

Psychosocial factors facilitating use of cognitive enhancing drugs in education

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DOI:

[10.1080/09687637.2019.1586831](https://doi.org/10.1080/09687637.2019.1586831)

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Document Version

Peer reviewed version

Citation for published version (Harvard):

Heyes, A & Boardley, I 2019, 'Psychosocial factors facilitating use of cognitive enhancing drugs in education: a qualitative investigation of moral disengagement and associated processes', *Drugs: Education, Prevention and Policy*, vol. 26, no. 4, pp. 329–338. <https://doi.org/10.1080/09687637.2019.1586831>

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Checked for eligibility 28/02/2019

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1 **Psychosocial Factors Facilitating Use of Cognitive Enhancing Drugs in**
2 **Education: A Qualitative Investigation of Moral Disengagement and**
3 **Associated Processes**

4 Illicit use of prescription drugs (e.g., Modafinil) to enhance academic performance –
5 termed cognitive enhancement (CE) – is a legal, health and ethical issue. Guided by
6 Bandura’s (1991) social cognitive theory of moral thought and action, the current study
7 investigated whether student users of CE evidenced specific psychosocial mechanisms
8 (i.e., mechanisms of moral disengagement) when explaining their reasons for CE.
9 Following ethical approval from the lead author’s institution, in-depth-semi-structured
10 interviews were conducted with nine students with experience of CE. Data were
11 content analyzed deductively, using definitions for the eight mechanisms of moral
12 disengagement; six of the eight mechanisms were identified through data analysis:
13 diffusion of responsibility, advantageous comparison, distortion of consequences,
14 displacement of responsibility, moral justification, and euphemistic labelling. In
15 addition, inductive data analysis identified three further themes; self-medication, family
16 and friends, and institutional position. Overall, the study findings suggest students may
17 morally disengage to justify and rationalize use of CE to minimize negative emotional
18 responses (e.g., guilt) that may be expected to result given the potential legal-, health-,
19 and ethics-based deterrents to CE.

20 Keywords: performance enhancement; interviews; nootropics; study drugs.

21

1 **Introduction**

2 Competition and the drive for performance excellence is a facet of modern life. The pressure
3 to perform, either real or perceived, has led individuals to seek methods to enhance their
4 performance across a broad range of contexts. One method of enhancing performance, either
5 physical or cognitive, is the use of drugs (McVeigh, Evans-Brown, & Bellis, 2012; Møldrup
6 & Rie Hansen, 2006; Petróczi & Aidman, 2008; Petróczi et al., 2011). As academia becomes
7 more competitive and outcome focused, a growing societal concern is the trend of students
8 engaging in cognitive enhancement (CE) through the off-label use of prescription drugs
9 (Hübner, 2012; McVeigh et al., 2012). CE has been defined, as ‘Use of any psychoactive
10 drug by healthy subjects with the aim of enhancing cognitive abilities such as vigilance,
11 attention, concentration or memory’ (Franke, Bagusat, Rust, Engel, & Lieb, 2014: p83). The
12 importance of this topic is highlighted by the increased research attention paid to CE over
13 recent years (Partridge, Bell, Lucke, Yeates, & Hall, 2011; Partridge, Lucke, & Hall, 2012;
14 Vargo et al., 2014; Vargo & Petróczi, 2016; Wolff & Brand, 2013). Although different
15 conceptualizations of CE have been proposed, in the current investigation CE represents the
16 off-label use of prescription medications for the purpose of augmenting cognitive abilities
17 and improving academic performance.

18 Three types of prescription stimulant medications commonly used by university
19 students for CE purposes are amphetamines (e.g., Adderall), methylphenidate (e.g., Ritalin),
20 and modafinil (e.g., Provigil) (De Jough, Bolt, Schermer, & Olivier, 2008; Dietz, Striegel,
21 Franke, Lieb, Simon, & Ulrich, 2013; Farah et al., 2004). Although prevalence is difficult to
22 determine categorically, lifetime use of such drugs for CE purposes is estimated to be
23 between 5 and 35% in North American (Smith & Farah, 2011; Wilens et al., 2008) and
24 between 1 and 10% in the UK and Europe (Franke et al., 2011; Ott & Biller-Andorno, 2014;
25 Singh, Bard, & Jackson, 2014). Although researchers (e.g., Vargo et al., 2014; Vargo &

1 Petróczi, 2016) have started to explore psychosocial factors that influence students use of CE,
2 more work is needed to fully understand such influences. Thus, the overarching aim of the
3 current research was to explore specific psychosocial factors that may facilitate illicit use of
4 CE by university students.

5 One reason why it is important to understand the psychosocial processes that may
6 lead to CE drug use is that use of such drugs could lead to detrimental health consequences.
7 Use of prescription stimulants such as those introduced previously has been linked to side
8 effects such as insomnia, psychosis, suppression of appetite, nausea, and irritability (Finger,
9 Silva, & Falavigna, 2013; Hysek et al., 2014). In addition to these side effects, evidence
10 supports the abuse potential of methylphenidate (Gahr, Freudenmann, Hiemke, Kölle, &
11 Schönfeldt-Lecuona, 2014; Morton & Stockton, 2000) and longer-term studies investigating
12 the potential for tolerance and abuse of modafinil are yet to be conducted (Sahakian &
13 Morein-Zamir, 2011). Students who use CE drugs are also more likely to use and misuse
14 other illicit substances for the purposes of self-medication (Singh et al., 2014). As such,
15 detrimental health consequences represent one possible deterrent to CE.

16 Beyond potential health consequences, certain legal considerations may also influence
17 students' decision making around CE. For instance, amphetamine and methylphenidate are
18 classified as Class B drugs within the UK, and therefore carry a five-year prison sentence for
19 possession without a prescription and up to a 14-year sentence for supply (Misuse of Drugs
20 Act, 1971). Regarding modafinil, although this drug is not illegal to purchase, its sale without
21 a prescription is illegal (MHRA, 2013). Moreover, the use, misuse, and sale of controlled
22 drugs on the property of university campuses will often contravene institutional regulations
23 and therefore represent a disciplinary offence (e.g., University of Birmingham, 2013). Thus,
24 potential legal and disciplinary consequences represent further possible deterrents to CE.

1 A further issue related to – but distinct from – legality, are ethical considerations
2 relating to CE. In particular, there has been extended discussion as to whether CE by students
3 represents a form of cheating given it may be deemed a form of academic dishonesty (Cakic,
4 2009; De Jongh et al., 2008; Vargo & Petróczi, 2016). Although some have argued
5 pharmacological enhancement should not be considered cheating (e.g., Harris, 2009;
6 Schermer, 2008), applying definitions of this concept suggest it should. Specifically,
7 academic dishonesty represents ‘...any deceitful or unfair act intended to produce a more
8 desirable outcome on an exam, paper, homework assignment, or other assessment of
9 learning’ (Miller, Murdock, & Grotewiel, 2017: p121). Thus, use of CE drugs to improve
10 performance constitutes academic dishonesty, even when students are assessed on individual
11 performance rather than against peers (Whetstine, 2015). Specifically, even in such cases an
12 improved university degree classification can improve a student’s chance of success within a
13 competitive job market post-university. Accordingly, students are often critical of
14 neuroenhancement, judging pharmacologically-enhanced performances as unfair and
15 inauthentic (Bell et al., 2013; Forlini, & Racine, 2012; Forlini et al., 2015). Thus, ethical
16 constraints regarding academic dishonesty could also deter students’ use of CE.

