Retrospectacle: A Neuroscience Blog

The trials, tribulations, and joys of a Neuroscience gradute student writing her thesis in the postmodern, post-Y2K world.

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Profile


Shelley Batts is a Neuroscience PhD candidate at the University of Michigan. She studies hair cell regeneration in the cochlea, and is just embarking on that quixotic quest called 'thesis.' She lies awake at night pondering how science intersects with politics, culture, policy, money, medicine, and religion in an attempt to be more than just a niche scientist sitting in the oh-so-lovely ivory tower. Follow me and my parrot on the quest to get funded, get a PhD, and stay sane.

Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth, are never alone or weary of life. ~Rachel Carson

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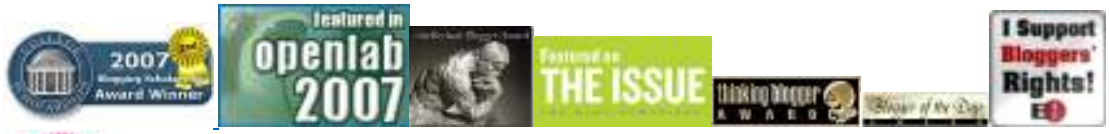

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Cognitive Enhancers in Academic Doping

Category: Drugs and the Brain • Tastes Like Neuroscience
Posted on: December 19, 2007 1:00 PM, by Shelley Batts

A commentary today in Nature, by Sahakian and Morein-Zamir, poses the question: if you could take a pill which enhanced attention and cognition with few or no side effects, would you?

But I ask, why **wouldn't** you?

Interest in potions and drugs which increase awareness and "brain power" has been around for thousands of years. Many natural compounds from ginseng to coffee to cocaine have been touted as a dubious panacea for a muddled mind. However in the pharmaceutical age, we are now in possession of agents which actually do enhance cognition through changes in neurotransmitter release. For example, modafinil, prescribed under the name Provigil, was initially developed to treat narcolepsy however its popularity grew when it was found to increase focus and attention in healthy, normal people. The same has held true for ADD/ADHD drugs on college campuses. Quite a few stressed-out college kids use Ritalin while studying, writing papers, or taking important tests in hopes of improving performance. These are examples of prescription drug abuse on the one hand, but if they can be shown to be safe in normal people, what's the real issue then?

Students face incredible competition to get into schools (and even more when it comes to medical, or ivy league schools). These kids, and their parents, often have all kinds of weapons in their arsenal for "getting ahead of the game" like tutors, specialized courses for tests (GRE, MCAT), books on how to get into college, sample essays. And I'm not even mentioning the "strings" which are often pulled by friends, favors called in, and money donated to get their kids the best opportunity available. Cognitive enhancers are just the next rational step in the ongoing quest to come out on top by whatever means necessary (short of sabotage or unethical behavior). As long as students are placed in extremely competitive situations, options like these will appear attractive.

However, it needs to be considered whether drugs which enhance cognition are a) harmful in the long term; and b) implicitly more unethical than all the other get-ahead measures I listed above. The issue with 'a' is that these drugs are mostly only tested in people who have the disorder it is being targeted to--ie, not perfectly healthy people. What happens when you increase steady-state levels of neurotransmitters from a normal level? What happens when you do this chronically? These are questions that remain unanswered, despite college kids being unwittingly involved in a huge, self-selected but unofficial study which will examine just that in years to come.

The issue with 'b' is that people have been engaging in 'cognitive doping' for ages. Today the legal drug of choice for cognitive enhancement is caffeine, although nicotine may also have the effect of focusing people. Both of these drugs have side effects which are dose- and delivery-dependent and are quite addictive, however their demand and daily use is staggering. There is a booming industry in herbal enhancers like St John Wort or Ginseng which have evidence to back up *some* of their claims, although side effects and drug interactions are still an issue. And it is difficult to argue that taking a cognitive enhancer is cheating in the academic sense, since a pill will never inform you as to the correct answer on a multiple choice test or give you the answer to any essay question. It will only improve the focus and grasp on information which you already know.

But, I'm interested in the views of others. Would taking Ritalin or some other pharmaceutical enhancer be cheating? Would you do it, if side effects were minimal (on the level, of say, caffeine?)

Janet Stemwedel at Adventures in Ethics and Science weighs in.

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TrackBacks

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Comments

1

Caffeine and nicotine - both help people work: the first one keeps you awake and alert and the second helps you focus.

Posted by: Coturnix | December 19, 2007 1:14 PM

2

Let's remember that "enhancement" is not necessarily the same for one person or one objective as another. I had a student who needed to smoke pot to get anything done. Without the pot, she had a very hard time producing. With a good supply of pot, she wrote an outstanding PhD thesis. The pot was not "enhancing" her in any way, but rather, turning her down a notch or two. Or maybe that is enhancement?

Posted by: Greg Laden | December 19, 2007 1:32 PM

3

I would prefer my surgeon to take Provigal than be sleepy at the operating table in the middle of the night!

Posted by: m. sellers | December 19, 2007 1:35 PM

4

There are many cognitive enhasement supplements available today too. Check out the nootropic article on wikipedia for examples. Piracetam is my personal favorite.

Posted by: Richard Minerich | December 19, 2007 1:37 PM

5

I think the term 'nootropic' is the general term for drugs with the ability to enhance cognitive function.

other examples include public speakers taking beta-blockers to counter the butterflies-in-the-stomach anxiety of giving an important speech. beta-blockers are also suggested to be 'performance-enhancing' during test taking for people whose performance is compromised by test-taking stress.

Shelley - i think i would argue that it can be shown that these drugs are 'performance enhancing' and their use might be akin to cheating in certain circumstances. however you seem to suggest that their use might be the next 'rational step' and not considered 'unethical behavior' whereas i think a stronger case might be made for just the opposite. even though they won't give you the correct answer on a test, you'd perform better (on an exam, etc) with the drug in your system than you would without the drug in your system, and if you're illegally using drugs for such a purpose, that probably would fall under the umbrella term of 'cheating'. If I can study for 1 hour, take a pill, then take an exam and do just as well as someone who studied for 2 hours... hmm, kinda seems like cheating to me.

Just because there's tough competition doesn't mean that cheating becomes excusable. By suggesting that this might be acceptable behavior for a few people, you're opening the door for a situation where everyone will need to cheat similarly to be on a level playing field, a horrible situation.

