If you're smart, we'll make you smarter

Applying the reasoning behind the development of honours programmes to other forms of cognitive enhancement

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1. Introduction

Students using Ritalin in preparation for their exams is a hotly debated issue, while meditating or drinking coffee before those same exams is deemed uncontroversial. However, taking Ritalin, meditating and drinking coffee or even education in general, can all be considered forms of cognitive enhancement.[2] Although social acceptance might change in the future, it is interesting to examine the current reasons that are used to distinguish cases deemed problematic or unproblematic. Why are some forms of cognitive enhancement considered problematic, while others are not? In this paper, we consider cognitive enhancement as the amplification or extension of core capacities of the mind, using augmentation or improvements of our information-processing systems.[3] We will analyse cognitive enhancement in an educational setting in order to clarify the fuzzy distinction between problematic and unproblematic forms of cognitive enhancement. We will show that the apparent distinction made by many people between problematic and unproblematic enhancement is not based on any fundamental difference between these two categories.

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[2] A. Sandberg, 'Cognition Enhancement: Upgrading the Brain', in J. Savulescu, R. ter Meulen and G. Kahane (Eds), *Enhancing Human Capacities*, (Oxford: Wiley-Blackwell, 2011).

[3] N. Bostrom and A. Sandberg, 'Cognitive Enhancement: Methods, Ethics, Regulatory Challenges', (2009) 15 *Science and Engineering Ethics* 311.

Our strategy to answer the question why some forms of cognitive enhancement are deemed problematic, while others are not, is as follows: we will describe, based on historical overviews and analysis, the underlying reasons of the use of what we deem to be an unproblematic case of cognitive enhancement. We will then apply these same reasons to supposedly problematic forms of cognitive enhancement. By this we hope to find out what the implications of extrapolating this reasoning would be. These implications, we will show, are a source of the concerns, which are prevalent in our (Western) society. If using the same reasons in a case of unproblematic cognitive enhancement does *not* lead to these concerns, then either there are other kinds of fundamental differences to be found between problematic and unproblematic forms of cognitive enhancement, which are not mentioned in current literature, or there is friction between the reasons we made explicit. We conclude that there is no fundamental difference to be found between what we identified as forms of cognitive enhancement deemed 'problematic' and 'unproblematic', and in our conclusion we will propose possible ways of continuing this discussion.

As exemplary cases of problematic forms of cognitive enhancement we will focus on the use of Transcranial Direct Current Stimulation (tDCS) and methylphenidate, the active substrate of Ritalin® and similar substances. In this paper we will use the term Ritalin when referring to these substances. Ritalin is a drug often prescribed to attention deficit hyperactivity disorder (ADHD) patients and primarily said to enhance concentration. tDCS is a device that delivers electric current to the skull in order to influence brain processes. It is developed in a therapeutic context, for patients with brain injuries, but studies also suggest an enhancing effect in non-patients. We use both cases to show that the arguments we propose hold not only for drugs that are already used to enhance cognition,[4] but can also be applied to newer options like tDCS. Both cases fit in the description of unconventional forms of enhancement as proposed by A. Sandberg.[5]

As a case study of non-problematic enhancement, we will examine a form of education, which previously has been described as a

[4] M. Smith and M. Farrah, 'Are Prescription Stimulants "Smart Pills"? The Epidemiology and Cognitive Neuroscience of Prescription Stimulant Use By Normal Healthy Individuals, (2011) 137 *Psychological Bulletin,* 717.

[5] n 2 above.

conventional method of enhancement. In particular we look at extracurricular 'honours programmes'. Compared to regular education this case study has features that are even more relevant for our analysis, such as the 'access' issue (i.e. enrolling into such a programme). Furthermore, it is interesting from a social perspective as well, as 'excellence' continues to be a topic of growing importance on the educational agenda. Certain key features of honours programmes are articulated in the literature,[6] and using these we propose the following definition: honours programmes are selective extracurricular programmes for gifted students who want to deepen or broaden their regular curriculum by following small scale education in which personal development, active participation and interaction are key features, and conclude with a specific diploma or memorandum. It should be noted that, as this is a case study, we take the specific case of honours programmes in the Netherlands, as we think there is an interesting case to be build and because we can generalize from this specific case to other forms of cognitive enhancement. In what follows, we will take the case of honours programmes and argue along the lines of the strategy we explained above.

We would like to emphasize that the main point of our paper is not the claim that education in general or honours programmes in particular should be seen as a form of enhancement. We happen to believe so (education does, after all, enhance cognition), but it is not the conclusion we wish to argue for. Instead we will argue, using honours programmes and Ritalin as examples, that the criteria typically used to distinguish between problematic and unproblematic forms of enhancement do not hold up to scrutiny.

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[6] P.J. van Eijl, H. Wientjes, M.V.C. Wolfensberger and A. Pilot, 'Het Uitdagen van Talent in Onderwijs.', in P.J. van Eijl, H. Wientjes, M.V.C. Wolfensberger and A. Pilot (eds), *Onderwijs in Thema's* (Den Haag: Onderwijsraad, 2005); M.V.C. Wolfensberger, P.J. van Eijl and A. Pilot, 'Honours Programmes as Laboratories of Innovation: A Perspective From The Netherlands.', (2004) 141 *Journal of the National Collegiate Honors Council - Online Archive* 115 http://digitalcommons.unl.edu/nchcjournal/141.

1.1. *Honours programmes*

Honours programmes can be seen as a deliberate attempt at cognitive enhancement, because, like all forms of education, they aim at amplifying or extending core capacities of the mind. Therefore we will examine the reasons behind the development of honours programmes, and apply this reasoning to other forms of cognitive enhancement to clarify the distinction between possible problematic and unproblematic kinds of cognitive enhancement. The reasons are both extracted from the development of honours programmes in the United States, which has a longer and better-documented history than the Dutch honours programmes, and from recent Dutch policy documents and studies. We choose to focus specifically on these reasons because they greatly influenced the decision making process of the Dutch government to support the development of honours programmes.

