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# Introduction

## Cognitive Enhancement

Voltaire reputedly drank 50 to 80 cups of coffee a day in a quest to improve his output[1]. Advice on sleeping and eating habits, with the contention of enhanced cognition has been abundant for years, and courses on better memory sell well. Recently Nintendo has started to market Wii products as a way of enhancing cognition[2]. We are obsessed with enhancement and the improvement of our cognition. It was perhaps only a matter of time before drugs were used to improve cognitive too.

In 2008, The New York Times reported that "an era of doping may be looming in academia" (Carey, 2008). This was supported by an informal survey conducted by Nature (Maher, 2008) dozens of academics revealed that they used prescription medication to improve their cognitive performance. Moreover, The New York Times reported surveys at colleges in the United States of America show that between 4 and 16 percent of students take cognitive enhancement drugs to gain an edge over their peers. It is becoming more and more normal for cognitive able individuals to augment their abilities.

Drugs that are most commonly used to enhance cognition are Ritalin and Modafanil. The former is a mild central nervous system stimulant developed to treat Attention-Deficit Hyperactivity Disorder, and the latter is a wakefulness agent to treat sleep disorders. Studies have shown that both these drugs have positive effects on wakefulness, concentration levels, memory function and even problem solving (Lynch, 2002; Marchant et al., 2009; Mondadori, Petschke, & Hausler, 1989)

Amongst ethicists the non-medical use of these drugs has provoked quite a controversy. The new field of neuroethics, regarding the ethical concerns specifically related to brain sciences such as cognitive enhancement drugs, has rapidly grown since the term was first coined in 2002. Since then, various leading universities have specific institutes devoted to the study of neuroethics (e.g. University of Pennsylvania and Stanford University) and in

[1] http://www.washingtonmonthly.com/features/2005/0506.koerner.html retrieved August 4th

[2] Nintendo DS have a game called brain training. "By performing a few mental exercises a day you can help sharpen your mind" (a commercial advertising Nintendo DS (http://www.youtube.com/watch?v=uGMOeYCa_jw&feature=related) retrieved on the third of august 2009)

2008 a journal entirely devoted to endeavour 'Neuroethics' was launched, the second volume was a cognitive enhancement drugs special.

Much of the debate in neuroethics concerns the practice of cognitive enhancement. Among the various topics discussed are the various forms of cognitive enhancement available such as drugs, brain implants and brain stimulation. Due to the fact that these are readily available, already in use by the public and a reputedly safe option, the discussion about cognitive enhancement has mostly revolved around the use of cognitive enhancement drugs. Issues of safety, implicit coercion and equality of access are often discussed. However the most passionately debated ethical issue is the topic of the changed self. There is the concern that as a result of cognitive enhancement people will lose their personhood, change personality. Further there is a concern that enhancement technologies will be able to enhance our cognition beyond what humans are currently capable whereby we will evolve beyond recognisable humanness. Metaphors of the *A Brave New World*[3] are invoked, to illustrate what might happen to the self. Talk of a 'Posthuman Future' is pervades the debates. I will refer to these types of problems as the 'personhood concern'.[4]

This type has also been addressed by sociologists and anthropologists. They have noted the shift in focus towards brain sciences in society, and argue that the new field of neuroethics is a result of this shift in focus. The focus was originally placed on psychological explanations, and is shifting towards neurological explanations. So that for, the concept of mental distress is now viewed and explained, both by patient and doctor, no longer as caused by a traumatic childhood or an unfortunate life event, but rather as the result of unbalanced neurochemistry.

## Chemical Influence versus Metaphorical Influence

This thesis discusses the possibility of changed personhood as a result of the widespread use of cognitive enhancement drugs. I will examine two different ways in which cognitive

[3] (Huxley, 2007) In *A Brave New World*, the standard of living in a fictional society has dramatically improved for all people and their lives have been enhanced in all possible way. They are happier and healthier than ever, but have lost their humanity. The argument is that suffering and trial is at the very core of who we are.

[4] I do not mean to imply that these concerns are all the same and can be discussed for every purpose in a uniform way. However a detailed discussion of every form of 'personhood concern' is beyond the scope of this thesis. For the purpose of my argument there is enough shared commonality.

enhancement drugs have been argued to influence personhood. I will take personhood to mean two different things, personality and the quality of being a person. I will take enhancement to be an undertaking with the purpose of improving something beyond good.[5]

I will do this by analysing the arguments used in the neuroethics debate regarding changed personhood due to cognitive enhancement drugs. The arguments will be analysed to emphasise the implicit premise which all arguments hold; cognition is in the head. The opponents of cognitive enhancement drugs argue that it is unethical as a result of the chemical influence of cognitive enhancement drugs on the self. This form of argument can only be valid if we understand cognition to be 'in the head'. This assumption, the cognitive assumption, motivates the controversy that is invoked in the current neuroethics debate.

According to proponents of 'Extended Cognition' the skull is an arbitrary membrane and should as such not be viewed as the limit of cognition. I will review and defend it against the main criticisms of this view.

If the concern about changed selves as expounded by neuroethicists is premised on the assumption that cognition is in the head, and instead cognition extends beyond the skull, then the neuroethicists' arguments fail. The chemical influence of cognitive enhancement drugs is not notably different from other forms of enhancement. The chemical influence on personhood is not ethically problematic.

In examining the sociological and anthropological debate I conclude that there is another influence that the wide spread use of cognitive enhancement drugs has on the self; a metaphorical influence. I mean by this the influence of the implicit equation between brain states and cognitive states; the influence of viewing the self as ones neurochemical make-up. I will argue that the self changes due to the metaphorical influence of cognitive enhancement drugs, and I will explain this phenomenon by appealing to the self-regulatory nature of our minds.

[5] Please note that the definition of enhancement is hotly contested. For a more thorough discussion of the types of issues associated with this definition refer to Daniels (2000). It is not directly relevant which definition is used of definition which is why I stick to the most standard definition.

The metaphorical influence presents a defensible ethical concern that will need further addressing. I briefly outline a possible argument that defends the problematic nature of cognitive enhancement drugs.

The overarching concern that unites this thesis is the need to refocus the ethical discussion regarding cognitive enhancement drugs. I demonstrate that the focus needs to shift from examining the chemical influence of drugs on the self to the metaphorical influence of drugs on the self. I will argue this by expounding an argument against the focus on the chemical influence after which I give a positive account of the metaphorical influence of these drugs.

