ ),  $M=5.92$  ( $SD=1.41$ ), respectively;  $t_{143}=16.51$ ;  $p<0.001$ ;  $d=2.734$ ]. However, Moral Judgement is significantly higher for CE when compared with PL in the Use condition [ $M=3.99$  ( $SD=1.58$ ),  $M=2.31$  ( $SD=1.22$ ), respectively;  $t_{124.1}=6.849$ ;  $p<0.001$ ;  $d=1.183$ ].

[Please insert Figure 1 here]

**Fig.1** Figure 1 shows the plot for the interaction Expedient \* Decision for the variables (a) Authenticity, (b) Moral judgement, (c) Cheating, and (d) Fairness. Bars represent 95% confidence intervals, circles the number of responses for each level of rating. The dotted line marks the intermediate value of the scale, corresponding to a neutral opinion. For Authenticity, Moral judgement and Fairness, values below it correspond to a negative judgement, values above it to a positive judgement. The reverse for Cheating. For statistical significance, please refer to text

## Cheating

*In general, (taking drugs to enhance one's own cognitive abilities without any medical need) / (copying someone else's work and passing it off as one's own) is a form of cheating. [1=Absolutely not; 7=Absolutely yes]*

Analysis revealed a significant main effect of Expedient, which shows that PL is regarded as a cheat more than CE [M=6.38 (SD=0.90), M=4.07 (SD=1.70), respectively;  $F_{1, 259}=180.520$ ;  $p<0.001$ ;  $\eta^2=0.403$ ]. Results also revealed an unexpected significant main effect of Decision: participants who read the Not-Use vignettes felt that the Expedient was more a cheat than participants who read the Use vignettes [M=5.45 (SD=1.65), M=5.02 (SD=1.90), respectively;  $F_{1, 259}=4.583$ ;  $p=0.033$ ;  $\eta^2=0.010$ ]. No significant effect of Evaluation criterion was found [ $F_{1, 259}=8.776e-5$ ;  $p=0.993$ ], nor any interaction (Fig.1c).

## Fairness

*(By resorting to this expedient, M.) / (Imagine that M. decided to resort to this expedient and hence was more likely to receive the bonus than his colleagues who did not. Do you think this (is) / (would have been) fair? [1= Absolutely not; 7= Absolutely yes]*

The analysis revealed a significant main effect of Expedient, which shows that on average participants deemed the advantage gained by CE as fairer than that gained through PL [M=3,76 (SD=1.77), M=1.81 (SD=1.09), respectively;  $F_{1, 259}=110.301$ ;  $p<0.001$ ;  $\eta^2=0.297$ ]. As expected, given that the question assumed resorting to the expedient, no main effect of Decision was found [ $F_{1, 259}=0.005$ ;  $p=0.941$ ]. Once again, no main effect of Evaluation criterion was found [ $F_{1, 259}=0.009$ ;  $p=0.924$ ], nor any interaction (Fig.1d).



## Hypothetical Behaviour

*If you were in M.'s situation, would you (take the drug) / (copy the essay)? [1= Absolutely not; 7= Absolutely yes]*

The analysis revealed a significant main effect of Decision, showing that participants who read the Use vignettes expressed relatively higher likelihood of using the expedient compared to those who read the Not-Use vignettes [ $M=2.61$  ( $SD=1.61$ ),  $M=2.13$  ( $SD=1.16$ ), respectively;  $F_{1, 259}=6.007$ ;  $p=0.015$ ;  $\eta^2=0.022$ ]. No main effect of both Expedient [ $M=2.52$  ( $SD=1.58$ ) for CE;  $M=2.19$  ( $SD=1.21$ ) for PL;  $F_{1, 259}=3.483$ ;  $p=0.063$ ] and Evaluation criterion [ $F_{1, 259}=4.792e-4$ ;  $p=0.983$ ] were found, nor any interaction (See Figure 2).

