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Partridge B., Lucke J., Hall W. A comparison of attitudes toward cognitive enhancement and legalized doping in sport in a community sample of Australian adults. *American Journal of Bioethics - Primary Research* 2012; **3**: 81-86.

## Abstract

**Background:** This article compares public attitudes toward the use of prescription drugs for cognitive enhancement with the use of performance enhancing drugs in sport. We explore attitudes toward the acceptability of both practices; the extent to which familiarity with cognitive enhancement is related to its perceived acceptability; and relationships between the acceptability of cognitive enhancement and legalized doping in sport. **Methods:** A survey was administered through a computer-assisted telephone interviewing system to members of the Australian general public aged 18–101 years in the state of Queensland. **Results:** Of 1,265 participants, 7% agreed that cognitive enhancement is acceptable; 2.4% of the total sample said they had taken prescription drugs to enhance their concentration or alertness in the absence of a diagnosed disorder, and a further 8% said they knew someone who had done so. These participants were twice as likely to think cognitive enhancement was acceptable. Only 3.6% of participants agreed that people who play professional sport should be allowed to use performance-enhancing drugs if they wanted to. Participants who found cognitive enhancement acceptable were 9.5 times more likely to agree with legalized doping. **Conclusions:** Policies that facilitated the use of prescription drugs by healthy people for cognitive enhancement or permitted performance-enhancing drugs in sport would be at odds with the attitudes of the vast majority of our participants. Furthermore, our findings do not support media claims that the use of prescription drugs for cognitive enhancement is widespread in all sectors of society.

## Keywords

cognitive enhancement, doping, methylphenidate, neuroenhancement, performance-enhancing drugs, public attitudes, public opinion

The archetypal example of nonmedical use of prescription drugs by healthy people for “cognitive enhancement” is the university student who buys prescription stimulants (e.g., Ritalin or Adderall) from a friend because she wants to improve her normal level of concentration or achievement while studying (Greely et al. 2008). Such behavior has been compared to the use of performance-enhancing drugs (PEDs) in sport. Similar concerns have been expressed about the two activities regarding: (1) users gaining an unfair competitive advantage; (2) competitive pressure coercing nonusers to engage in the practice; (3) the inauthenticity of drug-enhanced performances; (4) the potential benefits to the “enhanced” individual; (5) the health risks of using prescription drugs for nonmedical purposes; and (6) the effectiveness of the relevant regulatory systems in discouraging such use (see, e.g., Cakic 2009; Kayser et al. 2005; Kayser and Smith 2008; Lucke et al. 2011b; Partridge 2010).

The nonmedical use of prescription drugs by healthy people for cognitive enhancement and the use of PEDs in sport are both prohibited behaviors. Since the inception of the World Anti-Doping Agency (WADA) in 1999—globally formalizing a prohibitive stance toward the use of PEDs in sport—expenditures on eradicating “doping” in sport (e.g., drug testing of athletes) have increased enormously. Cognitive enhancement per se is not regulated explicitly, but in most developed countries there is a prescription system for acquiring putatively enhancing drugs, such as methylphenidate, dexamphetamine, and modafinil, none of which are indicated for “cognitive enhancement” in healthy people, and it is illegal to use these drugs without a prescription. There are as yet no pre-exam drug tests at universities, or threats of students being stripped of their degrees as a result of “academic doping,” but in many U.S. states the nominal penalties for diverting these drugs and using them without a prescription can be harsh. These penalties do not seem to be often enforced.

