Cognitive Enhancers

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Outline

• What are “smart drugs”?  
• Do they work?  
• Who is using them?  
• What does this mean for health professionals?  
• What should we do next?
Smart drugs

• Improve brain function, e.g. memory, cognition, motivation, attention
  ○ In people who are not ill, impaired or diagnosed
  ○ Who have normal human cognitive capacity
  ○ In order to be “better than well” in their everyday life

• Neuroenhancement, also known as
  ○ Cognitive enhancement
  ○ Neurocognitive enhancement
  ○ Cosmetic psychopharmacology
Current smart drugs?

- Drugs currently used to treat disorders
  - Methylphenidate (Ritalin) for ADHD
  - Modafinil (Provigil) for narcolepsy

- Nutraceuticals
  - Herbal extracts, “vitamins”
Smart Drugs Information

What are Smart Drugs

Smart drugs are any chemical ingested to improve mental performance. Some improve overall IQ, while others are more focused e.g. on memory boosting or attention span or creativity. The official medical term for smart drugs is nootropics.

Smart drugs have been called the academic athlete's steroids. But this comparison may not be fair. For one, smart drugs are not illegal. For two, nonprescription smart drugs have few if any ill health effects.

Why does StudyCram.com support smart drugs? Because life isn't fair. The opponents of smart drugs are generally people who never needed them. They suggest you just try harder. Proponents are those who struggled in school, experienced the benefits of smart drugs, and understand that we are not created equal... but we can buy equality. Studycram.com is pro choice. You decide if smart drugs are right for you, or not.
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SWD occurs when the body's internal sleep-wake clock is out of sync with the work schedule (the body wants to go to sleep when it needs to stay awake).
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http://drinkneuro.com/products/sonic
Smart drugs of the future?

• “Safer” recreational drugs
Smart drugs of the future?

• “Safer” recreational drugs

• Treatments for disorders
  - Dementia, mild cognitive impairment, stroke

• Military applications
Military interest in...

- Preventing/treating post-traumatic stress disorder/memory problems
- Enhancing executive functioning
- Endurance and alertness
Do smart drugs work?

• Animal models
  o Making rats seem smarter is easier than making humans smarter

• Where there is a problem
  o Potential therapies for cognitive dysfunction

• In healthy “normal” people
  o Effects on vigilance, verbal learning and long-term memory are often small and of limited application to everyday life
"For methylphenidate an improvement of memory was found, but no consistent evidence for other enhancing effects."

"Modafinil ... was found to improve attention for well-rested individuals ... but repeated doses were unable to prevent deterioration of cognitive performance ... possibly inducing overconfidence in a person’s own cognitive performance"
Questions about efficacy and safety

- **Efficacy**
  - How does use affect everyday performance?
  - Can “normal” be improved?
  - Placebo effect? Impact on mood/confidence?
  - Payoffs, e.g. improve alertness or focus but impede creativity or executive function

- **Safety**
  - How do they interact with other substances?
  - Does tolerance develop with regular use?
  - What about addiction – physical/psychological?
Are people using smart drugs?

Non-medical use of prescription stimulants among 10,000 US college students

(L McCabe et al 2005)

Lifetime prevalence = 6.9%
Past year prevalence = 4.1%
Past month prevalence = 2.1%

“Non-medical use” may include: recreation/fun, self-treatment of ADHD, weight loss, cognitive enhancement.
Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey

Sean Esteban McCabe¹, John R. Knight², Christian J. Teter³ & Henry Wechsler⁴

Figure 1  Distribution of past year non-medical use of prescription stimulants across 119 colleges, 2001
Who are non-medical users of prescription stimulants?

- Rarely older than 25 years
- Use other illicit drugs
- Live in fraternities/sororities
- Have lower grade point averages

(McCabe et al 2005, 2008; Bogle and Smith, 2009)
Outside the US …

• 16% of 77 Italian students had ever used **any drug** for cognitive enhancement (Castaldi et al., 2012)

• <2% of German students had ever used prescription stimulants for cognitive enhancement (Franke et al., 2011)

• 2.4% of 1265 Queensland adults had taken prescription drugs to enhance their concentration or alertness (Partridge et al., under review)
Misperceptions about prevalence

Survey of 3,639 US university students non-medical use of prescription stimulants

- 6% = prevalence of use in past year
- 20% = average estimated prevalence
- 34% = average estimate of users

(McCabe et al 2008)
A bubble of enthusiasm.
“Around the world, students are striking deals to buy and sell prescription drugs...to get higher grades”

“Adderall is one of several drugs increasingly used to enhance cognitive function”

“One survey estimated that almost 7% of students in US universities have used prescription stimulants in this way, and that on some campuses, up to 25% of students had used them in the past year.”
A bubble of enthusiasm.

Warren et al., 2009

“...an estimated 16% of students at some United States universities take prescription medication as study aids (Babcock and Byrne, 2000).”

Farah et al., 2004

“The use of prescription stimulants (such as methylphenidate and dextroamphetamine) as study aids ... might include as many as 16% of the students on some campuses (Babcock and Byrne, 2000).”
A bubble of enthusiasm.

Riis et al., 2008
“... many college students are aware of Ritalin's effectiveness. One study estimated that as many as 16% of college students have used it as a study aid, often illegally using pills prescribed for someone else. (Babock and Byrne, 2000).”

Chatterjee, 2006
“Based on the belief that these drugs improve test performance, the use of stimulant medications among college students in the US is widespread (Babcock and Byrne, 2000).”
A bubble of enthusiasm.