[Please insert Figure 2 here]

**Fig.2** Figure 2 shows the plot for the interaction Expedient \* Decision for the variable Hypothetical Behaviour. Bars represent 95% confidence intervals, circles the number of responses for each level of rating. The dotted line marks the intermediate value of the scale, corresponding to a neutral opinion. Values below it correspond to a negative answer, values above it to a positive answer

## Discussion

The present study compared laypeople's attitude towards CE versus a more typical form of academic misconduct, i.e., plagiarism. We aimed to understand whether the use of prescription drugs to enhance one's own cognitive skills is perceived as negatively as plagiarism is. Even though the real efficacy of "smart pills" on healthy people is still uncertain [13–15], the number of individuals that are, apparently, already using such drugs [39–43] makes it a topic worth investigating. Our findings show that overall CE is perceived in a relatively more positive manner than plagiarism. Our participants believe that the product of a performance influenced by CE is more authentic than one following plagiarism; that a person using drugs to enhance cognition is less blameworthy than a plagiarizer, and finally that CE is less of a cheat, and grants a fairer advantage over peers, than plagiarism.

It is worth noting that the average ratings for plagiarism were rather severe, often falling at the negative end of the scales, whereas the average ratings for CE were somehow more moderate. Although absolute values are not the key measure when using the CVT approach, it is still of interest to note that the negative attitude towards plagiarism was clear-cut, whereas the attitude towards CE was more moderate or even not negative. Surprisingly, CE was not even considered to be a form of cheating. One interpretation for this pattern of results comes from an inspection of the answers to the open-ended questions<sup>3</sup>. Despite the scenarios clearly pointed out that the drug is effective as cognitive enhancer in the non-clinical population, some participants were wary of CE's actual usefulness. For instance, some participants stated that, in their opinion, the drug had no effect whatsoever on M.'s performance (*"I don't think the drug could also improve M.'s performance"*); *"Taking the drug would not influence M.'s actual skills"*), or provided just a minor boost (*"I don't trust drugs that promise better performance, so I think M. benefitted, if anything, from a bland effect"*).

The evidence we found shows a more favourable attitude towards CE than plagiarism. This finding is in contrast with the results of Dubljević and colleagues, who reported lower moral acceptability for CE compared to plagiarism [46]. The two sets of results, however, may not be comparable for methodological reasons. Dubljević and colleagues [46] probed different facets of moral acceptability for CE and for plagiarism. In contrast, the present study investigates people's attitude by exposing them to different scenarios involving either CE or plagiarism, and comparing directly their answers to the exact same questions.

In addition, as the Authors themselves acknowledge, in their study acceptability measures on CE were also possibly influenced by considerations regarding other potentially reprehensible behaviours associated with CE consumption (e.g. illegal means to obtain the drug). In contrast, with the exception of the question on moral judgement (*"Would you judge a colleague of yours positively if you knew he/she behaved as M did?"*), we focused more on participants' opinion regarding ethical aspects that

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<sup>3</sup> Unfortunately, these were too few to allow for a systematic analysis. We report here examples of responses that can provide useful insights.

should be, in principle, neutral as to how the drug was obtained (i.e., in a licit or illicit way). Although we have no direct data to assess what our participants actually thought, this difference may help explaining the inconsistency of the results between the two studies. Still, in the absence of any evidence, this remains a speculation.