In the bioethics literature, cognitive enhancement has been compared to performance enhancement in sport (e.g., Cakic 2009). However, there have been few empirical studies comparing public attitudes toward each practice, and there are conflicting assumptions made in the literature about public attitudes toward cognitive enhancement and sports doping that can be empirically tested. For instance, antidoping campaigns typically rest on an assumption that the public condemns doping in sport, and one recent survey of the Australian public found overwhelming support for strong sanctions against athletes caught doping in sport, such as loss of sponsorship and prize money, and even criminal convictions (Engelberg et al. 2012). However, sociologists have speculated that there actually exists a “culture of enhancement” in many Western societies (Knorr Cetina 2005), and a number of bioethicists have even recommended various degrees of “legalized doping” in sport, by allowing athletes to use PEDs ((Kayser and Smith 2008; Kayser et al. 2005; Savulescu et al. 2004)). In arguing for fewer restrictions on doping in sport, Kayser and Smith (2008) say:

Outside the sporting field, enhancement technologies like cosmetic surgery and eye surgery and use of substances like caffeine, fluoxetine, modafinil, sildenafil, methylphenidate, and anti-ageing drugs are an increasingly accepted social behaviour; this places zero tolerance for enhancement in sport at odds with broader social values.

The existence of a culture of enhancement is often inferred from drug sales, but in the case of cognitive enhancement several recent papers have shown the phenomenon is not as prevalent as suggested by advocates in the popular media (Lucke et al. 2011a; Partridge et al. 2011). Importantly, there are very few empirical studies in the literature that have explored whether the public accepts either cognitive enhancement or sports doping and whether these attitudes are related. In his 2005 book *Testosterone Dreams*, John Hoberman links the two by suggesting that public attitudes toward PEDs in sport may actually be a kind of referendum on other enhancements:

The question of how ordinary people feel about the doping practices of elite athletes is significant because it indirectly addresses the status of all pharmacological enhancements in the modern world. (Hoberman 2005)

Several recent editorials have called for investigations of public attitudes toward cognitive enhancers to better inform policy discussions (Lucke 2012; Nadler and Reiner 2011). Nadler and Reiner (2011) point out that many assumptions about the value of cognitive enhancement in the public's eyes lack empirical support, and suggest that gathering such evidence is important not only for its predictive value, but also for deciding what role “public opinion” should play in setting policies toward cognitive enhancement. The lack of evidence on public attitudes contrasts with recent, high-profile calls by bioethicists and others to adopt policies that could facilitate the use of drugs for cognitive enhancement. In their *Nature* article, Greely and colleagues (2008) recommended allowing pharmaceutical companies to market drugs to healthy people for the purposes of cognitive enhancement, and proposed reevaluating legislation that prohibits the use of prescription drugs without a prescription. These proposals assume that current restrictions on the use of prescription drugs for cognitive enhancement may be at odds with public acceptance of cognitive enhancement (and enhancement more generally). The American Academy of Neurology has recently defended the ethical permissibility of prescribing drugs that are used to treat dementia, Alzheimer's disease, and attention-deficit hyperactivity disorder (ADHD) to normally functioning people who want to enhance their cognitive function (Larriviere et al. 2009). Yet it is not clear whether members of the public find it acceptable for healthy people to use prescription drugs for cognitive enhancement. The same appears to be true for legalized doping in sport.

This article reports the results of a survey of members of the Australian public that explored the following key questions: 1. To what extent do members of the public find it acceptable for healthy people to use prescription drugs for cognitive enhancement?

2. What is the level of personal or vicarious “familiarity” with cognitive enhancement among the general public? That is, what proportion of people has used prescription drugs this way? What proportion knows someone who has?
3. Is “familiarity” with cognitive enhancement related to attitudes toward its acceptability?
4. To what extent do members of the public believe that people who play professional sport should be allowed to use performance-enhancing drugs if they choose to do so (legalized doping)?
5. How are attitudes toward the acceptability of cognitive enhancement related to attitudes toward legalized sports doping?

## METHODS

### The Survey Instrument: The Queensland Social Survey

Data collection occurred during July and August 2011 as part of the Queensland Social Survey (QSS), a large omnibus statewide survey of views of participants in households in the state of Queensland, Australia. Ethical approval to conduct the study was obtained through Central Queensland University, where the survey is based. The QSS is administered through a CATI (computer-assisted telephone interviewing) system. It includes questions from multiple research bodies and other organizations on a wide range of topics. Among the questions, we asked participants about their familiarity with people who engaged in cognitive enhancement:

Q1: Have you, or someone you know personally, ever taken prescription drugs—not for a diagnosed disorder—but to enhance your normal level of concentration or alertness?

