

# **A Review on the Future of Work: Performance-enhancing drugs**

Dr Karen Dale and Professor Brian Bloomfield,  
Lancaster University, UK

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## What are performance-enhancing drugs / cognitive enhancers?

*Enhancement technologies* - interventions “for the purpose of restoring an impaired function to previous or average levels, or to raise function to a level considered to be ‘beyond the norm’ for humans” (Academy of Medical Sciences, 2012: 7).

*Cognitive-enhancing (CE) drugs* (also described as neuro-enhancers, neuro-technologies, psycho-pharmaceuticals or ‘smart drugs’) are pharmaceutical substances which are claimed to improve mental performance, such as attention or focus, concentration, memory or motivation.

*Performance-enhancing (PE) drugs* may also be seen as useful for improving the acquisition of motor skills, or affective skills, such as dealing with anxiety associated with performing certain work tasks or promoting feelings of trust and affiliation.

## Issues in defining performance enhancing drugs

- No drugs are licensed by state medical authorities to be prescribed as 'cognitive enhancers' as such.
- Usually refers to the off-label use of drugs prescribed for other medical conditions .
- Cognitive ability is difficult to measure, to compare and changes over time.
- So what, then, constitutes 'enhancement'?
- What is the difference between 'enhancement' and 'maintenance'?
- Despite these issues, there is increasing interest in cognitive enhancement, from individuals, the media and industry (large market potential).

## The diversity of performance enhancing substances

- 1) over-the-counter substances such as caffeine (coffee, caffeinated energy drinks and caffeine tablets) and other products sold for CE purposes;
- 2) prescription drugs for particular disorders;
- 3) illicit drugs such as methamphetamine (crystal meth) or cocaine
  - Internet sales have changed forms of consumption
  - Classifications differ between countries
  - There is a (minority) interest in 'biohacking'- changing one's own biology – and 'stacks' or combinations of these substances taken together to achieve enhancement

# Current Main Performance Enhancing Drugs

**Methylphenidate** - a central nervous system stimulant used for treating Attention Deficit Hyperactivity Disorder (ADHD) and narcolepsy [EU trade names include Ritalin, Concerta, Equasym, Medikinet and Rubifen].

**Modafinil/Armodafinil** – another central nervous system stimulant, promotes wakefulness, used for narcolepsy. Licensed for *Shift Work Sleep Disorder* in the US [EU trade names include Provigil, Nuvigil, Vigil, Modalert, Modasomil and Modiodal].

**Amphetamines** – stimulants used to treat ADHD. Adderall (trade name) is a mixture of amphetamine salts. It may be used off-label for the enhancement effects of increased focus (especially for study) or for euphoria ('high'), or for weight loss [EU trade names include Attentin and Tentin].

## Prevalence of Current Use

- Difficult to ascertain because of extent of non-prescribed use and internet sales
- Associated with certain groups:
  - **Military:** both authorised use and supervised research
  - **Students:** for enhanced study, focus, concentration, memory. Possibility of continuing into professional life
  - **Long-distance transport:** aid concentration and wakefulness
  - **Shift workers:** including emergency/medical services, to aid wakefulness and coping with work/life balance. *Shift Work Sleep Disorder* is a diagnostic category
  - **City traders and other high pressure occupations:** Widely reported in connection with drug abuse (e.g. cocaine, Adderall), but to aid necessary work/entertainment of clients

## Effects on Workers and on Work

- Contested; different studies show different effects.
- Long term effects and non-prescribed/unsupervised use unknown.
- Addictive potential.
- Not only cognitive, but physical and emotional effects:
  - studies show over-confidence with abilities over-estimated
    - ➔ implications for safety critical situations;
  - informal accounts suggest that task focus leads to corresponding dislike of social interaction/interruption
    - ➔ potential impact on team situations.

- Increased performance on some tasks may go along with decreased ability on others
  - e.g. methylphenidate may lead to an improvement on tasks that are unfamiliar but at the same time can produce a worse performance on familiar tasks (Bagot & Kaniner, 2013).
- “doubts about whether using these substances [CE drugs] enhances real-world cognitive performance in normal subjects” (Hall & Lucke (2010: 2042).

## Employment Issues of Performance Enhancing Drugs

- Potential coercion or indirect expectation to conform and take enhancers in some organisations/occupations.
- Rhetoric changing from drug taking as problematic for work, to considering how the use of these drugs might *improve performance* and *safety* (e.g. experiments to see whether modafinil would enable surgeons to focus better in long surgical procedures; or discussion of how it could be used for long distance drivers). Thus the discourse has shifted towards the idea that cognitive enhancers might *increase performance* and *safety*.

- Likely to be associated with high pressure, competitive or bullying work cultures.
- Likely to be linked to shift working, or other ways of balancing demands of work along with outside life.
- Senior professionals and managers may be as likely to take these drugs as those lower in the hierarchy.

# Implications for Health and Safety at Work

- Need to consider safety issues and non-prescribed use.
- Typically very little knowledge about these sorts of drugs and their effects amongst managers/HR professionals or staff generally.
- Existing approaches tend to assume that drug use is:
  1. recreational or outside work
  2. linked to poor work performance, not undertaken to cope with or to enhance work (sometimes with explicit or tacit approval or acceptance by an organization).
- Thus policy and practice needs to take into account issues such as workplace culture; patterns of working hours; performance assessment and promotion criteria etc.
- Widespread or random workplace drug testing unlikely to be effective for these reasons.

## Conclusions

- 1) This is an evolving area, which suggests dynamic changes in the future. At present there is not a distinct group of drugs which can be obtained and used for CE. Health and safety, and managerial responses need to take this diversity and lack of medical guidance into account.
- 2) Future changes will depend on particular economic and employment developments, including:
  - The development of new & safer drugs
  - A change in attitude that sees enhancement as socially and medically acceptable
  - Workplace/economic cultures that are high-pressure, highly competitive and/or high-stress, with low employee control.