Not like kids have many non-cheating role-models anymore. They grow up idolizing steroid/GH using athletes who promote that cheating is the way to succeed in the competitive environments that are sporting events. Now we're faced with a situation where kids might think the only way they could ever be a professional athlete they'll need to train with steroids their whole lives (just to keep up) - and i think most rational people can see why self-destructive behavior such as this is bad. We don't need to be playing this sort of roulette with our childrens minds as well as their bodies.

I don't even think it matters whether or not there are negative long term side effects for nootropics like there obviously are with steroids. The fact still remains that they would give an unfair edge to those who could obtain them and use them illegaly (almost all nootropics are either illegal or their off-label use would be illegal).

Posted by: darkman | December 19, 2007 1:46 PM

6

"Would you do it, if side effects were minimal (on the level, of say, caffeine?)"

What on *earth* does the presence or absence of "side-effects" have on the ethics of whether it is cheating or not?

This is going down the IMO stupid path followed by those trying to create rules for sports doping. Everything has health risks and, at least in anti-paternalistic cultures (as the US sometimes tries to be), this is up to the individual citizen, is it not?

One needs to start with the obvious minefields for coming to any sort of decision.

Should, for example, a person that only requires 4 hrs of sleep a night (coturnix, wanna weigh in on the natural distributions?) be advantaged in terms of output or is it "fair" for the 8-hr sleeper to resort to drugs to compete on an equal footing?

Is it "fair" only for the sleep deprived parent-scientist to make up for a deficit which is caused by a generally-accepted social-good condition?

How about those 17-18 yr old freshman that are still on that dang adolescent sleep pattern but forced to attend 8am classes? Can you get a medical exclusion from academic doping if you can prove your natural sleep pattern runs through morning classes?

Posted by: BikeMonkey | December 19, 2007 1:56 PM

7

coturnix,
both caffeine and nicotine have the ability to keep you awake, alert and focused; i don't think that those 3 effects can be selectively ascribed to either drug.

Posted by: darkman | December 19, 2007 1:59 PM

8

And actually a prior editorial in Nature raised an even better ethical issue which goes beyond personal choice. It boils down this observation. Wouldn't you maybe agree to become addicted to *crack* if you were going to be able to cure cancer?

cross to AinE&S

Posted by: BikeMonkey | December 19, 2007 2:03 PM

9

If I can study for 1 hour, take a pill, then take an exam and do just as well as someone who studied for 2 hours... hmm, kinda seems like cheating to me.

Well then you are merely judging *effort* as the measuring stick for what constitutes cheating. A friend and I performed equally well in one of our undergrad classes, although I had to study half as much as she did. Does that mean that I was somehow cheating? Of course not, some people naturally absorb information better the first time, or just need less rehursal. Caffeine, nicotine, even more sleep, a better breakfast, a more experienced tutor, the teacher's edition of the textbook, or a very smart friend could be considered *advantages* (ie, cheating) by that reasoning. Obviously, its not that clear-cut.

Just because there's tough competition doesn't mean that cheating becomes excusable.
Thats not what I argued at all. What I argued was that as long as there is competition there will be incentives for people to do whatever it takes to stand out. That's hardly controversial. The point which remains is whether certain drugs which increase attention, etc, *would* be considered cheating, or not. If it is, then there is no situation in which it would be acceptable. But assuming is begging the quesiton.

Until legal drugs which enhance cognition, like caffeine, nicotine, etc etc are also found to be cheating when taken with the express purpose of increasing performance, its arbitrary to claim a distinction between them and pharmaceuticals engineered to do the same. Which doesn't mean I would take them today. The side effect and long-term effects are unknown in people with normal brain chemistry, unlike the effects of caffeine/nicotine. They are all drugs which alter the levels of neurotransmitters in the healthy brain, however lots are known about the legal ones, and currently much less is known about the prescription ones. Other than that, the description of either class of drug as legal or illegally used is rather arbitrary.

Posted by: Shelley Batts | December 19, 2007 2:06 PM

10

What on earth does the presence or absence of "side-effects" have on the ethics of whether it is cheating or not?

Absolutely nothing. It does however factor in to how likely someone would replace an already used/abused drug like caffeine with a low-risk drug used for off-label purposes.

Posted by: Shelley Batts | December 19, 2007 2:12 PM

11

shelley -

you boiled down the most simplified (least correct) sentence from my point about nootropics as cheating. The sentence about 1 hour versus 2 hours was trite in many ways, i agree, but the point it makes is still valid. Let me rephrase (for clarity's sake): if you could study 1 hour for a test, then take a pill and do as well as you'd do on the same test studying 2 hours and not taking the pill... how about that. This can, and has, been tested in controlled scientific studies (though I'll assume it's rats running mazes type stuff). So yes, i'd say taking nootropics would be a form of cheating.

and i don't think if they're wrong in one situation they're wrong in all situations. my beta-blocker example (taking anxiolytics to be more calm before public speaking) doesn't seem to be cheating in any way. You might be able to understand me when I give a presentation if I'm not speaking veryveryvery fast or acting too scared to field questions. I'm not going to out-rhetoric you on stage (though debating might be a situation where this example doesn't hold - again with the competition).

Many nootropics are drugs of abuse, and many are FDA approved. There's lots of evidence of what these drugs do to people with normal brain chemistry. Also, side effects of all FDA approved drugs are known (thanks to several stages of clinical trials) in both healthy and sick animals - including long-term effects. Not like this makes a difference in regards to the ethics of their use.

Additionally, the use of any prescription drug for off-label purposes is illegal. The use of illegal drugs is illegal. That's all I said. Most drugs that have nootropic effects aren't made expressly for cognitive enhancement (provigil is for narcolepsy, etc), and I'm pretty sure no doctor has ever prescribed anything to anyone to 'make them smarter' - i could be wrong here. Hence, any use of drugs for this purpose would automatically be illicit use. Caffeine, nicotine, sugar... all legal, for whatever their use. If you're stupid enough to believe what they say on the packaging for 'natural herbal remedies' then be my guest as well, but don't come crying to me when you have heart failure or some other crappy outcome from those things.

Posted by: darkman | December 19, 2007 2:30 PM

12

my beta-blocker example (taking anxiolytics to be more calm before public speaking) doesn't seem to be cheating in any way.

Thats because you didn't frame it in a competitive academic situation. As soon as you bring in the issue of debate, you realize that it is not clear at all. What about people taking it before a job or school interviews?

if you could study 1 hour for a test, then take a pill and do as well as you'd do on the same test studying 2 hours and not taking the pill... how about that.