The idea for the first honours programme in the United States arose after World War I, after an expansion of American higher education. This development meant, foremost, a much greater heterogeneity of students, which in turn gave rise to concerns about what an adequate curriculum would look like. The curricula were adjusted to the average student, which, according to some, was harmful to students of exceptional abilities.[7] Concerns similar to those, which led to the development of the first honours programmes in the United States and the Netherlands, boil down to the first reason that we distinguish: *All possible efforts have to be made to develop all students to their fullest potential.* This reason is closely interwoven with another reason that follows from the same argument: *The best students, should receive the best education.*

During the Cold War, the quality of education at large state universities in the United States became especially important. There was a nationwide emphasis on the importance of human capital for the competitiveness of the American economy. Recent developments in Europe and the Netherlands demonstrate the same emphasis on the so-called 'knowledge economy' and the need to strengthen innovative capacity in order to keep an internationally strong economic position.[8]

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[7] E.V. Galinova, 'The Construction of Meritocracy Within Mass Higher Education: Organizational Dynamics of Honors Programs at American Colleges and Universities' (doctoral dissertation), (2005) Retrieved from: https://etda.libraries.psu.edu/paper/6530/.

[8] n 7 above, 115.

Some even claim that the Dutch can no longer afford to have so much unnoticed and unused talent, if they really strive to a top position in the world of knowledge economies.[9] The third reason that we will distinguish arises from this notion: *Investing in the potential of humans, especially the most talented students, will increase a country's economic position.*

Critical questions have been asked during this trend towards an increased focus on excellence. An important criticism is: Would honours programmes lead to the development of a small elite, or hold back the students with regular curricula? This seems not to be the case. So-called spin-off effects are demonstrably strong in Dutch honours programmes.[10] Examples are the attractiveness of honours programmes for new (talented) lecturers and students, the contribution of an honours programme to the profile of the institution, and the possibility to experiment with education innovation that will profit regular curricula as well.[11] These effects are often even seen as sub goals of an honours programme, besides the main goal to develop students' personal, professional and social skills. Based on this we identify a fourth reason: *By giving additional high-quality education to the best students, investments are made in all people who work with them.*

1.2. *Problematic forms of cognitive enhancement*

In the previous section we discussed reasons that are part of the foundation of honours programmes. These often-implicit reasons, usually not criticized at all, are the driving force behind the millions of euros spent in structuring and implementing honours programmes at the different universities and polytechnics in the Netherlands. We assume there was a broad, possibly implicit, consensus in government and society on these reasons, when deciding to implement honours programmes. Now the question is, what would it mean if we apply these reasons to the case of problematic cognitive enhancements? Would this help to clarify the debate about problematic and

[9] P.J. van Eijl, M.V.C. Wolfensberger, M. Schreve-Brinkman and A. Pilot, 'Honours, Tool for Promoting Excellence. Eindrapport van het Project 'Talentontwikkeling in Honorsprogramma's en de Meerwaarde Die Dat Oplevert.' (Utrecht: Interfacultair Instituut voor Lerarenopleiding, Onderwijsontwikkeling en Studievaardigheden Universiteit Utrecht i.s.m. het Landelijke Plusnetwerk voor Academische Honoursprogramma's, 2007).

[10] n 7 above, 115.

[11] n 6 above, 117.

unproblematic forms of cognitive enhancements? We will apply the reasons behind selective education to the use of Ritalin pills and tDCS, to find out.

The first reason would imply giving students pills and regular sessions of tDCS, perhaps starting at an early age, to improve their concentration and help them develop their full potential. We can imagine the students arriving at campus in the morning, where supply stations containing pills await them at the building entrances, so that lecturers can be sure they have the full attention of their audience. Then, perhaps, during lunch, students can take a short session in the general tDCS-room on their way to the canteen. In addition, later in the day, when the students go home, they can grab a pill in order to study efficiently at home as well. That this situation is not as hypothetical as it may seem, is shown by a recent article in *The New York Times.*[12] In a paper entitled "Attention Disorder or Not, Pills to Help in School", paediatrician Michael Anderson admits prescribing Adderall, a drug similar to Ritalin to children for whom he *makes up* the ADHD diagnosis. Why? Because he wants to adjust to what according to him is a common feeling in the USA, i.e. that it is too expensive to change the child's environment, and that the only option remaining is to change the child. So, at the moment at least one doctor has no problem to prescribe these drugs for non-medical reasons. Indeed, attempts have already been made to construct frameworks within which regulation and distribution of stimulants for students could be regulated.[13]

Of course, tailoring the intake of pills to a personal fit for each individual student would prove to be too expensive. Daily intake of Modafinil, also named as an enhancement substance, is estimated at around 60£ per month, a little bit cheaper than smoking.[14] Current health care systems are priority based and demand cost-effectiveness. It is likely that the improvement in quality of life from a reduction of disability is higher than the improvement in quality of life from an

[12] A. Schwarz, 'Attention Disorder or Not, Pills to Help in School', (2012) *New York Times*. Retrieved Oct. 27, 2012, from http://www.nytimes.com/2012/10/09/health/attention-disorder-or-not-children-prescribed-pills-to-help-in-school.html.

[13] I. Singh and K.J. Kelleher, 'Neuroenhancement in Young People: Proposal for Research, Policy, and Clinical Management.', (2010), 1 *AJOB Neuroscience* 3.

[14] A. Sandberg and J. Savulescu, 'The Social and Economic Impacts of Cognitive Enhancement', in J. Savulescu, R. ter Meulen & G. Kahane (Eds.), *Enhancing Human Capacities* (Oxford: Wiley-Blackwell, 2011).

enhancement. Therefore, current health care systems are not expected to include pharmaceutical enhancements in their health care arrangements. It is unclear who would want to pay for this 60£ per person per month. However, it might just be feasible on a smaller scale, say, with a selected group of gifted students, in order to ensure a profitable investment for society. This would be very similar to participation in an honours programme.

In agreement with reason two, a selected group of students could be personally supervised to receive an optimal dosage of the best drugs available, at the most beneficial moments during the day. Supervision would be done by medical and educational experts, to closely monitor and guide the personal development of the students.