### Judging product authenticity

Additional support for the notion that our participants were doubtful about CE effectiveness comes from the fact that, in our participants' opinion, the decision to resort to plagiarism lowers the authenticity of the product compared to the decision to refrain from it, while this does not happen for CE. In the CE scenarios, product Authenticity was comparable, irrespective of whether the individual decision is to resort to the drug or not. This means that, contrary to the statement of the President's Council on Bioethics, in our participants' opinion it is not true that a cognitively enhanced person's performance is "less his/her own". One possible explanation lies again in the perceived (in)effectiveness of the expedient itself (see the comments reported in the previous section). While none of the participants raised any doubts about the effectiveness of copying someone else's work as a cheating strategy to match the deadline, some of them reported not to trust CE. If the enhancer does not work, whether someone uses it or not has no effect on performance, hence the product is mostly genuine. Another reason was reported by some of the participants who read the scenarios about CE, who stated that even though the drug could alter the performer's skills, it could not alter his knowledge and hence the product was (at least to some degree) authentic. For instance, a participant stated: "*What M. knew and wrote did not depend on the drug, the drug just helped him match the deadline*". This reasoning cannot be applied to plagiarism: while the plagiarizer could, of course, put some effort in searching and editing the text, the final product will reflect a small amount of his/her own knowledge since the content is, mostly, copied from someone else. It is worth noting however that when judging to what extent the essay reflects M.'s skills, some participants commented that efficient time management and the ability to stay focused under stressful situations are also individual skills that contribute to the final product. Hence, they also could be considered skills altered by CE use.

## Judging the person

Results regarding the way participants judged M. are consistent with the fact that plagiarism is seen as less fair and more a cheat than CE: people's attitude seems to be relatively more favourable towards someone who reverts to CE than to plagiarism. Indeed, while the recourse to either expedient causes a more negative judgement, results clearly show that people blame much more the protagonist when he is depicted as a plagiarizer than as a CE-user. Again, it is worth considering not only comparisons, but absolute values as well. In the condition where M. is said to have plagiarized, the average rating corresponds to a clearly negative judgement; on the other hand, in the condition where M. is said to have taken a CE, participants' judgement is neutral (i.e., neither negative, nor positive). This attitude is reflected by the comments of the participants: for CE, most participants argued that the moral judgement depends on some aspects not specified by the scenario, e.g. the exact extent to which the drug works and whether it is dangerous or addictive. On the other hand, the overall tone of the comments on plagiarism was clearly negative (*"He cheated, and potentially damaged others"*), even though a few participants argued it depends on the circumstances, since *"A single episode is not representative of a general attitude"*.

## Would you do it?

Even though the evidence discussed so far shows a more favourable attitude towards CE than plagiarism, it is interesting to note that when asked whether they would resort to either plagiarism or CE, our participants answered that they would avoid both of them to the same degree. So, while the average ratings for the other measures show a clear difference between the judgments on CE and plagiarism, decisions about possible courses of action show that both expedients are regarded as equally undesirable, even though for -possibly- different reasons. When looking at participants' comments regarding CE, the main concern seemed to be that CE was perceived as a potentially harmful drug, with doubtful effectiveness and unknown side effects. Some said that they did not have enough available information to make a decision (*"I'd like to know first how much powerful it is compared to energy drinks"*). Others revealed a wariness about drugs in general and concerns for the health of the user (*"I*

*don't take drugs unless it's strictly necessary for health reasons*"; *"I think I'd fear for my health, that is much worthier than a few points at an exam"*). On the other hand, comments referring to plagiarism range from participants who state that *"It's not worth it because you lose the chance to learn something"* to *"It's morally and legally wrong"*.

### The role of competitiveness

In our study we also examined the effect of competitiveness by manipulating whether the criterion by which the performance was evaluated was either zero-sum (i.e., only the five best essays would obtain the bonus) or not-zero-sum (i.e., all students whose essay was considered to be worth it would obtain the bonus). We assumed that a zero-sum criterion results in a more competitive environment compared to a not-zero-sum criterion. Contrary to our expectations, and in contrast with previous results [33–35], competitiveness was not a relevant factor in determining the attitude towards plagiarism or CE. Results show no difference in respondents' attitude between scenarios with zero-sum and not-zero sum criterion. This could be due to an ineffective operationalization of competitiveness, with the result that participants did not perceive the zero-sum scenarios as more competitive than the not-zero-sum ones. However, this explanation is not consistent with the results of our pre-test, in which respondents reported to perceive scenarios as more or less competitive depending on the criterion (i.e., zero-sum being more competitive than not-zero-sum). A second methodological consideration that could help explain the lack of difference is that in our vignettes the consequence of the evaluation (i.e., receiving the bonus or not) may have been seen as relatively unimportant. In the construction of the vignettes we tried to create a scenario as realistic and plausible as possible: since academy is, generally, based on not-zero-sum evaluation criteria, we were worried that stressing too much the zero-sum vignettes element could create an unbelievable and unlikely scenario. Future research should examine if a series of vignettes representing scenarios with more crucial consequences (e.g. the admission to an honour course or a substantial scholarship) may lead to different results.

