The Ethics of Stimulant Use in Healthy Students

by
Gerrit Christiaan Verster

Thesis presented in partial fulfilment of the requirements for the degree Master of Philosophy (Applied Ethics) at Stellenbosch University

Supervisor: Prof Anton A van Niekerk

Faculty of Arts and Social Sciences

March 2012

Declaration

By submitting this thesis/dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

March 2012

Abstract

The quest for enhancement has been part of human culture for thousands of years. Progress in scientific developments and especially in the field of medical science has allowed for previously unthinkable advances to be employed in the endeavours to improve human functioning in its various forms. Whereas in the past, enhancement has been focused on aspects such as prolonging life, improving the immune system or cosmetic enhancements, cognitive enhancement is receiving substantial attention at the moment. Recent reports have commented on the use of stimulants such as methylphenidate, especially amongst students at tertiary institutions with the aim of enhancing cognitive abilities. This raises various concerns, ranging from safety issues and the risk of drug abuse to the moral issues relating to enhancement in the broader context. Enhancement therapies are easily justified where the required enhancement is needed to improve functioning where a specific deficit is present or where such enhancement could prevent illness. But where no illness or disorder is present, these issues cause marked ambivalence amongst medical practitioners. The legal restrictions placed on the access to stimulants require the participation of a doctor as these drugs may not be sold across the counter and a prescription is needed to acquire them. The doctor is then put in the position where a request is made for medication where illness or a disorder is not present. Medical paternalism could easily dictate that the decision does lie with the doctor because of statutory rules, but this would be at the risk of ignoring the possible rights of students to enhance. This thesis examines the concerns mentioned related to safety risks as well as the abuse potential of methylphenidate. Although there are precautions that need to be taken into account when prescribing methylphenidate, this is not sufficient to warrant a blanket refusal by medical practitioners to prescribe it to healthy students. The arguments used to debate both the promotion of enhancement therapies as well as the reasons for restricting and possibly even preventing any use thereof, are discussed. There are various reasons why enhancement may be needed in current and future society and to ignore these would raise moral issues in itself. There are various arguments used to disapprove of enhancement, but this thesis concludes that although the concerns raised should be considered on an ongoing basis, as enhancement is an ongoing process, enhancement should be allowed to continue to be explored and employed where appropriate. Finally, potential guidelines for the individual and also for tertiary institutions relating to

enhancement, especially relating to cognitive enhancement with stimulants such as methylphenidate, are proposed.

Abstrak:

Die soeke na verbetering is reeds vir duisende jare deel van die menslike kultuur. Vordering in wetenskaplike ontwikkelings en veral op die gebied van die mediese wetenskap het toegelaat dat voorheen ondenkbare vooruitgang toegepas kan word in die pogings om menslike funksionering in sy verskillende vorme te verbeter. In die verlede het verbeteringstegnieke merendeels gefokus op aspekte soos verlenging van lewe, die verbetering van die immuunstelsel of kosmetiese verbeterings, maar tans geniet kognitiewe verbetering aansienlike aandag. Onlangse verslae lewer veral kommentaar oor die gebruik van stimulante soos metielfenidaat, veral onder studente by tersiêre instellings, met die doel om die verbetering van kognitiewe vermoëns teweeg te bring. Dit lei tot verskeie bekommernisse, wat wissel van veiligheidskwessies en die risiko van dwelmmisbruik tot die morele kwessies met betrekking tot verbeteringstegnieke in die breër konteks. Terapieë gemik op verbetering is maklik geregverdig waar die verbetering nodig is om funksionering te verbeter, waar 'n spesifieke tekort teenwoordig is of waar so' n verbetering 'n siekte kan voorkom. Maar waar daar geen siekte of afwyking teenwoordig is nie, veroorsaak hierdie terapieë beduidende ambivalensie onder mediese praktisyns. Die wetlike beperkings wat geplaas is op die beskikbaarheid van stimulante vereis die betrokkenheid van 'n dokter aangesien hierdie middels nie oor die toonbank verkoop mag word nie en 'n voorskrif nodig is om dit te bekom. Die dokter word dan in die posisie geplaas waar daar 'n versoek is vir medikasie waar siekte of 'n versteuring nie teenwoordig is nie. Mediese paternalisme kan maklik dikteer dat die besluit suiwer as gevolg van statutêre reëls wel alleen by die dokter lê, maar die risiko bestaan dan dat die regte van studente om hulself te verbeter ignoreer word. Hierdie tesis ondersoek die potensiële probleme met betrekking tot die veiligheidsrisiko's sowel as die misbruikpotensiaal van metielfenidaat. Alhoewel daar voorsorgmaatreëls in ag geneem moet word wanneer die voorskryf van metielfenidaat oorweeg word, is dit nie voldoende om 'n totale weiering deur geneeshere om dit voor te skryf aan gesonde studente te regverdig nie. Die argumente wat gebruik word om sowel die bevordering van die verbeteringsterapieë as die redes vir die beperking en moontlik selfs die voorkoming van enige gebruik daarvan te debatteer, word bespreek. Daar is verskeie redes waarom verbetering in die huidige en toekomstige samelewing nodig is en om dit te ignoreer sou op sigself morele beswarte opper. Daar is wel verskeie argumente wat gebruik kan word om verbetering af te keur, maar hierdie tesis wys daarop dat hoewel die kommer wat geopper word in ag geneem moet word op 'n deurlopende basis, aangesien

verbeteringstegnieke ‘n voortdurende proses is, bevordering van hierdie terapieë toegelaat moet word en waar toepaslik in diens geneem moet word. Ten slotte word moontlike riglyne vir die individu en ook vir tersiêre instellings met betrekking tot verbetering, veral met betrekking tot kognitiewe verbetering met stimulante soos metielfenidaat, voorgestel.

CONTENTS

DEDICATION

This work is dedicated to my family, for tolerating the long hours of preoccupation.

ACKNOWLEDGEMENTS

I would like to express my gratitude to the various lecturers involved in trying to help me make sense of the subject matter – especially to Prof Anton van Niekerk for his passionate discourses and support. I would also like to thank Prof Willie Pienaar for his part in my acceptance of this challenge, as well as the team at Stikland Hospital for accommodating my academic responsibilities.

Chapter 1: Introduction

We live in a world where there is a continuous drive to be better, faster, stronger and even prettier or more intelligent. We want to live longer, be able to fight disease more effectively, or even better, to be able to prevent disease wherever possible. Improved quality of life in its various forms is a universal human endeavour.

Various interventions are employed to obtain these aims, including behavioural techniques, surgery and pharmacological methods – ranging from legal to illegal and sometimes even irrational[1].

Modern science has allowed us to be enhanced in ways that were previously unimaginable, and development in this field is continuing at a rapid pace.

To define the concept of enhancement, the following is suggested: "a biomedical enhancement is a deliberate intervention, applying biomedical science, which aims to improve an existing capacity that most or all normal human beings typically have, or to create a new capacity, by acting directly on the body or brain" (Buchanan, 2011:23).

Enhancement therapies have a particular and valuable role in the management of patients where there are specific deficits. These include cochlear implants to improve hearing, lens replacements to improve vision, or behavioural techniques aimed at enhancing sleep in insomniacs or improving interpersonal functioning in those with disordered personality functioning.

Pharmacological interventions are also employed in the enhancement of various impairments, amongst them drugs aimed at improving concentration and memory in patients suffering from conditions like Alzheimer's dementia and Attention Deficit Hyperactivity Disorder[2] or hormonal interventions where specific deficiencies are present.

Although there is little doubt that enhancement therapies could easily be justified in those suffering from existing disabilities, their use in healthy or so-called

[1] A case in point would be the scourge of rhinoceros poaching with the aim of obtaining the horns to sell them as therapy for enhancing sexual prowess.
[2] In both these disorders, the interventions are seen not as curative, but mostly as symptomatic treatment.

"normal" subjects – whether in sport, social life or academic performance – does raise extensive debate, not only in the lay press but also in academic journals discussing ethical questions.

Medical science and diagnostics tend to employ categorizing systems of diagnoses. This implies that the diagnosis of a particular illness or disorder depends on the presence of a defined number or set of symptoms and subsequent associated impairment. If all the criteria are not met, then a diagnosis is not made. Therefore, although there may be some impairment or significant so-called subsyndromal symptoms, if the full criteria for a specific diagnosis is not met, then treatment may not be considered justified, as the illness is not diagnosable. Unfortunately this distinction does not take into account the fact that subsyndromal symptoms may still lead to significant impairment – subjective or objective.

In reality, it is inevitable that the line between 'justified' enhancement in individuals with disabilities and enhancement in otherwise healthy and well-functioning individuals will become blurred.

Neuroscience has made remarkable progress over the past decades and is not left behind where enhancement technologies and therapies are involved.

Neurosurgery was extensively used in the 1950's to 'control and improve' behavioural problems, as demonstrated by the infamous frontal lobotomies that were performed on thousands of 'patients' by Walter Freeman and colleagues. This has fallen out of favour due to the excesses and lack of respect for basic human rights that occurred in the process. Nevertheless, it is still employed, albeit under much more controlled and scientifically sound conditions, e.g. in some intractable neurological and psychiatric conditions. Surgical implants are also employed in the management of some of these conditions with some success. Non-invasive techniques like transcranial magnetic stimulation are also showing promise in some cases.

Neurotechnology now also allows for brain-machine interfacing and shows promise in further understanding and enhancing brain functioning (Farah, Illes, Cook-Deegan, Gardner, Kandel, King, Parens, Sahakian, Wolpe, 2004). Although we are not at a point in time where such applications are relevant for

the immediate future, it raises debates which need to be argued - preferably before these technologies inevitably become viable.

But it is in the field of psychopharmacology that most progress has been made.

Since the advent of modern psychopharmacology in the 1950's, the available knowledge and science has increased dramatically, and continues to do so. The initial discovery of chlorpromazine resulted in dramatic improvements in the management of previously untreatable disorders such as schizophrenia and the discovery thereof can hardly be seen as anything but advantageous to humanity. But not all developments in the quest for rational and scientific psychopharmacology have been as clearly beneficial as the development of drugs to treat schizophrenia and incapacitating mood disorders.

The development of a safe and effective class of tranquillizers during the same time period was also hailed as a major discovery. These drugs, the so-called benzodiazepines, of which chlordiazepoxide (Librium®) and diazepam (Valium®) were the first to be marketed, offered new treatment options in various anxiety disorders. These drugs were not only effective in alleviating symptoms in those with clearly defined anxiety disorders; they were also effective in taking the edge off situational anxiety and suppressing the responses to daily stress. The end result was that by the late 1970's, benzodiazepines became the most prescribed drug worldwide (Ashton, 2005) – most certainly not all prescriptions for people suffering from a diagnosable anxiety disorder or insomnia. Clearly these drugs were also used to enhance a sense of well-being or blunt the inherent anxieties of the 'worried well' to allow for 'better' or 'easier' functioning. Given the extent to which these drugs were prescribed, the prevailing morality in the medical fraternity obviously did not consider this practice of enhancing well-being as problematic. It was only after the prolonged employment of this practice that some warning signs were picked up. It became clear that excessive and prolonged use of these drugs would lead to extensive abuse and dependence. The use of benzodiazepines has subsequently decreased markedly and is in most cases now only used in the short-term management of anxiety and insomnia.

Another class of drugs that was widely used in the 1960's and 1970's, were the amphetamines, which had limited therapeutic potential, but rapidly gained

popularity as agents for enhancement. They were widely used amongst students as stimulants to allow for longer hours of study, but also as 'party drugs'. It was also claimed that these drugs could enhance pleasurable experiences. Issues relating to abuse as well as safety eventually resulted in severe restrictions being placed on the availability of these drugs.

Partly because of the reasons discussed, and in spite of overwhelming evidence to support its justified and beneficial use in conditions like Attention Deficit Hyperactivity Disorder (ADHD) and sleep disorders, the use of related stimulants like methylphenidate have always been controversial in Psychiatry.

There are still perceptions in the general public that these drugs are dangerous and addictive and that they cause more harm than good. These misperceptions are actively promoted by the so-called Antipsychiatry Movement and have unfortunately denied many patients with treatable conditions (such as ADHD) the opportunity to improve their quality of life and ability to function substantially better in a normal school and academic environment. The arguments the movement would put forward are that this is a form of mind control and that disease-mongering by the pharmaceutical industry is the main driving force behind the use of methylphenidate.

Over the past one to two decades there have been reports about further uses for stimulants, in cases where they are not traditionally indicated and for which these drugs are not registered. Recent reports in the South African lay press (Delport, 2011) claim that the use of especially methylphenidate – marketed originally as Ritalin® - has increased dramatically under healthy students with no previous or current diagnosis of ADHD. Cases in SA have been reported since 2006 in various universities/colleges and it would seem that this practice is increasing rapidly.

The reason for this phenomenon is that it is claimed that methylphenidate increases concentration and improves academic prowess. Unsubstantiated claims of increases in academic performance of up to 36% have been reported.

Although methylphenidate is highly scheduled, it is apparently also freely available on campuses without prescription – most likely allowing for a new

breed of ‘drug dealers’ who in this case are fulfilling a need not based on a physiological craving or dependence, but rather a need based on trying to enhance functioning in a very competitive academic environment.

Responses to the issue have been contradicting – e.g. “If a doctor prescribes it, it is ethically acceptable” vs. “Students abusing Ritalin are drug abusers, and doctors prescribing it are drug dealers” – both statements from different spokespersons of the same university (Delport, 2011). These two statements from the same medical faculty demonstrate the classic ambivalence – not only among medical doctors, but also among other academics and the lay press - that seems to pervade the discussion about using enhancement therapies.

Doctors are on the one hand required to adhere to guidelines set by a statutory body - the *Health Professions Council of South Africa (HPCSA)* - which allows for methylphenidate as a highly scheduled drug to be prescribed and dispensed only under strictly controlled conditions, but on the other hand there is pressure from the community that enhancement therapies are required in cases where there is not even a specific diagnosis present.

Hiding behind rules and guidelines, it is easy for any doctor to deny a prescription, but if a patient requests medication that may be clearly beneficial and with few if any untoward effects, it would seem morally suspect to ignore such a request without at least some deliberation on the ethics thereof.

The prescription and use of methylphenidate in healthy students deserves such consideration, as it appears to be a relevant and common phenomenon, leading to diverging opinions and ambivalence among various role-players.

In a recent newspaper article (Potgieter, 2011), the question of enhancing cognitive abilities in children with medication – in this case not methylphenidate, but a combination of vitamins – was examined. Although there are clear doubts as to the claims made by the relevant drug company, it was also interesting to note the response by a spokesperson from the action group (*Equal Education)* which lodged a complaint in the matter. He was quoted as saying “the only way to perform in an exam, is to study hard”. This again highlights some of the prevailing emotions regarding cognitive enhancement. Although the proponents

of cognitive enhancement would not contradict the value of studying hard for tests and examinations, they would rather claim that “the way to perform in an exam, is to study hard and use whatever feasible enhancement is available”.

Before embarking on debating the arguments for and against the use of methylphenidate in healthy students, various considerations should be considered.

The following statements by respondents to a large survey reflect some of the dilemmas raised by the use of cognitive enhancers (Maher, 2008):

> “The mild side-effects will add up to be profound in due course and may even require stronger therapy to control the addiction.”
>
> “I wouldn’t use cognitive enhancing drugs because I think it would be dishonest to myself and all the people who look to me as a role model.”
>
> “As a professional, it is my duty to use my resources to the greatest good of humanity. If ‘enhancers’ can contribute to this humane service, it is my duty to do so.”

Cakic (2009) also raises four themes that are relevant in the discussion of the use of stimulants in students:

1) there is an argument that it is a form of cheating and it allows users an unfair advantage;
2) the problem of indirect coercion – the belief that everybody else is taking them and that I will be left behind if I do not;
3) the argument that they are dangerous – both because of direct physiological side-effects and also the possibility that they are habit-forming and may lead to addiction;
4) regardless of the restrictions on and ethical implications of their use, prohibition is likely to fail and therefore resources should not be wasted on attempts to curtail the use of these drugs.

A further aspect to consider is that in reality, availability of methylphenidate is clearly restricted, whether by scheduling, cost factors or the physical availability of a

doctor to write a prescription, and this immediately raises the issue of justice and fairness.

The mere fact that methylphenidate is a highly restricted and scheduled drug also emphasises concerns regarding safety and possible addiction potential. Available literature and evidence would have to be considered and evaluated in this respect.

The use of methylphenidate as an enhancing therapy may also be considered as a prototype for other enhancing agents or therapies. If it is argued that students should be allowed to use it and obtain benefits from it, then the argument may follow that all sportsmen should be allowed to use performance enhancers and universities and other academic institutions would have to consider making cognitive enhancement therapies available to all students.