17 *Moral Disengagement*

18 Given the possible health-, legal-, and ethical-based deterrents to CE, an important
19 aim for researchers is to understand psychosocial mechanisms that may allow some students
20 to circumvent such constraints. One theory that has proved useful in research investigating
21 how people psychologically bypass similar constraints regarding drug use in other contexts is
22 Bandura’s (1991) social cognitive theory of moral thought and action. Bandura (1991)
23 proposed engagement in harmful and/or transgressive activities – of which CE could be
24 categorized – is primarily discouraged by anticipation of resultant negative emotions (e.g.,
25 guilt). However, people can diminish or eliminate anticipation of such emotions through use

1 of one or more of eight psychosocial mechanisms, collectively referred to as mechanisms of
2 Moral Disengagement (MD). Through MD people can conditionally endorse harmful and
3 transgressive acts by cognitively reframing the behavior, reducing personal accountability for
4 it and/or its consequences, distorting the consequences stemming from it, or dehumanizing or
5 blaming the victim/s.

6 Given Bandura (1991) proposes MD can operate in any context, it may be used by
7 student users of CE to prevent anticipation of negative emotions one may expect to be
8 stimulated given the health-, legal-, and ethical-based deterrents outlined previously.
9 Consistent with this assertion, past research has linked MD with illicit drug use in non-
10 academic contexts. For example, Bandura, Barbaranelli, Caprara, and Pastorelli (1996)
11 identified moderate-to-strong positive associations between MD and self- and parent-rated
12 delinquent behavior, incorporating drug use alongside other forms of delinquent behavior
13 with junior-high school children from Italy. Similarly, Passini (2012) reported a moderate
14 positive correlation between MD and heavy drug use with secondary-school children from
15 Italy. In addition, MD has also been linked with illicit Image and Performance Enhancing
16 Drug (IPED) use in sport and exercise. First, across three studies Boardley and colleagues
17 presented qualitative evidence supporting the use of six mechanisms (i.e., moral justification;
18 euphemistic labelling; advantageous comparison; displacement of responsibility; diffusion of
19 responsibility; distortion of consequences) of MD to justify and rationalize IPED use with
20 samples of IPED users (Boardley & Grix 2014; Boardley, Grix, & Dewar, 2014; Boardley,
21 Grix, & Harkin, 2015). More recently, Boardley, Smith, Mills, Grix, and Wynne (2017)
22 presented quantitative evidence supporting a moderate positive link between MD and self-
23 reported IPED use with athletes from sport and exercise contexts. Thus, MD has been
24 positively linked with drug use across a range of non-academic contexts. However, to date
25 researchers have now explored possible links between MD and CE in student populations.

1 Research not grounded in Bandura’s (1991) theory provides some support for use of
2 MD to rationalize and justify CE in students. Specifically, Vargo et al. (2016) conducted
3 interviews with 13 university students with experience of CE to investigate their experiences,
4 motivations, and beliefs regarding CE. Importantly, some of the qualitative data presented
5 from this study illustrates MD being used to rationalize and justify CE. For example, one
6 student explained how he was influenced ‘... by the growing popularity of smart drugs’
7 (Vargo & Petróczi, 2016; p6). This quote evidences *diffusion of responsibility*, a MD
8 mechanism that involves diffusing personal responsibility for detrimental conduct amongst a
9 large group of perpetrators or portrays it as resulting from collective decision making
10 (Bandura, 1991). Another participant stated ‘neuroenhancement was seen as significantly
11 different from other illicit drugs as the former were used for functional reasons and not
12 recreationally’ (Vargo & Petróczi, 2016: p7). This quote demonstrates advantageous
13 comparison, an MD mechanism that operates when a transgressive act is contrasted with
14 another act that is deemed more heinous, thus making the act in question appear less harmful
15 or even inconsequential in comparison (Bandura, 1991). Although this study provides initial
16 evidence supporting students’ use of MD to justify and rationalize CE, research is needed that
17 systematically applies Bandura’s (1991) theory to this issue.

18 Based upon the arguments and evidence presented to this point, the overarching aim
19 of the present study was to investigate whether university students engaging in CE evidence
20 mechanisms of MD when explaining their use of CE drugs. Although research has shown
21 potential use of MD to rationalize and justify CE drug use (i.e., Vargo & Petróczi, 2016), to
22 date researchers have not systematically applied Bandura’s (1991) theory to this issue. As
23 such, the current research sought to extend research linking MD with drug use in non-
24 academic contexts (e.g., Bandura et al., 1996; Boardley & Grix 2014; Boardley et al., 2014;
25 Boardley et al., 2015, Boardley et al., 2017; Passini 2012) to the use of CE drugs in

1 education. Specifically, we looked to answer the following research questions: (a) do
2 university students evidence MD when explaining their CE drug use, (b) and if so, which of
3 the eight MD mechanisms are used.

4 **Methods**

5 *Participants, procedures, and interviewer*

6 Study participants were nine university students, ($n_{\text{male}} = 8$), attending
7 dissimilar programs of study at one University in the West Midlands region of
8 England. Participants' ages ranged from 20 to 22 years. The sample size is in line with
9 those used in similar investigations at this stage of enquiry (Boardley & Grix, 2014;
10 Vargo & Petróczi, 2016). All participants had experience of CE, with period of use
11 ranging from one to four years; seven were users at the time of interview and two
12 were past users. The CE drugs used were, Ritalin ($n = 3$), and Modafinil ($n = 9$).
13 Although recognized as one of the most prevalent CE drugs in the United States, none
14 of the participants had used Adderall.

15 Ethical clearance was granted by the host institution. Due to the sensitive
16 nature of the topic, recruitment occurred through intermediaries who knew individuals
17 with experience of CE use. One of the intermediaries first described the purpose of the
18 study, the rights of participants, and what participation involved to potential
19 participants; interviews were then arranged for those volunteering to participate. To
20 ensure the anonymity of the participants, names and contact details were not recorded;
21 participants were unknown to the interviewer. As such, verbal – rather than written –
22 informed consent was obtained. Finally, to protect the anonymity of participants, all
23 interviews were transcribed within 48 hours of interview, with audio files immediately
24 deleted upon transcription completion. The interviewer – although not a CE user –

1 ensured preparation for the interviews by studying a wide range of substances used for
2 CE, and how students tend to locate and use such substances.

3 *Interview structure and data analysis*

4 In-depth-semi-structured interviews were conducted during the winter of 2016/17,
5 based on a protocol designed to identify psychosocial mechanisms used to justify and
6 rationalize CE through use of one or more of the eight mechanisms of MD. The protocol
7 comprised of open-ended questions that were succeeded by more targeted questions centered
8 on the eight predetermined categories (e.g., moral justification, euphemistic labelling). This
9 structure allowed for most instances of MD to emerge naturally during interview, rather than
10 being imposed by the interview structure. The more targeted questions later in the protocol
11 gave us the opportunity to probe further on mechanisms that had arisen during the open-ended
12 questions. Study data were first analyzed through deductive reasoning using directed content
13 analysis. This involved the application of functional definitions for the eight mechanisms of
14 MD when content-analyzing the data. This approach is considered appropriate when
15 qualitatively investigating an existing theory (Hsieh & Shannon, 2005).