## The influence of social norms

A final note concerns how participants' attitude towards either expedient was more positive when the hypothetical student M. decided to resort to it, compared to when he refrained from using it. Previous literature suggests that individual's attitudes and the likelihood of engaging in academically dishonest behaviour are influenced by the perceived likelihood of others (and peers in particular) to engage in that behaviour [52]. This phenomenon was documented for controversial behaviours that were already acknowledged as misconduct (such as plagiarism in the present study). We argue that this could also apply to other behaviours that have not yet been officially labelled as misconduct (such as CE in the present study). Our results may be interpreted as evidence that M.'s decision to engage in plagiarism or CE was enough to provide social norm information, which influenced participants' responses accordingly.

If a single fictional instance of CE user/plagiariser is sufficient to increase the propensity to follow M.'s example, we could probably anticipate that real, everyday life examples will have a stronger impact on individual choices. At present, CE may not be particularly widespread among students, or at least not as widespread as more traditional forms of academic misconduct such as plagiarism. This may be due to the fact that people are sceptical about its effectiveness, and worried about their own health. However, should new evidence in favour of the efficacy and safety of "smart pills" be found, they might become more willing to consider it as an option, and prevalence of use may increase. The present study did not target directly the issue of how increased prevalence will affect people's attitude towards CE, both relatively to plagiarism and in general. This remains a key topic for future investigations. Moreover, our sample was limited to a small subset of the Italian population, and recruitment did not target selected categories that could have been more informed and sensitive to the issue (i.e., respondents were not purposely selected among students or academics in general). Further studies will have to assess the exact extent to which the relatively less strict attitude towards CE than plagiarism in academy is due to the fact that the former is less known and not formally regulated, while the latter is a more diffused and explicitly forbidden behaviour.

## Conclusions

Our results show that there are several differences in the way the recourse to CE and to plagiarism in an academic situation is perceived. Although the limitations of a convenience sample prevent us from extending the results to the entire population, we showed that, in general, our participants do not endorse CE use. At the same time, however, their opinion on the ethical issues related to its use is not negative; rather, their attitude is more positive towards CE compared to plagiarism. This seems to pose against the idea that, at present, the use of cognitive enhancers in academic settings is seen as a form of cheating. However, this may change in the future, should CE become undisputedly effective, more diffused and available to the general public.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## Bibliography

1. Gross, Charles. 2016. Scientific misconduct. *Annual Review of Psychology* 67: 693–711. doi:10.1146/annurev-psych-122414-033437.
2. Wells JA. Final report: Observing and reporting suspected misconduct in biomedical research. Rockville, MD: The Office of Research Integrity; 2008.
3. Fanelli, Daniele. 2009. How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. *PLoS ONE* 4. doi:10.1371/journal.pone.0005738.
4. ICAI - Statistics. 2017. <http://www.academicintegrity.org/icaei/integrity-3.php>. Accessed December 18.
5. Marques, Dora Nazaré, and António Filipe MacEdo. 2016. Perceptions of acceptable conducts by university students. *Journal of Optometry* 9. Spanish General Council of Optometry: 166–174. doi:10.1016/j.optom.2015.02.001.
6. Rabi, Suzanne M., Lynn R. Patton, Nancy Fjortoft, and David P. Zgarrick. 2006. Characteristics, prevalence, attitudes, and perceptions of academic dishonesty among pharmacy students. *American Journal of Pharmaceutical Education* 70. American Association of Colleges of Pharmacy: 73. doi:10.5688/aj700473.
7. Bostrom, Nick, and Anders Sandberg. 2009. Cognitive enhancement: Methods, ethics, regulatory challenges. *Science and Engineering Ethics* 15. Springer Netherlands: 311–341. doi:10.1007/s11948-009-9142-5.
8. Turner, Danielle C, Trevor W. Robbins, Luke Clark, Adam R Aron, Jonathan Dowson, and Barbara J. Sahakian. 2003. Cognitive enhancing effects of modafinil in healthy volunteers. *Psychopharmacology (Berl)* 165: 260–269. doi:10.1007/s00213-002-1250-8.
9. Müller, Ulrich, Nikolai Steffenhagen, Ralf Regenthal, and Peter Bublak. 2004. Effects of modafinil on working memory processes in humans. *Psychopharmacology* 177: 161–169. doi:10.1007/s00213-004-1926-3.