In line with our third reason, the development of giving the best enhancers to the best students fits into current economic policies as well. This is especially true in the case of the Netherlands, as the Dutch government has repeatedly emphasized that their financial strength is their 'knowledge economy', i.e. their knowledge in water management, agriculture, technology and their application of this knowledge.[15] So, investing in a Ritalin and tDCS driven education, means investing in the future of their economy.

Finally, according to the fourth and final reason we inferred, it is in the interest of society as a whole to ensure that future researchers, politicians and journalists develop their potential as much as possible. It is in the interest of society, because this means that these persons will have a greater positive influence on people around them. Thus, investing in the personal development of excellent students, is not only an investment in that individual, but also an investment in persons that individual will meet in her future. Besides, the best and brightest are most likely to influence society in the future as well, which is a further argument in favour of helping them become excellent in any way possible. After all, is it not the case that we should want the people who will in the future receive the greatest burdens in terms of responsibility, to also receive the best education *and* drugs available?

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[15] 'National Reform Programme 2011 The Netherlans' (n.d.) Retrieved 24-05-2013 from http://www.government.nl/issues/entrepreneurship-and-innovation/documents-and-publications/leaflets/2011/04/15/national-reform-programme-2011-the-netherlands.html; coalition agreement 'Building bridges' (n.d.) Retrieved 24-05-2013 from http://www.government.nl/documents-and-publications/reports/2012/10/29/coalition-agreement.html.

1.3. *Is this what people want?*

In the previous discussion we concluded that if the reasons behind honours programmes are imposed on other forms of cognitive enhancement, it seems that enhancers should be actively supported and financed by the government. The question rises whether this is something people in current society actually want to happen. If, as research[16] suggests, people do not want this to happen, then we are left with the question why this is the case. Therefore we will critically examine this question.

Several researchers[17] divide the objections against the usage of enhancers deemed problematic into three clusters: a medical, an ethical and a legal cluster. In the medical cluster the objections raised are related to: efficacy; desired effect and side effects and / or long term consequences; predictability; risk of addiction and mechanism of action. Within the ethical cluster the following dimensions were mentioned: harm to self and harm to others; changes in behaviour and personality; accessibility and fairness; autonomy; means-end relation and social conventions. In the legal cluster no sub-dimensions were observed, people only questioned whether the current use was legal or illegal. Objections taken from these three clusters are the basis on which people decide whether or not using cognitive enhancing drugs is appropriate.

If using these cognitive enhancing methods were to be widely supported and even financed by the government, this should be allowed by law. At the moment, honours education is allowed and using Ritalin without a prescription is not. However, laws change over time due to new insights and cultural changes. Thus, we conclude that legality does not originate but follows a difference made between participating in honours programmes and using Ritalin without a

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[16] S.L. Bergström and N. Lynöe, 'Enhancing Concentration, Mood and Memory in Healthy Individuals: An Empirical Study of Attitudes Among General Practitioners and the General Population', (2008) 36 *Scandinavian Journal of Public Health* 532; C. Forlini and E. Racine, 'Autonomy and Coercion in Academic "Cognitive Enhancement" Using Methylphenidate: Perspectives of Key Stakeholders', (2009) 2 *Neuroethics* 163.

[17] n 18 above, 532; A.G. Franke, K. Lieb and E. Hildt, 'What Users Think About the Differences Between Caffeine and Illicit/Prescription Stimulants for Cognitive Enhancement', (2012) 7 *PLoS ONE*.

prescription. Therefore the topic of law will not be evaluated in the remainder of this essay.

What was apparent in all studies was that enhancement by natural means was deemed acceptable. In one of these studies the general public stressed that natural remedies are safe and natural, have fewer side effects than pharmaceuticals and are less addictive than pharmaceuticals.[18] This shows a clear dichotomy between problematic and unproblematic enhancement in the eye of the general public. The question remains, however, why this dichotomy exists at all and what arguments underlie the distinction between 'natural' and 'unnatural'. In the following part of the discussion we will survey the main objections raised towards the use of supposedly problematic forms of cognitive enhancement. We will discuss the objections mentioned above and investigate whether they are invalid arguments or actually support a fundamental distinction between the use of tDCS or Ritalin and selective education.

2. The search for a fundamental difference

2.1. *Health*

Objections regarding the health of the user usually focus on: efficiency; whether the desired effect can be reached; side effects; long term consequences; predictability and risk of addiction. Underlying most of these objections is the fear that the use of pharmaceutical cognitive enhancers will irreversibly alter the brain. Drugs usually target one or more molecular processes in order to cause changes in brain functioning. We choose to discuss the cellular and subcellular level of description, because any method that alters brain function acts at this fundamental level. Also the concerns about addiction, long term consequences and brain alterations can be discussed on the cellular level, although this is not often done. We will specifically focus on epigenetic regulatory mechanisms because of their fundamental role in cell functioning. Although it is true that different enhancers do not necessarily target the same process or cells, they do affect the very same molecular processes. In this section, we will first give a short description of the phenomena of epigenetics and then compare the

[18] n 18 above, 532.

impact of honours education and other cognitive enhancing methods on the brain and the body. The question is: Are the physical effects of problematic cognitive enhancers fundamentally different from accepted forms of enhancement, such as selective education?

Even though the mechanism underlying the observed enhancement is a molecular one, some objections, which are very apparent in the discussion – such as the fear for side effects and long-term consequences – will be discussed on the macro level, i.e. of the entire organism. The topic of efficacy will not be addressed, as the level of efficacy can only constitute a gradual, and not a fundamental difference between Ritalin and education. As a general point, it is important to remember that most interventions will exert influence over more cells and processes than the primary targeted ones, resulting in unforeseen consequences and side effects.

The term 'epigenetic' refers to long term changes in gene expression that are maintained from one cell division to the next, caused by mechanisms other than changes in the underlying DNA sequence. It has become increasingly clear that external influences like chemicals, sunlight, but also maternal care and the social environment,[19] can cause changes in gene expression which persist long after exposure to the external influence has ceased to exist.[20]

Education is designed to bring about changes in behaviour and performance and this cannot be done without changing a person's neuronal architecture. Learning is therefore defined here as an experience-induced lasting change in the neuronal architecture and consequently behaviour and knowledge. Although education is rarely viewed from a biological point of view, its impact on the cellular processes are profound.[21] For example, the storage of memories in our

[19] D. Church (Ed.), *The Genie In Your Genes: Epigenetic Medicine and the New Biology of Intention.* (Santa Rosa: Elite Books, 2007); R.C. Francis, *Epigenetics; The Ultimate Mystery of Inherentance.* (New York: WW Norton & Company, Inc. 234., 1st ed., 2011); M. Szyf, P. McGowan and M.J. Meaney, 'The Social Environment and the Epigenome' (2008), 49 *Environmental and Molecular Mutagenesis* 46.