The argument of this thesis, while spanning several areas of expertise, is argued for conclusively, and as such, if the assumptions are accepted the conclusion I draw should be agreed to. Due to the broad nature of this argument I do not argue conclusively for all assumptions I make. I will make it known whenever I do assume something that requires much more discussion than this thesis permits, and will direct the reader to the appropriate sources.

The conclusion that I draw is that the current arguments as held by neuroethicists that support the hypothesis that cognitive enhancement changes personhood, do not hold. As such, the discussion ought to be refocused to discuss the ethical repercussions of the metaphorical influence of these drugs on personhood.

## The Chemical Influence

### The Rise of Neuroethics

Around the turn of the century, a new field in ethics emerged: neuroethics. This special strand of bioethics was concerned with the issues surrounding the manipulation of the brain. While there are a wide spread of issues that authors have since claimed which fall under neuroethics, such as legal and justice queries (M. J. Farah, 2004), I shall focus on the ethical questions that are specific to neuroethics to narrow this wide spectrum. Neuroethics has raised new questions because what is referred to as "unique relationship between brain function and the mind" (M. J. Farah, 2004, p. 1), and also because the

brain is increasingly seen as the place where the self resides due to the fact that the mind is increasingly seen to reside in the brain ((Lesher as quoted in Illes, 2007, p. 1).

There are several types of cognitive enhancement that are discussed in the literature, (e.g. transcranial magnetic stimulation) however the main concern is pharmaceuticals. A practical reason for this is that they are widely used, while the other forms are, at present, a future concern (Butcher, 2003; Chan & Harris, 2006; M. J. Farah, 2004; Glannon, 2006; Greely et al., 2008). Mood enhancers have come under continual debate (e.g. Kramer, 1994), and some issues raised in the cognitive enhancement debate have also been raised in the genetic enhancement debate (Vogel, 1997). While I do not intend to discuss either discourse at length, it will be is necessary to refer to them as a comparison.

It is sometimes argued that all ethical concerns can be solved by good policy making and that the debate ought to be focussed accordingly (Greely et al., 2008). There are those who view it as the first real instance of transhumanism; enhancement made possible through technology (Bostrom, 2005), and who discuss it in the wider context of transhumanism. Others discuss the ethical questions associated with the rapid "advances in cognitive neuroscience" that "make cosmetic neurology[6] in some form inevitable" (Chatterjee, 2006, p. 110). It is the debate that has followed on from this approach that will form the focus of this paper. This debate is mainly concerned with four questions; safety of these drugs, whether increased cognition will change personality in the same way that decreased cognition can change personality, concerns regarding equal distribution, and finally concerns about implicit coercion (Chatterjee, 2006). The safety and equal distribution questions are mainly of a practical nature, and are often phrased as empirical questions. Therefore, I shall not include them in this thesis.

Due to the considerations expounded above I shall focus on the ethical question that is unique to the cognitive enhancement debate regarding changed personhood in the remainder of this thesis. I will analyse this concern to highlight the implicit assumptions about the location of cognition that it is premised on. It will be concluded that the debate relies on an incorrect assumption of cognition. I shall argue that this motivates the rejection of the focus on the chemical influence in the neuroethical debate.

[6] Cosmetic neurology is a term used for any instance in which the brain is manipulated to make us (our mood, our cognition) "better than well" (Elliott, 2003)

## The Cognition Assumption

Cognitive enhancement is nothing new. Ever since the 18th century people have sought to control their lives and enhance their cognition. So what is it specifically about drugs that can enhance cognition that provokes an overwhelming debate and invokes controversy[7]? The only discussion that the other means of enhancement have provoked is centred on questions of effectiveness, certainly not changed personhood. What, then is causing this overwhelming concern, as the noted ethicist Parens (1998) said, why not worry instead about apple pie?

The response to the use of pharmaceuticals to enhance cognition is staggering in its abundance and in the intensity of debate. The controversy is justified by the fact that the direct influence that drugs have upon cognition is unprecedented: "The enhancement question, however, arises primarily in technologies that attempt to *directly* moderate the neurochemical, structure, or electronic components of the brain" (Wolpe, 2002). However it is only if one has specific assumptions about the brain, and what cognition means that one can state that new questions arise due to direct modification of the brain. Enhancement of cognition as demonstrated above is not a new concept, but pharmaceuticals enhance cognition directly in the head. The assumption that cognition takes place in the head is clearly present in the debate.

The arguments that support concern of changed personhood motivate the rejection of the use of cognitive enhancement drugs. The concern of changed personhood is the result of the implicit assumption; that cognition resides in the head. To demonstrate this, the arguments presented below, that motivate the changed personhood concern, have been restructured to demonstrate the implicit reliance upon this assumption.

Wolpe (2002), an often cited neuroethicist, specifically refers to the concern that drugs can change human nature. He argues that changed personality is often reported in the case of Alzheimer's disease and dementia. A loss of cognition affects opinions and memory which can lead to changed personality. Increased levels of cognition similarly affect opinions and memory and can therefore have the same effect. The difference between drugs and other forms of enhancement is that the former manipulate biology,

[7] This argument is purely centred on the extra concern that seems to exist for cognitive enhancement drugs. I do not intend to argue that there is no controversy or debate regarding enhancement in general.

inside the head and the latter on the body (e.g. by rubbing ones temples to try and remember a fact) and ones environment (e.g. smaller class sizes), both outside the head. Wolpe states that "the ability to manipulate our own biology is an affront to our humanity" –very clearly singling out only one of the two means of enhancement. The only factor that is different between the two means of enhancement is what it manipulates. The manipulation of biology is clearly seen to be the worst of the two options; it is an attack on our sense of humanity.

The argument discussed motivates the claim that change to cognition, by means of enhancement drugs, has detrimental effects on personhood. The argument relied implicitly on a difference between the manipulation of cognition through non-biological means and the manipulation of cognition through biological means. The latter was argued to be an attack on our sense of humanity, thereby implying that it is a form of manipulation that could most strongly affect a person. This conclusion can only be held if one equates cognition with its biological underpinnings.

On initial consideration it may seem uncontroversial to state that cognition is in some way underpinned by biology. Whatever view one takes of cognition, it would probably in one way or another be underpinned to some extent by biological processes. It could therefore be the case that the concern with drugs is really only about the direct interference of the biology of the brain, rather than with the interference of cognition. The issue, however, that I want to emphasize is that the biological underpinnings of cognition are seen only to change through manipulation inside the head. The question is whether Wolpe's (2002) argument is in fact a concern about manipulation of neurochemistry and or of cognition.