Participants were asked to answer according to the following format: (1) Yes—I have; (2) Yes—someone I know personally has; (3) Yes—both myself and someone I know personally; (4) No; (5) Don't know.

Next, we included two questions about attitudes toward cognitive enhancement and legalized sports doping. Participants were asked the extent to which they agreed with the following statements:

Q2: It is acceptable for prescription drugs to be used by healthy people without a diagnosed disorder, to enhance their normal level of concentration or alertness.

Q3: People who play professional sport should be allowed to use performance-enhancing drugs if they want to.

Participants were asked to respond using the following response categories: (1) strongly agree; (2) agree; (3) slightly agree; (4) neither agree nor disagree; (5) slightly disagree; (6) disagree; (7) strongly disagree; (8) don't know.

### Procedure

The target population for the telephone interview consisted of persons 18 years of age or older who at the time of the survey were living in a dwelling unit in Queensland and could be contacted by direct-dialed, land-based telephone service. The sample was drawn from a telephone database of randomly generated numbers that had been selected using postcode parameters. Known nonresidential and nonworking numbers were not included in the database. A smaller sample of randomly generated mobile telephone numbers was also included. Within each household, one eligible person was selected as the respondent for the interview. A respondent within each household was randomly selected to ensure an equal proportion of male and female participants. All participants gave verbal informed consent to participate.

### Analysis

Descriptive analyses gave overall rates of familiarity with the use of prescription drugs for cognitive enhancement; the overall rate of agreement with using prescription drugs for cognitive enhancement; and the overall rate of agreement with legalized doping. Participant responses to Q1 were coded into two groups: “familiar” (they, or someone they know personally, have taken prescription drugs to enhance concentration or alertness) and “not familiar” (they had never taken prescription drugs to

enhance concentration or alertness and didn't know anyone who had). Participant responses to Q2 and Q3 were coded into four categories: agree, disagree, neutral, or don't know.

We used logistic regression to examine participant characteristics that predict familiarity with cognitive enhancement (not familiar = 0 (reference); familiar = 1). The predictor variables were (a) gender (female = 0 (reference); male = 1); (b) age in years (18–34 = 0 (reference); 35–44 = 1; 45–54 = 2; 55+ = 3); and (c) years of education (1–10 = 0 (reference); 11–12 = 1; 13–14 = 2; 15+ = 3).

We used logistic regression to see what characteristics predicted agreement with the acceptability of using prescription drugs for cognitive enhancement. In this model, participants who responded “don't know” or “neutral” were excluded. The dependent variable was “agreement with the acceptability of using prescription drugs” (coded as disagree = 0; agree = 1). The predictor variables were: (a) familiarity with those who have engaged in cognitive enhancement (not familiar = 0 (reference); familiar = 1); (b) gender (male = 0 (reference); female = 1); (c) age in years (18–34 = 0 (reference); 35–44 = 1; 45–54 = 2; 55+ = 3); and (d) years of education (1–10 = 0 (reference); 11–12 = 1; 13–14 = 2; 15+ = 3).

We used the same method to examine predictors of attitudes toward legalized doping in sport (coded as disagree = 0; agree = 1). The predictors were: (a) attitudes toward the acceptability of using prescription drugs for cognitive enhancement (disagree = 0; agree = 1); (b) gender (male = 0 (reference); female = 1); (c) age in years (18–34 = 0 (reference); 35–44 = 1; 45–54 = 2; 55+ = 3); and (d) years of education (1–10 = 0 (reference); 11–12 = 1; 13–14 = 2; 15+ = 3).

## RESULTS

### Sample Characteristics

The sample comprised 1,265 Australian participants (633 males and 632 females) aged 18 years and older (range 18–101; mean = 53.7 years). Those under 35 years of age comprised 13.9% of the sample, those 35–54 comprised 35.1%, and those aged 55 and older 50.3%. The sample varied in the number of years of education: 1–10 (24.3%), 11–12 (22.5%), 13–14 (10.9%), and 15+ (41.2%). The response rate was 31.9%.