Another issue that is often raised, is that if enhancement is not regulated or even banned outright now, it would inevitably lead to an eventual unknown future 'posthuman' being, the product of various technological and pharmacological manipulations. This being is seen as an unnatural entity with the expected potential to harm, abuse or suppress those who have not been exposed to the enhancement therapies.

Further concerns about enhancement are raised by Buchanan (2011:21). In addition to some of those already mentioned, the following should be added:

- the impact on character;
- the possibility that enhancement would produce beings with a higher moral status than persons;
- aspects related to research on enhancements;
- the risk that governments may abuse available enhancement technologies (e.g. for unacceptable military applications);
- the risk of a "new eugenics".

Although not all of these concerns relate directly to the use of methylphenidate in healthy students, it must be emphasized that this discussion cannot be separated from the broader discussion on enhancement as a whole.

Because the traditional values and ethical principles of the medical profession are often inadequate in dealing with some of the situations described above, the field of biomedical ethics has to be employed in response to the need to answer some of the dilemmas posed (Winkler & Coombs; 1993:1).

Furthermore, the debate on enhancement and in fact also the debate on the use of methylphenidate in healthy students, is fraught with emotive responses and vague claims to a universal morality. These arguments can be quite influential and may therefore not be ignored. It may also be that behind the loud rhetoric there may also be some hidden truths that would need to be considered.

According to Buchanan (2011:23), the role of Practical Ethics is to address bad arguments – especially if they are seen to be influential.

The aim of this thesis is to investigate the issues relating to the use of stimulants – especially methylphenidate – in healthy students with the aim of cognitive enhancement. Firstly, the safety concerns and the risk of abuse and dependence would be investigated, because if the risks are of sufficient severity, it would be difficult to justify the use of methylphenidate in healthy students.

The reasons why enhancement may be considered will also be examined. Arguments for and against enhancement related to the use of methylphenidate as well as enhancement in its broader context will be investigated. The last chapter will attempt to answer the question on whether the use of stimulants in healthy students is morally justified. A set of guidelines will also be provided on how to proceed within the current context.

CHAPTER 2: BACKGROUND

When discussing the feasibility of any form of enhancement therapy, the most important consideration would be the risk of unintended bad consequences. Unless there is at least some investigation into the safety – both over the short-term and the long-term – of the intended intervention, there can be no serious consideration given to any debate on the future use of the specific mode of enhancement.

Although the case for disallowing the use of stimulants such as methylphenidate in healthy students could rest on various arguments, the same would apply. Arguing the point any further would have little point if there was proof that there are no benefits to be derived from its use and especially if evidence demonstrated that methylphenidate was a particularly dangerous or addictive drug.

It would thus be prudent to initially consider what available evidence there is to try and understand what methylphenidate is, what it actually does, how it does what it does, and to investigate the safety profile as well as the potential it has as a drug of abuse or addiction.

Methylphenidate – the facts:

Although there are some who would argue that enhancement therapies are a recent phenomenon and a consequence of a consumerist and competitive modern society, cognitive enhancing drugs, or nootropics[3] have been around for a long time. Various cultures have proposed certain indigenous herbs to promote memory and concentration for thousands of years. Some of these are still actively promoted – not necessarily always with the backing of extensive evidence. Examples would include *Ginko biloba*[4] which is often added to various 'energy drinks' with caffeine, widely available in any supermarket or convenience store, claiming to 'improve alertness'. These trees have been cultivated in China for centuries and there are examples at temples which are more than 1500 years old.

[3] Nootropics: Greek: noo = mind; tropo = change or turn)
[4] The leaves of the *Ginko biloba* tree have been used in traditional medicine for centuries and is now being investigated in the treatment of dementia.

In the domain of conventional psychopharmacology, nootropics include psychostimulants such as methylphenidate, modafanil, amphetamines and even medicinal caffeine.

Other classes of non-stimulant nootropics include drugs used to treat dementia, such as donepezil, rivastigmine and galantamine. These drugs have some proven efficacy in the symptoms of especially Alzheimer's dementia, but they are not curative and their efficacy is lost as the disease progresses. Although there are some anecdotal reports of these drugs being used as cognitive enhancers, it does not appear to be nearly as widespread a phenomenon as the 'off-label' use of methylphenidate.

Because it is by far the agent most widely used in the context of this discussion, methylphenidate will be used as the prototype of a psychostimulant and cognitive enhancer. Modafanil may also be used for similar indications, but there is very little evidence to currently support or even consider its use as a cognitive enhancer.

As will be seen in further discussion, methylphenidate also raises other issues that are very relevant to the debate on cognitive enhancement and enhancement in general.

Methylphenidate was first synthesized in 1944 and is currently used in Psychiatry for the following indications: ADHD, narcolepsy, depression and chronic fatigue. Clinical effectiveness is associated with the release of catecholamines from presynaptic neurones in the brain. Noradrenalin and especially dopamine actions are increased by reuptake inhibition (Sadock & Sadock, 2007:1098-1102; Stahl, 2009:329). In spite of its classification as a stimulant, methylphenidate is in fact used in ADHD to improve concentration and the ability to focus attention. This could be considered a paradoxical effect, as it does also lead to insomnia if taken too late during the day or early evening.

There is little doubt that methylphenidate is an established and important agent in the armamentarium of modern psychopharmacology, with a good safety record and proven efficacy in the mentioned conditions. In healthy subjects the use of methylphenidate is also claimed to lead to increased motivation, mood, energy & wakefulness and an appetite suppressant effect.

In a sense it was almost a medical inevitability that methylphenidate would be used where there is a subjective problem with concentration or ability to focus in the absence of diagnosable ADHD, as these are some of the main improvements noted when used in children with ADHD. The relevant question which subsequently arises, would relate to the actual efficacy of methylphenidate in the cognitive enhancement of healthy subjects.

Anecdotal reports by Delport (2011) relate various statements by students claiming dramatic increase in academic performance as reflected by improvement in examination results, immediate improvement in ability to focus and concentrate as well as the subjective experience of studying much more effectively. The improvement in academic results would also suggest that the positive effects do not only relate to the ability to stay awake and focus longer, but also to the ability to retain and integrate the attained knowledge.

Considering available research, animal studies have shown that methylphenidate improves various domains of cognitive functioning, depending on the dosage that was used. A so-called inverted U dose response curve is produced, which means that middle doses improves performance and higher doses causes either impairment in performance or no improvement (De Jongh, Bolt, Schermer, Olivier, 2008).

Harris (2009) and Farah et al (2004:422) confirm that significant advantages could be obtained from using methylphenidate in healthy human individuals. These include enhanced executive functioning and study skills, as well as improvement in the focusing of attention and in the manipulation of information. This includes abilities that overlap in the constructs of attention, working memory and inhibitory control, enabling flexible, task-appropriate responses.

Further human studies have demonstrated that subjects with lower baseline working memory capacity benefited most from methylphenidate, but there is also evidence that depending on the familiarity of the required task, cognitive performance may possibly be impaired (De Jongh et al, 2008). This raises the possibility that methylphenidate enhances executive function on novel tasks, but that it may impair previously established performance. The same authors also suggest that it is not effective in healthy elderly volunteers, and is therefore unlikely to be effective as a countermeasure for age-related cognitive decline and dementia.

Geppert & Taylor (2011) describe that people with low memory span would benefit from methylphenidate, but that in those with high memory span, there might actually be deterioration in memory functioning. Working memory also seems to be preferentially enhanced at the cost of long-term memory.

Thus, when considering the available literature on the use of methylphenidate for cognitive enhancement, the lack of consistent evidence seems to recur. This would suggest that there still would appear to be a need for more extensive studies on the exact benefits that could be expected in healthy individuals using methylphenidate for cognitive enhancement. Randomized controlled trials comparing methylphenidate against a control or placebo are needed to supply the necessary evidence needed to confirm methylphenidate's possible benefits to healthy students or the lack thereof.

The implications for the prescriber of methylphenidate to healthy students would be that at this stage, the students would have to be informed that the evidence for benefit is not conclusive.

In spite of this, the mere fact that there is some evidence of benefit would be more than enough reason to expect that the demand for methylphenidate as a method for cognitive enhancement will continue. This demand is highly unlikely to be related to the perceived superior efficacy of methylphenidate, but much rather a reflection of the societal need for enhancement.

Safety concerns:

ADHD is a condition primarily diagnosed and treated in children and methylphenidate is by far the most common pharmacological intervention applied in the management thereof. A drug that is prescribed all over the world to millions of patients – most of them being children – is unlikely to be considered a particularly dangerous drug in spite of the scaremongering employed by the Antipsychiatry movement.

Nevertheless, methylphenidate is not without side effects. These include anorexia and weight loss, insomnia and excessive nightmares, dizziness, irritability and

agitation. High doses may even lead to psychotic symptoms characteristic of schizophrenia (Sannerud & Feussner, 2000). Escalating doses may also lead to excessive anxiety, heart disorders and even seizures. It was previously thought that it caused growth retardation, but this has subsequently been disproved, as the reports of growth retardation were shown to be more likely as a result of the disorder itself.

The study by Maher (2008) reported that roughly half of the respondents on stimulants reported unpleasant side-effects which lead to discontinued use in some cases. Although these side effects are not dangerous, users should be informed about the potential occurrence.

Regulatory guidelines require that all relevant safety data must be printed in the package inserts of all registered drugs, and this is also available on the internet.

The package insert of a locally sold formulation of methylphenidate provides a comprehensive list of contraindications to its use[5]. Some of the included items are:

- Known hypersensitivity to methylphenidate
- Tic disorders (such as Tourette's Syndrome)
- Cardiovascular disorders such as hypertension, arrhythmias and severe angina
- Overactive thyroid
- Pregnancy and breastfeeding
- History of drug abuse

Compared to other pharmacological agents, the listed contraindications for methylphenidate are not excessive and nor are they indicative of a particularly unsafe drug. The mentioned cardiovascular disorders are unlikely to be present in healthy students, but should always be considered in older patients. Methylphenidate is also not proven to be safe in pregnancy and in a young student population this may be an issue to consider.

[5] Package insert: Adaphen® Tablets; published 27 May 2004

There are also certain drugs which should not be used concomitantly with methylphenidate (e.g. some classes of antidepressants and warfarin). The prescribing doctor therefore has to enquire about the use of other medication and the possibility of pregnancy.

The issue of drug abuse deserves special mention, and will be discussed in more detail in a following chapter.

The fact that methylphenidate is only registered for specific indications such as ADHD and narcolepsy, implies that whenever a physician is prescribing it for increased concentration in healthy students, he/she is doing so “off label”. Although “off label” use is a cause of much controversy in the medical fraternity, it is not illegal, and often used in clinical practice.

The local *Medicines Control Council (MCC)* is notoriously slow in allowing registration of medication for new indications, and often new data become available regarding the use of existing medications in new indications, justifying physicians to prescribe in these cases years before the *MCC* would get around to officially allowing registration for the specified indication.

An example would be the use of Sodium Valproate (Epilim®) in Bipolar Disorder. This drug has been officially registered in South Africa for many years as an anti-epileptic agent. But for more than 20 years, a growing body of evidence has established it as a first-line option in the management of Bipolar Disorder. It has been used and registered as such in most leading markets, but it has taken the *MCC* until very recently to allow local registration. The end result has been that local psychiatrists have used the drug “off label” for many years, and because of the available evidence, there has never been any question as to the acceptability of the practice.

Thus, medico legally and ethically, prescribing medication for off-label indications is not necessarily considered problematic, providing the prescribing physician has evidence in literature or peer-consultation to back the practice up. This would also apply to the prescribing of methylphenidate for healthy students, as prescribing methylphenidate for cognitive enhancement in healthy students is not a registered indication – but it does imply that the clinician would have to be aware of the available evidence, which currently is not without some controversy.

Another issue in prescribing any medication is the risk-benefit ratio which always has to be taken into account. Although this applies to all drugs, it is even more relevant in "off label" prescriptions. It would not be considered justifiable to prescribe a dangerous drug to healthy subjects just to increase their cognitive performance, especially if the available evidence of efficacy is not absolutely conclusive.

These issues are therefore clearly also relevant in the discussion of whether methylphenidate should be prescribed to healthy students.

Taking the above information into account and accepting that there are side-effects, methylphenidate could be considered safe in most population groups. Nevertheless, potential users have to be made aware that in some high risk groups, sudden cardiac deaths have been reported – especially in the elderly with incipient cardiovascular disease (Chatterjee, 2009).

It is also the doctor's responsibility to determine the cardiac status and risk factors for any patient possibly receiving methylphenidate.

The question of addiction:

One of the emotive responses often associated with the use of methylphenidate – especially in young children – is that of a fear of addiction. In the subspeciality of Child Psychiatry, this widespread fear is problematic, as it often leads to the underdiagnosis or undertreatment of numerous children with clear diagnoses of ADHD who might derive benefits in various aspects of their lives with the judicious use of methylphenidate. There are clear and well documented sequelae when ADHD is left untreated – especially in the emotional and social domains.

One of the public concerns relates to the fact that methylphenidate may be chemically similar to cocaine and have potentially similar potential for abuse or addiction. The reality is that methylphenidate has a distinctly different

pharmacokinetic[6] profile with a much slower absorption into and clearance from the brain, leading to a much lower potential for abuse.

The risk of dependence is often mentioned as a concern, but if used at prescribed doses, the risk is negligible (Sadock & Sadock, 2007:1101). In fact many physicians consider methylphenidate to be overregulated and that it deserves to be scheduled at a lower level. Given the historical background and its structural relation to cocaine and other amphetamines, this is unlikely to happen.

In South Africa methylphenidate is regulated as a Schedule 6 drug. According to the local law that regulates the scheduling of medication, this implies that there is strict control over the prescription and supply of the drug and that it may only be dispensed by a licensed pharmacist or doctor[7]. Furthermore, a Schedule 6 drug may also not be prescribed on a chronic basis and prescriptions need to be renewed monthly. This implies that any methylphenidate bought or sold outside a pharmacy and without a prescription is clearly illegal.

The local highly scheduled status of methylphenidate directly relates to the fact that it is classified as an amphetamine, a class of drugs widely abused in the 1960's and 70's.

According to Sannerud and Feussner (2000), some of the earliest reports of methylphenidate as a drug of abuse came from Sweden. Abuse and inappropriate use was apparently so prevalent that methylphenidate was withdrawn from the Swedish market in 1968. Various papers were published in the medical literature in the 1970's and 1980's, describing the intravenous use of methylphenidate. As the drug was never intended to be used in this fashion, serious complications were reported. Talc is used as filler in the manufacture of methylphenidate tablets and this caused obstruction of the blood supply in the lungs, leading to several deaths. Abscesses at injection sites were also reported and inevitably also other systemic infections.

U.S. law enforcement agencies reported the following cases where methylphenidate prescribed for ADHD was abused: (1) Parents who sold their children's medication or abused it themselves; (2) Adolescents who sold their own or their siblings' methylphenidate; (3) Adolescents who abuse their own or their

[6] Pharmacokinetics refers to the way in which a drug is absorbed and metabolized in the body.
[7] Medicines and Related Substances Act 101 of 1965

friends' methylphenidate by crushing the tablets and 'snorting' the powder; (4) Theft from home or school supplies of methylphenidate.

Nevertheless, Sannerud and Feussner (2000:38) also state clearly that there is now much less documented abuse of methylphenidate than with cocaine or methamphetamine. Various studies have also demonstrated that methylphenidate use is much less prevalent than that of cannabis (Teter et al; 2003).

Anecdotal feedback from local substance abuse experts also confirm that methylphenidate abuse or dependence is extremely rare in local settings. This is in spite of the fact that it is widely used, also in the State sector.

Barkley, Fischer, Smallish & Fletcher (2003) followed 147 children diagnosed with ADHD up for 13 years until adulthood and found that there was no compelling evidence that judicious prescribing of methylphenidate to children leads to an increased risk for substance experimenting, use, abuse, or dependence.

In spite of the widespread use of methylphenidate, it is highly unlikely that there exists an illegal manufacturing industry for methylphenidate, as is the case with drugs such as methamphetamine ("tik"), implying that the illegal trade in methylphenidate depends on stolen medication or other black market supply.

Although the current evidence suggests that the risk of abuse of methylphenidate is now very low in comparison to other drugs, cognisance needs to be taken of the history of the drug as well as its relatedness to other drugs of abuse. Good clinical practice and guidelines would therefore advise that it should preferably be avoided in patients with a previous history of drug abuse or dependence.

Taking this into account, this is another reason for not allowing unrestricted access of the drug for cognitive enhancement.