The brain is 'plastic'; it is a dynamically changing structure. It is altered by interactions and the environment. Education, a well structured text book, all change the structure of the brain. One extreme example of such enhancement is the Fast ForWord which utilises the brain's reputed plasticity to enhance reading and verbal skills. The Fast ForWord, a neuroplasticity-based training approach (Tallal, 2004) is a program which alters the structure of the brain in beneficial ways through video games with the effect that learning is facilitated. It is designed to "improve fundamental aspects of oral and written language comprehension and fluency" (Tallal, 2004, p. 724). The biology that underpins cognition

is therefore altered by this form of enhancement in a very explicit way[8]. The only difference between the video game and drugs is that one enhances cognition inside the head while the other works outside the head. It is therefore not the case that cognitive enhancement drugs are unique in their capacity to alter the structure of the brain. Objection to these drugs therefore are not objections against changing the structure of the brain per se. They specifically stem from the assumption that cognition in only in the head.

As a consequence of the argument that drugs uniquely impact cognition directly it is stated that the type of influence that they are capable of having is unprecedented. "[B]ehaviour-modifying drugs offer us an unprecedented power to enforce our standard of normality." (Bioethics, 2003, p. 90). The argument to support this is parallel to the one explained above. Drugs influence the inside of the head. The other forms of enhancement have been around for millennia, but manipulate the environment and the body externally. One who argues that drugs form an unprecedented way of enhancing cognition as a consequence of holding that cognition is impacted in a direct way, must hold that the difference between manipulation inside and outside the head is significant. Due to the fact that the concern was with the manipulation of cognition, cognition has to reside in the head for this argument to be sound.

One could object that there is another crucial difference between drugs and other means of enhancing besides the inside/outside difference, namely that the former enhances by manipulation of structure and the latter by manipulating content (which might impact structure). It can be seen as an active versus passive enhancement. This is a concern that does not have the cognitive assumption at its centre. Furthermore, it is not an argument that is discussed by neuroethicists, the concern about the unprecedented nature is motivated by concern about the direct impact of drugs. Remember that I am not discussing what could be ethically problematic about the use of cognitive enhancement

[8] NB. One might worry here about the accuracy of the analogy. The video game with the purpose of enhancing literacy skills seems to improve these skills through practice. It is therefore an active way of improving one's function and it may therefore be seen as more a more natural form of enhancement. The only difference between the two scenario's is not the inside/outside dichotomy. However, the videogame restructured the brain in an indirect way; the game itself did not directly have anything to do with the skills that were later tested. This casts doubt on the claim that enhancement by computer game is more active then the drugs example. A way to bring this out is to conceive of the computer as a controlled real life situation, as stated before the plastic brain is restructured by the environment in an indirect way, and most of the restructuring happens by virtue of being in this world not by active learning necessarily.

drugs here, I am discussing what the arguments are given by neuroethicists to motivate concern about cognitive enhancement drugs. This concern needs to be argued for in a wholly different way to the arguments than the arguments discussed seen so far. Later I will discuss ways in which this form of concern can be expounded in a defensible way.

Another indicator that the objections to the use of cognitive enhancement drugs stem from the fact that cognitive enhancement drugs are seen as categorically different from other forms of enhancement is that the people that do not hold that they are different, are not opposed to the use of cognitive enhancement drugs. The issue that separates the opponents from the proponents is whether drugs and other forms of enhancement are relevantly different.

Proponents of the use of cognitive enhancement often express that there is no significant difference between the use of pharmaceuticals and any other means of enhancement e.g. education. Harris and Quigley compare spectacles and electricity as ways of enhancement to cognitive enhancement drugs, and urge merely for fair policy making (Harris & Quigley, 2008). Moreover, they are quoted in *The Independent* (Laurance, 2009) as proposing that this class of drugs be seen as an extension of education. A recent article in Nature sparked an extensive online debate, where it was stated that "The drugs just reviewed [various cognitive enhancement drugs], along with newer technologies such as brain stimulation and prosthetic brain chips, should be viewed in the same category as education, good health habits, and information technology- ways that our uniquely innovative species tries to improve itself." (Greely et al., 2008, p. 702)[9]. Proponents develop the point that cognitive enhancement drugs are similar to other forms of enhancement and argue that as such, they should not inspire any more controversy than other forms of enhancement.

Neuroethicists that are in favor of enhancement drugs tend to hold that all forms of enhancement as similar in crucial ways. Greely *et al.* (2008) argue that no two ways of enhancement are ever entirely alike, meaning glasses are different from exercise in that former is not free and the latter is free, while education and sleep are different because the latter is equally distributed and the former is not. But all the issues that are associated

[9] Greely (2006) seems to not have departed from his opponents view in terms of where cognition resides "modern science, […] is opening vast opportunities not just to use new tools, but to change out bodies and minds."

with cognitive enhancement drugs are shared by these other means of enhancement, and as such they do not form a unique means of enhancement. In response to the changed personhood concern, it is argued that human nature is what comes natural to people. People have been enhancing their life since the beginning of mankind. Proponents argue that enhancement is therefore intrinsic to human kind.

### Cognition in the Body?

The issues that are discussed above are arguably not specific to cognitive enhancement. To look only at the cognitive enhancement debate and not at any other enhancement debate and then conclude that the discussion of cognition is unique to cognitive enhancement would be to beg the question. In order to argue successfully that cognition is viewed to be in the head, all the other enhancement debates (i.e. the use of doping in sports or cosmetic enhancement) must not be found to raise the same worries regarding changed cognition and indeed changed personality. If they did, then cognition would also be viewed as also occurring in the body, which would undermine my argument. Cosmetic and sports enhancement can be used to demonstrate that this is not the case, which leads one to conclude that these worries are unique to cognitive enhancement.

The ethical concern that is most often voiced with regards to sports enhancement is that it is against the 'spirit' of the sport. The argument is as follows. Sports are essentially competitive. The purpose of competition is to determine who is best at the sport. Artificial enhancements means that competition is no longer a valid means to determine who is best (Miah, 2006). Enhancement of the body is therefore not discussed in the ethics literature as altering cognition and by extension personality. This demonstrates that the concern voiced by neuroethicists regarding cognitive enhancement drugs is specific to enhancement targeting the neurochemistry through means that work inside the head. It is not a concern that also exists for enhancement of the body.