Table 1 Acceptance of cognitive enhancement and use of performance-enhancing drugs

Table 2 Predictive factors for acceptability of cognitive enhancement and legalized doping

### Familiarity With Cognitive Enhancement

Familiarity with cognitive enhancement was low in the sample. Most participants (89.6%;  $n = 1134$ ) said that neither they nor anyone they knew had taken prescription drugs to enhance their concentration or alertness. Only 1 in 10 participants (10.4%) were in the “familiar” group: 2.4% of the total sample ( $n = 30$ ) said they had taken prescription drugs to enhance their concentration or alertness in the absence of a diagnosed disorder and a further 8% ( $n = 101$ ) said they knew someone who had done so. A logistic regression analysis ( $\chi^2(7, N = 1242) = 27.462, p < .001$ ) showed that men were approximately 1.5 times more likely than women to be in the “familiar” group. Age was also a significant predictor of familiarity, but education was not. Roughly 21% of participants aged 18–34 either knew someone who had used prescription drugs to enhance alertness or concentration, or had done so themselves (6.2% of the 18–34 group had ever used). Younger participants were 2.5 times more likely to have used prescription drugs for cognitive enhancement or know someone who had compared to those aged 35–44, 2.65 times more likely than those aged 45–54, and 2.97 times more likely than those aged 55 and older.

### Attitudes Toward Cognitive Enhancement

Only 7% of participants ( $n = 89$ ) agreed that it is acceptable for healthy people without a diagnosed disorder to use prescription drugs to enhance their concentration or alertness (Table 1). Eighty-five percent ( $n = 1085$ ) disagreed to any extent (42.7% disagreed “strongly” and 2.2% disagreed “slightly”). Very few participants said they didn't know (4%;  $n = 51$ ), or were neutral (3.2%;  $n = 40$ ). The logistic regression analysis examining factors predicting attitudes toward the acceptability of healthy people using prescription drugs to enhance their concentration or alertness was statistically significant ( $\chi^2(8, N = 1153) = 26.989, p < .001$ ). It showed that those in the “familiar” group were almost twice as likely as those in the “not familiar” group to agree that it was acceptable (Table 2). Younger participants aged 18–34 were 3.2 times more likely than those aged 45–54 to find cognitive enhancement acceptable and 2.7 times more likely than those aged 55 and older. Gender and level of education were not statistically significant predictors.

### Attitudes Toward Legalized Doping

Only 3.6% of participants ( $n = 45$ ) agreed that people who play professional sport should be allowed to use performance-enhancing drugs if they wanted to (see Table 1). Ninety-three percent ( $n = 1181$ ) of participants disagreed with legalized doping to any extent (65.9% disagreed “strongly” and 0.5% disagreed “slightly”). Very few participants said they didn't know (1.3%;  $n = 17$ ), or were neutral (1.7%;  $n = 22$ ).

The regression model predicting agreement with legalized doping was statistically significant ( $\chi^2(8, N = 1135) = 41.737, p < .001$ ). Gender, age, and education were not significant predictors, but attitude toward the acceptability of cognitive enhancement was a statistically significant predictor.

Participants who said it was acceptable for healthy people to use prescription drugs for cognitive enhancement were 9.5 times more likely to think that people who play professional sport should be allowed to use performance-enhancing drugs if they wanted to (Table 2).