A recurring theme in the debate on the use of methylphenidate in healthy students is that it is accorded a special status of negative consideration. In the context of abuse potential, the argument for abuse risk, as mentioned before, is often used by medical professionals when they argue against the intervention. But it remains ironical that there are other substances of abuse that have much higher and more problematic abuse potential which are also only available on prescription and is not

accorded nearly the same status of negativity. These would include the class of benzodiazepine tranquillizers.

Benzodiazepines are schedule 5 drugs, with somewhat less restrictions than the scheduled 6 methylphenidate. Nevertheless, they cannot be obtained without a prescription and may not be sold or given to others. They have a much more problematic side-effect profile and rehabilitation centres report a substantial risk of relapse where a diagnosis of benzodiazepine dependence is made. The prevalence of dependence is also substantially higher than that of methylphenidate. In spite of this, medical practitioners are much less likely to deny requests for prescription of benzodiazepines, even though they are only indicated for short term relief of symptoms of anxiety or insomnia. In a sense this can be seen as a form of enhancement in wellbeing and quality of sleep.

If the benzodiazepines are then also agents for enhancement and the safety profile and risk of abuse and dependence are substantially more than that of methylphenidate, why is the prescription of methylphenidate as an agent of enhancement considered more problematic and morally suspect?

The pharmacological nature of benzodiazepines is such that they are suppressants and cause cognitive blunting and impairment. Such a result would inevitably lead to inhibited ability to make moral choices. This is in contrast to the potential ability of cognitive enhancers such as methylphenidate to improve the ability to employ moral reason.

The use of benzodiazepines is accepted as a valuable asset in the alleviation of symptoms in specified conditions. The side effects and abuse concerns are a reality and the consequences are regularly encountered in psychiatric units and rehabilitation centres. These risks are accepted as justified and the guidelines on appropriate use and prescription are considered adequate.

This again begs the question as to why the status of methylphenidate in the eye of the prescriber is considered to be lower and deserving of suspicion and stricter regulation and control.

The size of the problem:

Anecdotes and emotive responses often go hand in hand, and when debating the issue of stimulant use in cognitive enhancement and the prevalence thereof, it would be prudent to rather investigate the available literature.

According to Arria (2006), it is estimated that 4,1 million people of 12 years and older have used methylphenidate at least once in their lifetime without a prescription - an increase of about 400% from 1980. This is in spite of the relative paucity of documented efficacy as a cognitive enhancer in non-ADHD subjects – clearly demonstrating the power of the anecdote or word of mouth!

Studies have also demonstrated that college students are more likely to use stimulants than their non college-attending counterparts. One of the reasons for this dramatic jump in the prevalence would be that more students are attending college with the academic demands and progressively more competitive selection processes. Although detailed epidemiological data are not available in the South African context, it is expected that similar trends may be relevant among local students. According to Delport (2011), it is widely used and easily available on most local campuses.

In a survey of 1400 people in various countries (Maher, 2008), 20% of adults admitted to the use of medication to focus attention/memory (in the absence of medical diagnosis). 62% of the respondents used methylphenidate and 44% modafanil. A further concern is that one third purchased the medication over the Internet.

The most common reason why these drugs were taken, was to improve concentration and also to improve focus for a specific task. Other less common reasons included counteracting jet-lag, “partying” and even “house-cleaning”.

The frequency of use was evenly split between using the drugs daily, weekly, monthly or once a year. This reflects a pattern of “as needed” use, which also makes scientific sense, as methylphenidate does not need a sustained blood concentration level to have an effect. This is in contrast to e.g. antiepileptic drugs and mood stabilizers such as Lithium.

80% of those interviewed felt that healthy adults should be allowed to take these drugs if they wanted to. As mentioned before, current legislation requires a medical practitioner to act as some form of gatekeeper, restricting, or at least regulating, access. Proponents of easy access and as-needed use of methylphenidate would argue that the role of the doctor reflects the archaic paternalism still pervading the doctor-patient (in this case: doctor-client?) relationship.

Teter, McCabe, Boyd & Guthrie (2003) surveyed 2250 randomly selected undergraduate students and found that 3% reported past-year illicit methylphenidate use. All of the methylphenidate users also reported use of marijuana and 58% had used Ecstasy in the past year. This compares to an annual total use rate of 32-38% of marijuana (Ries, Fiellin, Miller & Saitz; 2009:1367).

Farah et al (2004) described a prevalence of up to 16% of students on 'some campuses' using stimulants as study aids. Unfortunately, the study does not indicate the efficacy of methylphenidate for this indication.

Bogle & Smith (2009) report rates of use among college students ranging from 1.5% to 31% among various surveys, with the most representative study estimating annual non-prescription or illicit methylphenidate usage at about 4%. Evidence further suggests that illicit methylphenidate users were more likely to be white, male, affiliated with a formally organized fraternity, and more likely to use other illicit and illegal substances. As with the previous study, this raises the issue of the abuse-risk of methylphenidate. It may also be argued that this association is only due to the fact that these students are already obtaining drugs form illegal sources and therefore have easier access to unprescribed methylphenidate.

Nevertheless, these statistics demonstrate that illicit use of methylphenidate is not nearly as common as that of marijuana. It is also important to note that illicit use does not necessarily imply a pattern of abuse[8].

[8] The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (4th ed; Text Revised)* describes substance abuse as a maladaptive pattern of substance use leading to clinically significant impairment or distress, manifesting in one or more of the following:

- Recurrent substance use resulting in a failure to fulfil major role obligations at work, school, or home
- Recurrent substance use in situations in which it is physically hazardous

The available evidence confirms the likelihood that in the South African context the size if the 'problem' is also substantial and in all likelihood expected to continue to increase.

- Recurrent substance-related legal problems
- Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance

Chapter 3: The arguments for and against

The debate on cognitive enhancement and more especially the use of methylphenidate in healthy students raises interesting issues in the field of Psychiatry. Informal discussions around the issue often illicit strong emotions against the practice. But on specific enquiry as to why this practice should be discouraged, the arguments often seem vague and of a rather emotive nature. Most psychiatrists have extensive experience in prescribing methylphenidate, and it is a very valuable treatment option for conditions such as ADHD. Anecdotal evidence states that GP's are much more likely to prescribe methylphenidate to healthy students.

If safety is not generally an issue and addiction risk can be contained, why this unease among psychiatrist to advocate its use in healthy students who may very well have valid reasons for requesting to use it? There is unlikely to be a simple or universal answer to this question, but it may well relate to the sensitivity that psychiatrists have regarding methylphenidate and an awareness of the antipsychiatry movement's criticisms.

Another reason could be the culture in Psychiatry that promotes psychotherapy as an essential part of any treatment. This could result in concerns that students requiring cognitive enhancement would want to use it as a quick fix and not take responsibility for disciplined and rational study methods as well as respect for a regular sleep schedule.

Various prominent authors such as Kass (1997), Fukuyama (2004) and even Habermas (2003) and Sandel (2007) have stated their opposition against enhancement. According to Buchanan (2011), opposition to enhancement ranges from a blanket refusal to consider any possible good to be derived from enhancement, requiring a strict ban on any form of enhancement to those who would consider all aspects relating to enhancement and deciding that on balance, enhancement, or at least certain aspects thereof, is not appropriate and should be discouraged. Clearly this would be a more convincing way to approach the debate.

The first group may be described as being *anti-enhancement* and their restricted point of view does little to contribute to constructive debate on the issue. In a similar vein, those who would advocate enhancement may be divided into a group

who are unquestionably (and possibly irrationally) in favour of enhancement in all its forms and would advocate for undeterred progress in the field. A more rational approach would be the so-called *anti-anti enhancement* stance. This approach would challenge the restricted point of view of the *anti-enhancement* group and use rational arguments to achieve this after having considered and weighed the relevant safety concerns and moral debates around the issue (Buchanan, 2011:13).

A total prohibition of enhancement would be a simplistic approach and it is necessary to shift emphasis to a more balanced view. Such a prohibition would ignore the various nuances relevant to the debate and the fact that enhancement in different forms has already been part of our lives for a long time. On the other hand, an unconditional acceptance of enhancement and unrestricted access to whatever is available to induce the desired outcome would be irresponsible. The nature of enhancement therapies is such that boundaries for existing applications will be pushed and new technologies would have to be investigated as they are discovered. These processes would have to be guided by rigorous ethical deliberation as it pertains to any biomedical research.

This applies as much to the use of stimulants such as methylphenidate in healthy students, as it is clear from previous discussion on safety issues and taking the risk of abuse potential into account, that unrestricted use of methylphenidate would be problematic. The debate around the ethical issues relating to the use of methylphenidate in healthy students is also not as simple as taking a blanket anti- or pro-enhancement stance.

It is interesting to note that although there are some authors who would roundly condemn enhancement, there are actually none who roundly endorse it (Buchanan, 2011:13).

It should also be noted that those authors who reject the “anti-enhancement” view, generally do not deny that there potential serious risks involved. These include the unintended risk of unforeseen ‘bad’ biological or psychological consequences and the risk of aggravating existing social inequalities and injustice. A valid criticism by Buchanan (2011:15) relates to the fact that those who are “anti-anti-enhancement” have tended to be vague in acknowledging the potential risk and have not offered clear guidance on how to proceed in advancing their point of view. Again, the same would apply to the use of methylphenidate. Those who advocate for its acceptance

as an agent of enhancement do not deny that there are safety and other issues to consider, but generally do not offer any guidance on how to proceed other than stating their advocacy.

When embarking on the debate for and against enhancement, it should also not be assumed that enhancement is a zero-sum affair (Buchanan, 2011). This implies that although those who are enhanced would be expected to benefit from the process, it does not mean that there would inevitably be no benefit to those who are not enhanced. As with many advances in society, there is bound to be some inequality in availability, but advances in one sector of society could generally be expected to convey some secondary benefits on others, even if it is only by virtue of a 'trickle-down' effect.

The ambiguity relating to the prescription of methylphenidate in healthy students is described by Forlini and Racine (2011). They relate that physicians hold "nuanced and ambiguous views of these issues" (referring to the use of medicines for enhancement) with few instances of clear-cut consensus. They have conducted a small focus-group study examining the reactions of students, parents, and health care providers to the use of methylphenidate for academic cognitive enhancement.

They reported that participants were unsure of how to capture this phenomenon from both a *descriptive* standpoint (e.g., is it prescription misuse, cognitive enhancement, lifestyle choice) and a *normative* standpoint (what can and should be done). They considered this reaction to be a manifestation of "ambivalence," i.e., fundamental uncertainty in the weighting and balancing of different ethical perspectives.

Fortunately, ambiguity and ambivalence in opinions can constitute a territory for open discussion. One definite challenge is to articulate and examine this ambivalence explicitly without becoming bogged down either in the impulses of premature guidance development or to the inaction of mere indecisiveness and indifference (Forlini & Racine, 2011).

The aim of the discussion that follows is to attempt to clarify the ethical issues surrounding the use of methylphenidate in healthy students, recognize where

further evidence is needed and attempt to provide suggestions for a possible way forward.

Why enhancements may be needed:

There are various arguments relevant to the debate as to why some may doubt the need or desirability for any enhancement.

In the 17th century, Francis Bacon advocated the project of "effecting all things possible". By this he meant using scientific techniques to master nature and thereby improving the living conditions of human beings. Also refuting the idea that the quest for enhancement is a recent phenomenon, JBS Haldane, a British biochemist, published an essay in 1923, *Daedalus; or Science and the Future*, in which he argued for the great benefits to be gained from science in general and more specific from controlling our own genetics (Bostrom, 2005).

Any medical practitioner who is confronted with a request for cognitive enhancement in an otherwise healthy student would do well to consider these arguments in order to justify refusal of such a request, rather than merely refusing by virtue of a 'gut feeling'. There are clearly also sound arguments why the request for enhancement is not necessarily morally problematic, but it is also important to take this a step further and consider why enhancements are in fact necessary and may be needed in future. Buchanan (2011:56) supplies a few examples of enhancements that might be needed:

- Enhancement of existing capacities for impulse control, sympathy, altruism, or moral imagination, through pharmaceutical or genetic interventions. This relates to the broader human propensity for violence and ideologies that fuel it, but also to individual personality traits that cause persons to have a diminished capacity for remorse or empathy with others. In extreme cases this is demonstrated by people with antisocial personality disorders or the so-called psychopathic personalities. If one considers that more than 75% of prison inmates have a diagnosis of this personality disorder, which hitherto has been

considered untreatable, then any intervention that could potentially lead to positive changes in the interpersonal functioning and moral insight of these people could only be beneficial to society at large.

- Enhancement of the human capacity to extract nutrients from current foods or even from substrates that we have been unable to use as food sources previously. Global warming, toxic industrialization and overpopulation are increasingly causing pressure on available resources and resource utilization where food production is concerned. Although humans are naturally omnivorous, our capacity to use natural resources as methods of sustenance, are limited compared especially to naturally herbivorous animals. Our ability to efficiently use plant material as food is mostly limited to fruit and seeds, and if a human being could be enhanced so as to be able to use a variety of other plant materials as food, the volume of available renewable food sources would increase substantially.

- Enhancement of the "normal" viability of human gametes and/or embryos. In an increasingly toxic environment, this may be needed to counteract a decrease in fertility and to reduce the risk of lethal mutations or the risk of cancers.

- Enhancements to help us adapt physiologically to climate change and the associated dangers thereof.

- Enhancement of the immune system to accelerate the development of resistance to virulent emerging infectious diseases. New strains of existing diseases caused by mutations were usually contained by virtue of geographical location, but with the easy availability of transcontinental travel, the spread of infections is no longer contained in this way. The recent spread of influenza-like viruses (so-called bird- and swine-flu) demonstrated this risk very clearly. Emergence of treatment resistant strains of bacterial infections has also become more prevalent and major concerns exist about the relative lack of development of new antimicrobial agents. The problems associated with multi-drug resistant tuberculosis are a local example of this very real problem.

These examples present cogent reasons why a blanket anti-enhancement view is not rational and why the concept of enhancement deserves at least serious

consideration. If these arguments are valid, then clearly there is also moral value to the general concept of enhancement. This would include cognitive enhancement.

To argue for a further reason to consider the merits of cognitive enhancement in relation to the above would require that the general reasons for cognitive enhancement be considered.

The main purpose of this thesis relates to the use of methylphenidate as a cognitive enhancing agent in healthy students. The aim of cognitive enhancement in these students would primarily be to improve concentration and ability to focus on studying for academic purposes.

The so-called information age has within one or two decades made available previously unimagined amounts of information literally at the flick of a switch or the clicking of a mouse. This has led to concerns that the ordinary human brain may not be able to cope with this "information overload". One solution could be to restrict the requirements demanded by academic institutions and business. This is unlikely to happen and cognitive enhancement may in fact be a necessary option to assist humanity in this regard.

Speculative reasons for cognitive enhancement would include the likelihood that it could help us to be more virtuous rather than less so, as virtuous behavior is to a large extent determined by cognitive abilities. According to Buchanan (2011:75), virtue depends on sound judgments and sound judgments depend on good ability to reason and processing of information.

Some might question the validity of this argument by contending that this would be an 'artificial' virtue and that true virtue can never be created in this way and only by the inherent character and efforts of the individual without any external influences. If this argument is to be examined to its logical conclusions, it would conclude that virtue is in fact influenced by external factors. Individual morality is surely partly determined by a multitude of psychodynamic factors. Parental role modeling and early exposure to other important persons and interactions would undoubtedly help to form and direct moral choices and the eventual development of virtue.

Sustaining moral character traits would also depend on choices and subsequent actions by the person. There is no reason why enhanced cognitive abilities should

not lead to logically more sound choices and reasoned actions – thus enhancing individual morality.

Avoiding the continuum fallacy, which implies that the eventual outcome of a course of action is not necessarily a given, the focus should rather be on “big-picture questions” (Bostrom, 2005:10). These relate to thinking about our place in the world and the long-term fate of intelligent life. These questions should be addressed in a sober, disinterested way, using moral reasoning and available evidence. There is no proof that the current use of methylphenidate as an agent for enhancement reduces our opportunities to learn self-discipline and causes us to be ‘less moral’ beings. On the contrary, improvements in cognitive functioning may even improve our abilities to reason and partake in the needed debates on moral issues (Pols & Houkes, 2011:87). Buchanan (2011:115-117) supports this view and states that we already possess a conception of what is right and moral before enhancement and that there is no reason why we should lose this perspective after enhancement.