In the cosmetic enhancement literature, ethical questions regarding safety, the responsibility of the surgeon, the body as a commodity, and the medicalisation of physical abnormalities are commonly voiced (De Sousa, 2007). In similar vein to the ethical discussion regarding enhancement in sports, there is no mention of the body being part of the self, and as such that there is no the risk of transforming or altering the self in the cosmetic enhancement literature. Chartterjee (2007) compared the ethical concerns of cosmetic enhancement and cognitive enhancement. He points out that the

same issues are raised for both forms of enhancement. At first glance this may seem to contradict my argument so far. However, the way in which he argues his case makes it clear that it is not entirely the same worry. In the case of cognitive enhancement, he states that struggles and trials are important for the development of one's character, and cognitive enhancement drugs eliminate struggle and trial. Therefore, cognitive enhancement drugs will lead to "erosion of character" (p. 131). The argument to motivate this concern regarding cosmetic enhancement is markedly different. He states that concerns like this were expressed in terms of "being inappropriately preoccupied by appearance" (p. 131). In this argument the concern seems to not be with a loss of character, but merely a development of character that is undesirable. In the first quote, personality is directly and lastingly affected, while the second quote there is no mention of direct change to personality but merely a shift in character. Again, cognition is not seen to reside in the body, as it is not discussed as affected by enhancement of the body.

In both ethical discussions of the enhancement of the body, cognition is not seen to be part of the body, a loss of personhood as a result of changed cognition were not mentioned. This is markedly different from the ethical concerns that were expressed in the case of alteration made within the head, by means that enhanced directly within the head. Alterations to the body are not seen to affect cognition in any important way. Therefore, cognition is seen to reside in the head. Interestingly, within the feminist tradition, the body is sometimes argued to be part of  and having influence on, the self (Butler, 1999). Arguments like this are situated within the embodied literature, which positions cognition in the whole body (Gallagher, 2005) and not merely in the head. This confirms that where cognition is thought to reside is of influence to the type of manipulations that are thought to affect cognition.

The arguments described above support the claim that cognitive enhancement drugs present unique ethical questions about personality. I have argued that these arguments are sound as long as they include a premise about the location of cognition. Cognitive enhancement drugs are seen as a uniquely direct and unprecedented way to enhance cognition because cognition is seen to reside in the head. I have argued that this concern only exists for alteration to the brain so far as the brain is seen as cognition, and that it is a concern that does not exist for enhancement of the body. One must therefore conclude that concern about changed cognition and by extension personhood, is wholly unique to

enhancement that takes place within the head. And considering that the concern is with changed cognition, cognition is seen to reside in the head.

### Means Matter Morally

There are ethical concerns about the use of cognitive enhancement drugs that are not directly related to the arguments expressed above. These arguments appeal to the moral connotations of enhancement drugs (Caplan & McHugh, 2007; Farah et al., 2004; Parens, 1998) rather than their chemical influence. These arguments would not necessarily need to appeal at all to the assumption that cognition resides in the head to motivate their concerns. However, this assumption is so prevalent that these concerns are also premised upon such assumptions.

The morality of the means with which goals are accomplished is crucial to maintaining an ethical society. Societies have goals, and socially valued activities are predicated upon chosen applications of these means. Therefore a moral means to achieve a goal would further the goal of society, while an immoral means would hinder this goal. Cognitive enhancement is an immoral means, and as such will hinder the goals of society (Parens, 1998). Too often this is ignored, and ways of enhancement are equivocated using the argument of the precedent. This argument of the precedent is as follows; means A achieves goal A, means B also tries to achieve goal A. If the former is unproblematic then so is the latter. Often the use of cognitive enhancement drugs is justified by comparing it to other forms of enhancement. This comparison is made using the argument of the precedent; however, since these means matter morally this is problematic.

The moral status of the means of enhancement is ignored if you make one of two mistakes, Parens argues; that the means have the same moral status, or that the ends have the same moral status. The first mistake stems from ignoring the 'object' of enhancement. For instance, Parens states, reducing class size works on the object noise by reducing it in the environment, while drugs works on the object head reducing the noise in there. The two different forms of intervention have different objects they influence; as such the means ought not to be equivocated. "Indeed" he states "some new means that work on our bodies instead of our environments may incline us to ignore the complex social roots of the suffering of individuals" (Parens, 1998, p. S7). Secondly,

Parens argues that the ends might only be the same according to one measure. Prozac and prayer might both induce heightened levels of serotonin, but that end state is only the same according to one measure. Means of enhancement are often compared or used interchangeably in ethical discussions, while the means of enhancements have different moral statuses. Additionally, treating two means as of enhancement as morally similar is often justified by the fact that they produce the same end state. This end state however is only the same according to one measure, as such, it should not be equated. For these reasons education and cognitive enhancement drugs are not similar forms of enhancement, and on these grounds we can explain why these drugs are unethical.

Parens' (1998) arguments presumes that previous tools for cognitive enhancement (e.g. education) have been directed at the environment, not at cognition. He argues the reason cognitive enhancement drugs are unethical is because they have different means (due to the different objects they affect), and these means of cognitive enhancement are immoral. The observation that the two means influence different objects is accurate only if cognition resides solely in the head. If cognition extends beyond the head, then a change in environment can have a direct influence on cognition in much the same way as drugs do.

Parens' (1998) argument is valid only if he includes the premise that cognition is in the head, a place that drugs can uniquely influence. If cognition extends beyond the head, then the object of enhancement by means of education and drugs is the same. Since the means are the same, their moral statuses are equal. If the moral statuses are equal his argument would fail.

For Parens' argument to be valid, he must hold that previous means of enhancement have different intention than cognitive enhancement drugs. That he holds this is particularly visible in the last quote, he states that the new means of enhancement are different from the old means of enhancement in what they work on. Drugs work on the body while education works on the environment. The argument would have to fail if it turned out that cognition did not reside solely in the head even though it seems like a wholly different argument from the ones discussed so far.

### Neuroethicists' focus on Chemical Influence and the Cognitive Assumption

I have demonstrated that the dominant trend in neuroethical arguments is to premise the personhood concern on the cognitive assumption; cognition resides solely in the head. The adherence to this assumption has been demonstrated here by means of a restructuring of the arguments that are given to motivate the rejection of cognitive enhancement drugs on ethical grounds. In doing this I have demonstrated that the arguments are not valid until the cognitive premise is accepted. The neuroethical concerns that put the cognitive assumption central focus on the chemical influence that cognitive enhancement drugs have on cognition. If the cognitive assumption is found to be incorrect, the chemical influence argument would fail. Even arguments to which the cognitive assumption is not central are premised on these assumptions, and would fail if this assumption was found to be false.

