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What should we tell our students about cognition enhancing drugs?

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Introduction

The issue of cognition enhancing drugs is an important one, and growing. It is not exactly clear what should be included in the category of ‘cognition enhancers’, as the boundaries might be stretched to include caffeine and glucose – drugs that students have always used to stay awake for last minute revision for exams. That complicates the ethical questions somewhat, as there are many who would want to stress the moral equivalence of caffeine and some of the more potent psycho-active drugs that are currently available.

However, what is clear is that Ritalin, a drug routinely prescribed for children with attention deficit hyperactivity disorder (ADHD) has been fairly widely used by students wishing to improve their concentration. This is now being supplanted by modafinil (sold as Provigil) and these drugs are likely soon to be overtaken by a family of drugs specifically developed for the purpose, the ampakines.

At the present time the off-prescription use of these drugs (which can roughly be equated with use by students looking for an advantage in examination conditions) has been estimated to be $500 million per year in the US alone, so the scale of the issue is by no means inconsiderable.

However, the issues related to the use of cognition enhancing drugs are by no means limited to those who physically pop pills to improve performance. The fact that such drugs are widely available, and widely used, should tell us something about how we think about learning in general. Why have we been ready to think of educational conditions, such as ADHD, dyslexia and dyscalculia in medical terms? Why do we find neuro-scientific explanations of learning so compelling? And who do we regard as appropriate experts to comment on educational issues?

Medical Models in Education

The first point to note is that we appear to be able to accept medical models of learning almost without explanation. The metaphor that the brain is like a muscle, and that it can therefore be ‘strengthened’ by appropriate ‘training’, is commonplace. In advertisements for educational materials, handheld computer games and supplementary classes, we accept the logic of the argument without question. If we think back over our own educational experiences, what stand about as crucial learning experiences are normally ‘eureka moments’ – moments of unique and unrepeatable experience where we learn something without repetition and with a strength that is not matched by learning brought about by repeated drill. What is patently clear if we think about it seriously is that the brain is not at all like a muscle.

And yet we do appear to be able to accept the idea very easily. And it is based on a very simplistic, and in many ways outdated, notion of the relationship between the
brain and the mind. That outdated notion is that there is a direct, one-to-one relationship between a specific brain activity and a particular thought or memory. Generally speaking, we think of a neurone firing or a particular area of the brain being active and correlate it with a particular function – judgement, emotion, calculation and so on. This simple, yet mistaken, view of the relationship between the mind and the brain can be described as materialism.

The philosopher Karl Popper was by no means alone in the area of philosophy to argue against the concept of materialism. However, he did point out a very interesting phenomenon which he described as ‘promissory materialism’ (Popper and Eccles, 1983: 96-98). Popper argued that, despite a long history of simplistic materialism, expressed through phrenology and more recent developments in neuro-science, there had been a conspicuous lack of success in identifying a specific mental function with a specific brain function (or even area of the brain). However, the belief persists, apparently with increasing vigour, that neuro-science is just about to establish such a link, and when it does everything about the inner workings of our minds will be explained.

Ironically, the development of modern technology which allows us to see the workings of a living brain has strengthened this belief. I say ‘ironically’ because in practice the very same evidence from neuroscience should be telling us that materialism does not and cannot work. For example, brain scans indicate that autistic-savants use different areas of the brain to perform arithmetical calculations than the average person does (Butterworth, 2001). In fact, the level of activity in the brain in such an individual is both greater and less localised than it is in an average person. This should suggest that extraordinary mental performance is associated with brain activity that is less localised and clearly defined than normal. But nothing, it seems will weaken the hold of promissory materialism; because we can see brain scans, we are more easily able to visualise a concrete link between brain function and mental function.

I should perhaps add that this is not simply a prejudice of one who is disposed to disbelieve the findings of neuroscience. Weisberg et al. (2008) reported an experiment where explanations of psychological phenomena were given to experimental subjects. In some cases the explanations were designed to be ‘good’ explanations, i.e. to give a reasonable psychological account of the mechanism thought to produce the phenomenon. In other cases the explanations were designed to be ‘poor’, i.e. simply to restate the description of the phenomenon, without adding anything to the subjects’ understanding. In some cases irrelevant neuro-physiological details were added, which did nothing to improve the explanations given. What Weisberg and colleagues discovered was that in general the subjects could distinguish between good explanations and poor ones, but that when a poor explanation was given with additional neuro-scientific content, the explanation was seen as being better than when the neuro-science was omitted. They summarised this finding in the title of their report, “The seductive allure of neuroscience explanations”.