Walker (2002) has considered the future role of philosophers and rather than scaling back the ambitions of philosophy – as suggested by some pragmatists in response to the ceaseless struggle of philosophy since its inception to answer questions on how to unite thought and being – we should attempt to create beings with advanced intelligence in order to realize the lofty ambitions of philosophers. Rather than deflating the ambitions of philosophy, we should consider inflating the ambitions. If cognitive enhancers can aid in achieving these ambitions, then clearly their use should be promoted! This is a somewhat extreme notion, and should be tempered by the concerns expressed by those concerned about the consequences of enhancement.

Is enhancement cheating?

In most sports, performance enhancing drugs are banned, as it is believed that those who use them would have an unfair advantage. A further consideration relates to the fact that there are always going to be safety concerns associated with

the indiscriminate use of medication. There are clear guidelines available in sport and the 'punishment' for disobeying the rules is often severe – resulting in prolonged and sometimes even permanent banishment from competition.

Unfortunately science has also made it progressively more difficult to trace some of these enhancing drugs, and sportsmen continue to use them in the hope that they would not be caught out and allow them to be more competitive. A case in point would be the annual debacle that is the *Tour de France,* where there are even claims that everybody uses some form of enhancement therapy, but due to the logistics and ineffective detection methods, only some are caught. Nevertheless, major efforts are continuously made to attempt 'cleaning up' the sport.

On the other end of the spectrum there are 'sports' such as bodybuilding, where enhancement therapies are in some respects seen as part of the preparation for competition. In a sense, these drugs are seen as part of the equipment you use – compared to other sports where the better and more advanced your bicycle, golf club or swimming gear is, the greater the improvement in your performance, and if it is available and you can afford it, it is not seen as a problem.

Unfortunately, the issue of doping in sport has confounded the issue of human enhancement. Cheating is usually seen as unethical behaviour, but whether the act is cheating or not, is merely determined by the rules of competition.

"Absent the ban, absent the cheating" (Harris, 2009:1533).

The reality is that there are numerous well-published cases such as those of Ben Johnson and Marion Jones, who were both champion athletes, as well as Floyd Landis, who won the Tour de France. They were all found guilty of using illegal substances and have subsequently been seen as cheats, with no acknowledgement that they were in fact also excellent in their chosen sports.

The acceptability of using enhancement or not is clear in most sports where strict rules are generally par for the course, but it is less clear in other areas of personal enhancement where the rules are not so clear-cut. Nevertheless, the issue of 'cheating' would still only relate to situations where there are clear guidelines or rules prohibiting enhancement.

Generally there would not be any such rules in the current academic environment expressly prohibiting the use of cognitive enhancement by pharmacological means. Although institutions may be tempted to consider such bans, it would be very difficult to police.

Coercion:

A further argument for the inevitability of accepting that cognitive enhancement should be allowed is the coercion factor.

Coercion refers to techniques that agents may use to get others to do or not to do something by supplying reasons why agents might do, or refrain from, doing something (Anderson, 2008). It is often considered to diminish the targeted agent's freedom and responsibility and therefore a violation of the person's rights. But in some cases coercion could be justified, for instance in the rearing of children or keeping criminals in check. Coercion may also be used in a broader context to describe social pressures (e.g. peer pressure) or the manipulative effects of advertising or even one's upbringing. It may even be treated as a general concept relating to almost any infringement of personal rights.

In the case of cognitive enhancement, the perceived benefits obtained by those who use it, would put others who may initially wish to refrain under pressure "not to be left behind'. The more widespread the use of cognitive enhancers, the greater the pressure on non-users to also consider using some or other form of enhancement. The potential user may be confronted by a "damned if you do and damned if you don't" argument.

Whatever moral or other arguments are employed to not take enhancers, they will be severely challenged if the likelihood becomes more and more that most fellow students are in fact using enhancers – possibly with substantial associated benefits. To then continue not using, would put one at a likely disadvantage, with the potential for long-term negative consequences relating to academic progress and employment prospects.

There are clear benefits to teachers and employers if students and employees are more attentive and able to apply themselves more effectively to tasks at hand. Students or prospective employees who are able to demonstrate these abilities are more likely to succeed in their academic endeavours or job applications. If using a cognitive enhancer is to be a major asset in promoting the chances of success, then it would at face value seem almost illogical not to consider using it.

Complications may arise in the scenario where a successful job application was, at least in part, related to the use of cognitive enhancers – possibly due to improved academic performance allowing criteria for the specific position to be met, or even helping achieve a more successful and focused job interview.

This may imply that if a position was obtained with the assistance of methylphenidate, the person would need to continue with methylphenidate for as long as they are employed in the same position. It may be argued that if you were employed by virtue of functioning achieved with the use of methylphenidate, one should continue with methylphenidate, so as not to be judged to have deliberately deceived the employer by presenting as someone with capabilities one is not prepared or able to sustain.

There is not clarity as to whether the knowledge gained by virtue of methylphenidate-related cognitive enhancement is retained or in fact lost as soon as the effects of the drug wears off. Conversely, the opposing possibility that it is in fact retained as effectively as with any other form of study technique has also not been unequivocally disproven.

The report by Delport (2011), although not based on empirical research, does claim that some students have demonstrated marked efficiency in an exam situation by virtue of using methylphenidate while studying. If this is in fact the case, then there is at least some short-term retention of information registered with the assistance of methylphenidate.

According to Farah et al (2004), merely having to compete against students in a normal academic environment may act as an incentive to use cognitive enhancers. The question is subsequently raised as to whether there should be legal intervention to outlaw or restrict the use of enhancement therapies to protect people against such incentives to compete. But to outlaw the use of cognitive enhancers

may also be coercive, as it denies people the freedom to practice a safe means of self-improvement in order to eliminate the conflict caused by others who choose not to enhance.

What would the good doctor do?

"*One of the first duties of the physician is to educate the masses not to take medicines"*

Sir William Osler

This statement by the so-called father of modern medicine may on face value appear to support the anti-enhancement argument, but in all likelihood it was probably rather a reflection on the status of pharmacological science in the 19th century.

The good doctor may experience somewhat of a dilemma in deciding what the right course of action would be in the debate on cognitive enhancement. On the one hand, what good doctor would stand in the way of a student fulfilling his or her potential with all the potential benefits that may result? On the other hand, the good doctor cannot avoid the nagging doubt that this student may be the one out of many who may be at risk of becoming addicted to methylphenidate. There is also the punitive sword of the *Health Professions Council of South Africa* which hovers over the doctor's head, threatening to invoke whatever measures deemed necessary if a doctor prescribes highly scheduled medication to healthy young subjects and they should develop an unexpected side-effect.

According to Drabiak-Syed (2011), the physician has various obligations towards the patient – to prevent, cure or reduce suffering – but there is no established duty to make patients "better than well". Therefore it may also be argued that the virtuous doctor's responsibility ends with the rational and ethical treatment of disease or of an established disorder. Any further responsibilities may be considered not to lie within the realm of medicine. But this does not allow the medical practitioner to ignore the fact that the current system functions in such a

way that he /she is afforded powers of decision making that also lie outside of the accepted role – i.e. simply deciding as to whether to write a prescription or not.

Available literature often states the argument that the act of prescribing has little influence on the moral argument as to whether cognitive enhancers should be prescribed or not. If one doctor refuses, another doctor might agree and these doctors would then be sought out to comply with the wishes of those demanding enhancement. It is argued that this would minimize the moral input of the first doctor and therefore the morality of the argument is mostly determined by the public. But the question remains whether the first doctor acted morally by refusing to prescribe, without investigating or deliberating his/her own ethical concerns before justifying the refusal of a prescription. Merely hiding behind a rule or acting out of paternal arrogance – 'because I say so' – is morally problematic.

Some authors would restrict "the ends of medicine" to treating and preventing disease, restoring of normal function, and offering comfort to those who are ill or disabled. Buchanan (2011:27) considers this essentialist talk, deserving "a good deal of scepticism". Essentialism refers to the doctrine that there are some properties without which an entity could not exist (Blackburn, 2008). In this case, the narrow definition of "the ends of medicine" as described above would exclude the possibility that enhancement may also be considered part of medicine. But this argument denies the fact that medical expertise would always be involved in the assessment of safety concerns and the monitoring of the effects of new enhancement techniques during the course of research (Buchanan, 2011:27). Essentialist talk may also be considered very limiting in any ethical debate, as it often disguises controversial moral claims as facts.

Even if enhancement is not considered a "proper" end of medicine, it also does not say anything about whether enhancement in itself is morally permissible or not (Buchanan, 2011). This speaks directly to the ambivalence experienced by many medical practitioners in the debate around the use of methylphenidate in healthy students.

The fact that medicine is supposed to focus on treatment, prevention, restoration of normal functioning, comfort, and care is a professional delineation which has no implications for the morality of any actions not classified under this demarcation. Where it does become problematic, is where doctors have been afforded

custodianship of some practice that should actually not be in the domain of medicine alone.

This is exactly what occurs when a doctor is requested to prescribe methylphenidate to a healthy student wishing to enhance cognitive performance. It is not for the doctor to decide whether the student should be allowed to enhance or not, as this debate falls outside the mandate of medicine. If this same student decides to purchase a set of videos which demonstrates training methods to improve study methods and techniques to improve concentration, then the doctor does not and should not have any say in the morality of this decision.

In the same way, if a student decides to use caffeine or other wakefulness-promoting agents which are available without prescription, the doctor may express concerns relating to the safety thereof if it is applicable, but not on the morality of whether it should be used or not. But with methylphenidate, the doctor has been placed in a position of gatekeeper to the availability thereof and is thus enabled to make decisions on the morality thereof.

Considering the safety issues, albeit minor, as well as the small risk of abuse relating to the use of methylphenidate, it would be hard to argue against the involvement of the doctor. Nevertheless, if a student is healthy and has no determinable risk of drug abuse, the doctor has to ask him- or herself what the reason for denying a prescription for methylphenidate would be.

What would the good student do?

Justifiably, major emphasis is placed on the role of virtue in the acts and practice of being a doctor, but the role of the patient is often neglected. Virtue does not only refer to the doctor or healthcare practitioner. It can also be expected of a patient to act in good faith and do the right thing (Campbell & Swift, 2002; Sokol, 2006).

A ‘virtuous patient’ may be considered someone who has developed the virtues of participating in his /her own recovery, or to maintain a satisfying and productive life in spite of difficulties and adversity. This concept of a virtuous patient could be

extended to include respect for the doctor and the doctor-patient relationship. A virtuous patient may also be expected not to obtain medication illegally and not use coercive arguments to pressure doctors for prescriptions.

Although they are not considered patients in the strictest sense, the concept of virtue still applies and it may therefore also be prudent to consider the virtue of the students requesting methylphenidate for cognitive enhancement.

The current situation where prescriptions may be obtained under false pretences or even illegally raises concerns about such virtue. It may be argued that the end may be considered just, but to consciously deceive a doctor or to break the law by supporting illegal sources, can hardly be considered the actions of a virtuous person. It also raises the spectre of the Aristotelian concept of virtue where repeated actions of dubious virtue would progressively lead one further down the path of diminishing virtue.

Even if a prescription for the use of methylphenidate for cognitive enhancement was obtained legally and without coercing the doctor involved, patient virtue would also extend to always using the medication in a judicious way and adhering to the prescriptions of the doctor. This also relates to the fact that methylphenidate remains a highly scheduled drug and to supply friends or fellow students with some of your own prescription is in fact a crime as stipulated by the relevant local law governing the prescription and dispensing of medicines[9].

Any doctor prescribing medication may from time to time discuss these issues with his/her patients or clients, as it is an often neglected part of the doctor-patient relationship.

Rights:

If by virtue of some intervention, all students are able to perform substantially better academically, there would be little debate as to whether it would be generally

[9] Medicines and Related Substances Control Act No. 101 of 1965.

beneficial to the students, academic institutions as well as the community in which these students are eventually going to apply their knowledge and academic prowess. Community as a whole would be better off, and the consequences of a generally more efficient population could have considerable consequences in the broader social context. Following this argument, it may even be considered morally problematic not to allow these benefits.

Given the fact that methylphenidate is a relatively safe drug to use and has the potential to allow substantial benefits to those students who may choose to use it, it may be argued that students have a right to make use of this available form of enhancement. After all, they are not harming anyone else in the process.

The *HPCSA* may not be a pushover in the process of convincing them to consider lowering the scheduling of methylphenidate, but there is a strong argument to be made that methylphenidate is in fact unfairly scheduled too high and that this should be changed.

Current practice by academic institutions emphasises the fact that all students should as far as possible be supported and be allowed all possible methods to function optimally in the academic environment. If restrictions on methylphenidate are lifted or even decreased, the academic institutions may be confronted with an interesting dilemma.

If methylphenidate can safely help students to improve academic functioning, then should the institutions not allow easy access to methylphenidate for all students? There may be a decision not to decide, but this would not be compatible with other stated aims to redress imbalances and raises moral questions in itself.

The same argument that would apply to doctors refusing methylphenidate for cognitive enhancement, would also apply to the academic institutions. If by some decree students are forbidden to use enhancements, then it would be a moral requirement of the institution to justify the decision based on logical arguments and moral concepts.

Autonomy and paternalism:

Traditional medical practice has often been characterised by a paternalistic doctor, all-knowing, who would impose knowledge and treatment plans on grateful and respectful patients.

But this has changed.

The modern doctor-patient relationship is now much more informal. Informative and deliberative styles of consultation are considered much more appropriate and have in fact led to better treatment adherence and cooperation from patients.

The question which is relevant in this discussion is: Should students be allowed to make the decision on whether to use methylphenidate or not? If one considers the fact that most students are over the age of 18 and often in their twenties, there does not seem to be any legal reason why they should be prevented from at least having some say in the decision as to whether to use cognitive enhancements or not. The only provision would be that they are well informed about any dangers or side-effects associated with the use of methylphenidate.

Emotive responses against the use of methylphenidate in healthy students are common, but these are not necessarily based on logical arguments. This does not only apply to lay persons, but also to the medical fraternity. A common response to the question as to whether methylphenidate should be prescribed to students without a diagnosis of ADHD is that it is wrong.

Further argumentation is often based on the employing of biased interpretations of statutory guidelines or vague morality, sometimes also based on selective or uninformed interpretation of actual risk or safety issues.

The fact that many doctors would refuse to consider assisting with enhancement, may be considered a paternalistic action on the part of the doctor. Medical practitioners would often claim that they have the best interests of their patients at heart and that they should be the ‘gatekeepers’ of the access to various treatment modalities sought or requested by patients. The rationale behind this is usually the argument that most drugs have the potential to be unsafe and that only the doctor has the knowledge and background to decide as to whether or when prescribing is justified.

If this was the only applicable consideration, it may well be justified. But the reality is that the medical fraternity would also often take it upon themselves to decide not only whether the prescription of methylphenidate in individuals is justified, but also per implication and by the 'power' afforded to them, whether the broader concept of cognitive enhancement is justified. This is not the mandate only of medicine, and the debate on cognitive and other enhancement therapies should involve a much broader community – also the students themselves.

But the current restrictions on the availability of methylphenidate and other enhancement agents clearly allow the medical fraternity to be the main decision makers in the debate around enhancement. This inevitably raises the question of paternalism.

According to Beauchamp & Childress (2001:177-180), Immanuel Kant denounced a paternalistic government or "*imperium paternale"* for benevolently restricting the freedom of its subjects. This "government as a father" suggests the following of the role of the father: the father would act beneficently and in the interests of the children, and that at least some of the important decisions regarding the welfare of the children should be made by the parent. Justified paternalism relates to the concept of a parent intervening in the life of a non-autonomous dependent child and may be extended to other forms of care for incompetents. In a healthcare perspective this may be seen as the professional with superior insight and knowledge that has the authority to decide what is in the patient's best interests.

Benefits and autonomy should be placed on a scale, implying that as the interests in autonomy for a person increases and the benefits of paternalistic intervention decreases, justification for paternalism decreases. If the interests in autonomy should decrease, paternalism becomes more applicable. Therefore, to prevent minor risk or to provide minimal benefits to a patient, while ignoring the patient's say in the matter, is not justified.

Where paternalism becomes problematic, is when it allows for the justification of deceiving or manipulating patients. There is even some available literature that claims that all paternalistic actions restrict autonomous choice (Beauchamp & Childress, 2001:185).

But in spite of the bad press, if the following conditions are met, then a paternalistic approach may be justified (Beauchamp & Childress, 2001:186):

1. The patient is at risk of a significant, preventable harm
2. The paternalistic action will probably prevent the harm
3. The projected benefits to the patient of the paternalistic action outweigh its risks to the patient
4. The least autonomy-restrictive alternative that will secure the benefits and reduce the risks is adopted
5. The paternalistic action does not substantially restrict autonomy – only if vital or substantial autonomy interests are not at stake

If a medical practitioner refuses to prescribe methylphenidate to a patient because the patient has a heart condition or a previous history of substance abuse, it would be justified to be more paternalistic and decide for the patient that it would be in their best interest not to use the drug, even though the patient may in fact insist upon a prescription. In this case other ethical obligations are also invoked, such as the principle of non-maleficence.