If it can be argued that cognition is not confined to the head it would follow that cognition can be enhanced in much the same way as drugs by other means. As a result, from the perspective of chemical influence, drugs are extensions of other forms of enhancement. If it can be argued that cognition does not reside solely in the head, the neuroethical argument that cognitive enhancement drugs are ethically problematic must be motivated in a wholly new way.

## The Extended Mind and the Cognitive Assumption

### Cognition located in the head?

In the previous section I have demonstrated that the most influential academics in the field of neuroethics show an, often implicit, reliance on what is known as the traditional or "orthodox" view of cognition[10]. What I have attempted to demonstrate is that the worry regarding human nature assumes that cognition is all in the head, and that the brain is the seat of personality (or personhood). I have shown that this belief motivates the assumption that this type of manipulation with cognition (using drugs) is unprecedented and unique in its influence on human nature.

[10] In the orthodox view of cognition representation is a central part. It posits "internal mechanisms for storing and manipulating data as well as processes that act on representations to carry our intelligent behaviour" (Markman & Dietrich, 2000, p. 470)

Can we assume that cognition is in the head? Out of an increasing support for an externalist view of belief content, and a call for holistic science; a new view of cognition has emerged over the past two decades (Chemero & Silberstein, 2008). The orthodox view of cognitive science puts representation at its centre, and cognition stays safely inside the head. In contrast the emerging view focuses predominantly on the causal coupling of the world and behaviour, as a result of which cognition extends beyond the head (Clark & Chalmers, 1998). If this account of cognition can be supported, the ramifications for the current discussion in neuroethics will be significant (Levy, 2007).

If cognition is extended, then neuroethicists will have to reposition their arguments. They will have to argue how the chemical influence of drugs has a more direct influence on cognition than simple tool use (computers, abacus, pen and paper etc). Further, those opposing enhancement drugs have called on the intuition that this type of influence on cognition is unprecedented and more powerful than other ways. If cognition extends, this intuition will no longer support this argument; if cognition extends into the world, enhancement has been occurring in precisely the same way for millennia[11]. In short, the problems that have been raised by neuroethicists thus far, will need much rethinking if cognition "ain't all in the head" (Clark & Chalmers, 1998).

## The Extended Cognition Thesis

The question at hand is, "where is cognition located?". The extended mind (ExC) thesis states that cognition extends beyond the head. This claim is expounded in slightly different ways by various people (Clark & Chalmers, 1998; Noë, 2005; Rowlands, 2009; Wilson). However, at the base is the claim that some or all cognitive processes, and/or the mind, extend into the outside world due to the manipulation and transformation of the world by a cogniser either as a necessary or contingent fact about cognition. Neuroethical issues would only need to be reconsidered if we can defend the idea that some cognitive processes extend into the world not as a matter of mere possibility but as a matter of (contingent) fact.

[11] e.g. the abacus, which was first around, around 2700-2300 BC

ExC is often presented as merely the more radical version of embeddedness and externalism[12] (Rupert, 2004). However, it is a distinctively different thesis from externalism as proposed by Burge (1977) and Putnam (1981). Externalism holds that the content of belief is determined by the external world in a passive way. ExC departs from this thesis by stating that the world does not merely play a passive role but an active role instead; the world is actively 'driving cognitive processes'. Chalmers and Clark (1998) therefore describe the extended mind thesis as an active externalism; according to ExC the external world does not merely passively influence the content of beliefs; instead the external world is part of the cognitive process: It is an active externalism. Similarly, it is not to be confused with the embodied and embedded thesis of cognition[13] which states that the body and the world is merely important for cognitive processes, and constrains the cognitive processes that occur, but that cognitive processes still happen in the head (Gallagher, 2005). Neither of these two theses is motivated by functionalism and causally spread cognition like the hypothesis of ExC.

While on a basic level it might seem to make sense to start from the less radical forms of ExC (passive externalism and embedded and embodied cognition) it is not strictly what motivates ExC. ExC relies on both functionalism and causal spread[14]; and if either of these premises found to be flawed, the thesis does not hold. I will argue that the criticisms of the ExC hypothesis mistake the nature of the two theses upon which it is premised.

The ExC theory is not always explicitly framed in terms of a functionalist view of the mind by its proponents; it is essentially based on functionalist principles. A functionalist approach to the mind means the defining feature of what is minded is not due to its internal constitution but rather the way it functions or the role it plays in the system. The debate regarding the nature of cognition therefore ought to be about which functions are

[12] The paradigmatic example in externalism is the twin earth example. In this example, first described by Putnam, there are two identical twins that live on identical earths and live identical lives. The only markable different is that on earth the chemical composition of water is H2O and on twin earth it is XYZ. Putnam used this example to argue that even though the twins are exactly alike, they must have different belief content. The thought experiment demonstrated that belief content is determined by the external world.

[13] The Embodied and Embedded Cognition thesis was first put forth by Merleau Ponty (1962). It views cognition as inextricably linked to the body and the environment.

[14] Because I am covering such extensive ground in this paper, I cannot conclusively argue for either of these theses. For a more thorough discussion of them read e.g. (Dennett, 1987; Rowlands, 2009; Wheeler & Clark, 1999)

characteristically cognitive, not which internal features are essentially cognitive. Due to this focus, cognition is realisable in multiple forms; Martians, computers and human minds. Clark states "The notion of belief *ought* to be used so that Otto[15] qualifies as having the belief in question" (Clark, 1997, p. 14 emphasis mine) because it performs the same role in his cognitive economy as traditional belief. ExC clearly adheres to multiple realisability since the theory importantly holds that whatever fulfils the function of a cognitive state *is* a cognitive state.

Cognition is made up of causal processes, and the theory of closely coupled systems states that a closely coupled cognitive system is a system in which "all the components in the system play an active causal role, and they jointly govern behaviour" (Clark & Chalmers, 1998, p. 8). Causal spread is used to describe any situation in which an "outcome is generated by a network of multiple, co contributing causal factors that extends across readily identifiable systemic boundaries" (Wheeler & Clark, 1999, p. 106). There are some examples that Clark and Chalmers describe which demonstrate the close coupling of the world with the mind[16]. There are, they conclude causal interactions between the world and the brain that are so closely coupled that they do not merely influence one another, but that are integral to each other; they form a closely coupled system. Clark refers to this relationship as "Escher spaghetti" (Clark, 1999) because it is unclear where the interaction between mind and world starts, stops, and which direction it is in.