16 Directed content analysis involved reading each transcript and highlighting all text
17 that appears representing one or more mechanisms of MD; highlighted passages were then
18 coded according to the predetermined codes (Hsieh & Shannon 2005). The unit of coding
19 used throughout data analysis was the complete response to a question; this avoided potential
20 loss of context if only individual sentences were coded (De Wever, Schellens, Valcke, & Van
21 Keer, 2006). In the presentation of results, exemplar quotes are provided with reference to the
22 participant (e.g., P1, P2) and the page and line numbers (2, 5–10) from the relevant transcript.
23 In some cases, clarification was required and additional words have been included within
24 square brackets [] when this was the case. Any data relevant to psychosocial processes
25 facilitating CE use that could not be coded into one of the eight predetermined categories was

1 coded inductively into a category that captured the essence of the underlying process. This
2 inductive analysis allowed further themes to emerge from the data that would otherwise have
3 been missed if the data analysis had solely been deductive in nature. The three inductive
4 themes detailed in the Results section emerged during all interviews.

5 The philosophical approach underpinning the study is a variant of the post-positivist
6 position (Brustad, 2008). While the world view is aligned to that of positivism, the
7 researchers are more reserved regarding the ability to fully discern reality. The researchers
8 are of the view that it is impossible to produce theory-free knowledge. As such, we
9 acknowledge the interview, results, and analyses are all instilled with the researchers'
10 subjectivity (McGannon & Smith, 2015). As the current investigation was specifically
11 designed to examine elements of Bandura's (1991) social cognitive theory of moral thought
12 and action, the themes described may have been interpreted differently if they had been
13 examined using an alternative theory. Also, as with all qualitative research, the construction
14 of data themes is influenced by the researchers' experiences and perspectives relevant to the
15 topic of study. As such, the findings may have been different if investigated by a different
16 research team.

17 **Results and Discussion**

18 Within the current section, we present and discuss the results from the deductively and
19 inductively determined themes evidenced in the data. The primary research aim for the
20 deductive analyses was to investigate whether university students evidence MD when
21 explaining their CE drug use and if so, which of the eight MD mechanisms are demonstrated.
22 Overall, deductive data analyses revealed evidence of six mechanisms of moral MD:
23 diffusion of responsibility, advantageous comparison, distortion of consequences,
24 displacement of responsibility, moral justification, and euphemistic labelling; no evidence of
25 dehumanization or attribution of blame was identified. Subsequent inductive analysis

1 revealed three further data themes. The most frequently evidenced mechanisms within the
2 study were those of distortion of consequence (DC), diffusion of responsibility (DR), and
3 advantageous comparison (AC). Distortion of consequences was evidenced in all nine of the
4 participants with DR and AC being evidenced by eight of the nine participants. All
5 participants displayed at least one mechanism of MD. However, the current data does suggest
6 that the mechanisms of diffusion of responsibility and advantageous comparison were
7 favoured by the participants. Over the following sub-sections, we present and discuss the
8 results for each of the identified themes beginning with those evidenced most by the
9 participants.

10 *Diffusion of responsibility*

11 Diffusion of responsibility can occur through collective action, group decision making, or
12 division of labor, leading to responsibility for transgressive acts and/or their consequences
13 being diffused within the broader group (Bandura, 1991). Such diffusion was evident within
14 our study participants, especially with reference to their close social group. The concept of
15 collective action was represented by P6:

16 'Yeah [I] definitely feel like it's that mass psychology thing again, where you know if
17 everyone is doing it, so you're sort of like well, surely can't be that bad if I was doing,
18 it wouldn't be bad if I was doing it.' (7, 30 - 32)

19 Many of the participants were keen to highlight how common the use of CE drugs was,
20 especially within their immediate social group:

21 'Students love study drugs. I didn't realize how popular it was until I started to talk to
22 people in my social group in second year and then most people have tried it and a lot
23 of people I know.' (P3, 5, 27 - 31)

24 The possibility that perceived ubiquity of CE leads to reduced personal responsibility
25 for it highlights the potential danger in CE becoming normalized. Consistent with our

1 findings here, Vargo and Petróczi (2016) evidenced the perceived growing popularity of CE
2 may lead to its wider adoption. The perception of increasing and widespread use may allow
3 students to diffuse personal responsibility for their actions when using CE drugs. Similarly,
4 diffusion of responsibility through collective action has also been evidenced with illicit
5 performance enhancing drug use in sport and exercise (Boardley & Grix 2014, Boardley et
6 al., 2014, Boardley et al., 2015; Kirby, Moran, & Guerin, 2011). Consistent with what was
7 seen presently with CE, in these studies athletes argued performance-enhancing drug use was
8 morally acceptable in contexts in which it is highly prevalent. As such, it seems diffusion of
9 responsibility may be an important facilitator of drug use across a range of contexts where it
10 is perceived as pervasive.

11 *Advantageous comparison*

12 Advantageous comparison takes advantage of the contrast principle by making a
13 transgressive act appear inconsequential or less harmful by comparing it with act/s perceived
14 to be more heinous (Bandura, 1991). This mechanism was evidenced frequently when CE
15 was favorably compared to other illegal activities. For example, P3 stated ‘As a student you
16 come into contact with so much stuff that is illegal that when you put it relative to other
17 things it’s not that bad’ (5, 4 - 6). As such, this mechanism appears to allow users of CE to
18 portray it as almost inconsequential when compared to more detrimental activities. This was
19 again demonstrated by P5:

20 ‘I’ve sped over the speed limit before, smoked marijuana before, I’ve broke the law in
21 a number of ways I think most people do every day... so I’m not going to feel guilty
22 about doing something which I will use that’s minor... it’s not like I’ve done anything
23 against anyone, I haven’t hurt anyone, it’s just literally for me to me.’ (8, 4 - 19)

24 Clearly, this participant didn’t view his CE as a serious transgression when he compared it to
25 other illegal activities he had engaged in as a student.

1 Some participants focused less on the relative legality of CE drug use and more on the
2 possible health consequences by framing their comparisons to activities that to them present
3 more of a health concern:

4 ‘There’s far worse things to be doing... in the scheme of things you could be out
5 drinking every night and you know, doing hard drugs and like putting yourself in
6 danger and all that sort of stuff...whereas you’re just trying to work.’ (P5, 8, 26 - 31)

7 In comparing CE drug use to unhealthy lifestyle behaviors that would likely be detrimental to
8 – as opposed to supportive of – academic study, this individual is able to portray his CE in a
9 very favorable light. Similarly, qualitative research with IPED users has shown how they can
10 compare IPED use to unhealthy lifestyle behaviors such as poor diet, alcohol use, and
11 recreational drugs to make IPED use appear favorable in comparison (Boardley & Grix 2014;
12 Boardley et al., 2014; Boardley et al., 2015).