But you are still saying that anything that confers advantage by reducing study time is somehow unfair. If I was a millionaire, I perhaps could hire Stephen Hawking to be my tutor for an astrophysics class. Or someone who has the internet might be able to find much more relevant information about a homework assignment, in half the time. Is *that* cheating? How about someone who takes online tests to prep for the MCAT vs. the person who looks up all possible answers to practice questions? The main thread is that studying is still going on--the information is learned and retained. As I said a pill (or a red bull) won't teach you, it may aid recall, etc. Also as I understand it, students take Ritalin, not to reduce study time per se, but to increase the effect of studying- learning, storage, and later recall. That might have the byproduct of reducing study time, it may not.

However there is still the issue that doing the same thing on caffeine will enhance performance. Thats legal, accepted, encouraged, hell there's a whole culture around styuding in coffee shops. The fact that that has developed around caffeine, or that nicotine is legal, is oppertunistic. I mentioned in my post that using drugs not as prescribed or aquiring them without a prescription was of course illegal--there is an interesting graphic in the Nature commentary about that actually.

Posted by: Shelley Batts | December 19, 2007 2:49 PM

13

i didn't just realize when i mentioned the debate example that the situation was unclear. it fits right in with my contention about competition. I said that in situations where there can be a competitive advantage (test taking, debating, interviews) it is cheating, where there is no direct competition (giving a speech, performing surgery, writing your thesis) not cheating. not sure where this isn't clear.

let me finish chuckling at the mental image of stephen hawkings taking on tutoring responsibilities... done. I am not arguing that anything that reduces study time is unfair (nowhere in my argument do I suggest that my study/pill/test example can be extended limitlessly). If you hired a rat maze tutor, yeah, i think the rat might learn a maze faster too. And all your examples in the second paragraph show someone studying more and getting an advantage (by tutor, prep classes, the internet). If i'm not mistaken, studying and using the internet for research are not cheating. However not studying and taking a drug to help you perform better or taking a drug to reduce your study time is.

Also, I think the theory of state dependent learning might have something to say to those kids taking ritalin to study and not taking ritalin at test time.

Posted by: darkman | December 19, 2007 3:15 PM

14

Seems to me the general public would kill any attempt to market a pharmaceutical cog enhancer due to 1) distaste for altering "what God gave ya" (which also explains some of the stigma in psychiatry); 2) American ideal of 'pull yourself up by your bootstraps' mentality where anyone should be happy to overcome struggles instead of think of ways to minimize them.

darkman: not all supplements should be assumed to be ineffective or harmful, check out http://en.wikipedia.org/wiki/Piracetam

Posted by: Caribou | December 19, 2007 3:18 PM

15

Great post!

Something that may be helpful: what's cheating or not is determined by what the RULES are, so as long as there are no rules against it, it's not cheating. Thus, since there are currently no rules against 'cognitive enhancers' per se in academia, it is thus not cheating to use them in academia.

But we can't decide the real questions so easily. The real questions, it seems to me, are (1) whether there OUGHT to be rules against cognitive enhancers per se and (2) whether one should use cognitive enhancers if there are no such rules.

With respect to (1), it seems to me that there should be no such rules. Why would one think otherwise? Well, in sports we think there should be rules against performance enhancers. But why? In sports, the end goal is to be better than the other players/teams. Thus, using a drug which others (including, most importantly, one's predecessors) may not have had access to gives one an unfair advantage. However, in academia, the end goal is not 'being better' but, well, it's tough to say... the betterment of humanity? No, the betterment of all sentient life to which we have moral obligations? Something like that. In any case, it's clearly something more than being better than other academicians. Perhaps the competition is only valuable in so far as it furthers this something more, or perhaps it is valuable in itself. In any case, the important thing is the something more, not the competition. Thus, if cognitive enhancers contribute to the achievement of this something more, that outweighs whatever affects they may have on whether the competition is fair. So I think that there should be no rules against using them.

With respect to question (2), I'm with Shelley: why not? I think I would, if I weren't worried about the side effects. Actually, I do. This morning I had a larger than usual amount of coffee and, consequently I'd say, got a larger than usual amount of work finished!

Posted by: Dustin | December 19, 2007 3:20 PM

16

caribou - i didn't mean to pigeon-hole all supplements as being harmful/ineffectual. Maybe the whole supplement market shares a negative bias for a reason though... there might be some good out there (and by might i mean definitely), i just think that FDA controls are there for a reason and all the supplement producers skirt those FDA rules because, well, they couldn't prove safety or utility if they tried. if some company showed how/why their supplements are safe/useful and marketed their product honestly... i would bitch about them less often.

I also think your argument as to why people wouldn't accept marketing of CE's to be flawed because neither 1) nor 2) are american ideals (maybe in conversation, but certainly not in practice). the 'american way' in practice has never been about anything fair...

Dustin - great 'rules' point to get us back on track.
Your argument that there OUGHT to be rules leaves me a little confused. You seem to suggest a different end point for athletes and students being grounds for different sets of rules. Many students might disagree however. The point of academics in certain places is to do better than your peers (look at any class graded on a curve). I agree that the point of learning SHOULD be to better yourself, however, in practice, that just isn't the case. Additionally employers and admissions committees care about GPA's and SAT's not about the fact that you learned a lot (i guess these numbers are supposed to be indicative of how much you know, but again, they're not).

Posted by: darkman | December 19, 2007 3:43 PM

17

This is very interesting to me, because these same issues have been running through my head quite a bit recently.

I am prescribed adderall for (what I feel is) bona fide ADHD. I think it really does do me a lot of good, and I likely would have been fired from some jobs and not be in school right now without it. The thing is, I do really well in school with it, and sometimes, I find myself taking a dose and half on days when it would benefit me to study rather than sleep, and on test days. I feel like the line is very blurry between taking the drug for keeping a handle on my spaciness which puts me on equal footing with my classmates, and drug use which constitutes abuse and gives me some sort of an unfair advantage.

The problem is, I haven't reached any conclusion regarding those issues. So far, I just worry about them. I agree that academia is distinct from sports, and that its probably not the healthiest thing to view school as "competition", because that IS kind of silly. Its hard not to treat it as competition though when some teachers run their classes that way. So I haven't even decided if I think the guilt I feel is legitimate. Sorry, I don't have any answers and only more questions!

Posted by: Susie | December 19, 2007 4:13 PM

18

"FDA controls are there for a reason"
Ohh thats a good argument - if the government mandates something it must be a good idea.