[20] L. Liu, Y. Li and T.O. Tollefsbol, 'Gene-Environment Interactions and Epigenetic Basis of Human Diseases', (2008) 10 *Current Issues in Molecular Biology,* 25.

[21] D.M. Curlik and T.J. Shors, 'Training Your brain: Do Mental and Physical (MAP) Training Enhance Cognition Through the Process of Neurogenesis in the Hippocampus?', (2013), 64 *Neuropharmacology* 506; M. Dresler, A. Sandberg, K. Ohla, C. Bublitz, C. Trenado, A. Mroczko-Wasowicz, S. Kühn and D. Repantis, 'Non-Pharmacological Cognitive Enhancement', (2013), 64 *Neuropharmacology,* 529; S. Ge, K.

brain is a complicated process that requires a host of molecular mechanisms dictated by epigenetic factors. But also the social and physical context education is performed in, are known to have an impact on these epigenetic processes.[22] Studying generally involves being indoors, bereft of daylight, and doing very little physical exercise. These conditions are probably suboptimal, and not conducive to performing at the highest level of one's mental ability. Indirect effects of education on, for example, stress levels, which in turn impact the epigenome regulatory process, need to be taken into account as well. Claiming that education is without side effects is hardly defensible, and, although not all students experience fear of failure to the same degree, most students will be familiar with the accompanying symptoms: they can feel quite sick; have an upset stomach, insomnia, headaches, loss of appetite etc. These effects may not be so dissimilar from the side effects seen often after use of prescription drugs. Education is known to elicit stress in students, although the amount experienced varies from student to student, due to settings of the individual hypothalamic-pituitary-adrenal (HPA) stress axis.[23] Early life experiences will determine the functioning of the HPA stress axis resulting in lifelong lasting effects on personality, social functioning and mental health.[24] The experience of stress during late childhood and adolescence, has a major impact on the functioning of all cells of the body,[25] and exerts a great influence on the epigenome, thereby possibly affecting the quality of life for the entire lifespan and future generations. To conclude, the pressure on current honours students may very well affect their health.

Cognitive enhancers like Ritalin and tDCS are usually targeted at improving a specific cognitive function or group of related cognitive functions. They are not necessarily targeted at inducing long lasting effects on the neuronal architecture. This is not to say that they cannot

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A. Sailor, G.-l. Ming, and H. Song, 'Synaptic Integration And Plasticity of New Neurons in the Adult Hippocampus', (2008), 586 *The Journal of Physiology* 3759.

[22] F. Masterpasqua, 'Psychology and Epigenetics', (2009) 13 *Review of General Psychology* 194; n 25 above, 46.

[23] L. Dusselier, B. Dunn, Y. Wang, M.C. 2nd Shelley and D.F. Whalen, 'Personal, Health, Academic, and Environmental Predictors of Stress for Residence Hall Students', (2005) 54 *The Journal of American College Health* 15.

[24] n 30 above, 194.

[25] I. Herpfer, H. Hezel, W. Reichardt, K. Clark, J. Geiger, C.M. Gross, … C. Normann, 'Early Life Stress Differentially Modulates Distinct Forms of Brain Plasticity in Young and Adult Mice', (2012) 7 *PLoS ONE*.

have such effects, but this is not what they have been designed for. The level of learning is usually measured by performance in a specific task. Learning is the experienced induced change in the brain, and performance is a measurement of this change. The two are certainly related but definitely not identical, as previously stated by Tolman.[26] Activities that only affect the performance may be transient and need not result in lasting changes. These transient changes may not make a difference in the future life of the performer.[27] One can wonder whether the possible side effects and consequences of using Ritalin or tDCS are worthwhile if they only enhance a single performance and do not result in a stable long term effect.

Long term epigenetic effects of most medications are not thoroughly studied in humans yet, although efforts are being made to translate findings of animal studies to humans. All cognitive enhancement, whether accomplished by the use of Ritalin, tDCS or participation in honours programmes, can be perceived as being external to the receiver. Cognitive enhancers are therefore environmental factors that influence performance through epigenetic changes. Ritalin, and virtually all pharmaceutical drugs, are known to have epigenetic consequences, many of which are often not the purpose of the drug and are usually known as side effects. Studies reveal that long-term use of Ritalin results in altered gene expression, synaptic plasticity and behaviour.[28] Ritalin does not only influence the epigenome, but also exerts influence on a more macro level, through interfering in dopamine levels in the synaptic cleft of, mainly, the prefrontal cortex.[29] The behavioural change observed after intake of Ritalin, is brought about by an epigenetic change. Experiments reveal that Ritalin can improve structural and functional parameters in animals with psychomotor impairments. These improvements are not seen in

[26] E. Tolman, Purposive Behavior in Animals and Men. (New York: The Century, 1932).

[27] J. McGaugh and B. Roozendaal, 'Drug Enhancement of Memory Consolidation: Historical Perspective and Neurobiological Implications', (2009), 202 Psychopharmacology 3; J.L. McGaugh, 'Dissociating Learning and Performance: Drug and Hormone Enhancement of Memory Storage', (1989) 23 *Brain Research Bulletin* 339.

[28] A.B. Csoka and M. Szyf, 'Epigenetic Side-Effects of Common Pharmaceuticals: A Potential New Field in Medicine and Pharmacology', (2009) 73 *Medical Hypotheses* 770.