But when the withholding of a prescription is based only on the decision as to whether there is moral justification for the use of the medication or not, paternalism becomes problematic and may even be construed as an abuse of power by the practitioner.

But then what about the doctor who does have moral concerns about the use of methylphenidate in healthy students? It would also not be acceptable to force these doctors to practice in a way that is contrary to their own morals.

This same dilemma arose in South Africa after the laws regarding termination of pregnancy were changed[10].

Previously doctors did not have to justify their ethical concerns regarding abortions, because they were allowed to hide behind restrictive legislation. But now doctors are forced to decide on whether to do terminations or not by justifying their own

[10] NO. 92 OF 1996: CHOICE ON TERMINATION OF PREGNANCY ACT, 1996

moral arguments. Doctors and nurses may refuse to do terminations, but they are required to direct the person requesting termination of pregnancy to a centre where terminations are done. Furthermore, if the doctor or nurse is found to obstruct any attempts to obtain a termination, they may be prosecuted.

Regarding the use of methylphenidate in healthy students, this raises interesting considerations. If methylphenidate is considered safe and not contra-indicated in a specific individual, then it would be ethically suspect of a medical practitioner to be obstructive in an individual's attempts to obtain cognitive enhancement.

Do no harm:

"*Primum non nocere"*

The basic premise to "first do no harm" has been guiding the medical profession since the times of Hippocrates. This is reflected in the Hippocratic oath, requiring physicians to promise "to abstain from doing harm". Beauchamp & Childress (2001:115) take it a step further and state: "One ought not to inflict evil or harm"

Any physician who puts his or her hand to paper to write a prescription, needs to bear this promise in mind. Nevertheless, it is also relevant to consider that in some cases, dangerous or potentially harmful drugs are, and indeed need to be prescribed in cases where there are no better alternatives available. In some cases, by not treating the patient, more harm will be done by the consequences of the disease or condition. This would clearly be the case in cancer treatment and immunosuppressant therapy. The threat or seriousness of the underlying condition would determine the justification for the use of potentially harmful drugs.

It is therefore obvious that where drugs are to be prescribed to "healthy" individuals, the safety profile of the relevant drug would have to be good.

Considering the available evidence, from a safety perspective, the use of methylphenidate is unlikely to cause physical harm (Sadock & Sadock, 2007:1211) provided the cautions mentioned previously are adhered to.

But there is another issue which is often raised in the debate around enhancement therapies. Some authors feel that the use of enhancements would inevitably lead to changes in the enhanced person that may not be physically obvious, but could lead to changes in personality and taken to the extreme, lead to a 'posthuman' being whose sense of morality and ethics may be changed to such an extent that non-enhanced humans may be in danger of oppression or exploitation.

It is also important to consider potential harm to the community, and this argument has been put forward by various authors as a potential risk of enhancement, as they believe that enhanced beings may lose their sense of morality and attempt to master or harm those who are not enhanced.

These issues will be discussed in more detail in following sections, as this is where the main debate around enhancement is currently waged.

Justice and fairness:

Life is essentially unfair. People are born with certain talents and abilities and some people are not. Life is easier for those born with certain talents as much as life is easier for those fortunate enough to be born in areas with geographical advantages or mildness of climate. History has also perpetuated differences between classes and allowed for oppression by those with superior numbers in a community or groups with superiority in resources.

As this is a common occurrence all over the world, anti-enhancement supporters would be justifiably concerned about the effects of enhancement of a select few on the rest of the population.

Societies which claim to be just and promote fairness amongst members are arguably more stable and may be expected to remain in situ for longer than societies experienced as basically unjust. If members of such a society believe in the justness of their respective societies, and believe in the beneficial results for the society as a whole, they are more likely to abide by the expectations and rules of the society (Dupré, 2007:180). This may be why governments, and by association,

institutions like universities and colleges of education, in countries where there are substantial inequalities would be very sensitive to any intervention or technical innovation which could potentially broaden the gap even further between groups.

In South Africa we have a history of prolonged and entrenched injustice, enforced by law. This, together with other social and in some cases geographical factors, has lead to large sections of our society being substantially disadvantaged compared to other privileged sections. With the advent of democracy, one of the stated claims by government was that these injustices were to be redressed.

The argument for justice is important in the debate against the use of methylphenidate in healthy students. Given the current situation where prescriptions are needed and that the drugs would have to be purchased from a chemist, it is obvious that not all students would have the same access to methylphenidate. If it is proven that students on methylphenidate do perform better, then it is clearly also not just towards those who do not have access.

Advocates for the anti-enhancement stance may suggest that the inevitable inequalities in access to enhancement therapies should be grounds for disallowing it.

But this argument does not stand when taken to its logical conclusion. The use of artificial light (synthetic sunshine), written language, advances in educational techniques, improved exercise plans and targeted dietary interventions are all forms of enhancement technologies which have led to profound benefits – even beneficial neural changes have been reported - to those who are able to avail themselves of these interventions (Harris, 2009).

Surely it would be unthinkable to ban these technologies because inequalities in availability prevent some from access.

Morality would rather demand that government or educational agencies ensure that programmes to promote more equal access are actively promoted and prioritized.

This raises a dilemma for tertiary institutions. Academic support and assisting students to perform to the best of their abilities are important aspects promoted by most universities – especially in the context of trying to accommodate previously disadvantaged students.

If academic institutions are seen to promote the best interests of all students, and they endorse the practice of methylphenidate to be used as an aid to study, then it raises the question as to whether universities should have programmes to make cognitive enhancers available to all students who may benefit from them.

There are numerous other areas where a privileged background would lead to advantages for which a university or other institution could not be rationally expected to compensate. The impact of a good education, continuous proper nutrition and even a stable and supportive home environment is significant and would inevitably lead to discrepancies in the likelihood of developing to fullness of potential. It would be irrational to expect any academic institution to attempt to address all of these imbalances and it is to be expected that the institutions mentioned would not be easily convinced that this process of assisted enhancement should be considered. But precedents have been set where government does assist in active medical intervention to produce enhancement (e.g. vaccination programmes aimed at enhancing immunity).

Where the state is concerned, it may in reality actually be easier to ensure equitable distribution of cognitive enhancers than it would be to address other existing factors contributing to the inequalities in opportunities for socioeconomic achievement, such as good nutrition and access to quality school education.

Vaccination may also be considered as a form of enhancement – it assists the body's immunological system to be more effective than it would have been if it depended on natural processes only. Clearly the use of vaccination then functions as a form of enhancement of natural immunity. The effectiveness of vaccination has produced tremendous benefits to the health of those able to make use of it. If it was only available to those able to afford the actual cost of the immunizations, or if it was severely restricted by the Medicines Control Act, then a large section of the population would not have been able to receive it. This section would most likely also be the section of the population already disadvantaged by the factors mentioned previously.

In this case, the state has become extensively involved in the supply and provision of this valuable enhancement. Vaccinations are widely available – even in remote rural areas, and community nurses have been extensively trained in the

administration thereof – negating the need for a prescription or expensive consultation with a doctor.

There are practicalities to be considered which apply specifically to methylphenidate – e.g. the highly scheduled status as well as the abuse potential. This would imply that there would always be more restrictions on access.

But the argument is not only about methylphenidate in particular.

The science of cognitive enhancement is in a process of development and what is available today is not the final product. Ongoing research is needed to ensure further improvements in efficacy and especially safety. Whenever a new technology or agent is produced, long-term consequences not only in relation to safety, but also to social impact would have to be evaluated. It is mostly in this last aspect where the concerns of governmental and academic institutions would have to be addressed.

It should be argued that the current available evidence in this regard related to methylphenidate does not allow for unequivocal assurances of beneficence and safety, and that ongoing research is needed. But the more important argument that would have to be debated by the institutions mentioned relate to the stance they would take on enhancement in general, because by not making a decision now merely based on the limited available evidence to promote methylphenidate, they are only postponing a debate that would inevitably have to be tabled.

Furthermore, endorsement or disapproval of the concept of enhancement would have an important impact on future research. It would be difficult to obtain financial support from funders to do research at a tertiary institution on enhancement, if it is an official policy that enhancement be discouraged and even condemned.

Therefore, to be able to do the much needed and ongoing research related not only to methylphenidate, but cognitive enhancement in general, it is important to have the support of the relevant academic institutions.

According to Bostrom (2005), transhumanism is a loosely defined movement that holds that current human nature is improvable in various ways – from intellectual capabilities to physical and mental well-being. In the spirit of justice, transhumanists promote the view that human enhancement technologies should be made widely

available, and that individuals should have broad discretion over which of these technologies
to apply to themselves (morphological freedom), and that parents should normally get to decide which reproductive technologies to use when having children (reproductive freedom) (Bostrom, 2005).

The slippery slope

The slippery slope argument states that if an individual or society embarks on a certain course of action which would result in a series of subsequent consequences – some foreseen, but eventually mostly unforeseen – there is an inevitable undesirable endpoint over which there would not be control.

The argument is also called “The Camel’s Nose”, referring to the metaphor that if a camel puts his nose into a tent, the rest of the body will soon follow. The metaphor of the camel also refers to the fact that the initial innocuous act or request by the “humble camel” to be allowed to put his nose inside the tent should be denied, because of what is inevitably to follow.

In the debate about cognitive enhancement, the concerns expressed relate to the fact that cognitive enhancement would set a process in motion where ongoing progress in enhancements would inevitably lead to the so-called posthuman state. This posthuman or transhuman state is considered undesirable by the opponents of enhancement as it is expected to have inevitable negative consequences.

Bertrand Russel (1924), provided fuel to the concerns raised by the bioconservative movement in *Icarus: the Future of Science.* In this he argued that technological advances in power would mainly increase our ability to harm one another. Within 21 years, he was proven correct by the advent of nuclear warfare.

In *Brave New World,* Aldous Huxley described a future world where the availability of advanced technologies and drugs have led to the control of the world’s population by ten so-called ‘world-controllers’. On the surface, the population appears to be ‘happy’, albeit with the help of technology and a mood-enhancing

drug called ‘Soma’, and in fact they are being manipulated unknowingly by those on power. Although written 80 years ago, modern society has not proven Huxley wrong in the ongoing search for instant gratification and ‘the quick fix’. In a number of essays first published in 1958, Huxley (2001) revisited the ideas he proposed in 1932, and came to the conclusion that his fantasy was becoming a reality at a much more rapid pace than he ever imagined.

Slippery slope arguments are used in various writings and discussions to argue against a multitude of proposed options. What these arguments all share is that they are used to oppose some form of change in the status quo. In that sense, slippery slope arguments may generally be perceived as ‘conservative’ in nature.

Some bioconservatives have a more extreme view on the need to restrict human enhancement (Kass, 1997). These relate to concerns about human dignity, and the way in which our attempts at mastery over human nature would lead to us undermining basic human values such as the meaning of the life cycle, the meaning of sex, the meaning of eating and the meaning of work (Bostrom, 2007:24). Others have even proposed legislation to make inheritable genetic modification in humans a ‘crime against humanity’.

Playing into the emotive arguments and fears of those opposed to enhancement, Annas, Andrews & Rosario (2002) suggest that:

> The new species, or “posthuman”, will likely view the old “normal” humans as inferior, even savages, and fit for slavery or slaughter. The normals, on the other hand, may see the posthuman as a threat and if they can, may engage in a pre-emptive strike by killing the posthumans before they themselves are killed or enslaved by them. It is ultimately this predictable potential for genocide that makes the unaccountable genetic engineer a potential bioterrotist.

The origins of these concerns are most likely to be found in historical reasons.

Crude attempts at manipulation and enhancement of the ‘genetic pool’ became a frightening reality in the 20th century – the most obvious example being the Nazi ‘eugenics’ programmes. But other countries also attempted to address their

concerns about the effects of modern medicine and other social interventions on the quality of the human gene pool.

Between 1907 and 1963 more than 60000 individuals were forcibly sterilized in the USA under eugenics laws. Other countries, including Canada, Denmark, Australia, Sweden, Finland and Switzerland had their own state-sponsored eugenics programmes (Bostrom, 2005:6). Even in South Africa, forced sterilization on intellectually impaired persons was only recently challenged and subsequently addressed by changes in law.

The scarring of the collective human psyche by especially the brutality of the Nazi programmes has sensitized humanity to the abuses of power by those claiming to possess the wisdom needed for justified social interventions. The result has been that the programmes mentioned above are now widely condemned.

Subsequently, those interested in improving the future prospects of humanity have begun to look to science (including medical science) and technology for progress (Bostrom, 2005).

The slippery slope argument would assert that by embarking on a process of promoting enhancement technologies, the feared consequences of producing a morally suspect transhuman being are inevitable and to avoid this, cognitive enhancement should be considered undesirable and that it should not be entertained, even to a limited extent.

But this would not constitute a balanced view.

The slippery slope argument may be considered a *continuum fallacy*. This fallacy states that there is a mistake in logic in that the eventual outcome is not a given. As in any scientific or social advancement, there are many variables that are as yet unforeseen and there is no logical reason why all the consequences are inevitably to be negative. The intended consequences could possibly also hold tremendous benefits to humanity, and this is precisely what the supporters of the anti-anti-enhancement stance would advocate.

The stated aims of enhancement would surely not be to produce an undesirable and dangerous posthuman being which would inevitably embark on a path of mastery and suppression of those who have not been enhanced.

The aims would rather be based on the need for humanity to be able to adapt better to a rapidly changing environment and an uncertain future. Responsible development of enhancement technologies would also be expected to have various checks and balances built into the process so as to continuously determine the consequences of the process.

It has to be considered that during a process of ongoing enhancement, ethical debate should and would be part of the review process and if already established ethical guidelines are followed, there would be various processes available to influence progress and new directions that would have to be decided upon.

Human Rights Charters are also well established in most societies and should obviously be integrated into whatever process of developing enhancement technologies is embarked on.

On the other hand, the anti-enhancement lobby also expresses concerns that enhancements will inevitably be pounced upon by governments and be used for nefarious purposes such as assisting in subverting 'undesirable' sections of society and even in warfare against other countries. These fears are not without foundation, as demonstrated by the various eugenics programmes as well as the experiments with various enhancement agents in the U.S. defence forces[11].

[11] The CIA conducted a covert human experimentation program, commencing in the early 1950's and continuing into the late 1960's. This project was codenamed *Project MKULTRA* and used US and Canadian citizens as its test subjects. The project involved many methodologies to manipulate individual mental and brain functions and employed the use of clandestine administration of various drugs and behavioural interventions. Some of the aims of the project were to investigate:

- Substances which increase the efficiency of mentation and perception
- Substances which will promote illogical thinking and impulsiveness to the point where the recipient would be discredited in public
- Substances which will alter personality structure in such a way that the tendency for a person to become dependent upon another person is enhanced
- Substances which will enhance the ability of individuals to withstand privation, torture and coercion during interrogation.

This information is publicly available in documents relating to a joint hearing of the Committee on Human Resources of the US Senate on August 3, 1977, titled "*Project MKULTRA, The CIA's Program of Research in Behavioural Modification*"

This is unfortunate as it demonstrates the real danger of abuses of power and what could happen when ethical considerations are ignored for the sake of expediency. Legislation would have to be passed that would provide for a legalised need for accountability in all cases, should covert abuses occur.

In spite of this, care must be taken to avoid another slippery slope argument in this case. If the proper oversight and public accountability are in place, governments would be expected to focus on their moral responsibilities aimed at promoting wide ranging benefits to society rather that embark on unethical covert experiments such as those mentioned previously. This should imply that government's interests in enhancement technologies would rather focus on its potential applications in enhancing productivity and teaching and training methods.

The argument from nature:

The “argument from nature” is commonly used in contemporary debate on moral issues in bioethics (Holland, 2003:151-152). This argument employs a moral presumption in favour of nature and would claim that it is against the natural order to interfere with the course of what “nature intended”. This is a conservative stance and anything that is seen as against whatever is seen as “natural”, should be condemned. Whatever is seen as in accordance with nature is therefore seen as acceptable. This argument clearly also applies to the debate around cognitive enhancement.

The impact of this argument extends all the way from the view that homosexuality is seen as unnatural to the interference by science in nature (e.g. genetically modified crops) and medical interventions aimed at modifying or preventing the natural progression of a condition or illness. This may even relate to the ‘unnatural’ intervention aimed at preventing reproduction by contraception.

But man has been modifying nature for thousands of years in the process of enhancing quality of life and to ensure safety. This is a basic Maslowian concept and is seen as human nature.