Just like the War on Drugs is so successful!

Posted by: Steve | December 19, 2007 4:17 PM

19

I also am having a hard time understanding why a doctor has to decide what drugs I'm allowed to have... shouldn't I be allowed to choose what I put in my body?

Posted by: Steve | December 19, 2007 4:18 PM

20

or take out of your body ;)

Posted by: Stephanie | December 19, 2007 4:19 PM

21

Wait, why would reducing study time be a bad thing? Wouldn't we all love to have that extra productivity or extra hours of sleep rather than stare at the same page in a textbook, chugging coffee, stressing out, and barely keeping our eyes open? Has anyone considered that is might be unethicaly NOT to make something available that would reduce the time and effects of stressful all-nighters, if it increased productivity? Or unethical NOT to give it to tired doctors, who otherwise would be more prone to medical mistakes?

Posted by: Tritc | December 19, 2007 4:31 PM

22

wow steve - you jumped on that one pretty hard. you're also guilty of reading WAY more into what i actually said. FDA controls are there for legitimate reasons, for example, why america doesn't have lead in food problems like china (sorry to use china here to make a point shel, only fodder for the unenlightened). FDA also make sure that drugs released to market are safe and effective (why supplements like ginseng are called 'supplememts' by american law, they don't meet basic safety/utility standards). I'm not sure where i've ever advocated anything like 'whatever the government says is correct'.

This was never a discussion about whether or not drugs should be legalized. Only about whether or not the use of CE drugs for the express purpose of better performance is cheating.

I think if you knew me at all you'd find that we probably agree on most points you've made. that doen't change the fact that the FDA is there to make sure food is food and prescription medication safe/effective.

also, doctors won't be making those decisions for you anyways... lobbyists and lawmakers will.

Posted by: darkman | December 19, 2007 4:31 PM

23

tritc -

do we really need to be encouraging the advancement of the 'rat race'? is more productivity what we need? do you really think if we were made more productive that we'd really have any extra free time? or that we'd just produce more need for more work.

You're kidding me about the doctor comment, right? You're telling me that you'd go under the knife of an underslept doctor on the tail end of a gruelling 18 hour shift because they told you he took provigil to stay awake just for your surgery? Good luck.

Posted by: darkman | December 19, 2007 4:41 PM

24

Modafinil was recently forbidden to prescribe to children because it was found to cause (!) a nasty skin condition. There are related compounds; adrafinil is cheaper, but is said to have digestive side effects.

I wonder whether nicotine really improves concentration or if it only counters distraction caused by cravings for it. (The work I've seen was conducted on addicts.) Regardless, 90% of schizophrenic patients smoke: I suppose it helps them ignore the "voices". David Sedaris found that smoking entirely relieved his compulsion to lick light switches.

Posted by: Nathan Myers | December 19, 2007 4:52 PM

25

Yeah, people with ADD often self-medicate with caffeine, so it makes sense. Acutally I think I read that bit about the caffeine here, in a post of yours Shelley..

Posted by: KSven | December 19, 2007 4:55 PM

26

nathan -

nicotine has been shown to have nootropic-like effects in drug-naive animals in experimental models of learning and memory. dunno about non-smoking humans though. if you want a reference i'll go through pubmed and find you an appropriate one.

in fact, addicts themselves are more impulsive and have a harder time concentrating in many research paradigms than non drug users. doing 'concentration' research in addicts might have automatic confounds (unless studying addict vs non).

The smoking-schizophrenia link has been an interesting question for some time. Most recent good argument i heard has something to do with nicotinic ACh receptor's being dysregulated in schizo patients and this is in fact some legitimate self-medication. Though generally, many people ascribe schizo symptoms to dopamine and glutamate dysregulation (not acetylcholine).

caffeine as self-medication for ADD i haven't heard about and it would surprise me that there is anything more that placebo effect there since the mechanisms of action of caffeine are quite different from ADD meds.

Posted by: darkman | December 19, 2007 5:19 PM

27

Cheating is not a clear issue, in terms of constantly applicable ethics. That is to say, my ethical compass is going to be differently aligned from yours, and no matter what Moral Rules we come up with, our personal ethical interpretations of them are going to vary.

I consider the secret use of something by someone, designed to enhance their performance in a competitive situation to be cheating. If it's to be3 declared "not cheating," then that substance should be A) available to everyone (or an analogous enhancement, should a person be allergic), and B) declared, or known, beforehand.

Every one of my teachers knows that I use caffeine to stay awake and study, or write papers. I, personally, don't see it as an "enhancer" so much as a "stabiliser." The option is there for anyone to use it, and it's no secret.

Cheating, like lying, tends to be philosophically defined by the intent to deceive or misinform the other party. In cheating, you have an unfair advantage if and only if your "opponents" (however they are defined, in this situation) do not have access to that advantage, nor knowledge of your advantage. You can cheat on a test by taking answers from someone else without your teacher's knowledge. That is an unfair advantage of which your professor is (hopefully for the cheater) unaware.

If you inform your professor and your class that you, say, have the test answer key and will be distributing it, that evens the playing field, again.

Again, my needs and personal definitions of "unfair advantage" will more likely than not vary from yours.

Posted by: Damien | December 19, 2007 5:24 PM

28

"I wonder whether nicotine really improves concentration or if it only counters distraction caused by cravings for it. (The work I've seen was conducted on addicts.)"

Yes, nicotine is a good cognitive enhancer in non-"addicts". Yes, it improves concentration and decreases sleepiness, and not just in those chronically exposed to nicotine via smoking. And yes, there is good evidence that it may have more specific effects on some aspects of memory function in particular. Stroll on over to PubMed and search for authors AV Terry and/or JJ Buccafusco for a toehold on the relevant literature. It is thought at the moment that the alpha-7 type subunit (the nicotinic receptors are formed from 5 subunit which may be assembled in different combinations, the wikipedia entry is decent) represents a good CE target. Good evidence of involvement with the cognitive effects with lesser abuse (addiction) potential in comparison with some of the other subunits = less "side-effects" of candidate meds. BigPharma are going great guns on their respective alpha-7 programs for cognitive enhancement. Alzheimer's and schiz, as mentioned in the Sahakian commentary, being the overt target conditions.

one thing about putative cognitive enhancers is that dosing is very tricky and individually determined. dose-response functions tend to be biphasic at the least with only a limited range producing specific cognitive improvement. and, as per the above quote, many compounds which improve cognition also induce a great deal of plasticity (tolerance, say). meaning that enhancement will potentially be a moving target with chronic use. the fact that it is complicated does not mean that they are not effective, however.