10. Elliott, R., Barbara J. Sahakian, K. Matthews, A. Bannerjea, J. Rimmer, and Trevor W. Robbins. 1997. Effects of methylphenidate on spatial working memory and planning in healthy young adults. *Psychopharmacology* 131. Springer-Verlag: 196–206. doi:10.1007/s002130050284.
11. Mehta, M A, A M Owen, Barbara J. Sahakian, N Mavaddat, J D Pickard, and Trevor W. Robbins. 2000. Methylphenidate enhances working memory by modulating discrete frontal and parietal lobe regions in the human brain. *The Journal of neuroscience : the official journal of the Society for Neuroscience* 20: RC65.
12. Ilieva, Irena P., Cayce J. Hook, and Martha J. Farah. 2015. Prescription Stimulants' Effects on Healthy Inhibitory Control, Working Memory, and Episodic Memory: A Meta-analysis. *Journal of Cognitive Neuroscience* 27: 1069–1089. doi:10.1162/jocn\_a\_00776.
13. Zohny, Hazem. 2015. The Myth of Cognitive Enhancement Drugs. *Neuroethics* 8: 257–269. doi:10.1007/s12152-015-9232-9.
14. Lucke, Jayne C., Stephanie Bell, Brad Partridge, and Wayne D. Hall. 2011. Deflating the neuroenhancement bubble. *AJOB Neuroscience* 2: 38–43. doi:10.1080/21507740.2011.611122.
15. Vrecko, Scott. 2013. Just How Cognitive Is “Cognitive Enhancement”? On the Significance of Emotions in University Students' Experiences with Study Drugs. *AJOB neuroscience* 4: 4–12. doi:10.1080/21507740.2012.740141.
16. Iuculano, Teresa, and Roi Cohen Kadosh. 2013. The mental cost of cognitive enhancement. *The Journal of neuroscience : the official journal of the Society for Neuroscience* 33: 4482–6. doi:10.1523/JNEUROSCI.4927-12.2013.
17. Cakic, V. 2009. Smart drugs for cognitive enhancement: Ethical and pragmatic considerations in the era of cosmetic neurology. *Journal of Medical Ethics* 35: 611–615. doi:10.1136/jme.2009.030882.
18. Farah, Martha J., Judy Illes, Robert Cook-Deegan, Howard Gardner, Eric Kandel, Patricia King, Eric Parens, Barbara J. Sahakian, and Paul Root Wolpe. 2004. Neurocognitive enhancement: what can we do and what should we do? *Nature reviews. Neuroscience* 5: 421–425. doi:10.1038/nrn1390.