13 Presently, advantageous comparisons were also made with IPED use, with numerous
14 participants focusing on steroid use and the negative health consequences associated with
15 steroid use. Specifically, participants perceived the long-term physical impact of steroid use
16 to be more detrimental than those resulting from use of CE drugs. An example of this was
17 seen with P4, who stated, ‘things that they [anabolic steroids] do physically, there are a lot
18 more drastic compared to mods’ (7, 42 - 43).

19 This mechanism was also evidenced when participants compared their use of CE
20 drugs to that of others, ‘I’ve had friends who have done it for like a week and they don’t look
21 too good by the end.’ (P4, 1, 38 - 39). This form of advantageous comparison has also been
22 evidenced in IPED users in exercise (Boardley & Grix, 2014; Boardley et al., 2014).
23 Specifically, bodybuilders using anabolic steroids compared the dosages they used with those
24 of other bodybuilders who used much higher dosages and ran longer drug-use cycles than
25 them to make their own use appear less harmful. Thus, advantageous comparisons whereby

1 drug users compare their frequency and volume of drug use to others who use the same drugs
2 more frequently and/or in greater volumes appear common across a range of contexts.

3 *Distortion of Consequences*

4 Distortion of consequences occurs when transgressors actively avoid or cognitively minimize
5 the harmful outcomes resulting from their actions (Bandura, 1991). This was evidenced when
6 students professed their use of CE harmed neither themselves nor anyone else, therefore
7 downplaying the outcomes stemming from it. For instance, some participants suggested use
8 of drugs such as methylphenidate or modafinil in medical practice (i.e., to treat
9 ADHD/narcolepsy) meant they were safe to use. P7 provided a good example of this when
10 stating, ‘...I googled it before I did take it but didn’t read up massively into it. I saw it was
11 prescribed and nowhere on the internet saying it had killed them or anything like that.’ (2, 10
12 - 12). Similarly, P5 suggested:

13 ‘I see it as quite normal... other people take it on like a prescription... I know they’ve
14 got ADHD and I don’t... if I need the help with work and it’s not going to affect me
15 long term, I would take it.’ (11, 2 - 7)

16 It therefore seems that because a drug is approved for use in clinical practice it is therefore
17 safe to take. However, even when medications are fully approved following clinical trials
18 they may still have damaging side effects (FDA, 2017).

19 Distortion of consequences was also demonstrated when participants argued CE
20 caused no harm to others. For instance, P5 disregarded any potential effects on others, ‘...I
21 feel like there’s no victims, no hurt, it’s just me it’s helping.’ (13, 20 – 22). Such a position
22 taken by the student may be ignorant of possible psychological harm caused to family
23 members if CE ultimately resulted in harm to the user. Such harm should not be discounted
24 given evidence stimulant medication may lead to negative side effects such as irritability,

1 insomnia, psychosis, and in some cases cardiac pathologies (Hysek et al., 2014; Vetter et
2 al., 2008).

3 Participants also downplayed the academic advantage CE gave them over students not
4 using CE, arguing the educational environment is not competitive. P4 evidenced this when
5 suggesting, ‘you are not necessarily competing at uni...if you get high marks you can get
6 high marks anyway.’ (7, 18). There was also a feeling that although there was stigma
7 attached to the use of CE drugs, their use did not constitute cheating, ‘in terms of just the
8 cheating and morality, I just personally feel no guilt associated with taking modafinil. I don’t
9 feel like I’ve cheated at all.’ (P5, 11, 24 – 26). This accords with Vargo and Petróczi (2016),
10 who found students regarded vignettes portraying CE in zero-sum games more negatively
11 than ones portraying its use in non-zero-sum games; students were more likely to consider
12 CE as cheating if there was an explicit competitive element within the context. Thus, CE drug
13 users may portray academic study as a non-competitive context to allow them to view it as
14 inconsequential for other students. In addition to this it has been evidenced that students’
15 perception of CE drug use within academia is often negative with CE often considered unfair
16 and inauthentic (Bell et al., 2013; Forlini, & Racine, 2012; Forlini et al., 2015).

17 Some students also suggested CE allowed them to reach grades they were already
18 capable of, but that it is just a means of achieving this more efficiently. For example, P7
19 suggested:

20 ‘I think the majority of people could get the same degrees than they do with it just by
21 working a little bit harder... I don’t think it really makes a huge difference to your
22 grades unless, well it sort of allows you to do what you should be able to do in a
23 sense.’ (7, 45 - 47)

24 Thus, participants downplayed the advantage given to them by CE, there was a belief that if
25 the student worked harder they would be able to attain the same grade anyway. The concept

1 of CE only improving the ‘admin’ side of university work and the ability to read large
2 volumes of material prior to an assignment was also made, ‘it’s more like for admin work
3 almost just to get all (the work done), to get that focus.’ (P3, 1, 8 – 9) and this perception
4 appears similar to the belief of IPED use benefiting training rather than competition
5 (Boardley et al., 2015). In the academic context, such beliefs appear to distort any advantage
6 gained from being more effective in one’s reading provides for performance in assignments
7 through the use of illicit prescription drugs. Thus, distortion of consequences allowed
8 participants to not see CE as unethical by separating its effects on day-to-day work from
9 subsequent assignment performance.

10 Interestingly, even when a participant did openly recognize the benefit of CE, he still
11 did not perceive it as cheating:

12 ‘I suppose it does give you a benefit, it’s illegal and it does give you a benefit over
13 people that don’t take it so in a way that is cheating but then I mean it’s not that
14 different of caffeine in that respect, you wouldn’t class it as proper cheating anyway’
15 (P7, 3, 41 - 43)

16 Here, P7 displays what was a frequent use of analogy, whereby CE was compared to use of
17 coffee and caffeine tablets as a similar form of academic performance enhancement.

18 Similarly, P5 said:

19 ‘It’s like, people drink coffee before they work to help them feel energized and
20 awake. I’d say it’s pretty much a similar thing but you feel like more consistent, like
21 for a longer amount of period of time. And it keeps you more just like coffee would,
22 but like longer. But you don’t have to keep drinking coffee throughout the day.’ (7, 8
23 - 12)

24 This was reinforced by P6 who stated:

1 ‘It’s sort of a mega coffee shot that makes you concentrate for way longer and makes
2 you work for way longer than sort of drinking coffee you can just take half or a pill in
3 the day and that’s you.’ (6, 11)

4 Participants appeared to be portraying CE drug use as analogous to caffeine use. This may
5 allow CE drug users to perceive it as equivalent to a legal behavior, and therefore as ethically
6 acceptable.

7 Participants also compared CE to another licit behavior when comparing CE drug use
8 to pay a dissertation tutor for essay coaching. P2 provided an example of this, suggesting CE
9 is no worse than employing a dissertation tutor, ‘I’m semi-aware its cheating but I don’t think
10 it is any more cheating than getting a dissertation tutor, like a paid one.’ (5, 17 - 18). P2 then
11 expanded further on this:

12 ‘I’d say it’s not level because of the cost of dissertation tutor is more than modafinil
13 and the goal of the degree is to get your grade and know what you are on about...
14 Whereas someone who has got a dissertation tutor that isn’t in the same way frowned
15 upon, they can have a dissertation where they have barely got a clue what is written
16 on it.’ (P2, 8, 11 - 31)

17 The ethical nature of dissertation tutors is a growing concern for academic study
18 (Miller et al., 2017), and participants appeared to be proposing that whilst use of dissertation
19 tutors may be permitted to some degree, morally their use is worse than CE because at least
20 with CE the work produced is the student’s own, whereas with a dissertation tutors this may
21 not be the case. Thus, comparison of CE-drug use to a licit behavior again appeared to help
22 users downplay its potential consequences.