Koelsh et al., 2008

“A growing number of publications show that especially stimulants are being used for improving task performance during examinations (Babcock and Byrne, 2000)”

Mehlman, 2004

“...with methylphenidate (Ritalin) being the current cognitive enhancement drug of choice on U.S. college campuses (Babcock and Byrne 2000).”
Student Perceptions of Methylphenidate Abuse at a Public Liberal Arts College
Quinton Babcock, BA; Tom Byrne, PhD
JOURNAL OF AMERICAN COLLEGE HEALTH

- 283 students at Massachusetts College of Liberal Arts (MCLA).
- 10 item, “Yes/No” survey.
- No items asked about cognitive enhancement.
- “Have you ever taken Ritalin for fun (non-medical purposes)?” 16.6% Yes.
Universities told to consider dope tests as student use of 'smart drugs' soars

Exams students 'fuel up on Ritalin'

‘Steroids for school’: College students get hooked on ‘smart drugs’.

What does the media say about cognitive enhancement?

Ritalin is students' new drug of choice for parties and studying.
Smart Drugs “As Common As Coffee”: Media Hype about Neuroenhancement

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Abstract

Background: The use of prescription drugs to improve cognitive functioning in normal persons—“neuroenhancement”—has gained recent attention from bioethicists and neuroscientists. Enthusiasts claim that the practice is widespread and increasing, and has potential benefits. Critics argue against the claim. In this study...
“Smart drugs as common as coffee”

“Student dex rife”; “One in five admit using brain drugs”; “Brainiac drug use at work”

“Many students”... “popular”... “commonplace”... “widespread”... “rife”...“proliferated in recent years”...“soared”.

“Students are increasingly taking drugs like Ritalin instead of Red Bull or triple espressos”

“...spreading across all sectors of society”

“...as common as coffee within a decade or two”.
ABSTRACT

In the last decade, persons who have no diagnosed medical or mental health condition are increasingly seeking and utilizing, for the ostensible purpose of enhancing their memory or cognitive skills, prescription drugs that were originally developed to improve executive function or memory in persons diagnosed with disorders such as attention deficit hyperactivity disorder or Alzheimer disease. Evidence suggests that this practice, now known as neuroenhancement, is gathering momentum. As a result, neurologists may be encountering patients without a diagnosed illness asking for medications with the goal of improving their memory, cognitive focus, or attention span. Strong arguments have been made for and against this practice, often reflecting strongly held convictions concerning the appropriate practice of medicine. The purpose of this report is to provide neurologists with an overview of the ethical, legal, and social issues surrounding the use of pharmaceuticals prescribed to enhance or augment normal cognitive or affective functioning, as well as practical guidance for responding to an adult patient’s request for neuroenhancement.

Neurology® 2009;73:1406-1412
Public attitudes

Queensland Social Survey (n= 1265)

Question: Is it acceptable for healthy people to use prescription drugs to enhance their concentration or alertness?
- YES: 7%
- NO: 86%
- UNSURE: 7%

Question: Is it acceptable for prescription drugs to be used in the treatment of ADHD?
- YES: 35%
- NO: 35%
- UNSURE: 30%

Question: Is it acceptable for prescription drugs to be used in the treatment of Depression?
- YES: 55%
- NO: 15%
- UNSURE: 30%
Student attitudes towards cognitive enhancement.
Who uses Ritalin as a study aid and why?

1. Neuroenhancement to “get ahead”: high performance and pressure to succeed.

“It’s the people staying ahead that seem to have the advantage and that’s the mentality that everyone’s got.”
Who uses Ritalin as a study aid and why?

2. Neuroenhancement to “keep up”: a method of coping and cramming

“Exams are stressful. When people get stressed, they will do anything in order to achieve the marks they need to achieve.”
Who uses Ritalin as a study aid and why?

3. Neuroenhancement to “go out”: a way to maintain an active social life.

“If you want to keep your social life and get through then Ritalin would help you be superhuman…”
In conclusion...

• Smart drugs may not be so smart
  o Inadequate evidence of efficacy and safety

• We need to know more
  o Prevalence, patterns of behaviour, attitudes
  o Future smart drugs?
Research Questions

How prevalent is the use of smart drugs in Australia? Which drugs?

Who is using smart drugs in Australia?

How do people typically access prescription drugs if they want to use them for cognitive enhancement?

What should we do about it?
Prohibition

• Performance enhancers in elite sport
• Mood enhancers
‘SMART’ DRUGS

UK universities to curb use with dope tests

LONDON — British universities must investigate measures, including random dope testing, to tackle the increasing use of cognitive enhancement drugs by students for exams...

"British universities must investigate measures, including random dope testing, to tackle the increasing use of cognitive enhancement drugs by students for exams…"

"If a safe and effective drug was developed which enhances memory, then I think it would be difficult not to allow access to it, Sahakian said. But if drugs were then legal, there would be ethical issues had to be be considered.

The big question is, are we just going to be taking drugs in 10 years and boosting our cognition in that way? And if we are, will we use them to have a shorter working week or will we go headlong into a 24/7 society where we work all the time because we can? You have to consider there..."
YOU CAN BE INVOLVED

Physician attitudes towards the use of prescription stimulants and cognitive enhancement.

CALL FOR PARTICIPANTS
GPs, Psychiatrists, Neurologists, Pediatricians.

30min interview: this can be done at a time and place convenient for you.
Participants receive a $30 Coles/Myer voucher.

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