## DISCUSSION

Despite explicit analogies being drawn between the ethical and regulatory issues surrounding cognitive enhancement and sports doping, this is the first time public attitudes toward the two forms of enhancement have been assessed. The majority of our participants clearly believed it was unacceptable for healthy people to use prescription drugs to improve their concentration or alertness. They were even more disapproving of allowing professional athletes to use PEDs if they wanted to (most disagreed “strongly”). Policies that facilitated the use of prescription drugs by healthy people for cognitive enhancement (e.g., Greely et al. 2008) would be at odds with the attitudes of the vast majority of our participants. Similarly, proposals to relax doping controls and permit the use of PEDs in sport (e.g., Kayser et al. 2005; Kayser and Smith 2008; Savulescu et al. 2004s) would also appear to be strongly opposed by the Queensland general public. These results provide new information about the nature of the relationship between attitudes toward different forms of enhancement. Kayser and Smith (2008) criticize what they see as hypocrisy in public support for “zero tolerance” toward doping in sport while the use of drugs for cognitive enhancement is deemed a socially acceptable behavior. Our results do not support the existence of contrasting attitudes. At least for this sample of the Australian public, the use of drugs for cognitive enhancement was not acceptable (nor one that was commonly engaged in), and nor was the prospect of legalized doping in sport.

Hoberman (2005) suggested that attitudes toward sports doping may be related to attitudes toward pharmacological enhancement in general. Only a minority of our participants found cognitive enhancement acceptable (7%), but they were 9.5 times more likely to agree that professional athletes should be allowed to use PEDs if they wanted to. Even so, the vast majority of those who found cognitive enhancement acceptable did not support the use of PEDs.

Perhaps unsurprisingly, those who were familiar with cognitive enhancement were more likely to find it acceptable than those who were not, although the acceptance of cognitive enhancement was still low even among the former. There were low levels of direct or vicarious familiarity with cognitive enhancement—only 2.4% of participants claimed to have ever used prescription drugs in this way and a further 8% knew someone else who had done so. It is worth reinforcing that our survey was with members of the Australian general public, and it cannot be assumed that prevalence and attitudes toward cognitive enhancement are uniform across countries or across populations (e.g., students vs. general public). Surveys with other populations showing low prevalence have also found cautious attitudes. For example, a survey of nonmedical prescription stimulant use for cognitive enhancement among 1,547 German students and pupils found very low rates of lifetime (1.29%) and past month prevalence (0.06%) (Franke et al. 2011).

While 80% of respondents said they would consider taking a drug for cognitive enhancement, it was on the condition that such a drug was safe and would not lead to addiction; 95% of respondents thought that currently available “cognitive enhancers” would lead to addiction. Our findings about familiarity do not support media claims that the use of prescription drugs for cognitive enhancement is widespread in all sectors of society (Partridge et al. 2011).

Younger people were more likely to be familiar with the practice, which supports suggestions that younger people (and students in particular) may be the most common users (Smith and Farah 2011).

Even so, only 6.2% of participants aged 18–34 had ever used prescription drugs for cognitive enhancement. Only 12.5% of these participants agreed that cognitive enhancement was acceptable even if they were more likely to find it acceptable than older participants.

The findings about younger participants require more detailed follow-up surveys, given the fact that younger members of the general public were undersampled in this survey. Such surveys need to explore attitudes toward different forms of cognitive enhancement using different types of drugs. Our survey should serve as a useful pointer to subsequent surveys that should explore attitudes toward cognitive enhancement and doping with the use of more in-depth questioning and more open-ended questions that delve into the reasons for the public's disapproval of cognitive enhancement and doping.

The results of self-report surveys of drug use and attitudes may be subject to recall and response biases; however, these limitations are not unique to this survey and it is not clear that our results have been unduly affected. Our methods are similar in principle to other large household surveys conducted in Australia (e.g., the National Drug Strategy Household Survey) and the United States (e.g., the National Survey of Drug Use and Health).

Despite these limitations, our survey generates one of the first sets of empirical data about public attitudes toward cognitive enhancement and legalized doping in sport. A strength of the study is that it surveyed a broad range of participants, allowing an examination of age/gender differences and the relationship between attitudes toward cognitive enhancement and sports doping. It also provides the first empirical data on the prevalence of cognitive enhancement in the general public in Australia, suggesting that this behavior is not as common in the general adult population of Australia as some media reports have assumed. Exaggerated portrayals of the prevalence of cognitive enhancement run the risk of unintentionally normalizing the practice or fueling uncritical policy responses.

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