19. Cohen Kadosh, Roi, Neil Levy, Jacinta O'Shea, Nicholas Shea, and Julian Savulescu. 2012. The neuroethics of non-invasive brain stimulation. *Current Biology* 22. Elsevier: R108–R111. doi:10.1016/j.cub.2012.01.013.
20. Roache, Rebecca. 2008. Enhancement and Cheating. *Expositions* 2: 153–156. doi:10.1558/expo.v2i2.153.
21. Schermer, Maartje H. N. 2008. On the argument that enhancement is “cheating.” *Journal of Medical Ethics* 34: 85–88. doi:10.1136/jme.2006.019646.
22. Whetstine, Leslie M. 2015. Cognitive Enhancement: Treating or Cheating? *Seminars in Pediatric Neurology* 22. Bioethics: 172–176. doi:10.1016/j.spen.2015.05.003.
23. Goodman, Rob. 2010. Cognitive enhancement, cheating, and accomplishment. *Kennedy Institute of Ethics Journal* 20: 145–160. doi:10.1353/ken.0.0309.
24. President's Council on Bioethics. 2003. *Beyond Therapy: Biotechnology and the Pursuit of Happiness*. Washington, DC.
25. Duke University Student Conduct. <https://studentaffairs.duke.edu/conduct/z-policies/academic-dishonesty>. Accessed December 18 2018.
26. Faber, Nadira S, Julian Savulescu, and Thomas Douglas. 2016. Why is Cognitive Enhancement Deemed Unacceptable? The Role of Fairness, Deservingness, and Hollow Achievements. *Frontiers in Psychology* 7: 232. doi:10.3389/fpsyg.2016.00232.
27. McCabe, Donald L., and Linda Klebe Treviño. 1997. Individual and contextual influences on academic dishonesty: A Multicampus Investigation. *Research in Higher Education* 38: 379–396. doi:10.1023/A:1024954224675.
28. McCabe, Donald L., Linda Klebe Treviño, and Kenneth D Butterfield. 1999. Academic Integrity in Honor Code and Non-Honor Code Environments: A Qualitative Investigation. *The Journal of Higher Education* 70. Ohio State University Press: 211–234. doi:10.2307/2649128.
29. McCabe, Donald L., Linda Klebe Treviño, and Kenneth D Butterfield. 2001. Cheating in Academic Institutions: A Decade of Research. *Ethics & Behavior* 11: 219–232. doi:10.1207/S15327019EB1103\_2.

30. Teixeira, Aurora A. C., and Maria Fatima Rocha. 2010. Cheating by economics and business undergraduate students: an exploratory international assessment. *Higher Education* 59: 663–701. doi:10.1007/s 10734-009-9274-1.
31. Patel-Bhakta, Hemali G., Kathleen B. Muzzin, Janice P. DeWald, Patricia R. Campbell, and Peter H. Buschang. 2014. Attitudes Towards Students Who Plagiarize: a dental hygiene faculty perspective. *Journal of Dental Education* 78: 131–145.
32. Brain Boosting and Cheating in Exams: Four Responses. 2008. *Practical Ethics*.
33. Dodge, Tonya, Kevin J. Williams, Miesha Marzell, and Rob Turrisi. 2012. Judging Cheaters: Is substance misuse viewed similarly in the athletic and academic domains? *Psychology of Addictive Behaviors* 26: 678–682. doi:10.1037/a0027872.
34. Bell, Stephanie, Brad Partridge, Jayne C. Lucke, and Wayne D. Hall. 2013. Australian university students' attitudes towards the acceptability and regulation of pharmaceuticals to improve academic performance. *Neuroethics* 6: 197–205. doi:10.1007/s12152-012-9153-9.
35. Forlini, Cynthia, and Eric Racine. 2012. Stakeholder perspectives and reactions to " academic " cognitive enhancement: unsuspected meaning of ambivalence and analogies. *Public Understanding of Science* 21: 606–625. doi:10.1177/0963662510385062.
36. Fitz, Nicholas S., Roland Nadler, Praveena Manogaran, Eugene W. J. Chong, and Peter B. Reiner. 2014. Public attitudes toward cognitive enhancement. *Neuroethics* 7: 173–188. doi:10.1007/s12152-013-9190-z.
37. Cabrera, Laura Y., Nicholas S. Fitz, and Peter B. Reiner. 2015. Reasons for comfort and discomfort with pharmacological enhancement of cognitive, affective, and social domains. *Neuroethics* 8: 93–106. doi:10.1007/s12152-014-9222-3.
38. Babcock, Quinton, and Torn Byrne. 2000. Student perceptions of methylphenidate abuse at a public liberal arts college. *Journal of American college health: J of ACH* 49: 143–145. doi:10.1080/07448480009596296.
39. McCabe, Sean Esteban, John R. Knight, Christian J. Teter, and Henry Wechsler. 2005. Non-medical use of prescription stimulants among US college students: Prevalence and correlates