23 ***Displacement of Responsibility***

24 Displacement of responsibility is apparent when people view their actions and consequences
25 as stemming from implicit or explicit social pressures, rather than something they are

1 personally responsible for (Bandura, 1991). Regarding implicit pressures to use CE, some of
2 the participants felt pressure to ‘catch up’ with university assignments and CE was perceived
3 as an effective way of achieving this. For instance, P9 suggested:

4 ‘I think it’s only because of the situation I was in and I don’t plan to be in a situation
5 like that again. But if I happen to be in a situation where I have to write 3000 words in
6 a matter of hours, then probably yeah, risk and reward.’ (2, 16 - 18)

7 This approach to dealing with pressures to meet deadlines was evidenced among several
8 other participants including P4 who would, ‘[I] only ever use it really when I need to use it,
9 it's like a panic thing.’ (1, 9) when ‘if everything is getting too much. Then you, I would just
10 spend a 16-hour shift in [the] library and bosh it out.’ (1, 20-21). This motivation to ‘catch
11 up’ using CE has been evidenced elsewhere (Vargo & Petróczi, 2016; Vreko, 2013). This has
12 often been about meeting the standards of other students that have worked harder to meet
13 deadlines, suggesting standards set by other students may create an implicit social pressure to
14 catch up. Presently, it appeared CE drugs were perceived as acceptable responses to such
15 pressures. Such pressures only appeared to increase through the course of their academic
16 studies. Accordingly, students appeared to rely even more on CE during their final study
17 year. Further, consumption patterns described by participants suggested CE-drug use was
18 primarily used during exam revision or immediately prior to assignment submission
19 deadlines. Such use of CE drugs is consistent with those reported in past research (Vargo &
20 Petróczi, 2016).

21 Participants also described how their own use could actually create implicit pressure
22 for others to adopt CE-drug use. For instance, P2 described how his own use of CE drugs
23 may encourage others to adopt it,

1 'I've come back from the library having said I've done really well today; I've done 10
2 hours' work. "Oh why have you done that?" Oh I've had a modafinil this morning. In
3 a secondary way people probably pick it up that it is beneficial.' (7, 23 - 26)

4 This potential role of the social group was consistent with the experiences of most
5 participants, as the majority had first learnt of CE drugs from their social group. For example,
6 P8 described:

7 'there was a group about five of us, my friends, and we sort of heard about these
8 things, we thought they might be like a limitless pill type of thing... I tried it I just sort
9 of found that it sort of worked for me' (2, 23 - 25).

10 P1 also noted, 'if they're [friends] like doing all that work, you want to see if it actually does
11 work.' (2, 15). Thus, when social-group members describe favorable experiences with CE
12 drugs, this may create an implicit pressure to try them that allows users to displace
13 responsibility for this initial decision to adopt their use. Similar processes have been
14 identified with IPED users, whereby bodybuilders described how seeing the impressive
15 physiques of steroid users created an implicit pressure for them to adopt use of IPEDs
16 (Boardley & Grix, 2014; Boardley et al., 2014). However, evidence for displacement of
17 responsibility in CE users differs in some ways to its application with IPED users. Whereas
18 research with IPED users has consistently found evidence of explicit coercion to use IPEDs
19 (Boardley & Grix, 2014; Boardley et al., 2014; Boardley et al., 2015), no evidence of explicit
20 pressure to use CE drugs was found presently.

21 ***Moral Justification***

22 Moral justification represents the cognitive restructuring of harmful activities as a means of
23 achieving commendable social or moral outcomes (Bandura, 1991). One example of moral
24 justification was seen when students justified their use of CE on the basis of it facilitating an

1 enhanced return on their parents' financial investment in their education. P5 provided an
2 example of this when arguing:

3 'Yeah, if it's helping me get a 2:1... university is sort of an investment isn't it. So, if
4 like, if you leave with a 2:2 it's sort of a fail...' (5, 37 - 39)¹

5 With the cost of tuition fees in the UK rising and the consequent impact on student debt,
6 financial assistance is critical for a considerable proportion of students, and can also be a
7 significant source of stress (Ross, Cleland, & Macleod, 2006). Thus, it is possible students
8 see CE as a justifiable means of enhancing academic performance if it helps them maximize
9 the return on their parents' investment.

10 Moral justifications were also framed in terms of potential benefits for other students,
11 with almost all students suggesting they were able to help other students on their course. A
12 good example of this was seen with P1:

13 '... if I've maybe had a modafinil and I've done a piece of work, and [my friend]
14 comes in and is like, oh I haven't understood this, if I've maybe done that work and
15 I've really fully understood it, ... I could maybe better just like explain it to them.' (7,
16 5 - 13)

17 As such, by suggesting there are social benefits stemming from their CE, students appear able
18 to morally justify it. A similar justification has been seen in research with IPED users, who
19 often suggest they develop knowledge of safe and effective practices through their own use
20 which they then pass onto others (Boardley & Grix, 2014; Boardley et al., 2014, Boardley et
21 al., 2015).

22 *Euphemistic labelling*

¹ In the UK the higher education system, the major degree classifications are first class ($\geq 70\%$), upper second class (i.e., a 2:1; 60-69%), lower second class (i.e., 2:2; 50-59%, and third class (40-49%). A 2:1 classification is required for entry into many postgraduate courses in the UK.

1 Euphemistic labelling involves the selective use of anodyne language to portray transgressive
2 actions as less harmful (Bandura, 1991). Participants appeared uncomfortable with the term
3 ‘cognitive enhancing drugs’, instead preferring to refer to them as ‘Study Drugs’ or ‘Mods’,
4 with mods apparently the most popular term. P1 summed up the collective feeling among the
5 participants on why such terminology is preferred when stating, ‘They call them mods. I
6 think again, cos yeah it’s an illegal drug...’ (7, 27 - 30). There was a general feeling that as
7 use of CE drugs is still be in its infancy, the broader lexicon around CE drug use – as seen
8 with other forms of drug use – is yet to be fully developed. P8 explained this effectively,
9 ‘Other drugs... they’ve been around for ages and people have coined them different things,
10 whereas this is quite a recent thing.’ (7, 38 - 40).

11 Importantly, use of colloquial language when referring to CE drugs has the potential
12 to weaken emotional responses that may normally deter it. The influence of euphemistic
13 labelling is likely to be intrapsychic. Emotional reactions that would likely be stimulated if
14 individuals used more accurate and complete terminology (e.g., Modafinil, Ritalin) are likely
15 stunted through use of terms such as mods (see Bandura, 1991; Bandura, 2002). Similarly,
16 the term ‘study drug’ has positive connotations as it likely focuses the mind on links to a
17 positive behavior (i.e., studying).