There are several key characteristics of causal spread that are crucial to the success of ExC. Firstly causal spread has implications for how we understand the causal connections in a closely coupled system like for instance the system existing of the mind and the world. It is not a simple directional casual relationship. Instead, it is a set of connections that are all interdependent and constitutive of each other: "if we retain the internal structure [i.e. the brain] but change the external features [i.e. the world], behaviour may change completely" (Clark & Chalmers, 1998, p. 9). Further causal spread implies that factors might be causally coupled that seemingly extend out of the system.

[15] The case of Otto and what makes him a special case will be explained later on in the paper.
[16] There examples can be read about in (Clark & Chalmers, 1998)

Secondly, causal spread lacks a representational level. Brooks (1997) designed robots that could move around the world in an intelligent way[17] without representations, they were directly coupled to the world without an interface. It was the world directly (i.e. not mediated by representation) that the robot used to move around and perform actions (collect cans in a natural environment). This is a direct departure from the orthodox view of cognition in which representations are central in the explanation of behaviour. Another example of using the world directly as part of cognitive action is an epistemic action. This is an action that shapes the world directly in aid of a cognitive program, for instance turning the map around to match your north and south.

I have argued that cognition is the result of a closely coupled system involving the brain and the world; cognition is causally spread across the brain and world. It is coupled as Escher spaghetti; the components of the systems are interlinked such that there is no direction of influence and all the components are interdependent. This means that sometimes cognitive processes heavily depend and are linked to processes that occur outside of the head. Since this is the case, we ought to accept that cognition occurs beyond the skull. Clark and Chalmers (1998) have formulated a principle, the parity principle, expressly to do away with the intuition that cognition can only occur within the skull. "If, as we confront some task, a part of the world functions as a process which, *were it done in the* head, we have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process" (Clark & Chalmers, 1998, p. 8 original emphasis ). To sum up, cognition is a closely coupled system and the world is (sometimes) part of that system, and using the parity principle we must conclude that cognitive processes extend out of the skull.

## Objections to ExC

The extended mind thesis has been viewed and criticised from many perspectives, from the metaphysical to the mereological to the scientific. Criticisms have been presented first with regard to the content of representations, second whether parts of a whole share the same function and, third if the extended mind perspective can provide solid scientific theories. I will focus on the first two criticisms, which is not to deny the importance of the third criticism. In fact Chalmers and Clark expressly make the point that theirs is not

[17] In invoking this example I mean to not say anything determinate about the cognitive status of these robots.

a terminological decision, theirs is a thesis which "makes a significant difference to the methodology of scientific investigation" (Clark & Chalmers, 1998, p. 9). Furthermore, for my argument that neuroethics ought to reposition its focus due to new light that has been shed on the nature of cognition to be valid; the extended mind thesis has to be more than a terminological thesis. If ExC was purely terminological, then the neuroethicists would still have grounds for their intuition regarding the novelty and directness of cognitive enhancement drugs. Regarding the scientific question, I follow Chemero and Silbertstein (2008) who argue that it is an empirical question. It seems so far, that there is favourable evidence for the ExC, both from the cognitive science research and recent advances in Artificial Intelligence (Brooks, 1997; Oullier, de Guzman, Jantzen, Lagarde, & Kelso, 2007).

The ExC theory has attracted some serious and interesting challenges. I will however argue that these all stem from misunderstandings or under appreciation of the two theses that I have argued are crucial to ExC being a defensible theory[18]. I will now discuss the criticisms that stem from an under appreciation of the functionalist aspect of the mind.

## The Functionalism Objections to ExC

On type of criticism against ExC regards the difference between a cognitive process in the head, and a transcranial cognitive process (Adams & Aizawa, 2008; Adams & Aizawa, 2001; O'Brien, 1998; Rupert, 2004). [19] This worry is particularly developed by Adams and Aizawa (2001) who criticise ExC on two counts; first, with regard to the ExC's claim that transcranial processes are cognitive without offering a 'mark' of the cognitive, and second, the incompatibility of transcranial cognitive processes with the widely accepted mark of cognition. They state that while transcranial cognitive processes are a possibility due to the functionalist view of the mind they take, the contingent fact is that there are two marks of the cognitive which cannot be satisfied by anything other than intracranial cognitive processes[20]. I will first elaborate on this objection, I will then expound another

[18] This does of course not preclude the possibility that there might be other possible future serious objections such as those addressed at functionalism that could be applied to upon ExC. It is merely an argument regarding the current most prevalent and threatening objections to ExC.
[19] This objection can be expounded both by fellow functionalist or non functionalist. The objection is then respectively that the functions within the system are too different in intra and transcranial processes, or that the processes are materialised in relevantly differently ways.
[20] Theirs is a particular objection for my purposes. They state that it could be the case that cognition was extended, but that as a contingent fact this is not the case. As I have argued before, the ExC thesis

criticism and demonstrate that it relies essentially on the first objection. I conclude by arguing that these contingent marks of the cognitive are functionalist criteria (in contrast to what Adams and Aizawa state) and that as such they are (easily) realisable by transcranial cognitive processes.

The objection that ExC does not give a mark of the cognitive is a problem for ExC insofar as it points to a gap in the theory, which needs clarifying if one wishes to defend the theory. However it is not a rejection of the theory in so far as it does not prove wrong any of the crucial premises of ExC.[21] The other objection, to ExC is that it is incompatible with the currently accepted mark of the cognitive. This also fails due to the under appreciation of the functionalist character of their own mark of the cognitive.

Adam and Aizawa (2001) support a functionalist view of the mind. Due to this, they do not object to the functionalist part of the ExC claim per se. They argue that the mark of the cognitive is such that as a contingent fact intracranial processes are relevantly different from transcranial processes.

The first mark of the cognitive is that it must involve the manipulation of non-derived content, and the second is that the process is differentiated on the basis of underlying causal processes. Non-derived content means to "not have derive[d] their meaning from convention or social practise" (Adams & Aizawa, 2001, p. 48). Cognitive processes must be causally individuated which means that they "must be discriminated on the basis of underlying causal processes" (ibid. p. 52). For instance, a chess machine and a human may both be able to play chess, but they play in such distinctly different ways (a human will consider a very limited amount of possibilities only, whereas a chess machine will consider every possibility) so the processes should not be seen as similar. Therefore, they argue that cognitive processes ought to be distinguished by "certain sorts of principles that are found to operate in the brain" (Adams & Aizawa, 2008, p. 22). Non-derived intrinsic content means to "not have derive[d] their meaning from conventions or social practices" (ibid. p.48). They argue for this feature of cognition by citing theories of cognition that have increasingly been favourable to presenting cognition in this way

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has to be not only possible but actually occurring right now for this thesis to be of impact on the neuroethics concerns.