Posted by: BikeMonkey | December 19, 2007 5:26 PM

29

Yeah,I talked a bit about the caffeine self-medding in the comments of a post I wrote re: the neuroscience of ADHD.
http://scienceblogs.com/retrospectacle/2007/07/the_neuroscience_of_adhd_1.php

Caffiene stimulates the release of epinephrine and norepinephrine, same as although not as well as Ritalin. I was speculating, but quite a few ADHD-sufferers chimed in with "Oh yeah, it helps!" A breif input into PubMed gave a lot of studies to choose from, seems that the co-administration of caffeine and ADHD stimulants may be more effective than the stimulant alone...

Posted by: Shelley Batts | December 19, 2007 5:29 PM

30

From Wikipedia: "Armodafinil (Nuvigil□) is an eugeroic drug produced by the pharmaceutical company Cephalon Inc., which was approved by the FDA on June 15, 2007." It's just the "R" enantiomer of modafinil, with a longer half-life in the body. I suppose you take half as much, but pay more.

Meanwhile, a generic modafinil is supposed to be out soon, a result of a court settlement for some sort of malfeasance by the Cephalon. Adrafinil, meanwhile, retains the advantage of being entirely unscheduled in the U.S.

Posted by: Nathan Myers | December 19, 2007 5:29 PM

31

darkman- The assumption wasn't that you wanted sleep-deprived doctors to work on you, its whether taking it would decrease medical errors regardless. Medical professionals are often chronically overworked, and maintain a constant sleep-debt whether their patients realize it or not. Would you rather have the status-quo sleepy/tired doctor working on you who did, or did not, take a cog enhancer to maintain poise?

And what about this study (Modafinil improves attention, inhibitory control, and reaction time in healthy, middle-aged rats.):
http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=17328945&ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum

These weren't sleep-deprived rats, but normal ones. If you could make someone a better doctor, or more skilled and responsive fighter pilot (assuming no deleterious effects to the taker), lives would be saved. That seems to suggest that it may be more ethical to give these people the drug than withhold it with full knowledge.

Posted by: Tritc | December 19, 2007 5:38 PM

32

And if you wopuldn't use one of these drugs, would you use it if it weren't called "doping"?

Posted by: Charlie (Colorado) | December 19, 2007 5:46 PM

33

Well, I picked 'doping' as a grabby headline, not neccesarily what I personally think about the issue (which I think it clear in my post). :)

Posted by: Shelley Batts | December 19, 2007 5:53 PM

34

tritc -
i think that i feel there would be more egregious medical errors if we started putting doctors on drugs to keep them 'alert'. it's possible with stimulants and other CE's to keep yourself awake and working at a reasonable capacity for extended periods of time (days even). however, regardless of how much coffee you take your brain can't keep up with your body (ever pulled an all nighter and then sometime the next afternoon your brain 'shuts off' while you're still awake - you can't speak in full sentences let alone perform surgery well). What happens when you artificially stimulate someone who is past that point is that they'll self-report feeling fine but their performance will have deteriorated (and they won't even know it). Medicated doctors will be more likely to self-report being fine for surgery when they're really not and they're going to be more likely to make horrible mistakes. If a doctor is tired before my surgery I don't want them to perform the surgery at all... certainly not if they've had an extra big cup of coffee because it'll keep them awake and focused during the surgery... i want them to go home and go to sleep...

Posted by: darkman | December 19, 2007 6:31 PM

35

tritc-
sorry - missed the citation and explanation at the bottom of your post (not enough provigil at the end of my workday).

i still would be against medicating people with CE's regularly just to 'up' their performance. drug monkey's point about 'tolerance' would be one of several arguments against such a plan. also, generally i think there would be more harm done by this than good that could come out of it (maybe i'm alone in the feeling that what the world needs is less reasons to take medication rather than more).

Posted by: darkman | December 19, 2007 6:38 PM

36

darkman- The point wasn't whether we should force tired docs to take stimulants, but rather if a compound existed which did not result in deleterius effects to the user, but provided improvements in attention, control, reaction time (as in the paper I provided), if an ethical need for such a drug could exist. That isn't to say that we force someone to take it if they are against, but that we perhaps refrain from strawman ethical arguments about over-stimulation and getting more sleep to decrease (or make illegal) its use. No one's in favor of issuing mandates to health professionals, but the facts must be considered whether discouraging the use of something like Modafinil makes good scientific, as well as ethical, sense. Decisions about drug legality, in the best cases, are empirical questions, and in the worst cases, decisions based on emotion and generalizations.

Posted by: Tritc | December 19, 2007 6:42 PM

37

Thats an interesting paper, Tritc. Very bloggable, if I get some time tonight.

Posted by: Shelley Batts | December 19, 2007 6:57 PM

38

Reading through this discussion, I thought the results of these studies might be interesting to some of you. The excerpt below is from the ATTENTION RESEARCH UPDATE email newsletter published by David Rabiner, Ph.D. Senior Research Scientist at Duke University. (Sorry about the length of the quote but I couldn't find an online link to the newsletter)

-- from the December newsletter --

In the largest study of this issue conducted to date, nearly 11,000 students attending 119 nationally representative 4-year colleges in the US were asked about their non-medical use (i.e., use without a prescription) of stimulant medications (McCabe, et al., 2005, Non-medical use of prescription stimulants among US college students: Prevalence and correlates from a national survey. Addiction, 99, 96-106). The data from this study was collected in 2001 and participants were assured that their responses would remain completely confidential so that they could respond in an open and honest manner.

Results of the survey indicated the following:

* Approximately 6.9% of college students reported non-medical use of prescription stimulants during their lifetime, 4.1% reported non-medical use in the past year, and 2.1% in the past month.

* Non-medical use was twice as high among males, and was also substantially higher among white students compared to African Americans or Asians.

* Fraternity/sorority members reported more than double the use of non-members.

* Use was higher among those with a GPA of B or below compared to those with a B+ or above.

* The rate of non-medical use of prescription stimulants varied dramatically across colleges, ranging from 0% to 25%. At twenty schools, the reported past-year use was 0; at 12 schools, the rate exceeded 10%. This clearly illustrates how much variability there is across schools.

* Use was highest at colleges with the most competitive admissions standards and lowest at the least competitive schools. More than 80% of schools with a past year prevalence rate exceeding 10% had highly competitive admissions standards and were located in the Northeast or South. Among all students attending three historically black colleges, not a single one reported non-medical use of prescription stimulants in the past year.