What we see, then, is a strong and apparently growing willingness on the part of the general public to accept a materialist understanding of the link between brain function and mental function, in spite of the fact that such a link has been repudiated by
philosophers. Moreover, that popular culture of materialism seems to be as puzzling for (some) cognitive neuroscientists as it is for educationists.

However, in the context of simplistic materialism, the idea that a pill can make you smarter makes perfect sense.

**Ethics of Education**

The ethical dilemma which faces us is that most ethical discussion of cognition enhancing drugs starts from the assumption that they work, and that their working is clearly understood. That is to say, most of the ethical discussion has it basis in a materialist view of the mind.

A consequence of that is that the popular press thinks that the appropriate commentators on this important question in the ethics of education are medical ethicists. (Tysome, 2007) reviewed some of the issues involved, and gave clear evidence that a number of medical ethicists considered modafinil to be the moral equivalent of caffeine, a view that is perfectly sensible if one sees the issue as being one of using chemical intervention to enhance brain/mind function.

There is a spectrum of opinion in the quasi-medical world, which ranges from this laissez-faire approach, to the frankly bizarre. For example, while advocating making such drugs freely available to students, Julian Savulescu argues that the use of drugs should also unrestricted in sports (Maley, 2008). Not all the arguments are even so well structured, with some arguing that cognition enhancing drugs should be freely accessible, because if they were not good for us, they would not be called ‘enhancers’.

Not surprisingly, with this leadership from the field of medical ethics, the Academy of Medical Sciences (2008) found that the main ethical concern of parents was whether students competing with their children would gain unfair advantage by the use of drugs. Indeed, the main way in which the question was framed was, “Would it be ethical to withhold these drugs from my child, if everybody else is using them?”

Coming at this from an educational perspective, it seems that the primary question should be rather different. The question is whether it is ethical to present these drugs as having an unequivocal beneficial effect, when in fact this is not the case. I will come back to the question of exactly what these drugs can and cannot do in the next section, but it seems to me that the greatest damage these drugs do from an ethical perspective is to reinforce a simplistic notion of materialism. Everybody who engages in the discussion on that basis, with the assumption that these drugs definitely do something beneficial, is in danger of misrepresenting the learning process. What I would argue is that we have a clear moral responsibility to explain to our students that simplistic materialism is wrong, and it is therefore unlikely that a pill can have an overall beneficial effect on learning.

One slight, but very irritating aside on the ethical dilemmas surrounding this field is that question of who should be commenting on the use of drugs for ostensibly educational reasons. A number of commentators from the quasi-medical field wrote an article calling for a ‘responsible’ use of cognition enhancing drugs (by which they apparently meant that, after weighing up all the pros and cons, and evaluating the
evidence, the drugs should be freely available to anybody who wanted them and could afford them) (Greely et al., 2008). However they went on to add: “In contrast to physicians, these professionals [educators and human resource professionals] have direct conflicts of interest that must be addressed in whatever guidelines they recommend” (Greely et al, 2008: 704). That is to say, teachers and educationists should not be listened to seriously, because they have a vested interest in stuffing their students full of pills, so that they look better when the examination results are published. In contrast with this, physicians have no vested interest, and should be allowed to pontificate on educational issues as much as they wish.

I fear that the main damage that will be done by cognition enhancing drugs they will change the nature of the ethical discussion about educational issues, and ensure that those discussions are located in contexts where appropriate, educational expertise cannot be brought to bear.

Quality of Learning

The literature on learning and teaching among adults, and particularly in higher education, distinguishes between surface learning and deep learning. Surface learning is learning done for extrinsic purposes (such as an examination or test), depends mostly on recall, does not involve integration of new knowledge into the mental frameworks that the student already has, and is easily forgotten. Deep learning is the opposite of surface learning on each of these dimensions.

Although not everything that we do in higher education may measure up to these demanding standards, most teachers in higher education, indeed in most levels of education, would claim to aspire to promoting deep learning in their students. We would prefer our students to learn as part of a long-term life project, than to sit up and cram the night before an examination.