18 *Self-medication*

19 Self-medication was the first of three themes that emerged inductively during data analysis,
20 and related largely to the use of ancillary drugs to address issues with sleep disturbance, an
21 acute side-effect of the stimulant drugs used for CE (Hysek et al., 2014). Several participants
22 attempted to address this through use of other drugs, primarily marijuana. For example, P5
23 described that, ‘[weed] is the only thing that can help put me to sleep after I’ve taken a
24 modafinil.’ (1, 36 - 37). Marijuana was used to offset the wakefulness effects of CE drugs,
25 ‘modafinil takes you up in like your concentration, your focus, everything like that. It takes

1 you up a level. And then weed, just sort of like brings you back down to your normal level...
2 it allowed you to sleep' (P5, 2, 1-3). This finding suggests some students are using ancillary
3 drugs to offset the side effects of the drugs they use for CE purposes.

4 In contrast, P9 described how modafinil may also be used to offset the lethargy often
5 experienced following use of marijuana:

6 'It will just sort of clear my head. I would say, because I smoke a lot of weed, in the
7 evenings. So, if I try and get work and do work in the morning, I sort of will be a bit
8 like, foggy. So, for me that kind of clears me out ready to do work.' (1, 26 - 28).

9 Such polypharmacy has the potential to lead to additional adverse side effects that can result
10 from accumulated effects or adverse drug interactions (Rambhade, Chakarborty, Shrivastava,
11 Patil, & Rambhade, 2012).

12 *Family and friends*

13 A further emergent theme related to students' categorization of associates into fellow CE
14 users, non-using subject peers, and family members, with students' discussing CE only with
15 those in the first category. For example, P1 was adamant he would not disclose his use of
16 modafinil to family members, '...I think they would home in on the fact that it's an illegal
17 drug rather than seeing that it would help you...' (9, 24-26). There was an acknowledgement
18 that there was a stigma attached to CE, and this led to reluctance in discussing CE with
19 anyone but other CE users. The label for this theme has been adopted from research in the
20 sport and exercise context (Boardley & Grix 2014; Boardley et al., 2014; Boardley et al.,
21 2015), where similar selectiveness regarding who to discuss drug use with has been
22 identified. Specifically, athletes who use IPEDs tend to only discuss their use with other users
23 and not with family or even close friends if they are not part of the IPED-using community.
24 Thus, across both athletic and academic contexts those who use drugs for performance-
25 enhancing purposes may avoid discussing their drug use with those who may challenge their

1 use of such drugs, proactively avoiding social censure (see Boardley et al., 2015). Avoiding
2 such social censure is important, as the emotional responses (e.g., shame) stemming from
3 social censure could constrain future engagement in the transgressive acts that led to them
4 (see Bandura, 2002)².

5 ***Institutional Position***

6 The final theme related to the potential influence of institutional stance on CE, with some
7 students suggesting an explicit standpoint from the University against CE might reduce it.
8 For instance, P7 said, ‘... if the uni said, put out a rule... said modafinil is not allowed then
9 I’m sure that would deter a lot of people ...’ (5, 39 – 43). Others suggested a lack of
10 awareness regarding the scale of the issue may explain why most institutions don’t currently
11 have an explicit stance on CE, ‘People say its cheating and it essentially is. It does get you a
12 step ahead... if they [the university] knew [how] common it was, [they] would crack down
13 on it.’ (P3, 5, 23 – 25). Interestingly, some universities in the USA – such as Duke University
14 (Duke University, 2017) – have started to explicitly ban use of CE drugs. This may be
15 because more prevalence research has been conducted in the USA, so institutions may be
16 more aware of the scale of the issue, and therefore feel the need to take action to try to deter
17 it. As prevalence data increases globally, it is possible more institutions may follow suit.
18 Though as noted in Steward and Pickersgill (2019) care should be taken if and when
19 university institutions decide on CE drug use policy.

20 ***Practical Implications***

21 While it may be too soon to design detailed interventions aimed at the use of CE drugs, the
22 current findings do provide insight that could inform any such interventions developed in the
23 future. Specifically, the aspects of CE drug use that were the focus of MD, and the

² The emergent theme here was related to disclosure and the distinctions made between different social groups when sharing knowledge of CE drug use, for clarity within the literature the current investigation maintains the same title of the theme.

1 mechanisms of MD used provide an indication of what users of CE drugs feel the need to
2 rationalize. Further, interventions that aim to undermine the basis of these rationalizations
3 could help stimulate the self-regulatory mechanisms (e.g., anticipated guilt) MD serves to
4 blunt. One example would be to provide education on the possible harms associated with
5 misuse of CE drugs, as well as highlighting how any harm to the self can have implications
6 for others such as family members. Such an intervention has the potential to make MD
7 through DC more difficult by making the potentially harms of use more salient. Interestingly,
8 consistent with this suggestion, Oxford University Students Union recently organised a series
9 of workshops for users of CE drugs that included educational materials such as this
10 (Fullerton, 2017).

11 *Limitations and future directions*

12 The current study contributes important knowledge on the facilitation of CE drug use in
13 student populations. However, as with any research there are methodological limitations that
14 should be considered when interpreting the findings.

15 As the participants within the present investigation all resided within the UK, any
16 cultural differences in rationalization of CE drug use will not have been captured. Cultural
17 differences could result from differences in government policy (e.g., legal status) on the
18 relevant medications across countries. Such differences have the potential to influence the
19 degree to which students feel the need to rationalize their use. For instance, legal status is
20 known to influence morality (Wingrove, Korpasa, & Weisz, 2011), and therefore differences
21 in legal status could impact upon peoples' ethical views on CE drug use. Thus, future
22 researchers are encouraged to seek to investigate the current research questions in alternative
23 cultures/countries.

24 Another limitation relates to the makeup of the sample. Specifically, although the
25 sample represented a range of academic subjects, no single subject was represented by more

1 than three students. As a result, it was not possible to investigate the possibility of nuanced
2 themes specific to particular degree programs. In future research, larger numbers of users
3 from different subjects could be recruited, allowing for any subject-specific themes to
4 emerge. An additional limitation of the sample is the limited number of female participants,
5 therefore future researchers are also encouraged to incorporate more females in the sample.

6 **Conclusion**

7 When explaining their reasons for use of CE drugs, students show clear evidence of six
8 mechanisms of MD, with deductive analyses supporting use of all MD mechanisms aside
9 from dehumanization and attribution of blame. To support their MD, participants appeared to
10 avoid information relating to the legality and safety of CE. Instead, information such as the
11 ease of availability and use of CE drugs in legitimate medical practice was proposed as being
12 indicative of their perceived legality and safety. Through application of Bandura's (1991)
13 theory, the present research has demonstrated how MD may be central to how student users
14 of CE rationalize and justify their off-label use of drugs to support their academic studies.
15 Continuation of this line of research may further our understanding of the psychosocial
16 mechanisms that support CE, leading to the development of harm-reduction interventions
17 aimed at reducing students' use of CE drugs. For instance, the nature of the rationalizations
18 identified could help inform interventions aimed at reducing the possible harmful use of CE
19 drugs in student populations. Finally, such research may help universities take an explicit
20 stance on this issue; at present very few institutions take any position on use of CE drugs by
21 students.