[29] T.E. Wilens, 'Effects of Methylphenidate on the Catecholaminergic System in Attention-Deficit/Hyperactivity Disorder', (2008) 28 *Journal of Clinical Psychopharmacology* s46.

healthy control animals.[30] This means that uncontrolled use of Ritalin can give people, but also their future children, long lasting consequences without ever experiencing the benefits of the substance. However, Ritalin is being studied in great detail and no debilitating long-term consequences have been observed so far. Short-term side effects of prescription drugs are numerous but are often mild, like headaches, stomach aches and insomnia. Whether the positive effects of Ritalin observed in impaired individuals translates to healthy individuals remains to be seen, but the side effects caused do not appear to affect the quality of life.

Even though less is known about the physiological impact that education has on the human brain when compared to Ritalin, we do know that education has an effect on the brain. However, we noticed that education could have unwanted side effects. Due to the social context and possible stressors, education can have possible negative long lasting consequences. Pharmacological cognitive enhancers like Ritalin have been developed in a therapeutic context. Their use is subject to strict laws and close monitoring. Although epigenetic, life-long and trans-generation impact of these drugs has not thoroughly been studied in humans yet, epigenetic, and possible trans-generation impact of education have not been studied in humans at the cellular level at all. Whether one or the other is dangerous, how the risks can be avoided, and whether the benefits are greater than the risks are questions open for further scrutiny. For now, to answer the question at the beginning of this section, we argue that the effects both methods have are comparable. We argue that it is not shown that deemed unconventional cognitive enhancers are more of a threat to human health, than participation in honours programmes is.

2.2. *Authenticity and fairness*

The concept of 'honesty' plays an important role in the possible fundamental differences between problematic and unproblematic cases of cognitive enhancement. A lot of people who use, for example, Ritalin, do so in secret, while people who are enrolled in selective education are willing to be publicly lauded as 'excellent students'. Why

[30] T. Grund, K. Lehmann, N. Bock, A. Rothenberger, and G. Teuchert-Noodt, 'Influence of Methylphenidate on Brain Development - An Update of Recent Animal Experiments', (2006) 2 *Behavioral and Brain Functions* 2.

this difference? Perhaps it has something to do with keeping up appearances: if a person uses stimulants, she apparently overreached herself, but she does not want to admit this. Or, in other words, she is not being *honest* about this. Is this typical for problematic cognitive enhancements? And could this be a criterion to separate those from the unproblematic ones? Before we start answering this question, we distinguish honesty as telling the truth and not cheating, on the one hand, from honesty as being authentic and true to oneself, on the other. Concerning honesty in the sense of authenticity: what could be reasons for not being honest towards oneself in the case of using Ritalin or other problematic cognitive enhancers? The first reason that springs to mind is that, for whatever reason, a person is in conflict with herself: using these stimulants does not fit with who she thinks she is or who she wants to be. She might want to be someone who accomplishes things 'on her own', without 'cheating'. A second reason could be that a person might not want to admit to herself that, after a while, she is getting dependent on the enhancers, and, without using it, might not be able to do her work anymore. Thirdly, a discrepancy between how a person acts and how she *feels* she must act can arise in the case of social pressure. If a person uses drugs because of social pressure, by for example peers, and this is not in line with her own motivations, then cognitive dissonance will arise and her motivations will likely change according to her behaviour. She will believe that she uses drugs, not because of social pressure, but because she wants to.[31]

If the aforementioned reasons constitute a difference between deemed problematic enhancers and selective education, then it should not be possible to apply these reasons to the case of selective education. Is this true? Beginning with the last reason, one way to illustrate the role of social pressure in selective education is done by pointing out the need of a research master or honours programme in current career perspectives. It seems to become a prerequisite for research positions,[32] meaning that aspiring researchers have to plan

[31] J. Cooper, 'Cognitive Dissonance Theory', in *Handbook of Theories of Social Psychology: Volume 1*, Los Angeles, 2012, p. 389.

[32] Cf. an open funding round for PhD-positions from the Netherlands Organisation for Scientific Research (NWO), which states that "[c]andidates with a Dutch qualification must have completed a research master's or due to complete one within the foreseeable future", 'Research Talent', retrieved May 30, 2013, from

accordingly as soon as they start their studies. They might therefore start, for example, selective education, without wanting it out of intrinsic motivation.

The second reason, the concern for addiction, is applicable to studying as well as to other forms of cognitive enhancement. However, drug addiction might be better known than work addiction. This might be related to the fact that there is a scarcity of research on this topic, even though some authors suggest that workaholism is increasing.[33] Workaholism is also demonstrated in a sample of undergraduate students, and it is readily imaginable that this could even be more the case for honours students because they follow more courses.[34]

The first reason described by us as a possible criterion, is having a sense of accomplishment. One might argue that the use of stimulants devaluates a high performance in one's study. After all, if a person has to use tDCS or Ritalin to boost her concentration, she might not have been able to accomplish the same when compared to not having used those means. It is difficult, however, to draw the line as to what means are acceptable and what means are not. Two decennia ago, the Free University of Amsterdam developed clap skates, a new type of ice skate, which proved much more efficient than older models. Old time records in ice-skating were pulverized, but does this mean that the previous accomplishments in ice-skating, without clap skates, are less authentic than the newer ones? Developments like the clap skate often seem problematic when first introduced, before being generally accepted. However, we do not see a fundamental difference between those developments and the development of cognition enhancing psychopharmaceuticals. A single ice skater using the clap skate may feel uncomfortable when using her 'advantage', but when the technique is generally accepted and used, there seems to be no reason why there should be a lesser sense of accomplishment. A similar line of thought is very much possible for enhancers like Ritalin, and tDCS.

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http://www.nwo.nl/en/funding/our-funding-instruments/magw/research-talent/research-talent.html.

[33] R. Koonce, 'There's More to Life than Laptops', (1998) 52 *Training and Development* 15

[34] W. Bovornusvakool, S.J. Vodanovich, K. Ariyabuddhiphongs and S.T. Ngamake, 'Examining the Antecedents And Consequences of Workaholism', (2012) 15 *The Psychologist-Manager Journal* 56

So far, the conclusion is that the issue of being honest to oneself, which we called 'authenticity', plays a role in both the case of honours programmes and other forms of cognitive enhancements. Let us now take a look at being honest or not towards *others*, and its aspects of fairness and cheating.