* The illicit use of stimulant medication was associated with other substance use. Thus, when reporting on their behavior during the past 30 days, students who used non-prescribed stimulants were more likely than other students to:

- Use cigarettes (67% vs. 24%)
- Engage in frequent binge drinking (69% vs. 21%)
- Use ecstasy (19% vs. 1%)
- Use cocaine (17% vs. 1%)
- Drive after binge drinking (35% vs. 9%)
- Be the passenger of a drunk driver (66% vs. 21%)

--- end quote ---

Also, from another study in the same newsletter on the same subject, this one by Rabiner et al,

--- quote --
- Reports of adverse effects were common. About 60% reported that non-medical use contributed to sleep difficulties and appetite reduction and about 50% reported irritability. More concerning side effects were reported to occur relatively infrequently. Thus, about 5% believed that using ADHD medication contributed to their use of other substances, and/or resulted in their having to see a doctor, and/or that they sometimes worried about becoming dependent on ADHD medication.

-- end quote --

The newsletter subscription available from www.helpforadd.com for anyone who's interested.

Just an FYI, I have ADD and usd to take extended release Adderal but stopped because I didn't like the side effects. It definitely helps with concentration though, and I wish I'd had access to it in college.

Posted by: Nigel | December 19, 2007 8:27 PM

39

>if you could take a pill which enhanced attention and cognition with few or no side effects, would you?

This question is poorly phrased. When they say "few or no side effects", do they mean when taken as perscribed/directed, or under any circumstances. Because college students are generally not known for their careful adherence to guidelines concerning medication (see results of study above).

And the idea of a pill that doesn't make you sick no matter how many you cram or combine with everything else in your aresnal seems rather unrealistic.

Posted by: Lab Lemming | December 19, 2007 11:51 PM

40

This is an aside, but I must point out that off-label use of prescription medication is neither unethical nor illegal. The FDA made a considered decision to permit off-label prescribing. They have revisited this decision at least once, but have let the original decision stand.

Posted by: Joseph j7uy5 | December 20, 2007 12:33 AM

41

Regardless of the fact that my moral compass starts twitching at the idea of having to use a medical drug to keep up with the "competition", let's imagine this scenario.

Let's say that there exists a CE that gives no side effects apart from dependence. I am assuming it will cause dependence issues because, to affect brain activity, it will most probably be affecting neurotransmitter levels. Let's also say that the use of such CE is considered legal.

Now, I will have to use the CE - really, whether I want it or not - if I want to be able to compete with users. The reply that "it is my choice" is not viable, because the more users there will be, the more I will have no real choice but becoming a user if I even want to perform average among a population of users.

Why? The widespread use of the CE will, in a way, "bring up the average". Think about what happens when the average gets higher, and you are graded on a curve - I am sure at least some of you must have seen this happening before. More work (and less sleep) are going to be required, the tasks required are going to become more and more taxing as the population moves from non-users to users (ie, as we move from a 'low' to a 'high' average - high...no pun intended!), and being a user will become a pre-requisite for "riding the curve". Only exception: if you need very little sleep and you are already significantly "riding" such curve.

Now, the point is: forget about the ethics. Are we willing to become users, dependent on a drug for life to keep up with the newly required performances?

"Using" will only encourage harsher competition, and harsher requirements, together with more inhuman lifestyles. Forget about the ethics, if that is "sticky" for you, and you cannot make up your mind. But are you willing to become an addict, AND being asked to perform more?

And BTW: addiction to nicotine is a serious issue among the mentally ill. If you want to know more about its consequences, check out this resource: http://www.cmha.bc.ca/resources/visions/tobacco

Sorry for the long comment, I hope it makes any sense to you.

Posted by: steppen wolf | December 20, 2007 1:22 AM

42

I agree with steppen wolf, and go even further.

It's not just an issue of improving the average. Once you learn to use chemicals to boost your performance in school, you'll do it to get a good job, and then you must keep on using it to keep on performing at the expected level.

The dependency isn't just biological. There are external reasons as well. See a smoker try to kick the habit: the biological dependence on nicotine will wear off in a few days, but the other habits will last for months. When a former smoker takes a cup of coffee, the hands start looking for the smoke that used to go with the cup. I've seen smokers who need to light up, before they can participate in a conversation. The smoke screen is part of the role. Without it they feel insecure.

I expect the same to happen to students who use boosters: when working, they need their kick before they dare attack the given task. In the long run they are harming themselves. Therefore I think it is unethical, even if there are no biological side effects.

Posted by: Lassi Hippel□inen | December 20, 2007 6:36 AM

43

Hi Darkman,

I agree that a student's job prospects, etc. depends on her relative performance because employers value better performers over lesser performers. But that just means they value better performance over lesser performance--not that they value the better performance BECAUSE it's better performance (as we do in sports). Suppose there are a pool of applicants A1, A2,... An and the employer hires applicant A17 because he has performed better than all the others. Now, as an employee, A17 contributes X to the company. Question: does X depend on the RELATIVE quality of A17's performance? If not, then I should think that A17's absolute value to the company does not depend on A17's RELATIVE performance. In sports this just isn't so: absolute value IS determined by relative performance in sports.

Posted by: Dustin | December 20, 2007 9:40 AM

44

Steppen seems to have hit it on the head. People lament the stress of competition (and get burnt out) in working life as it is, the pressure to perform and to take measures to increase one's abilities with drugs or whatever would probably make this exponentially worse over time. I imagine dependence would be a major problem with any drugs, based on their neurotransmitter-modulating mechanisms.

I think nicotine and caffeine are 'accepted' for their enhancing effects because its just as easy to achieve as well as, or better than, a smoker or coffee drinker if you are neither. Not to mention we're all aware of the negative effects of these substances. The idea of performance-enhancing drugs with no side effects seems intrinsically unfair in comparison! This might be why it's viewed as unethical. It goes against the concept of no pain, no gain. And this hurts more when success or money is involved, as in competing for a place at an educational institution or a job with prospects of personal financial gain.

A17 who used CEs to win their job in that company probably doesn't contribute much more X than anyone else would but the company can only afford to employ limited numbers, especially in more important positions. So they want to be sure they got the best person for the job (most deserving just because they appeared the most able to perform?) I wonder how recruiters view the issue of using CEs amongst competing candidates, especially if a user WAS able to bring more to a company than a non-user.