[21] There are in fact papers that argue for a mark of the cognitive, and argue that the ExC can fit that criteria (Rowlands, 2009).

(Dretske, 1981; Fodor, 1987; Searle, 2004).The second mark of the cognitive is that cognitive processes are causally individuated; the "cognitive must be discriminated on the basis of underlying causal processes" (Adams & Aizawa, 2001, p. 52) to insure that one picks out genuinely cognitive processes. The objection is that any form of transcranial 'cognition' is destined to fail these two criteria.

A famous example often used to demonstrate a case of extended cognition is the case of Otto and Inge (Clark & Chalmers, 1998). This same example is often used by the opponents of ExC to demonstrate how trans- and intracranial processes are different in relevant ways. Clark and Chalmers' example goes thus: Otto suffers from Alzheimer's disease and relies on information in his environment to remember things. One of his memory aids is a notebook, something that he carries around with him wherever he goes, and holds all of the important information that previously he would have stored in his memory. One of those pieces of information is that the Museum of Modern Art is on 53rd street. Inge does not suffer from Alzheimer's disease, and has the information that the Museum of Modern Art is on 53rd street in her memory. During the process of getting to the museum they use their notebook and memory respectively. Since the notebook is closely coupled with, and functionally plays the same role in Otto's cognitive economy as Inge's memory, cognition extends beyond the skull. This illustrates a case of ExC[22].

Opponents to the ExC thesis object to the conclusion of this example and argue that the process of memory is relevantly different from the process of viewing information in the notebook and that therefore it cannot have the same status. The content of the notebook clearly does not have non-derived content, so it fails that mark. And secondly, it is not causally individuated "The external symbols do not have the same causal properties as the representations vehicles responsible for my memories" (O'Brien, 1998, p. 3). More specifically, external symbols as opposed to representation are causally passive and causally discrete. Further, it has been argued that memory has certain features, for

[22] This is a fictional example, but there are real world cases where the ExC way of thinking about cognition seems to describe well what goes on in the world. Take for instance the sociologist Luhman, he used a sophisticated index card system to organise him notes (Luhmann, 1993). Just as in the Otto case, it can only quality as extended cognition if it performed a similar function to 'traditional' cognitive processes. It so happens to be that Luhman describes his index card as a communication partner, who he called Lila (Burkeman, 2009) as they, through an elaborate reference system, link thoughts together that he has not consciously thought of. It seems therefore that his index card system does not only function as a memory store (which is a cognitive function in itself) but also exhibits higher level type functioning (brain storming, consolidating memory).

instance the generational effect which is the effect that meaningful grouping of stimuli makes it easier to remember those stimuli. These types of effects do not exist for the notebook.

The second mark of cognition has also prompted other concerns; there has to be an affinity between intra and transcranial cognition. It is not, it is argued, empirically fruitful to study transcranial processes as memory while they are so wholly different to the phenomenon of memory as we know it (Adams & Aizawa, 2001). If this is a valid point, it is a problem for ExC since it does expressly cite empirical sources for support and presents itself as a thesis that has empirical implications. A solution to this objection might be to think of memory as a generic kind, one which comprises various types of memory. But viewing 'memory' as a generic overarching kind comprising various sorts of memory is rejected by cognitive scientists (Tulving, 2000). One could argue that there is an explanatory benefit to describing it in this way. But a sufficiently comprehensive description would still include details of which memory system was used, in which case framing it in terms of generic memory would not add to the explanation.

In addition to the main refutation of these objections that I will outline below, I will outline a response to the 'science' worry. These objections seem to assume that external processes have no effect upon the cognitive processes that are currently studied; the objections suffer an intracranial bias. If the ExC hypothesis is true then features of memory (like the generational effect) are a result of interaction between internal and external features of memory. It would be merely a case of discerning functional roles and recognizing causal spread that would enrich and complete the explanations that are in place.

There have been several criticisms of these arguments described above that highlight the equating of intra and transcranial processes, even from opponents of the ExC theory. I will follow Rupert's line of argument[23] (2004) to demonstrate why Adam and Aizawa's mark of the cognitive does not form an objection to ExC. And as such, why the 'science' worry expressed in similar vein fails.

[23] Rupert concludes that this criticisms he sets out are not damaging overall to the ExC thesis because their positive account of ExC does not hold up to the criticism expounded by Adams and Aizawa (2001), but as I have argued here, all their subsequent criticism stems from this mark of the cognitive concern.

Rupert points out that Adams and Aizawa (2001; 2008) have not only not said enough to argue for the necessity of non-derived content, they even concede that there are instances where cognitive content is not intrinsic (F. Adams & K. Aizawa, 2008, p. 50), and they suggest a functional approach to the individuation of these limits. This is a problem for them. Their argument relied on the fact that the functional criterion of cognition was non-derived intrinsic, and that since this was only realisable in the head, transcranial processes were not an option. If therefore cognition is sometimes realised in other ways, then it seems that it is not as scarcely possible as Adams and Aizawa make us believe. This looks suspiciously like they would have to let go of the intrinsic contents requirement. However, they could appeal to the distinct nature of cognition. And indeed that is what they seem to do (F. Adams & K. Aizawa, 2008, p. 60). They state that as a matter of contingent fact cognition is only realizable in neural processes.

Rupert (2004) objects to that proposal; cognitive theories are not conceptualised at the neural level. The most accepted and prevalent theories in cognitive psychology are more abstract. He cites various accepted cognitive theories in which "the neural goings on do not come into play in virtue of their intrinsic physical natures" (Rupert, p. 6). The only way that Adams and Aizawa can therefore defend their theory of the cognitive is by phrasing it in terms of fine-grained functionalism, one so specific that, as they state, only as a matter of contingent fact are they connected to neural states. That is the downfall of their theory. As soon as functionalism is admitted to some degree, one needs to argue why one process is cognition and another is not. As I have argued, the intrinsic and causally individuated content criterion on which they base their argument does not hold up to scrutiny.

I have demonstrated this in two ways. First, I have argued that many objections to ExC essentially are grounded on the belief that intra- and transcranial cognitive processes are identical. Second, I have demonstrated that the arguments in place to support this objection fail. They fail because the mark of the cognitive they put forth allows for more functional differences than Adams and Aizawa had considered which brings back the possibility of ExC. The argument had underestimated how functional the mark of the cognitive is in character.