When addressing the issue of being honest to others, or acting fair without lying or cheating, two problems arise. Firstly, the relation between working or studying competitively, and being assessed on your work according to absolute criteria. Secondly, harming others because of a person's own addiction. With regard to the latter we can be brief: the same three problems which play a role in addiction in relation to authenticity, also play a role in the case of being honest to others while being addicted. Therefore we will not to repeat those here. We will take a closer look at the first issue, i.e. the relation between studying competitively and being assessed according to absolute criteria.

As both Roache[35] and Goodman[36] point out, an important issue when discussing cognitive enhancement and fairness involves assessment of individual accomplishments. If the performance of an individual is ranked relatively to the performances of her peers, one or more of her peers 'cheating' will directly influence her own ranking. Conversely, if the assessment of a performance is based on general standards, one individual cheating need not influence the performance of her peers. Now, the use of stimulants like Ritalin and tDCS in an educational setting can only be argued to give an 'unfair advantage', when students are being judged competitively, that is in relation to the performance of their peers. This means that, because fairness is dependent on circumstance, this poses no fundamental difference between problematic and unproblematic forms of cognitive enhancement. After all, it is not the enhancement itself, but the way performance is measured, that influences whether the enhancement is (un)problematic.

In this section we took a closer look at two different approaches of 'honesty' in relation to cognitive enhancers: authenticity, which is about being honest towards oneself, and fairness, which is about being honest to towards others, by not lying or cheating. With regard to authenticity,

[35] R. Roache, 'Enhancement and Cheating', (2008) 2 *Expositions* 153.

[36] R. Goodman, 'Cognitive Enhancement, Cheating, and Accomplishment', (2010) 20 *Kennedy Institute of Ethics Journal* 145.

the sense of accomplishment, addiction and social pressure were discussed, but we found no fundamental difference to differentiate categorically between cognitive enhancers of a problematic and unproblematic sort. Fairness also fell short on this point, so we conclude that both fairness and authenticity give us no grounds to make the aforementioned distinction.

2.3. *Moral attitude*

Franke, Lieb and Hildt[37] and Bell, Partridge, Lucke and Hall[38] identify the concern whether or not using cognitive enhancements in education, but also in other settings, is negatively influencing the development of certain character traits in young individuals. It is therefore necessary to take a closer look at the possible differences between problematic and unproblematic cases of cognitive enhancement with regard to developing 'character'. Before we do this, we will introduce the helpful terminology of virtue ethics to help us clarify the issues at hand. Talking about virtues is a long established tradition in philosophy when discussing (moral) attitudes and building character. After explaining this terminology, we will analyse the issues surrounding different cognitive enhancers in detail, before concluding whether or not there is a fundamental difference to be found in this case.

It is clear that education is about more than just transferring knowledge. At university level for example, individuals are trained to internalize an 'academic spirit', i.e. to use sound reasoning and to be critical in an academic sense, when evaluating new knowledge. In other words, they are taught to be *virtuous* academics. In this context, a virtue is seen as the ideal middle between two extremes, and like any ideal, it might be impossible to attain. A scholar, for example, needs to learn and find the middle between being outright dismissive of ideas contrary to her own, and being too naive and adopting every theory she comes across. Only then can she claim a proper critical attitude. And like mastering the piano, there is no point at which you can say that you mastered the virtue of being critical: there is always a next level of

[37] n 21 above.

[38] S. Bell, B. Partridge, J. Lucke and W. Hall, 'Australian University Students' Attitudes Towards the Acceptability and Regulation of Pharmaceuticals to Improve Academic Performance', (2012) 1 *Neuroethics* 1.

mastery to be gained. All this implies that obtaining virtues requires hard work, a lot of time, and constant practice.

Now it could be argued that the use of problematic cognitive enhancers undermines the idea of education as contributing to the right moral attitude. How would a person ever learn the virtue of discipline, when she does not have to study hard for an exam, but can just take Ritalin to increase her concentration, read the book and be finished? Discipline, learning to focus and concentrate, valuing hard work, all these character traits are devaluated when cognitive enhancers lower the bar of studying. The conclusion would seem to be that, when we look at the case of problematic cognitive enhancers, the moral fibre of young individuals runs a severe risk of degrading.

We argue that the aforementioned perspective is based on a misapprehension of how enhancers work. The misapprehension is that problematic cognitive enhancers are viewed as an *alternative* to unproblematic cognitive enhancers, like selective education, while in fact they are *not*, and can even be seen as *additive* to current forms of education. To date, and in the foreseeable future, no cognitive enhancers exist which can directly insert new knowledge into people's minds. Swallowing a pill of Ritalin, or being hooked up to a tDCS system, does not give you knowledge about the Battle of Thermopylae, or the relation of the Higgs boson to other subatomic particles. But what about 'discipline' and the other traits we just discussed? One could argue that, if a student is able to use tDCS or Ritalin to, repeatedly but temporarily, increase her cognition, then such a student might be lured into not developing these qualities in herself. Stimulants, in this case, present the danger of being a 'quick fix', something you use before an exam, and they offer the student no long-term incentive to develop her abilities to study.

Again, there is a misapprehension of how education works if one thinks that drugs helping a student to concentrate, is what separates problematic from unproblematic forms of cognitive enhancement. For example, with the introduction of the calculator, and more recently with the personal computer, educational systems had to change. Computers are basically calculators and this means that it is less necessary for people to do difficult calculations from the top of their head. But it is absurd to state that this has led to a decrease in study load. Instead, education has been adapted to accommodate these developments, and by lessening the focus of learning mathematics on

mental arithmetic, teachers have the opportunity to let their students delve deeper into other topics, like programming. The point is that the development of traits like discipline in young individuals, is only indirectly influenced by the cognitive enhancements just mentioned, and more so by the standards we set in the educational system. Put simply, if those cognitive enhancers make it possible to attain the same amount of knowledge, in a smaller amount of time, then the bar can be raised: the students could be set to learn more. In the sense of educational challenges, cognitive enhancements like Ritalin and tDCS could only influence people's moral attitudes relatively, and then only if the environment stays the same. Seeing as that we can adjust the educational landscape according to the dynamics of the enhancers, the latter pose no fundamental difference to the internalizing of moral attitudes. Indeed, Fröding[39] goes even further and argues that, as the ideal of specific virtues is very difficult, if not impossible to attain, cognitive enhancers might even help *more* people become virtuous in their respective fields, by adjusting biological constraints that might hinder individuals internalize virtues in the first place. Unfortunately, she does not give concrete examples of which biological constraints might be removed or lessened by which enhancements.