- from a national survey. *Addiction* 100: 96–106. doi:10.1111/j.1360-0443.2004.00944.x.
40. Maher, Brendan. 2008. Poll results: look who's doping. *Nature* 452. Nature Publishing Group: 674–675. doi:10.1038/452674a.
  41. Teter, Christian J, Anthony E Falone, James A Cranford, Carol J Boyd, and Sean Esteban McCabe. 2010. Nonmedical use of prescription stimulants and depressed mood among college students: Frequency and routes of administration. *Journal of Substance Abuse Treatment* 38. NIH Public Access: 292–298. doi:10.1016/j.jsat.2010.01.005.
  42. Majori, S, D Gazzani, S Pilati, J Paiano, A Sannino, S Ferrari, and E Checchin. 2017. Brain doping: stimulants use and misuse among a sample of Italian college students. *Journal of preventive medicine and hygiene* 58: E130–E140.
  43. Castaldi, Silvana, Umberto Gelatti, Grazia Orizio, Uwe Hartung, Ana Maria Moreno-Londono, Marta Nobile, and Peter J Schulz. 2012. Use of cognitive enhancement medication among northern Italian university students. *Journal of addiction medicine* 6: 112–117. doi:10.1097/ADM.0b013e3182479584.
  44. Schelle, Kimberly J., Nadira Faulmüller, Lucius Caviola, and Miles Hewstone. 2014. Attitudes toward pharmacological cognitive enhancement—a review. *Frontiers in systems neuroscience* 8: 53. doi:10.3389/fnsys.2014.00053.
  45. Franke, Andreas G., Caroline Bonertz, Michaela Christmann, Stefan Engeser, and Klaus Lieb. 2012. Attitudes Toward Cognitive Enhancement in Users and Nonusers of Stimulants for Cognitive Enhancement: A Pilot Study. *AJOB Primary Research* 3: 48–57. doi:10.1080/21507716.2011.608411.
  46. Dubljević, Veljko, Sebastian Sattler, and Eric Racine. 2013. Cognitive Enhancement and Academic Misconduct: A Study Exploring Their Frequency and Relationship. *Ethics and Behavior* 24: 408–420. doi:10.1080/10508422.2013.869747.
  47. Burstin, Kenneth, Eugene B. Doughtie, and Avi Raphaeli. 1980. Contrastive Vignette Technique: An indirect Methodology Designed to Address Reactive Social Attitude Measurement1. *Journal of Applied Social Psychology* 10. Blackwell Publishing Ltd: 147–165.

- doi:10.1111/j.1559-1816.1980.tb00699.x.
48. Alexander, Cheryl S., and Henry Jay Becker. 1978. The Use of Vignettes in Survey Research. *The Public Opinion Quarterly* 42. Oxford University Press: 93–104. doi:10.1086/268432.
  49. Nichols, Austin Lee, and Jon K Maner. 2008. The good-subject effect: investigating participant demand characteristics. *The Journal of general psychology* 135: 151–165. doi:10.3200/GENP.135.2.151-166.
  50. Partridge, Brad, Jayne C. Lucke, and Wayne D. Hall. 2014. “If you’re healthy you don’t need drugs”: Public attitudes towards “brain doping” in the classroom and “legalised doping” in sport. *Performance Enhancement and Health* 3: 20–25. doi:10.1016/j.peh.2014.03.001.
  51. Krosnick, Jon A. 1999. Survey Research. *Annual Review of Psychology* 50: 537–567. doi:10.1146/annurev.psych.50.1.537.
  52. McCabe, Donald L., and Linda Klebe Treviño. 1993. Academic Dishonesty: Honor Codes and Other Contextual Influences. *The Journal of Higher Education* 64: 522–538. doi:10.2307/2959991.