Posted by: kururin | December 20, 2007 12:11 PM

45

Possibly relevant:

http://godplaysdice.blogspot.com/2007/12/why-mathematics-doesnt-need-mitchell.html

Posted by: Capt. Jean-Luc Pikachu | December 20, 2007 5:30 PM

46

Ritalin, dexedrine, caffeine pills, excedrin, coffee, stimulants are rampant on college campuses. I occasionally used ritalin and excedrin myself to get through extended periods of studying and cramming. During finals ritalin is often up to $5 a pill, but it will often mean the difference between a B and an A, which is certainly worth it if you have grants and scholarships based on merit.

It's the natural result of any competitive situation.

Also it should be noted that a bachelors degree is really just a modern high school diploma, without one you are screwed, and with one you are barely guaranteed a reasonable job.

A masters is the new bachelors, ie: if you want to make a reasonable livable income upon graduation, especially when you consider the rampant inflation of consumer goods in the USA, and the declining dollar.

So yea, occasionally using stimulants to live at the same means as our parents did 50 years ago? You betcha.

Posted by: CollegeGrad | December 20, 2007 8:28 PM

47

if you have to take ritalin to study for anything in undergrad, you shouldn't even be in college.

there are too many retards attending every college in this country.

Posted by: user | December 20, 2007 10:07 PM

48

As with sports performance enhancing drugs, the problem is that there ARE side effects.

Low and infrequent doses of these drugs might be relatively safe, but if they do in fact work, then inevitably competition will result in people taking high and frequent doses.

Therefore, the only practical approach is to ban them entirely.

I'm as trans-humanist as the next guy, but until some real progress is made in the areas of effectiveness and safety, there many options I'd recommend.

Posted by: xoc | December 21, 2007 1:08 AM

49

I think the side-effects can change the issue ethically even if they are small or theoretical long-term effects.

As with most drugs, I would expect any CEs to have side effects which vary by individual, such that even with a "low side-effect" drug, some portion of the population will have significant side effects and be unable to use them. If CEs are not against the rules and if they work well, then it seems plausible that they would become de facto required for getting into med school (or what have you).

In this situation, a subset of the population would be excluded from educated and professional society due to a genetic predisposition to CE side-effects. Would this be a situation we would consider fair? Would we need to have separate check boxes on applications or even separate school programs for the CE-challenged who cannot take the drugs?

One could theoretically argue that we base our current system on the inherent and possibly genetic individual variation in cognition and so this is the same thing, but I want to know if anyone actually would.

I agree with you that if there were NO side effects (long or short term), then then it seems harder to justify an ethical rule against CEs, but if I may be allowed to interject this one real-word possibility into the theoretical question you set up, I think it brings in a different issue entirely.

In a side note, if a prospective med student need drugs to get into med school, I think I might want him to be required to continue taking them throughout his entire professional career.

Posted by: metzgerm | December 21, 2007 5:17 PM

50

I want to follow up on a point raised by Damien. Let us consider the hypothetical situation in which a cognitive enhancer is legal and "safe". Now imagine that, if you choose to use this drug, you are required to begin each of your published manuscripts with a statement acknowledging your use. Would you be just as willing to use the drug if you had to disclose it? If you say no, or there is any hesitation to say yes, it indicates that you would associate your use with a degree of shame. I would argue that shame associated with use is an indication that you believe cheating has occurred.

Posted by: Seth | December 21, 2007 9:08 PM

51

darkman: *maybe i'm alone in the feeling that what the world needs is less reasons to take medication rather than more*

Hummm... what about ***less*** competition rather than *more regulated* competition?
Your pseudo is very well choosen and you are good epitome of the american righteousness and obsession with legalistic concerns.

Posted by: Kevembuangga | December 23, 2007 3:18 AM

52

both caffeine and nicotine have the ability to keep you awake, alert and focused

Posted by: geciktirici | December 23, 2007 2:09 PM

53

I think that this attitude of "we all need to keep the playing field level" as applied to intellectual pursuits is very short sighted. We as humans have very many technical and nontechnical problems that we cannot solve presumably because we are not smart enough; if we could eventually solve these problems by using any external means to boost intelligence then to not do so would be to intentionally stunt our growth as a species.

I do not think that academics are like sports. Sports are merely a diversion, and excellence in sports does not mean improvement of the human condition. On the other hand, one who excells intellectually could (as mentioned by BikeMonkey) potentially cure cancer. What is the rationality behind not using a tool that could facilitate the creation of something that could benefit millions, or even billions of humans beings? The idea that we should do this for the sake of academic fairness sounds extraordinarily petty.

Personally, getting the highest grade in the class by riding the curve is not a priority, graduating first in my class is not a priority, beating my academic peers is simply not a priority, it is nothing compared to the ultimate goal of general human progress.

We must not reduce intellectual pursuits to the level of interpersonal competition. It is so much more than that.

Posted by: KeithS | December 23, 2007 8:46 PM

54

wow. I guess the vast quantities of bad coffee I consumed in college in the '70s makes me more hip than I ever could have dreamed. (the "hip" reference completely undoing that concept!)
but the occasional use of dexedrine or benzedrine (free samples from the roomie's MD bro') for those times when sports, parties & laziness left no option but all-night cramming puts my experience smack in the middle of the argument. in addition, my experience tracks pretty well with a number of friends and acquaintances of the same age.

I can state pretty confidently that the illegal use of such drugs was of no greater concern than sparking up a joint or running a line or two off of a mirror. granted, the prevailing cultural beliefs among college students at the time made using one's own body as part of a chemical experiment pretty easy. but the use of drugs as cognitive enhancers never carried the same moral and ethical stigma as direct cheating, i.e. stolen answers or copying the work of others. I speak of course of my own belief, but I also remember this as a general opinion held by most of the other students I knew. its possible that the physical payback was considered part of the fair price paid for the performance. no one could make it through a week or more of finals and papers on drugs; the problem was self-correcting. the side effects of amphetamines, particularly from extended usage would appear to be much more severe than the chemical enhancers in discussion here.