In this section we argued, that there are two misconceptions surrounding the issue of moral attitudes in relation to cognitive enhancement. Firstly, that other cognitive enhancers will replace traditional education, instead of adding to it. Secondly, that the development of character traits is something that should be viewed as something wholly separate from the standards set by the educational system. Based on this, we conclude that there is no fundamental difference to be found between problematic and unproblematic forms of cognitive enhancement, with regard to moral attitudes.

2.4. *Availability and accessibility*

The emergence of new forms of cognitive enhancement, currently seen as unconventional,[40] has brought up some discussion points about possible effects at the societal level. A few of the often mentioned possible consequences are: unfair competition, coercion, social

[39] B.E.E. Fröding, 'Cognitive Enhancement, Virtue Ethics and the Good Life', (2011), 4 *Neuroethics* 223.

[40] n 2 above.

injustice, social pressure and unfair distribution.[41] In the following part we will compare the availability and accessibility of cognitive enhancing methods and honours education, and whether a fundamental difference between the two can be found. We choose to focus on availability and accessibility, because they are at the centre of the fairness and equality discussion, both of which are central values in the Western world.

Access to cognition enhancing drugs like Ritalin is at the moment legally restricted to those with a prescription. Drugs are developed in the context of a disorder or a syndrome, but the medication developed can be prescribed off-label to patients not suffering from this disorder or syndrome. This implies that getting a prescription from a physician does not require one to have the disorder the drug was designed for. All one needs, to get hold of a prescription, is to find a physician who is willing to prescribe the drug for non-medical use. The amount of Ritalin prescriptions in the Netherlands has been rising about 19 percent annually over the past few years[42] and questions are raised whether this is due to an increase in actual ADHD cases or whether the diagnostic criteria are being widened by doctors. Acquiring Ritalin legally for the purpose of enhancement, will require considerable social skills on behalf of the requester, in order to convince her doctor. Other ways to acquire Ritalin are buying, stealing or asking peers, family members or classmates for their prescription. In this case, not only social skills but also the environment is of importance, since the proximity of users is an important factor in the ease of acquiring the drug. A final option for acquiring Ritalin, is buying the drug via the internet from an online pharmacy or other specialized website. The price of Ritalin online is about one euro per 10mg:[43] an accessible price range (October 24th 2012).

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[41] n 3 above; M. Hesse 'Enhancement Drugs: Are There Limits to What We Should Enhance and Why?', (2010) 8 *BMC Medicine* 50; M. Schermer, I. Bolt, R. de Jongh and B. Olivier, 'The Future of Psychopharmacological Enhancements: Expectations and Policies', (2009) 2 *Neuroethics* 75; n 14 above, 3.

[42] Stichting Farmaceutische Kengetallen, 'Gebruik ADHD-Middelen Niet in te Tomen', (2012) 147 *Pharmaceutisch Weekblad.*

[43] 'Shop Your Meds, No. 1 Online Pharmacy', (2011) Retrieved 24-10-2012, from http://www.shopurmeds.com/.

High tech methods as tDCS are readily accessible by creating them yourself[44] or buying them as off-shelve products.[45] The device costs about 200 to 500 euros, which makes it considerably less accessible than Ritalin, although once acquired, maintenance costs are very low.

In the case of Ritalin and tDCS, some research has been done to test the effects of these methods in the short and long term, with results having been inconclusive so far. Besides the fact that the effects are unclear, there are also safety issues with illegal online ordering of these substances. Small changes in molecular structure can have profound effects on the working of the drug, so a pill of below average quality may very well result in a dangerous situation. This means that not having access to the substance via the legal route can put you at great risk, because there is no way to verify that you buy, steal or receive a correctly working substance.

Honours programmes are becoming available on several educational levels, and are no longer restricted to university bound organizations,[46] meaning that their availability for motivated people is rising. Access to selective top education, such as honours programmes, is by definition hard to reach, because it is meant for the best students who want, or are in need of, extra educational or personal challenges. The programmes are not meant for the average student and are targeted and tailored towards the 'excellent'.[47] Criteria of which students are the best students are not always clear and differ between institutions, often depending on the people running the honours organization.[48]

Being able to enter an honours programme often requires passing a selection procedure in which the student is evaluated on whether she fits several stringent criteria. Good social and conversational skills are highly helpful in ensuring a place in an honours programme. In order to be able to sign up for an honours programme, one needs to be highly motivated and able to schedule the activity in one's timetable. Although research shows that students doing an honours programme

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[44] Anthonynlee, 'How To Build a Simple Tdcs Device of Your Own (That You Can Use)' Retrieved 24-10-2012, from http://www.youtube.com/watch?v=hgFWEBwT6BE.

[45] 'CESta', (n.d.) Retrieved 24-10-2012 from http://www.mindalive.com/2_2.htm

[46] n 10 above, 52.

[47] n 10 above, 24; 'Sirius Programma: Excellentie in het hoger onderwijs', (n.d.). Retrieved 31-10-2012, from http://www.siriusprogramma.nl/.

[48] n 10 above, 24.

do not spent more time on studying,[49] honours programmes do take up time by having regularly scheduled meetings. If a student does not have money and needs to work to be able to maintain her study, she might not be able to actually follow an honours programme, thus constituting an additional, implicit, form of selection.

Honours programmes and the new forms of enhancement are available for a number of people. The accessibility of both, as described in this section, differs. Although Ritalin is a class B substance, meaning it is regulated by the opium law in the Netherlands and access to it is therefore controlled, having access to it proves not to be so hard at all. One does not have to have great social skills or a wide network in order to get to the drug or device, in the case of tDCS. Honours programmes on the other hand are less accessible: they provide a limited amount of spots, and the criteria to enter, exclude all but the top students. As mentioned before, in society an objection to problematic enhancement is the poor predictability of the enhancing method. In the case of honours programmes, large claims about the impact on students and their surroundings are made. However, these claims still have to be proven.