To insist on the validity of the argument for nature, would imply that an arbitrary line would have to be drawn as to what degree nature may be interfered with. For instance, would it be acceptable to catch rainwater in a container or bucket for use at a later stage? Nature would intend for the rainwater to run into a stream and eventually into the sea. Catching and retaining the water in a container is obviously "not as nature intended". It could hardly be seen as morally problematic, but then what about changing the course of a river in order to allow continuous supply of water on a larger scale? The morality of the argument should in this case not be determined by the fact that it is an intervention against what nature intended, but rather by the consequences of the action.

The practice of medicine itself is generally aimed at enhancing a failing organ or assisting a struggling immune system. This would imply that the basic practice of medicine should be considered interference in the natural course of an illness or the ageing process. Clearly the practice of medicine in its totality cannot be considered immoral.

The reality is that we cannot rely on the natural order to serve as the ultimate guide to how we should be and how we should live. Nature has given us illnesses like malaria, cancer and AIDS, and to claim that we have no moral right to fight these illnesses because they are determined by nature is clearly irrational.

Another argument challenging the argument from nature was put forward by David Hume, the Scottish philosopher. Arguing against the emotive views that propose the sanctity of life and the divine duty not to engage in the "crime" of suicide, David Hume suggests that we consider the laws of Nature (Fieser, 1995):

> Shall we assert that the Almighty has reserved to himself in any peculiar manner the disposal of the lives of men, and has not submitted that event, in common with others, to the general laws by which the universe is governed? This is plainly false; the lives of men depend upon the same laws as the lives of all other animals; and these are subjected to the general laws of matter and motion. The fall of a tower, or the infusion of a poison, will destroy a man equally with the meanest creature; an inundation sweeps away every thing without distinction that comes within the reach of its fury. Since therefore the lives of men are for ever dependent on the general laws of matter and motion, is a man's disposing of his life criminal, because in every case it is criminal to encroach upon these laws, or disturb their operation? But this seems absurd; all animals are entrusted to their own prudence and skill for their

> conduct in the world, and have full authority as far as their power extends, to alter all the operations of nature. Without the exercise of this authority they could not subsist a moment; every action, every motion of a man, innovates on the order of some parts of matter, and diverts from their ordinary course the general laws of motion.

According to Hume, if we accept that the "laws of nature" allow for natural disasters and illness to befall man and in this way potentially end his life, as it also pertains to all living things, it would seem that Nature considers the life of man no more unique or worthy than that of an oyster! [12] If we believe that these natural disasters are the Providence of God, and that only God may decide to end the life of a man, does that imply that man may not interfere? In reality, man has to interfere on a daily basis and tries to control Nature to thwart the effects of natural disasters so as to protect life.

Even Darwin considered nature to sometimes be much different from the good, stable and harmonious entity often described by the romanticism of some. In his letter to Joseph Hooker he writes: "What a book a Devil's Chaplain might write on the clumsy, wasteful, blundering low and horridly cruel works of nature!" (Buchanan, 2011).

Furthermore this argument would suggest that most (if not all) that is good in life is the result of Nature's goodwill, ignoring the fact that after centuries of altering and improving 'natural' conditions with the aim of enhancing safety, living conditions and socialization, man deserves at least some of the credit.

What of those less fortunate who may be genetically constrained in physique or mental capacity? Should they still be grateful to Nature, or could they at least consider some gratitude for human endeavours affording them special attention to also enjoy some quality of life?

Does the argument from gratitude also expect us to accept 'gifts' such as illness or natural disasters? If the argument allows us to challenge some gifts as unacceptable or deserving intervention only if there is a deviance from 'normal',

[12] This argument states that if a tree should fall, a man standing in the path of the falling tree would be killed in the same way that an unfortunate oyster or any other living being would be killed by the same tree. Nature does not distinguish in the moral worth or standing of beings. (The argument also does not state how an oyster came to be in the way of a falling tree!)

then only would it follow that normality deserves a special moral standing, to be excluded from any further improvement.

Personal freedom:

Habermas' (2003) concerns about enhancement also refers to the given and the value accorded the preservation of the natural state. He states that if parents are allowed to genetically modify an unborn child, even to attempt to ensure a 'better' life for the child by preventing a genetic deficit or illness, then the child can never be regarded as free. According to him ".... interventions aiming at enhancement ... violate the fundamental equal status of persons as autonomous beings ... barring him from the spontaneous self-perception of being the undivided author of his own life."

The problem with this argument is that genetic make-up is considered as the only factor determining the character of the individual. The role of the myriad of environmental factors is ignored. A sense of freedom is surely also influenced by styles of parenting, influences from teachers and other role models, peer pressure, prevalent laws and rules etc. Depending on a specific philosophy of freedom, integration of healthy ego-functioning is a much more important determinant – with little influence from predetermined genetic make-up.

Similarly, the use of methylphenidate in healthy students may be considered an external factor influencing biological functioning to such an extent that man is no longer "the author of his own life". This argument remains weak in the sense that there is no evidence that psychodynamic influences and character traits are in any way diminished by the use of cognitive enhancements. On the contrary, it may afford the individual the opportunity for better insight and ability to process deep-seated trauma by virtue of enhanced cognitive functioning.

Argument from ignorance:

The argument from ignorance states that a proposition would be held as true because it has not yet been proven false. The converse may also be used in that something is held as false or undesirable because the contrary has not yet been proven.

Buchanan (2011:154-155) raises a further concern, especially relevant to the debate relating to the use of methylphenidate in healthy students. According to him, there is a serious risk that our desire for improvement or enhancement will outstrip our knowledge of how to produce the necessary enhancement. It would thus be assumed that current enhancements are effective and desirable because the contrary has not been conclusively proven. This is well demonstrated on the reported magnitude of the use of methylphenidate in spite of the relative lack of conclusive evidence that it is as effective as what is clearly wished for. The reports of the illegal trade and supply in methylphenidate also demonstrate the fact that the safety concerns, albeit uncommon, and the abuse potential of methylphenidate is not taken seriously enough.

An argument used by the anti-enhancement group is that we simply do not realize what the implications of our meddling in the processes of nature would produce. Because we do not know what the exact outcomes would be, to meddle would be wrong. The statement that nature knows best would be repeated here and that we should respect and trust evolution to guide us where nature intended.

In an idealized world this may be more relevant, but the reality is that changes in our environment, technology and increases in the world population are happening at such a pace that evolution is unable to keep up. Global warming and the increasingly rapid industrialization of new superpowers are causing tremendous amounts of pollution and is toxifying our environment. Evolution is unable to allow humans and other living beings to adapt in time and we are increasingly forced to live in an environment to which we have not yet adapted.

Furthermore, contemporary morality is contradicting the dictum of ‘survival of the fittest’. Humanity has accepted the responsibility to also consider the interests and rights of those who would be neglected and condemned by the process of

evolution. This applies to the protection of endangered animal and plant species which evolution would consider being unfit to survive in modern times, but also to those humans who have been disadvantaged by virtue of physical or intellectual abilities. In a purely competitive environment, these individuals would not have survived, but they are now considered to have moral value in their own right and should be allowed the opportunity to also flourish.

Buchanan (2011:41) describes this as follows:

> So, it is simply not true that for the first time human beings are becoming capable of changing their biology; the more accurate statement is that for the first time they are becoming capable of changing their biology deliberately, in accordance with what they value, on the basis of scientific knowledge, rather than haphazardly.

This implies that technology and science has to be employed to bypass the deficiencies of evolution in modern life. Enhancement therapies are one of the methods which would afford us the ability to compensate and allow for the active promotion of living up to the changed moral, social and environmental issues we are faced with.

Therefore, instead of it being morally wrong to challenge the laws of nature and use available technology to thwart the vagaries of nature, it would appear as if it is morally wrong not to do that.

Pharmacological hedonism:

Klerman (1972) has identified a moral crisis in society, relating to extremes in value orientation which he calls *Pharmacological Calvinism* and *Psychotropic Hedonism.* The pharmacological Calvinist would view drugs used for non-therapeutic purposes with a general distrust and a conviction that “if a drug makes you feel good, it must be morally bad”. Although the use methylphenidate does not primarily aim to make one feel “good”, the potential gains clearly aim to improve one’s ‘being’. Achieving better grades or being appointed in a desired position of employment would lead most do derive some form of pleasure – although not necessarily in the physiological sense? Therefore the use of methylphenidate as an agent for

cognitive enhancement would clearly not be acceptable to the pharmacological Calvinist.

Klerman (1972:3) considers the main threat to pharmacological Calvinism to come from the youth culture. Youth generally has a more hedonistic view and often has a distrust of the authoritarian and paternalistic view of adults in the drug area. Achievements are viewed as less important than the immediacy of human relations, and the use of drugs which may enhance social functioning or standing are not considered morally wrong. This is clearly demonstrated by the culture of "soft" drug use as modes of enhancing sensory experiences during dance parties and as part of the so-called 'club-scene'. This most likely has its origins in the 1960's where the discovery of hallucinogens like LSD were considered a mode of enhancing perceptions and intensity of emotions and experiences.

These drugs were even used in attempts to do psychological research and by the U.S. army to enhance the capabilities of soldiers in combat. These poorly regulated experiments had negative consequences, as hallucinogens have potentially severe psychiatric side effects such as inducing mood disorders and inducing ongoing psychosis as well as repetitive hallucinatory experiences long after discontinuation of the drug.

As could be expected, these failed experiments gives further credence to the bioconservative approach to enhancement therapies.

Some sections of the medical fraternity would condone the use of medication only for therapeutic purposes and only under regulated supervision by physicians. Abstinence would be considered an ideal – medication should never be considered the only solution. This would of course depend on the nature of the illness being treated, but these practitioners would hardly be comfortable with prescribing methylphenidate to healthy students!

Mental Health professionals have their own version of pharmacological Calvinism. Proponents of psychotherapy – especially among the more psychodynamic therapists – would often view drug use as a "crutch", which hinders the process of therapy and may even prevent the goals of personal growth and emotional insight. Drugs may be viewed as agents promoting dependence – both physical and psychological – independent of potential efficacy and thus morally problematic.

True salvation can only be achieved through insight and self-determination and – actualization whereas drug use may be considered a secondary or lesser salvation. This theory of change through therapy – the philosophy of personal growth – could be considered a secular version of the theology of salvation through good works.

As an afterthought, it should be noted that hedonism as an ethical theory should not be confused with its use in popular parlance (Geppert, 2007). It was a theory that advocated not indulgence and excess, but the good life worth living, of which pleasure was an important condition. Pleasure in itself may be defined in various ways, and achieving personal enhancement, whether in appearance, physical ability or cognitive functioning, could clearly be considered a hedonistic pursuit in this respect.

Therapy and enhancement:

Another argument used to debate against the use of enhancement therapies relates to the distinction between therapy – broadly understood as an intervention aimed at the treatment and prevention of disease – and enhancement (Buchanan, 2011).

Few, if any, would consider therapy as defined above to be an unethical practice. To treat pneumonia with appropriate antibiotics, to correct hormonal imbalances in an underactive thyroid, to restore neurotransmitter deficiencies in depression, to fix a broken bone – these are clearly forms of therapy, and for a doctor not to perform these interventions when appropriate, would be considered unethical. The anti-enhancement group would see therapy and enhancement as two distinct actions – one being ethically required and the other seen as morally wrong.

Holtug (1998:211) raises a logical flaw in this distinction. If a patient with HIV needs a specific therapy to prevent progression to AIDS, this is seen as treating a deficient immune system and according to above distinction, morally acceptable. But if someone with hemophilia and a normal immune system, who is at risk of being infected by HIV because of repeated blood transmission, is given a drug to enhance her immune system to better than before (in other words better than normal) to prevent infection with HIV, then she is being enhanced. She is receiving a desirable increase in immunity that others do not naturally have and if enhancement

is considered unethical, then this treatment should also be considered unethical. Clearly this is not the case and the distinction between therapy and enhancement is not always easily defined.

If the distinction cannot be clearly demonstrated in at least some cases, then the unambiguous statement that enhancement is morally objectionable has to be questioned.

Preventative medicine is an integral part of modern health care. When one considers that most preventative interventions are in fact forms of enhancement, it further places doubt in the validity of the anti-enhancement stance in this regard. As mentioned before, vaccination is widely employed as an essential intervention to prevent potentially serious illnesses in healthy babies. But what vaccination does, is in fact to enhance the immune system.

The same may be said for many psychotherapeutic interventions.

Although in some cases psychotherapy is aimed at treating an underlying disorder, there are many instances where it is aimed at preventing future relapses. These interventions would include psychoeducation, improving interpersonal skills and general coping skills. Some psychotherapists would go as far as stating that these interventions are in fact more effective if they are targeted at patients who are in remission and not suffering from a distinct diagnosable disorder and therefore more able to integrate the process of therapy.

Psychotherapy has also been shown by neuroimageing techniques to cause structural and functional changes in the brain, which are associated with ‘better’ functioning of the brain (Linden, 2006). Here we then have a technique leading to potentially permanent changes in the brain, aimed at enhancing functioning in someone not suffering from a diagnosable illness.

Erosion of character:

"We can never be gods, after all--but we can become something less than human with frightening ease."

N.K. Jemisin, The Hundred Thousand Kingdoms

The literature on enhancement often refers to concerns about the effect it could have on character or individual morality.

Buchanan (2011:71-73) refers to two kinds of character concerns. The first is the expressivist or nonconsequentialist concern which states that the pursuit of enhancement, independently of the eventual outcomes and consequences, is a sign of an already existing "bad" character. This implies that the mere debate on the possible value of enhancement is morally problematic and should not be entertained. To merely request methylphenidate for cognitive enhancement would be a sign of deficient character in students and most likely in the prescribing doctor as well.

The consequentialist concerns predict that the active pursuit of enhancement will lead to the progressive development of bad character. A number of 'bad' decisions and actions will eventually contribute to the failure of character integrity.

Although these concerns need to be argued for their validity, it is interesting to first consider the origins of the concerns for character.

In the *Epic of Gilgamesh*, one of the earliest literary works available, dating from about 38 centuries ago, there is a reference to enhancement of the human condition. Gilgamesh is the central character in the *Epic of Gilgamesh,* the greatest surviving work of early Mesopotamian literature. In the epic his father was Lugalbanda and his mother was Ninsun, a goddess. In Mesopotamian mythology, Gilgamesh is a demigod of superhuman strength who built the city walls of Uruk to defend his people from external threats, and travelled to meet the sage Utnapishtim, who had survived the Great Deluge. He is usually described as two-thirds god and one third man.The second part of the epic revolves around Gilgamesh's quest for immortality. Fearful of his own death after the demise of his companion, Enkidu, Gilgamesh undertook a long and perilous journey to learn the

secret of immortality. Although he was ultimately unsuccessful, this was most likely the earliest reference to the quest for human enhancement. Gilgamesh set the tone for the search for ways to cheat nature and be better than what nature intended as a norm.

In spite of Gilgamesh's noble efforts, the attempts at human enhancement still generate fierce opposition from various quarters and the quest for transcending our natural limitations has long been viewed with ambivalence (Bostrom, 2005). As a counterargument against enhancement from classical literature, the Greek myth of Daedalus and Icarus describes the perils associated with unnatural enhancements.

Daedalus was kept prisoner in a tower to prevent him from sharing his knowledge of his own famous Labyrinth, built to contain the Minotaur, from spreading to the public. Daedalus fabricated wings for himself and his son Icarus by tying feathers together and securing their bases with wax in order to escape from their imprisonment. Before setting off, Daedalus warned Icarus not to fly too close to the sun, as this would melt the wax, with disastrous consequences.

Their escape was successful, but unfortunately, Icarus forgot his father's warning and began to soar upwards toward the sun. The sun duly softened the wax and the feathers came off, resulting in Icarus falling into the sea and drowning.

This tragedy could be used as a metaphor to warn against the consequences of unnatural enhancements. It could also be used to further demonstrate the inevitable arrogance that could develop in the enhanced human, followed by disaster.

Also with its origins in Ancient Greece, *hubris* refers to an act of arrogance, flouting the decrees of the Gods, but ending in *nemesis,* the fall of the protagonist. Hubris against the gods is often attributed as a character flaw of the heroes in Greek tragedy. This is a theme recurring in literature – from Shakespeare to Shelly – reflecting the ambivalence between the desire to be better or greater and the feared consequences.