I wouldn't advocate such behavior for anyone else, nor have I worn a hair shirt and gone in for regular floggings since then. do I think I gained an unfair advantage over other students? only in that I may have had more fun during the time I should have been studying earnestly. I do not believe I did better on tests or papers because of chemical enhancements. I do believe that I did nearly as well as I would have if I had put in the time spread out over several days.

one caveat to all this is that this behavior was not constant throughout college. rarely would I consider being unprepared for major courses and those of particular interest to me. yes, that meant spending the time and effort spread over the semester to stay on top of the work and have papers ready before they were due.

so how does this blast from the past fit in with the current subject? I guess y'all will decide that. but it is interesting to note that this would not even be an issue if it weren't for the doping problems in sports. the use of steroids and HGH has been rampant throughout professional sports (that includes the Olympics and NCAA football) for more than 25 years. is it fair? is it cheating? amateur sport is supposed to be about fair competition, but does that hold for professional sport as well? why should it? pro sports are business and businesses have only one ethic - profit.

so are we talking about amateur academia or professional academia here?

Posted by: lil dutchboy | December 23, 2007 9:33 PM

55

Unfortunately discussions about mental enhancers or nootropes usually deteriorate into back and forths about cheating students workplace competition etc. Many in the research community usually pour on the altruistic crap about helping the poor little victims of Alzheimer's Picks ALS dementias etc. etc. etc. Not to mention the bio-Luddites at the NIH and FDA. The great benifit to society in brain enhancers lie in the collective cognitive enhancement that may be gained. Not just by "cheating" students or type A office dwellers, but by EVERYONE desiring more knowledge and needing more brainpower .. in short an upgrade .... more RAM. If Detroit thought of cars as some scientist think of the brain we would still be driving Model T's. Our salvation lies not in repairing the broken but enhancing the "normal". Forget caffeine ginko Ritalin Provigil ..... general enhancers... child's play!!! Check out GABA inhibitors Ampakines NMDA modulators CREB modulators cAMP modulators Kinase modulators BDNF Alpha AdrenoReceptor agonists Hippocamcal implants Deep brain stimulators transcranial magnetic modulation and this does not exhaust the list or touch on genetic manipulations such as Microcephalin and ASPM .... now we're talking enhancement!!!

Posted by: jd37027 | December 25, 2007 7:09 PM

56

Awesome post and debate question! I'm a bit late on the discussion (and not a part of your 'local' academic community), and bring somewhat of an outsider's perspective.
-Cheating. For me this is an inherently subjective concept, and thus vulnerable differing perspectives. One example I can remember is "studying for the test" vs. "studying the whole book." It seems to me the first is focused on rote memorization (accepted in some cultures) and the second lacks concept prioritization (weaker memory potentiation). When defined as an access issue - ie some students not having access to the test questions, or pharmas, etc. - then the playing field is absolutely tilted at a number of levels. Take for instance those of us who had to work during college Grad/professional school and didn't have that "extra hour." Another example might be drawn from athletes. It is commonly accepted that HGH is cheating, but what about a "beta-blocker" drug, say for a mixed martial arts fighter? "Mental toughness" is considered a part of the goal in mixed martial arts fighting, so if you make yourself unafraid, or reduce your anxiety (as opposed to enhancing muscle-building, stamina and aggression with HGH) it should technically be considered cheating because it stifles or overcomes the "mental toughness" part of the sports' goal. It has yet to become a topic, or even considered, even though MMA fighters are known as avid early adopters of chemical physiology enhancements.
-Enhancements. I have, will, and always would use enhancements where possible. I think Shelley has clearly identified issue a. The example I'm thinking of is how some drugs (when used by healthy people) might alter the physiology of a brain (such as sustained alcohol use generating increased volume of dopamine receptors - the black dragon for heroin users).
-Individualized effects. It is becoming understood now that drugs effect people in slightly different ways, which I believe may be at least marginally related to their specific physiological make-up. Marijuana absolutely helps a great number of people focus and reduces tendencies of aggression. Others simply get sleepy (this could be related to the particular phenotype of marijuana). Until science gives us a clearer picture of the relationships of cannibinoids in our CNS we will not be able to determine what effects it would have on individuals. This is just one example, but seems transferrable as a concept when you consider how only a portion of a subject group exhibits contraindications when testing drugs. Some people just get shaky and anxious with the use of caffeine, not to mention its diuretic effects for non-habitual users.
-Malum in se v. Malum Prohibitum. One last distinction, which may be of interest to some. Drugs are largely a malum prohibitum illegality (subjective, value based prohibition), where as malum prohibitum illegalities are universal (murder, theft, etc.). This adds so many layers to the ethical portion of the debate that it can be hard to distinguish between parochial motivations (drugs are bad because my religion says the body is a temple) versus altruistic motivations (this particular drug alters the brain's physiology to such a degree that the person no longer has control, and would harm others to quench their resulting addiction).

Posted by: Redleg | December 26, 2007 12:36 PM

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To take a chemical that improves an individuals cognitive compatability should be treated as another method of "getting ahead". There is no reason to stigmatize the use of adderall, dextroamphetamine, or ritalin above something such as caffeine or as previously mentioned marijuana. Some individuals may need to be taken down a notch to produce at maximum capacity, while others may need that extra boost that caffeine or adderall provide. An individual must choose whether to take the enhancement or not. As previously stated, they must figure out the proper regimen for their own inprovement, not others. I have known individuals who get nothing done on adderall and simply fixate on the trivial, individuals who feel modafinil and caffeine make them overly jittery, thus impairing concentration, and individuals who benefit from all three. Simply put, if improvement is the goal, a legal stimulant is perfectly fair. This does become complex when discussing provigil or the amphetamines/ritalin, but if legally obtained this is not an ethical violation. In addition, many who are prescribed stimulants are not afflicted with the only two conditions they can be legally prescribed for--ADHD and Narcolepsy. Provigil is all the rage in Washington DC, used by many both in the government and dealing with governmental affairs, should we then claim this is wrong if it improves the performance of our elected officials. I highly doubt narcolepsy or ADHD are afflicting many who lobby or govern. They use the drugs to stay awake, continue to push themselves through difficult situations to complete their intense jobs. How and why should this be perceived as unethical for a student who is under intense pressure to succeed, a student who may not have a helping hand (connections) to guide them into a top-notch medical, law, or clinical psychology program? Yes there are risks, but if these are adults we are discussing they should be allowed to decide the cost benefit ratio of these substances, caffeine included.

Posted by: loxodont | January 8, 2008 12:04 AM

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Like it or not, people all over the world are doing it as of now. If you aren't going to join them, you have two options:

1. Employ fearmongering tactics similar to the ones used to ban steroids to get the substances made illegal.
2. Quit worrying about it and keep doing your own personal best.

I suggest option 2.

After all, the relative improvement is minor. You don't worry that people drinking coffee have an advantage over you, do you?

Posted by: mr. gunn | February 11, 2008 6:39 PM

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