22

1 **Acknowledgements**

2 We would like to thank the Economic and Social Research Council for the funding the
3 studentship and associated research and also the students' willing to give up their time to be
4 interviewed for the study.

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7 *Disclosure of interest:* The authors report no conflict of interest.

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9 *Word Count:* 7518 Inclusive of abstract and title. Exclusive of References

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1 **References**

- 2 Bandura, A. (1991). Social cognitive theory of moral thought and action. *Handbook of moral*
3 *behavior and development, 1*, 45-103.
- 4 Bandura, A. (2002). Selective moral disengagement in the exercise of moral agency. *Journal*
5 *of moral education, 31*(2), 101-119.
- 6 Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Mechanisms of moral
7 disengagement in the exercise of moral agency. *Journal of personality and social*
8 *psychology, 71*(2), 364.
- 9 Bell, S. B., Partridge, J. L., & Hall, W. (2013). Australian university students' attitudes
10 towards the acceptability and regulation of pharmaceuticals to improve academic
11 performance. *Neuroethics, 6*(1): 197–205.
- 12 Boardley, I. D., & Grix, J. (2014). Doping in bodybuilders: A qualitative investigation of
13 facilitative psychosocial processes. *Qualitative research in sport, exercise and health,*
14 *6*(3), 422-439.
- 15 Boardley, I. D., Grix, J., & Dewar, A. J. (2014). Moral disengagement and associated
16 processes in performance-enhancing drug use: a national qualitative investigation. *J*
17 *Sports Sci, 32*(9), 836-844.
- 18 Boardley, I. D., Grix, J., & Harkin, J. (2015). Doping in team and individual sports: a
19 qualitative investigation of moral disengagement and associated processes. *Qualitative*
20 *Research in Sport, Exercise and Health, 7*(5), 698-717.
- 21 Boardley, I. D., Smith, A. L., Mills, J. P., Grix, J., & Wynne, C. (2017). Empathic and Self-
22 Regulatory Processes Governing Doping Behavior. *Frontiers in psychology, 8*, 1495.
- 23 Brustad, R. (2008). Qualitative research approaches. *Advances in sport psychology, 3*, 31-44.

1 Cakic, V. (2009). Smart drugs for cognitive enhancement: ethical and pragmatic
2 considerations in the era of cosmetic neurology. *Journal of medical ethics*, 35(10), 611-
3 615.

4 De Jongh, R., Bolt, I., Schermer, M., & Olivier, B. (2008). Botox for the brain: enhancement
5 of cognition, mood and pro-social behavior and blunting of unwanted memories.
6 *Neuroscience & biobehavioral reviews*, 32(4), 760-776.

7 De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes
8 to analyze transcripts of online asynchronous discussion groups: A review. *Computers
9 & education*, 46(1), 6-28.

10 Dietz, P., Striegel, H., Franke, A. G., Lieb, K., Simon, P., & Ulrich, R. (2013). Randomized
11 response estimates for the 12-month prevalence of cognitive-enhancing drug use in
12 university students. *Pharmacotherapy*, 33(1), 44-50.

13 Farah, M. J., Illes, J., Cook-Deegan, R., Gardner, H., Kandel, E., King, P., . . . Wolpe, P. R.
14 (2004). Neurocognitive enhancement: what can we do and what should we do? *Nature
15 reviews neuroscience*, 5(5), 421-425.

16 Finger, G., Silva, E. R. d., & Falavigna, A. (2013). Use of methylphenidate among medical
17 students: a systematic review. *Revista da Associação Médica Brasileira*, 59(3), 285-
18 289.

19 Food and Drug Administration, 2017 [online]
20 Available from:
21 <https://www.fda.gov/Drugs/ResourcesForYou/Consumers/ucm196029.htm> [Accessed
22 18 Feb 2018]

23 Forlini, C., & E. Racine. (2012). Added value(s) to the cog- nitive enhancement debate: Are
24 we sidestepping values in academic discourse and professional policies? *AJOB Primary
25 Research*, 3(1): 33-47.

- 1 Forlini, C., Schildmann, J., Roser, P., Beranek, R., & Vollmann, J. (2015). Knowledge,
2 experiences and views of German university students toward neuroenhancement: an
3 empirical-ethical analysis. *Neuroethics*, 8(2), 83-92.
- 4 Franke, A. G., Bagusat, C., Rust, S., Engel, A., & Lieb, K. (2014). Substances used and
5 prevalence rates of pharmacological cognitive enhancement among healthy subjects.
6 *European archives of psychiatry and clinical neuroscience*, 264(1), 83-90.
- 7 Franke, A. G., Bonertz, C., Christmann, M., Huss, M., Fellgiebel, A., Hildt, E., & Lieb, K.
8 (2011). Non-medical use of prescription stimulants and illicit use of stimulants for
9 cognitive enhancement in pupils and students in Germany. *Pharmacopsychiatry*, 44(2),
10 60.
- 11 Fullerton, A., (2017, March 17). Oxford University Student Union introduces 'smart drug'
12 workshops for students. *The Telegraph*. Retrieved from
13 [https://www.telegraph.co.uk/education/2017/03/06/oxford-university-student-union-](https://www.telegraph.co.uk/education/2017/03/06/oxford-university-student-union-introduces-smart-drug-workshops/)
14 [introduces-smart-drug-workshops/](https://www.telegraph.co.uk/education/2017/03/06/oxford-university-student-union-introduces-smart-drug-workshops/)
- 15 Gahr, M., Freudenmann, R. W., Hiemke, C., Kölle, M. A., & Schönfeldt-Lecuona, C. (2014).
16 Abuse of methylphenidate in Germany: data from spontaneous reports of adverse drug
17 reactions. *Psychiatry Research*, 215(1), 252-254.
- 18 Harris, J. (2009). Is it acceptable for people to take methylphenidate to enhance performance?
19 Yes. *BMJ: British Medical Journal (Online)*, 338.
- 20 Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis.
21 *Qualitative health research*, 15(9), 1277-1288.
- 22 Hysek, C. M., Simmler, L. D., Schillinger, N., Meyer, N., Schmid, Y., Donzelli, M.,
23 Grouzmann, E., & Liechti, M. E. (2014). Pharmacokinetic and pharmacodynamic
24 effects of methylphenidate and MDMA administered alone or in combination.
25 *International journal of neuropsychopharmacology*, 17(3), 371-381.