Bioconservatives would argue that there is something intrinsically valuable about human nature, and if we enhance ourselves, this will be lost (Pols & Houkes, 2011). We may make ourselves 'better', but not necessarily 'better humans'. If

methylphenidate makes one smarter, it does not necessarily imply that it also makes one wiser – which would have been a desirable 'virtuous' trait. Following this argument, it would imply that human nature should be 'technology-free'. But this is impossible to sustain, given the levels that technology has pervaded our lives. Examples would include the role of computers in education, more effective exercise routines, medical discoveries and better understanding of nutrition.

Another theory would advocate that nothing of value could be achieved unless there is some compensatory effort involved – "if the short-cut was the best way, it would have been the only way". This also has religious origins, as the well-known phrase in Genesis, "by the *sweat of your brow* will you have food to eat…." clearly emphasises the virtues of hard work.

But does hard work necessarily confer 'dignity' and is medicalization necessarily 'bad'? According to Farah et al (2004), these rules of thumb may be contradicted.

When one considers that in the vast majority of cases, the aim and purpose of "hard work" is to fulfil basic needs for safety, shelter and food, it is hard to see why the act of working hard conveys a special sense of dignity if it is primarily aimed only at survival. The act of working hard would thus at best be considered morally neutral and not convey special dignity. Obviously the alternative – not working or even worse, using illegal means like stealing etc. to ensure that basic needs are met – is contra to dignity.

A chilling reminder of the potential abuse that the argument for the so-called benefits of hard work may justify relates to the slogan "*Arbeit macht frei",* which was used and displayed in Nazi concentration camps, aiming to provide some justification for the abuse perpetrated.

Neurocognitive enhancement intersects with our understanding of what it means to be a person or a human being (Farah et al; 2004:423-424). Again this also raises contradictions. On the one hand, self-improvement is seen as a laudable goal, but enhancing natural traits such as memory or attention span is somehow seen as 'commodifying' them. Practical techniques or behavioural interventions may be employed to achieve the same ends without any ethical concerns, but as soon as pharmacological interventions are used to achieve the same results, then it is problematic. There is no clear logic as to why the mode of enhancement should

determine the acceptability or not, unless the mode in itself demonstrates a dangerous or morally dubious action.

Sandel (2007) claims that the pursuit of enhancement betrays and exacerbates an existing character deficit because it demonstrates a lack of appreciation for "giftedness". "Giftedness" is described as a sense of accepting the limitations of human powers and "openness to the unbidden", what we cannot control:

> To acknowledge the giftedness of life is to recognize that our talents and powers are not wholly our own doing, despite the effort we expend to develop and to exercise them. It is also to recognize that not everything in the world is open to whatever use we may desire or devise. Appreciating the gifted quality of life constrains the Promethean project and conduces to a certain humility. It is in part a religious sensibility.

The sense of "giftedness" is further expanded to be considered a precondition for having proper humility and possibly other virtues as well.

Sandel is concerned that those with a lack of appreciation for "giftedness" and who promote the processes of enhancement do so because of a desire for mastery and perfection. His concerns relate to the Promethean aspiration to remake nature, purely to serve our own purposes and satisfy our desires. The problem is not the drift to mechanism, but the drive to mastery and the creation of a bioengineered group of beings who would have lost something intrinsically human. This would imply that the inevitable consequences of enhancement allows us to *know* that it is a bad thing and that the debate around it is unnecessary, since even extensive debate could not justify a bad thing.

The claim that those who desire enhancement are essentially motivated by a desire for mastery, perfection or immortality, is often considered as self-evident by bioconservatives (Buchanan, 2011). It is difficult to see how the jump from a desire to be better or a desire to live longer can be made to the desire to master others or the desire for immortality. To make these assumptions, one would expect empirical support, but Sandel and others do not supply this. The possibility that the risks of these bad consequences might very well be outweighed by the potential benefits of enhancement is ignored. To reach the conclusion that the risks posed by enhancement are too great and it should therefore not be promoted, Buchanan (2011:176) suggests stages which would first need to be followed:

- The magnitude of possible harm as well as the probability that it would occur would have to be determined.
- The full range of potential benefits and the likelihood of its' occurrence should be determined.
- The determining of whether there are morally acceptable, affordable and effective risk-prevention or –reduction measures that would allow for the benefits of enhancement to be enjoyed without running an unacceptable risk of bad consequences (elimination of all risk is virtually impossible in the real world).

None of the anti-enhancement arguments examined seem to even consider these suggestions.

Buchanan (2011:78-81) discusses the examples of the theoretical enhancement for vision to better than 20/20 simply for better enjoyment of a hobby (birdwatching) or the possibility of an enhanced lifespan. Neither of these enhancements would lead to a sense of or desire for mastery. Improved ability to enjoy a pleasurable hobby could in fact be considered as something good. A longer life would still allow for an appreciation of "giftedness". Many things would stil be out of our control and there would still be many limitations to human powers. The simple fact that some enhancements are good or even possibly good, and the fact that some enhancements have no impact on the appreciation of "giftedness" makes Sandel's argument invalid.

The transhuman species:

Gane (2006) describes the current era of technological advancement, in which humans are no longer bound by the 'laws of nature', but open to technological modification, as the *posthuman era.* Humans are no longer the most important beings in the universe and technological progress is geared to transforming humanity as we know it. Although there are various definitions of posthumanism,

for the purposes of this discussion, it can be used interchangeably with *transhumanism.*

Fukuyama (2004) adds fuel to the debate on whether the aim for transhumanism should be promoted or prevented by stating that "If we start transforming ourselves into something superior, what rights will these enhanced creatures claim, and what rights will they possess when compared to those left behind?"

Again there is the expectation that an enhanced being would have some moral deficit and the implication that transhuman beings would claim more rights – inevitably to the detriment of those who were not enhanced.

Julian Huxley, the brother of Aldous Huxley, was most likely the first person to use the word "transhumanism". He was a biologist, first director-general of UNESCO and a founder of the World Wildlife Fund (Bostrom, 2005). According to him:

> The human species can, if it wishes, transcend itself – not just sporadically, an individual here in one way, an individual there in another way – but in its entirety, as humanity. We need a new name for this belief. Perhaps transhumanism will serve: man remaining man, but transcending himself, by realizing new possibilities of and for his human nature (Huxley, 1927).

Countering the argument that the posthuman or transhuman agenda causes beings to have loss of inherent dignity, Bostrom (2011) states that the sets of individuals or groupings having received full moral status has actually increased.

In the 1970's, when *in vitro fertilization* was developed, there were ominous forecasts about the psychological impact of having to deal with the fact that they have to realize that they originated from a test tube, These concerns were found to be baseless.

The concept of transhumanism has found substantial support among various authors and others – to the extent that a transhumanist movement has been formed. The World Transhumanist Association (WTA), gave two formal definitions for transhumanism:

1. The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.
2. The study of the ramifications, promises, and potential dangers of technologies that will enable us to overcome fundamental human limitations, and the related study of the ethical matters involved in developing and using such technologies.

Transhumanists see human and posthuman dignity as compatible and complementary. Dignity should be seen as what we are and what we have the potential to become. Human nature is seen as a dynamic process which is seen as improvable.

Gane (2011) suggested that the posthuman or transhuman is not about 'progress' *per se*, but is rather a new culture of transversalism in which the 'purity' of human nature gives way to new forms of creative evolution that refuse to keep different species, or even machines and humans, apart.

This would also imply that the posthuman is a condition of uncertainty and likely to only be a temporary stop (if a stop at all) on a further progression to even more enhanced states. This argument is inevitable, since the acceptance of the need for enhancement cannot imply "enhancement until transhumanism is reached" and then stopped.

Transhumanist philosophers would argue that there not only exists a perfectionist ethical imperative for humans to strive for progress and improvement of the human condition but that it is possible and desirable for humanity to enter a transhuman phase of existence, in which humans are in control of their own evolution. In such a phase, natural evolution would be replaced with deliberate change.

Considering the fact that the supporters of enhancement do not generally propose a blanket and heedless pursuit of technologies and interventions aimed at bettering the human condition, but rather attempt to examine a balanced point of view with cognisance of the potential dangers and pitfalls, it is important to note that most of

these aspects have been incorporated in the Transhumanist Declaration (Bostrom, 2005):

> (1) Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth.
> (2) We believe that humanity's potential is still mostly unrealized. There are possible scenarios that lead to wonderful and exceedingly worthwhile enhanced human conditions.
> (3) We recognize that humanity faces serious risks, especially from the misuse of new technologies. There are possible realistic scenarios that lead to the loss of most, or even all, of what we hold valuable. Some of these scenarios are drastic, others are subtle. Although all progress is change, not all change is progress.
> (4) Research effort needs to be invested into understanding these prospects. We need to carefully deliberate how best to reduce risks and expedite beneficial applications. We also need forums where people can constructively discuss what should be done, and a social order where responsible decisions can be implemented.
> (5) Reduction of existential risks, and development of means for the preservation of life and health, the alleviation of grave suffering, and the improvement of human foresight and wisdom should be pursued as urgent priorities, and heavily funded.
> (6) Policymaking ought to be guided by responsible and inclusive moral vision, taking seriously both opportunities and risks, respecting autonomy and individual rights, and showing solidarity with and concern for the interests and dignity of all people around the globe. We must also consider our moral responsibilities towards generations that will exist in the future.
> (7) We advocate the well-being of all sentience, including humans, non-human animals, and any future artificial intellects, modified life forms, or other intelligences to which technological and scientific advance may give rise.
> (8) We favor allowing individuals wide personal choice over how they enable their lives. This includes use of techniques that may be developed to assist memory, concentration, and mental energy; life extension therapies; reproductive choice technologies; cryonics

The feminist concern:

On initial consideration it may appear as if feminist ethical theories do not have much to offer to the debate on cognitive enhancement. But as is often the case, lofty debates around morality and various counterarguments tend to ignore the practicalities of day-to-day life. And this is where feminist ethics may have the most relevance.

Whatever arguments are put forward in the debate on whether to enhance or not, eventually it will have implications for the daily lives of people. People are involved with others and their contributions or commitments to relationships have major implications to their long-term wellbeing.

The mistake often made in the layperson's description of feminist issues is that it is an attempt to assert equality in various fields of human endeavour compared to traditional, non-feminist approaches – Gilligan described these options as the Separate but Equal Thesis and the Integrationist Thesis (Hinman, 2005). This simplistic assumption does the concept of feminism a major injustice, as a feminist approach is much more complex and rich and should not be in competition with traditional norms and values – rather offering an alternative with much to offer and complement.

Feminist ethics relates to an Ethics of Care (Gilligan, 1997:150-152). This is in comparison with an Ethics of Justice which proceeds from the premise that everybody should be treated equally, whereas an Ethics of Care determines that no-one should be hurt (surely including both physical and emotional aspects).

Feminist ethics would consider the preceding debate on cognitive enhancement as fixed in a contest between medical and social paternalism vs. a drive towards functional improvement with hardly any mention or discussion of the importance and potential impact on family and the emotional bonds between people.

One of the difficulties faced by a feminist ethics, is that science is used to 'prove' the validity of theories – and also where ethics is concerned. Considering that most science originated from an androcentric environment, there is always going to be a bias against feminist concerns.

Universal ethical principles need to consider problems within families and in the context of care-giving (Held, 1993). This implies very strongly that a society that promotes the system of individual self-promotion and economic gain, or a conservative patriarchy, needs urgent revision. The feminist concepts of care, interconnectivity and trust in social networks, are hardly compatible with the aforementioned. It is clear that in some respects the debate on enhancement crosses directly into this domain.

On an individual level, a feminist ethics would require the person to always be aware of others, their interactions with him/her and continuous awareness of attaining balance between individual rights and actively becoming involved in shared responsibility.

The concept of a feminist ethics then challenges traditional views, to the extent that it forces one to reconsider ideas that were held as true and justified – whether from a male perspective, comfortable in patriarchy, or from a female perspective, which may never previously have been exposed to the validation of ego-syntonic concepts.[13]

One important consequence of these considerations may be that it opens up the possibility of also considering the voices of other minorities or groups previously ignored or discriminated against – e.g. the elderly, persons with physical or emotional handicaps etc. For instance, who are involved in the debate on enhancement? Have any attempts ever been made to involve the handicapped or disenfranchised? Could it be possible that there might be some new concepts or perspectives brought to the table?

A feminist ethics therefore allows for a much more humane and universal moral discourse and application. The importance of our interconnectedness and shared responsibilities on both macro- and microsystems in a social context should be emphasized as a central and pivotal concept for implementation. If claims to morality are to be made, it has to be determined from within this context and not from the point of view of a hierarchy of predetermined rules. Although the social and historical context cannot be ignored, feminist ethics should not be gender-specific. It should rather serve as a model for moral discourse based on our

[13] *Ego syntonicity* refers to behaviours and emotions that are in harmony with or consistent with one's ideal self-image.

responsibilities to and connectedness with each other – not only as men and women, but also as members of different race groups, religions, age groups and other groups with different needs.

In the debate on cognitive enhancement, feminist ethics would have the following concerns:

- Although mention is made of a trickle-down effect and some greater benefit that could accrue to the community as a whole, little if any debate is on the need for interconnectedness.
- While we do not necessarily have the answers, it has to be considered what the impact of individual enhancement would be in a family unit. If it is to lead to an emotional disconnectedness, there should be serious ethical concerns.
- Some may argue that enhancement is in part a selfish endeavour. Whatever the individual aims for enhancement are, it has to be the responsibility of the person considering enhancement to involve those who are dependent on him/her as well as those (often the same people) on whom he/she is depended for support and emotional sustenance.

CHAPTER 4: CONCLUSIONS

Bioethics seldom entails simple decisions only or allow for guidance in clear black or white terms. The decision on whether the use of methylphenidate in healthy students should be allowed or not, is also not a straightforward one. Various role players are involved and a number of practicalities are relevant. In the broader context of enhancement, there is no question that the debate should be actively encouraged. This debate should include the considerations of the implications for foregoing enhancement in its totality.

For example, when debating euthanasia, the morality of the decided course of action involves various processes and interactions with other role-players, which would each have to be considered on their own merits. Not only would the physical act of euthanasia have to be debated on the grounds of allowing for preservation of dignity and not causing further pain or discomfort, but medical ethics demands that health care workers involved should be aware of the emotions and conflicts in family members and be prepared to accommodate these as well. Participants in the debate and decision-making process on euthanasia have a responsibility not to make decisions from behind the safe fortress of rules and statutes. The same holds true for the debate on enhancement, and more particularly the use of methylphenidate and other stimulants for cognitive enhancement.

The debate demands examination of ethical thinking about the subject – both on a societal level as well as an individual level.

When utilitarianism demands that the latest (and most expensive) treatments for conditions such as schizophrenia cannot be financially justified in government hospitals, the moral approach would demand that extra attention be given to education and attempts to minimize side effects expected with cheaper and inferior available products. It would also demand of the health care workers involved to continue being involved in looking for ways to allow justification for changing decisions – whether by researching data on pharmacoeconomics or putting pressure on suppliers to lower costs.

There are safety concerns with the use of methylphenidate and there is bound to be further developments in the field of cognitive enhancements which may well be safer. But these developments are inevitably going to be substantially more

expensive initially. This does not imply that the use of cognitive enhancement techniques should be put on hold until the ultimate and ideal intervention is discovered. Methylphenidate is most likely the best we currently have available, and is as such deserving of further research and consideration for more freely made availability.

Demands by users and ongoing developments in cognitive enhancement is rapidly leading us to the point where not to decide is in fact to decide (Farah et al; 2004:424). The question is therefore not so much as to whether we need regulations, but rather what kind of regulations we need.

The argument that cognitive enhancement techniques will lead to a being with a lessened sense of morality, does not hold water either. If we consider humans to be more advanced than our predecessors of a few centuries ago, whether by the use of new technologies, better nutrition etc., are we less moral today than in 1800? There is no denying that there are excesses taking place on a daily basis today and interactions between humans are still fraught with old and new immoralities. But the same has transpired since history has been documented and we cannot ignore the fact that there are also many examples of altruism and enhanced moral arguments put forward by the very societies that promote enhancement.

The concerns expressed by those against the quest for enhancement would appear to employ the slippery slope argument in that if enhancement technologies are allowed, it would lead to a chain of events with the eventual inevitable result of humanity transformed into some posthuman cyborg, should be seen as the continuum fallacy that it is. This argument ignores the most likely scenario of that of a middle ground.

Nature has of course also contributed to this process of enhancement. This often overlooked contribution is called evolution (Harris, 2009). The Darwinian concept of natural selection is merely nature's effective, albeit slow, process of ensuring that humans and other terrestrial organisms continue on a path of continuous enhancement aimed at allowing species to survive in a changing environment.