One of the obvious problems of caffeine, glucose and amphetamines is that they promote the wrong kind of learning. Students use them to stay up around the clock for the few days before an examination and fill their minds with details that they will recall on the day, but for the most part will have forgotten by a week later. Caffeine is a poor cognition enhancer, because it promotes the worst kind of learning. The problem with other cognition enhancers, such as modafinil, is that they are the equivalent of caffeine in more ways than simply ethical equivalent. They, too, promote the worst kind of learning.

The radio programme that first sparked my interest in this topic included the interesting fact that modafinil enhance or maintained low level cognitive functions while high level functions deteriorated. For example, when tested on soldiers who were deprived of sleep, it was found that they maintained their ability to aim a gun (low level activity) while their judgement as to what to fire at (high level activity) was impaired. The programme also noted that one of the low level activities that was maintained or enhanced was performance on IQ tests. This should give us pause for thought as to whether we are always promoting the deep learning that we aspire to promote.
However, in general terms, the issue set out here is a clear one. We need to be explaining to our students that we wish them to engage in deep learning, and that cognition enhancing drugs do nothing to promote such learning.

I think that the ethical imperative to explain this is part of a growing culture of openness, and a sense on the part of educators that education is not something that is done to students and pupils, but a project which engages teachers and learners to develop better and more capable people. We need to explain to our students why deep learning is to be preferred, and what kind of action this implies.

Part of the materialist view of psychology that ties in with the use of cognition enhancing drugs is the evolutionary view that we are equipped with a million year old brain which is somehow unfitted to modern society. The implication is that we also have a million year old mind. However, the difference is an important one.

The brain, as a biological system, evolves only very slowly, and we have brains which are barely distinguishable from those of our ancient ancestors, or even our modern day near relatives. However, that is very far from saying that we have minds that are the same as theirs. Four hundred years ago, nobody could use mathematical calculus, because it had not been invented. Fifty years ago nobody could understand what a spreadsheet would look like. And thirty years ago nobody knew what a hedge fund was. We have furnished our minds with concepts that are very different from those that were available to our ancestors. And those mental furnishings give us capabilities that are different, extended, and very possibly better, than those available to earlier generations.

I have a range of metaphors, mental techniques, insights and concepts which make up the furnishing of my mind, and which give me certain capabilities. The materialist philosophy falls down, as can be clearly seen from the fact that changes in such mental furnishings do not necessarily require any physical changes in the structure of the brain. And education, insofar as it involves deep learning, is about acquiring and developing those mental tools which will help us to think better. This, essentially, is the lesson that Vygotsky taught us about the way people learn. It is a hopeful story of human potential, that we can incorporate from our social environment, mental schema, tools and techniques by which we can extend our natural capabilities and become better people.

Deep learning is a very serious matter; it is about the unique development of an individual. We should explain that to our students, at the same time as we stop thinking that we can impose upon them the mental furnishings that we think are good for them. As teachers we can propose, exemplify, provide experience, but it is our students who will ultimately decide what they internalise and make a part of their own minds. And we need to explain to them that drugs can have only a very limited part in that process if they have any part at all. Even when drugs are capable of generating an enhancement, that enhancement is tiny in comparison to what can be achieved through the development of mental capabilities developed through deep learning.
Conclusion

Each of us was born incommunicative, unable to read, with a poor memory and without an understanding of what was going on. Over the course of time we have each overcome those shortcomings to a greater or lesser extent. We fall along a spectrum of performance which might be regarded as ‘normal’. In recent decades we have seen a growing tendency to mark of part of that spectrum and label it as a medical condition. Rather than seeing the question in educational terms, of looking at the question of one of learning mental capabilities, we prefer to see pathology.

We are in danger of doing this with learning. I am a slow learner, so I need medical help to support my learning. In fact, apart from the fact that we insist on setting timetables in schools, there is no reason to suppose that slow learning is worse than fast learning, and some reasons to believe that it is better.

The rise of cognition enhancing drugs is linked to this tendency to trust medicine to solve our problems. In my view, it is a tendency that we should resist in all its manifestations, and should explain why it is not helpful to view education in those terms.

I was very grateful to have the opportunity of setting out these ideas at the SoTL conference, and of having a discussion with participants. This was the first opportunity I have had to discuss issues that I deal with in greater length in my forthcoming book, Using the medical model in education: Can a pill make you smarter? (Continuum Books: to be published November 2009). I was also encouraged by the range of interest and support that the participants in the session expressed. Thank you all very much.

References