- 1 Hübner, M. (2012). Do tuition fees affect enrollment behavior? Evidence from a ‘natural
2 experiment’ in Germany. *Economics of Education Review*, 31(6), 949-960.
- 3 Kirby, K., Moran, A., & Guerin, S. (2011). A qualitative analysis of the experiences of elite
4 athletes who have admitted to doping for performance enhancement. *International
5 journal of sport policy and politics*, 3(2), 205-224.
- 6 McCabe, S. E., Teter, C. J., & Boyd, C. J. (2006). Medical use, illicit use and diversion of
7 prescription stimulant medication. *Journal of psychoactive drugs*, 38(1), 43-56.
- 8 McGannon, K. R., & Smith, B. (2015). Centralizing culture in cultural sport psychology
9 research: The potential of narrative inquiry and discursive psychology. *Psychology of
10 Sport and Exercise*, 17, 79-87.
- 11 McVeigh, J., Evans-Brown, M., & Bellis, M. (2012). Human enhancement drugs and the
12 pursuit of perfection. *Adicciones*, 24(3), 185.
- 13 MHRA, 2013 *Modafinil 200 mg Tablets* [online].
14 Available from:
15 <http://www.mhra.gov.uk/home/groups/par/documents/websiteresources/con273748.pdf>
16 [Accessed 14 Feb, 2018]
- 17 Miller, A. D., Murdock, T. B., & Grotewiel, M. M. (2017). Addressing Academic Dishonesty
18 Among the Highest Achievers. *Theory into Practice*, 56(2), 121-128.
- 19 Misuse of Drugs Act. (1971).
20 Retrieve from <https://www.legislation.gov.uk/ukpga/1971/38/contents>
- 21 Møldrup, C., & Rie Hansen, R. (2006). Public acceptance of drug use for non-disease
22 conditions. *Current medical research and opinion*, 22(4), 775-780.
- 23 Morton, W. A., & Stockton, G. G. (2000). Methylphenidate abuse and psychiatric side
24 effects. *Primary Care Companion to The Journal of Clinical Psychiatry*, 2(5), 159-164.

- 1 Ott, R., & Biller-Andorno, N. (2014). Neuroenhancement among Swiss students—a
2 comparison of users and non-users. *Pharmacopsychiatry*, 47(01), 22-28.
- 3 Partridge, B., Lucke, J., & Hall, W. (2012). A Comparison of Attitudes Toward Cognitive
4 Enhancement and Legalized Doping in Sport in a Community Sample of Australian
5 Adults. *AJOB Primary Research*, 3(4), 81-86.
- 6 Partridge, B. J., Bell, S. K., Lucke, J. C., Yeates, S., & Hall, W. D. (2011). Smart drugs “as
7 common as coffee”: media hype about neuroenhancement. *PloS one*, 6(11), e28416.
- 8 Passini, S. (2012). The delinquency–drug relationship: The influence of social reputation and
9 moral disengagement. *Addictive behaviors*, 37(4), 577-579.
- 10 Petróczy, A., & Aidman, E. (2008). Psychological drivers in doping: the life-cycle model of
11 performance enhancement. *Substance abuse treatment, prevention, and policy*, 3(1), 1.
- 12 Petróczy, A., Nepusz, T., Cross, P., Taft, H., Shah, S., Deshmukh, N., . . . Barker, J. (2011).
13 New non-randomised model to assess the prevalence of discriminating behaviour: a
14 pilot study on mephedrone. *Substance abuse treatment, prevention, and policy*, 6(1), 1.
- 15 Rambhade, S., Chakarborty, A., Shrivastava, A., Patil, U. K., & Rambhade, A. (2012). A
16 survey on polypharmacy and use of inappropriate medications. *Toxicology*
17 *international*, 19(1), 68.
- 18 Ross, S., Cleland, J., & Macleod, M. J. (2006). Stress, debt and undergraduate medical
19 student performance. *Medical Education*, 40(6), 584-589.
- 20 Sahakian, B. J., & Morein-Zamir, S. (2011). Neuroethical issues in cognitive enhancement.
21 *Journal of Psychopharmacology*, 25(2), 197-204.
- 22 Schermer, M., (2008). On the argument that enhancement is "cheating". *Journal of Medical*
23 *Ethics*, 34(2), 85-88.

- 1 Singh, I., Bard, I., & Jackson, J. (2014). Robust resilience and substantial interest: a survey of
2 pharmacological cognitive enhancement among university students in the UK and
3 Ireland. *PloS one*, 9(10), e105969.
- 4 Smith, B., & McGannon, K. R. (2017). Developing rigor in qualitative research: problems
5 and opportunities within sport and exercise psychology. *International Review of Sport
6 and Exercise Psychology*, 1-21.
- 7 Smith, M. E., & Farah, M. J. (2011). Are prescription stimulants “smart pills”? The
8 epidemiology and cognitive neuroscience of prescription stimulant use by normal
9 healthy individuals. *Psychological bulletin*, 137(5), 717.
- 10 Steward, A., & Pickersgill, M. (2019). Developing expertise, customising sleep, enhancing
11 study practices: exploring the legitimisation of modafinil use within the accounts of UK
12 undergraduate students. *Drugs: Education, Prevention and Policy*, 1-9.
- 13 Duke University. (2017). *Student Conduct and Academic Dishonesty*
14 Retrieved from <https://studentaffairs.duke.edu/node/2350>
- 15 University of Birmingham. (2013). *Drugs and Alcohol Policy*
16 Retrieved from [https://www.birmingham.ac.uk/Documents/university/legal/14-15/drug-
17 alcohol.pdf](https://www.birmingham.ac.uk/Documents/university/legal/14-15/drug-alcohol.pdf)
- 18 Vargo, E. J., James, R. A., Agyeman, K., MacPhee, T., McIntyre, R., Ronca, F., & Petróczi,
19 A. (2014). Perceptions of assisted cognitive and sport performance enhancement among
20 university students in England. *Performance Enhancement & Health*, 3(2), 66-77.
- 21 Vargo, E. J., & Petróczi, A. (2016). “It Was Me on a Good Day”: Exploring the Smart Drug
22 Use Phenomenon in England. *Frontiers in Psychology*, 7, 779.
- 23 Vetter, V. L., Elia, J., Erickson, C., Berger, S., Blum, N., Uzark, K., & Webb, C. L. (2008).
24 Cardiovascular monitoring of children and adolescents with heart disease receiving
25 stimulant drugs. A scientific statement from the American Heart Association Council

1 on Cardiovascular Disease in the Young Congenital Cardiac Defects Committee and the
2 Council on Cardiovascular Nursing. *Circulation*.

3 Vrecko, S. (2013). Just how cognitive is “cognitive enhancement”? On the significance of
4 emotions in university students’ experiences with study drugs. *AJOB neuroscience*,
5 4(1), 4-12.

6 Whetstine, L. M. (2015). *Cognitive enhancement: Treating or cheating?* Paper presented at
7 the Seminars in pediatric neurology.

8 Wilens, T. E., Adler, L. A., Adams, J., Sgambati, S., Rotrosen, J., Sawtelle, R., . . . Fusillo, S.
9 (2008). Misuse and diversion of stimulants prescribed for ADHD: a systematic review
10 of the literature. *Journal of the American Academy of Child & Adolescent Psychiatry*,
11 47(1), 21-31.

12 Wingrove, T., Korpasa, A.L., and Weisz, V. (2011). Why were millions of people not
13 obeying the law? Motivational influences on non-compliance with the law in the case of
14 music piracy. *Psychology, crime & law*, 17 (3), 261–276.

15 Wolff, W., & Brand, R. (2013). Subjective stressors in school and their relation to
16 neuroenhancement: a behavioral perspective on students’ everyday life “doping”.
17 *Substance abuse treatment, prevention, and policy*, 8(1), 1.

18