A further reality is that advances in technical and medical knowledge have increased the average human lifespan substantially over the past 150 years. This

has lead to a rapid increase in the world's population and together with the ongoing increase in the use of fossil fuels and resultant pollution, the ability of the earth to sustain humanity and all the other forms of life will be increasingly put under pressure. As mentioned before, evolution is nature's process of adapting to changing environments. But evolution is a slow process, and the current pace of change requires adaptations at a rate that would not be achieved by natural evolution.

There can be little doubt that there will come a time when the earth's natural resources will be depleted, or the balance between those resources that could be replenished and the demands by an ever growing population with basic needs for sustenance and energy will become unsustainable. This implies that man has no choice but to develop technologies aimed at optimizing available resources, but also developing new methods of providing what is needed for the human race to survive.

For humans to be able to function optimally in this demanding environment, enhancement – especially in the domain of cognitive functioning – may become a necessity for survival.

Allowing or promoting the use of cognitive enhancement also does not imply unrestricted access. The availability of artificial light may be considered an enhancement technology, allowing people to function and work more effectively in environments and hours where previously darkness would have prevented this (Harris, 2009). But excessive or injudicious use of this technology could have detrimental effects on the health of users. The solution to this problem was not to ban the use of artificial light, but rather allow access to the research done on sleep phase disturbances, regulate working hours and improve access. The same process should be followed for cognitive enhancers: allow access to all available safety data and instructions in rational usage thereof, and because of some safety concerns (relating to current enhancers like methylphenidate), continue to use medical practitioners or, depending on relaxation of scheduling restrictions, pharmacists as gatekeepers.

Whether we like it or not, whether we support the anti-enhancement argument or the anti-anti-enhancement thinking, it would appear as if there is a desire amongst students to enhance and that this is unlikely to abate.

The argument that it is happening and that the ongoing use would just have to be accepted, should not be considered a valid justification.

The fact that some actions or even culturally accepted phenomena are becoming entrenched in daily life does not necessarily afford it moral standing. Nepotism and 'soft' corruption (where others are not directly disadvantaged) is often emphasised in current society, but has been prevalent long before any recent changes in government. The fact that it is happening and that it may even be seen as part of accepted business practice, does not allow it moral status.

Therefore, the mere fact that stimulants such as methylphenidate are being used regularly with the aim of enhancement rather than treating a disorder, does not in itself justify ongoing use on an ethical basis.

Anti-enhancement arguments would also have to be investigated, rather than just accepted on face value. To state that the use of stimulants in healthy students "is just wrong and should be prohibited" is an emotive appeal rather than considered reason.

Bioethics would require that safety always be considered when new technologies or treatments are applied. If methylphenidate was a dangerous drug with substantial risks of causing harm to whoever was to use it, then there would be little justification to further promote its use in a healthy population. But this is not the case. methylphenidate has a proven record of safety, and although, like virtually any other available pharmacological agent, there are side effects and some cases where its use would be contraindicated, these are not substantial. Safety concerns alone would therefore not warrant the prohibition of methylphenidate as a cognitive enhancement.

The issue of abuse potential does raise some concerns. methylphenidate is chemically related to other problematic drugs and there are documented reports where it had been abused in the past. Abuse patterns have changed substantially over the past one to two decades and methylphenidate does not feature in current statistics as a problematic or prevalent drug of abuse.

The argument from nature also does not offer convincing reasons for condemning the use of stimulants in healthy students. Human survival has always depended on man's ability to manipulate and influence the natural course of events. In man's

efforts to improve life expectancy, general health and physical attributes, various forms of enhancement have been employed over many decades. Cognitive enhancement cannot be seen as morally more problematic than enhancement of the immune system by vaccination or the practice of cosmetic surgery.

The bioconservative argument that cognitive and other enhancements would inevitably lead to the eventual existence of a posthuman being with a different and dangerous sense of morality, does also not withstand scrutiny. If one considers that the current state of human nature does incorporate at least some measure of enhancement that was not present one or two centuries ago, then this argument would have to imply that man in the 1800's was a substantially more noble being than what we are today. Many examples exist why this is in fact not the case.

A further fear entails the idea that enhancement would lead to major inequalities in ability, favouring those with the means to enhance, and causing these privileged enhanced individuals to use their superior abilities to suppress or harm those not so fortunate. This is certainly a possibility in some cases, as privileged classes and nations with superior resources have in the past been guilty of oppression and abuse of their privileged statuses. But this is not the general rule. Conscious promotion of ethical debate and active criticisms of these excesses mentioned previously are currently as active and relevant as ever before. It could even be surmised that cognitively enhanced humans would be even better equipped to debate moral injustices and argue against oppression of the less fortunate.

After considering all the various arguments in this discussion, we have to return to the initial question of why there still remains some members of the medical profession (especially psychiatrists) who remain unconvinced either by the arguments for the promotion of cognitive enhancement in healthy subjects or even refuse to debate the issue.

I would propose that in this case the anti-enhancement point of view is derived from a combination of fear and paternalism. Paternalism in this case would relate to the fact that some members of the medical profession are reluctant to relinquish or share their grasp on the right to prescribe medication. Although this is not what is proposed, the fear that doctors may be required by law to prescribe enhancement agents, would be regarded as a paternalistic defense. Medical paternalism demands that doctors remain in control of scheduled pharmaceuticals and that

there should be no requirement to defend their domain. The demand for enhancement requires debate broader than that of traditional medicine and medical practitioners should be seen as participants in this debate rather than all-powerful gatekeepers.

Taking all the preceding arguments and discussion into account, the use of stimulants in healthy students does not deserve to be denied. As an intervention aimed at improving cognition it falls clearly in the domain of enhancement therapies and as such deserves moral value.

Finally, I would like to propose the following suggestions to the question of how to approach the use of stimulants in healthy students:

1. Because of the profound increase in knowledge and technology, human potential needs to be broadened and enhancement technologies should be considered as a potential avenue to pursue in this regard.
2. It should be realized that all new interventions have the potential to be abused. Stimulants are no exception and there should be checks and balances to prevent abuse.
3. Governmental and academic institutes should ensure that continuous debate on the ethical issues pertaining to enhancement technologies is in place – to accommodate both current and future issues that arise.
4. Current available evidence does not allow for unequivocal acceptance of the potential benefits of methylphenidate and whoever considers using it as an agent for enhancement, should be made aware of this.
5. Safety issues are not of major concern, but together with the relatively small risk for abuse, the current *status quo* regarding the scheduling status of methylphenidate should remain.
6. Because of the reasons mentioned in (4), the illegal use and distribution of methylphenidate should be actively discouraged and intervened in where possible.
7. The refusal by a medical practitioner to supply a prescription for methylphenidate for enhancement should be based on weighing the safety concerns and the relative abuse risk against the available data regarding

efficacy. If a doctor has personal moral concerns about the broader concept of enhancement, he/she should refer the person requesting the prescription to another who has a different view on the morality of the issue.

8. It is the responsibility of the medical practitioner to make use of available sources on ethical and moral debate around the issue to determine his/her own stance on the issue.

9. Authorities and the medical fraternity have a duty to conduct ongoing research on the safety issues, and especially on the efficacy as a cognitive enhancer, as well as on other stimulants and cognitive enhancers.

10. Academic institutions should develop a policy on the issue of cognitive enhancement and make it widely available.

BIBLIOGRAPHY

Anderson, S. 2008. Coercion. in Zalta, E.N. (ed.) *The Stanford Encyclopaedia of Philosophy* [Online] Available: http://plato.stanford.edu/archives/fall2008/entries/coercion/ [2008, August 29]

Annas, G., Andrews, L., Isasi, R. 2002. Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations. *American Journal of Law and Medicine.* 28(2&3):151-178.

Ashton, H. 2005. The diagnosis and management of benzodiazepine dependence. *Current Opinion in Psychiatry.* 18:249-255.

Arria, A.M., Wish, E.D. 2006. Nonmedical use of prescription stimulants among students. *Pediatric Annual.* 35(8):565-571.

Barkley, R.A., Fischer, M., Smallish, L., Fletcher, K. 2003. Does the Treatment of attention-Deficit/Hyperactivity Disorder With Stimulants Contribute to Drug use/Abuse? A 13-year Prospective Study. *Pediatrics.* 111(1):97-109.

Beauchamp, T.L., Childress, J.F. 2001. *Principles of Biomedical Ethics*. New York: Oxford University Press.

Blackburn, S. 2008. *Oxford Dictionary of Philosophy*. Oxford: Oxford University Press.

Bogle, K.E., Smith, B.H. 2009. Illicit methylphenidate use: a review of prevalence, availability, pharmacology, and consequences. *Current Drug Abuse Reviews.* 2(2):157-76.

Bostrom, N. 2005. A History of Transhuman Thought. *Journal of Evolution and Technology.* 14(1):1-25**.**

Bostrom,N. 2005. In Defense of Posthuman Dignity. *Bioethics.* 19(3):02-216.

Buchanan, A. 2011. *Beyond Humanity?* Oxford: Oxford University Press.

Cakic, V. 2009. Smart drugs for cognitive enhancement: ethical and pragmatic considerations in the era of cosmetic neurology. *Journal of Medical Ethics.* 35(10):611-615.

Campbell, A.V., Swift, T. 2002. What does it mean to be a virtuous patient? *Scottish Journal of Healthcare Chaplaincy,* 5(1):29-35.

Chatterjee, A. 2009. Is it acceptable for people to take methylphenidate to enhance performance? No. *British Medical Journal.* 338:1532-1533.

De Jongh, R., Bolt, I., Schermer, M., Olivier. B. 2008. Botox for the brain: enhancement of cognition, mood and pro-social behavior and blunting of unwanted memories. *Neuroscience & Biobehavioural Review.* 32:760-776.

Delport, S. 2011. Ritalin se nuwe (onwettige) gebruike. *Rooi Rose* [Online]. Available: http://www.rooirose.co.za/index.php?p[IGcms_nodes][IGcms_nodesUID]=45a4941c2e9f8e466e99748e9db8fb00 [2011, May 10]

Drabiak-Syed, K. 2011. Physicians Prescribing "Medicine" for Enhancement: Why We Should Not and Cannot Overlook Safety Concerns. *American Journal of Bioethics.* 11(1):17-19.

Dupré, B. 2007. *50 Philosophy Ideas You Really Need To Know.* London: Quercus Publishing Plc.

Ericsson, K.A. 2003. Exceptional memorizers: made, not born. *Trends in Cognitive Sciences*. 7(6):233-235.

Farah, M.J., Illes, J., Cook-Deegan, R., Gardner, H., Kandel, E., King, P., Parens, E., Sahakian, B., Wolpe, P.R. 2004. Neurocognitive enhancement: what can we do and what should we do? *Nature Reviews Neuroscience.* 5(5):421-425.

Fieser, J. (ed.) 1995. Essays on Suicide and the Immortality of the Soul. *The Writings of David Hume* [Online]. Available: http://www.anselm.edu/homepage/dbanach/suicide.htm#A1 [2006, May 21]

Forlini C, Racine E. 2009. Disagreements with implications: diverging discourses on the ethics of non-medical use of methylphenidate for performance enhancement. *BMC Medical Ethics.* 10:9.

Fukuyama, F. 2004. The World's Most Dangerous Ideas: Transhumanism. *Foreign Policy.* 5:42-43.

Gane, N. 2006. Posthuman. *Theory, Culture & Society.* 23(2):431-434.

Geppert, C.M.A. 2007. The Religion of Benzodiazepines. *Psychiatric Times.* 24(4). [Online]. Available: http://www.psychiatrictimes.com/print/article/10168/54151 [2007, April 1]

Geppert, C.M.A., Taylor, P.J. 2011. Should Psychiatrists Prescribe Neuroenhancers for Mentally Healthy Patients? *Psychiatric Times.* 28(3). [Online]. Available: http://psychiatrictimes.com/display/article/10168/1834532 [2011, April 1]

Gilligan, C. 1997. In a Different Voice. In Kemp, S., Squires, J. (eds.) *Feminisms.* New York: Oxford University Press.

Habermas, J. 2003. *The Future of Human Nature.* Cambridge: Polity.

Harris, J. 2009. Is it acceptable for people to take methylphenidate to enhance performance? Yes. *British Medical Journal.* 338:1532-1533.

Held, V. 1993. *Feminist Morality: Transforming Culture, Society, and Politics.* Chicago: The University of Chicago Press.

Hinman, L.M. 2005. *'Moral Reasoning and Gender: the Kohlberg-Gilligan Debate and Beyond'* (powerpoint presentation) [Online]. Available: http://ethics.sandiego.edu/presentations/Theory/Gender/Gender.pdf [2005, November 17]

Holland, S. 2003. *Bioethics: A Philosophical Introduction.* Cambridge: Polity Press.

Holtug, N. 1998. Creating and patenting new life forms. In Kuhse, H., Singer, P. (eds.) *A companion to bioethics.* Oxford: Blackwell Publishers.

Huxley, A. 1932. *Brave New World*. New York: Harper Perennial.

Huxley, A. 2001 (Reprint). *Brave New World Revisited.* New York: Rosetta Books.

Huxley, J. 1927. *Religion without revelation.* London: E. Benn.

Karlsson, H. 2011. How Psychotherapy Changes the Brain. *Psychiatric Times.* 28(8). [Online]. Available: http://psychiatrictimes.com/display/article/10168/1926705 [2011, August 11]

Kass, L. 1997. The Wisdom of Repugnance. *The New Republic.* 216(22):17-26.

Klerman, G.L. 1972. Psychotropic Hedonism vs. Pharmacological Calvinism. *Hastings Center Report.* 2(4):1-3.

Larriviere, D, Williams, M.A., Rizzo, M, Bonnie, R.J. 2009. Responding to requests from adult patients for neuroenhancements: guidance of the Ethics, Law and Humanities Committee. *Neurology.* 73(17):1406-12.

Linden, D.E.J. 2006. How psychotherapy changes the brain – the contribution of functional neuroimageing. *Molecular Psychiatry.* 11:528-538.

Maher, B. 2008. Poll results: look who's doping. *Nature.* 452(7188):674-5.

McCabe, S.E., Knight, J.R., Teter, C.J., Wechsler, H. 2005. Non-medical use of prescription stimulants among US college students. *Addiction.* 100(1):96-106.

Nutt, D.J., Fone, K., Asherson, P., Bramble, D., Hill, P., Matthews, K., et al. 2007. Evidence-based guidelines for management of attention-deficit/hyperactivity disorder in adolescents in transition to adult services and in adults: recommendations from the British Association for Psychopharmacology. *Journal of Psychopharmacology.* 21(1):10-41.

Outram, S. 2009. The use of methylphenidate among students: the future of enhancement? *Journal of Medical Ethics.* 36:198-202.

Pols, A.J.K., Houkes, W. 2011. What is morally salient about enhancement technologies? *Journal of Medical Ethics.* 37:84-87.

Potgieter, M. 2011. Klag ingedien oor 'eksamen'-vitamien. *Die Burger.* 1 September.

Ries, R.K., Miller, S.C., Fiellin, D.A., Saitz, R. (eds.). 2009. *Principles of Addiction Medicine.* Philadelphia: Lippincott Williams & Wilkins.

Rizzo, M., Whitman, G. 2003. The Camel's Nose is in the Tent: Rules, Theories and Slippery Slopes. *UCLA Law Review.* 51(2):539-592.

Russel, B. 1924. *Icarus; or the future of science.* London: Paul, Trench, Trubner & Co.

Sadock, B.J., Sadock, V.A. (eds.). 2007. *Kaplan & Sadock's Synopsis of Psychiatry.* Philadelphia: Lippincott Williams & Wilkins.

Sandel, M. 2007. *The Case Against Perfection: Ethics in the Age of Genetic Engineering.* Massachusetts: Harvard University Press.

Sannerud, C., Feussner, G. 2000. Is Ritalin an Abused Drug? Does it Meet the Criteria of a Schedule II Substance?, in Greenhill, L.L. & Osman, BB. (eds.) *Ritalin: Theory and Practice.* Michigan: M.A.Liebert. 27-42.

Sokol, D.K. 2006. Virulent Epidemics and Scope of Healthcare Workers' Duty of Care. *Emerging Infectious Diseases,* 12(8):1238-1241.

Stahl, S.M. 2009. *The Prescriber's Guide.* New York: Cambridge University Press.

Teter, C.J., McCabe, S.E., Boyd, C.J., Guthrie, S.K. 2003. Illicit Methylphenidate Use in an Undergraduate Student Sample: Prevalence and Risk Factors. *Pharmacotherapy.* 23(5):1-11

Winkler, E.R., Coombs, J.R. (eds.). 1993. *Applied Ethics: A Reader.* Cambridge: Wiley Blackwell.

Walker, M. 2002. Prologomena to Any Future Philosophy. *Journal of Evolution and Technology.* 10:1-29.