We wonder why accessibility and social justice are such a hot topic when discussing the Ritalin and tDCS types of enhancement. The concerns raised by people in society might be due to the novelty of enhancements like Ritalin and tDCS. We could not find any reason that convincingly demonstrates why the use of Ritalin or tDCS, poses a bigger threat towards creating injustice than selective education does. It is true that buying illegal prescription drugs can have unpredictable consequences. But as described in paragraph 2.1 'Health', participating in a poorly designed and monitored honours programme, or indeed, any form of (selective) education is not without risk either. The predictability issue is no different in this respect.

[49] Commissie Ruim baan voor Talent 'Wegen voor Talent, Eindrapport 2007' (2007), Retrieved 20-10-2012 from http://www.rijksoverheid.nl/nieuws/2007/12/11/eindrapport-commissie-ruim-baan-voor-talent.html.

3. Conclusion

The aim of this paper is to investigate the apparent distinction between problematic and unproblematic enhancement. Why are certain forms of enhancement seen as problematic, and others, like education, not? We have argued that criteria typically used to distinguish between problematic and unproblematic forms of enhancement, do not hold up to scrutiny.

We have used the case of selective education for gifted students, specifically Dutch honours programmes, to demonstrate that concerns about deemed problematic forms of enhancement, such as pharmaceuticals and tDCS, could have easily arisen in other enhancement fields, such as selective education, as well. We have shown that the history of honours programmes fits in a larger framework within society, in which personal development and striving for excellence are key concepts. We have demonstrated broadly-discussed-reasons why people object to some forms of enhancement, such as Ritalin, and not to selective education. When these reasons are scrutinized they start to fall apart, and no fundamental differences were found between the two apparent different kinds of enhancement.

On a biological level, Ritalin and tDCS may have negative epigenetic consequences but we have shown that this trait is not unique to Ritalin and tDCS, as it applies just as well to education. However, for all of those holds that the life-long and trans-generation effects are not clear. Furthermore, both the issue of authenticity and fairness can play as much a role in honours programmes, as they do in 'problematic' forms of cognitive enhancement. These issues are perceived as negative in the case of Ritalin and tDCS usage. However, they are not discussed as negative for participation in selective education, while there seem to be no grounds for such a distinction between Ritalin or tDCS usage and participation in selective education. We have also argued that the development of certain moral character traits is not held back by new forms of enhancement, but that it might even help students develop those traits by improving the effect of traditional education. Focusing on the last point, availability and accessibility, the apparent difference seems to be, again, a matter of perception.

Currently, the concerns expressed in society on the use of enhancement drugs like Ritalin, or technological options like tDCS, are

not the same as discussed on participation in honours programmes. After careful consideration, we did not find fundamental differences that could underlie this observed distinction. The fact that we did not find concerns that were more applicable to the case of the use of Ritalin, than to the case of honours programmes, does not mean that they are not perceived or not available at all. However, it is striking that the concerns that are currently most debated on problematic enhancers, are just as easily applicable to a case on which there are no societal debates, such as selective education. This could be due to two reasons, as is already formulated in the introduction of this paper. Either, the reasons about selective education for talented students we derived earlier in our paper are, at a more fundamental level, in conflict with other societal values. Or, there are other kinds of fundamental differences to be found between conventional and unconventional forms of cognitive enhancement, which are not yet mentioned in the current literature about the topic. We will explicate these options below.

With regard to the first option, i.e. that there might be a more fundamental conflict between the reasons about selective education and societal values, we propose a possible example for clarification. On the one hand there is the value of equality and a right on education for every citizen. This is founded in the Dutch constitution, but also in many international conventions, like the United Nations "International Covenant on Economic, Social and Cultural Rights". On the other hand, during the twentieth century education has become more meritocratic, which does not guarantee equality per se.[50] A meritocratic educational system might very well lead to inequality in forms of education. So, at this level, both values seem to be in conflict with each other, and this inner conflict in society might be a reason why so-called problematic cognitive enhancers are perceived as being different from selective education. Future discussion is necessary to investigate if this actually is the case.

The second option that could explain why we did not find a fundamental difference between honours programmes and the use of Ritalin or tDCS, is that the available literature on problematic enhancers might not cover all the relevant concerns. If we are not able to distinguish problematic and unproblematic enhancers based on the current concerns, but concerns still exist, then it is clear that the

[50] n 8 above, 1.

discussion is missing key points. This asks for a shift in the debate, from a debate on concerns that come to mind easily but are actually not fundamentally different to unconventional cases, to a search for the actual concerns about possibly problematic enhancers.

There might be concerns that could be raised for honours programmes, similar to the ones raised in the debate for Ritalin and tDSC usage today. It could be that society does not have enough information to discover these concerns. There is reason to believe that education, both selective and general, is seen as more natural than the use of Ritalin or tDCS, although as previously demonstrated, it is not shown that the effects on the brain of the latter two are more detrimental than those of the first one. Many of us, at least in the Western world, are educated for the largest part of our youth, and education is so intrinsic to our lives that we may be blind to certain points of concern. This would suggest that when the use of Ritalin or tDCS would be more ordinary, or would become a daily habit for many of us in the future, the concerns surrounding them would diminish. This could be a development similar to the growing acceptance of cosmetic surgery, which raises much less critique than it did only a few years ago.

Ritalin and tDCS are said to be dangerous, their effects irreversible, run a risk of serious side effects, create unfair advantages, and are not accessible for everybody. We examined these claims and come to the conclusion that all of these statements can be made for selective education as well.

We propose two options for further discussion if people are still inclined to draw a boundary between the problematic forms of enhancement and selective education. Either society holds an unfair, strict view on these problematic enhancers when compared to the selective education programmes. Or the current literature on concerns in the enhancement debate is not able to distinguish problematic and unproblematic enhancers yet. But, if there is no fundamental difference, then the use of what we now call problematic enhancements might become less problematic over time. So, if the question remains, 'What exactly *is* the problem?', the answer might be, 'Nothing we cannot get used to.'

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