## Causal Spread Objections

I have argued that to assess the ExC thesis properly, one has to appreciate the extent to which this thesis is a combination of a functionalist view of the mind and the belief that cognition is best viewed as a closely coupled system. I have demonstrated that a number of the objections to ExC stem from an under appreciation of the functional character of the thesis. I will now deal with another set of used objections that stem from a misunderstanding or under appreciation of the role and importance of causal spread[24].

I will first outline several common objections to ExC, after which I will demonstrate how they all relate to a misunderstanding of the meaning of causal spread. Best known is the 'coupling constitution fallacy' (Adams & Aizawa, 2008) which criticises the coupling argument that supports ExC. This objection states that proponents of the ExC thesis often make an unmotivated jump from stating that the environment and cognition is closely coupled to stating that cognition is constituted by the environment. "What is common" Adams and Aizawa state "to these arguments is a tacit move from the observation that process X is in some way causally connected (coupled) to a cognitive process Y to the conclusion that X is part of the cognitive process Y." (2001, p. 8).

The objection has two parts that correspond to the two different types of coupling arguments that are invoked in defence of the ExC thesis. In the simple coupling argument constitution of the environment is argued for by merely invoking a close coupled connection between the environment and the cogniser, Adam and Aizawa argue. This type of argument is invoked in the "long division" example. In this example, it is argued that the use of pen and paper plays a causal role in solving long division due to the nature of the methods used in solving a long division problem. The objection to this argument is that a causal influence does not necessitate constitution. The second type of coupling argument states that the coupled items form a system, in which case since cognition occurs in the system, all the parts are cognitive. The objection to this argument is that a part can constitute a whole while performing a different function from the system as a whole. The latter idea is motivated by instances such as an air conditioner. While the whole machine conditions air, parts of the system, that are integral to the

[24] Menary (2006) makes a similar point, only he does so by re-branding causal spread as 'cognitive integration'. This is the view that "internal and external vehicles and processes are integrated into a whole" p. 329.

functioning of the system perform other functions like liquefaction of Freon, which is not air conditioning (Adams & Aizawa, 2001).

Another objection to refute is that the arguments that are said support the ExC thesis can only support the embodied and embedded cognition thesis. The embodied and embedded hypothesis states that cognition is limited by the possibilities that the body and the environment offer. Extended cognition is not part of this thesis. Further, as with the coupling-constitution fallacy, the objection is a result of the misreading of the coupling argument, as I will now argue.

I will now address the coupling-constitution fallacy. What is assumed by people who make this objection is that the process that is coupled is cognitive by virtue of being coupled to something cognitive, rather than that both things (i.e. the whole coupled network) in an integrated fashion (i.e. coupled) results in cognition (Menary, 2006). To justify this mistake the parity principle is invoked: if the process that is occurring transcranially is similar to a cognitive process then it is cognitive. But the parity principle should be read with the thesis of causal spread in mind. There is an implicit assumption at work in the coupling-constitution fallacy, or rather a lack of the assumption of causal spread.

Remember that the extended mind thesis is about how the world and the brain work *together* to make cognitive processing happen. The argument of causal spread, or close coupling, importantly states that all parts combine and are integrated to create a whole. It is therefore not the case that a fully cognitive system is at work in the same way with and without these external parts. Clark and Chalmers (1998) are explicit in stating that a network is only closely coupled and that cognition is only properly causally spread when any change of parts results in a different network. To assume that there is a fully functioning cognitive network, and that an external feature can dip in and out of without that having influence on the network is to have an internal bias and to misunderstand what causal spread means (Menary, 2006). If something is merely causally tied to a process then the full process can still exist without this causal link. But what ExC requires is that in order to fully appreciate the whole of the cognitive system, one must include external features.

This assumption *must* be at play in any successful version of the ExC. Various processes are closely coupled and as such the whole system is a cognitive system, rather then assuming (justified by the *wrong* reading of the parity principle) that something is cognitive by virtue of it being coupled to a cognitive system. "X is the manipulation of the notebook *reciprocally* coupled to Y –the brain process- which together constitute Z, the process of remembering" (Menary, 2006, p. 334). The causal constituent fallacy is in fact a result of the misinterpretation of the full extent of causal spread, and an internalist bias. This internalist bias can also be read in this quote "Talk of the mind leaking out of the brain and into the world is in the air these days" (O'Brien, 1998, p. 2).

The objection that cognition should be thought about as embedded and embodied rather than extended can now be safely dispelled as well for two reasons. As mentioned above, ExC is not founded upon the same principles as externalism and the embedded and embodied theory, and as such it should not be viewed as the extension of either. Secondly, this objection mostly relies on a mistaken view of what constitutes a closed coupled system. As I have argued, a closely coupled system means that the various components are constitutive of the process.

The coupling-constitution fallacy is one of the most challenging and most frequently cited objections to the ExC hypothesis. I have argued that this objection is a direct result of a failure to understand the causal spread theory and that as such it is not a valid objection. Further, I have demonstrated that other objections make this same mistake, and that as such they are similarly invalid objections.

One of the most important objections to the widespread use of cognitive enhancement drugs was premised on cognition being all in the head. With the plausible possibility that this is not the case, they must rethink their case. If cognition is not all in the head, then it is plausible to assume that it has been benefiting from many types of enhancement throughout history; abacuses, computers pen and paper. The case of using cognitive enhancement drugs is then certainly not a new one, nor is it markedly different from any of these other means. They all require purchasing and have all enjoyed scarcity at one time or another.

## The ExC and the Chemical Influence

I have explained that the ExC hypothesis is the consequence of a functionalist view of the mind and the theory of causally spread cognition. I have argued that any of the major objections to the ExC theory are a result of misunderstanding the theory of causal spread or are a failed objection to the function status of cognition. As such, I argue ExC is a defensible theory of cognition. As I have argued, this has consequences for the way in which the ethical debate regarding cognitive enhancement drugs is framed. Currently, the arguments that urge caution when using cognitive enhancement drugs rely on two premises; cognition is in the head, and can only be directly modified by drugs; therefore cognition has never been modified in this powerful a fashion. However, I have argued that cognition extends out of the mind and that as such we must allow the possibility that cognition is modified all the time, and moreover that it has been modified throughout history. I could be mistaken for trying to argue that all forms of enhancement are the same, siding with the proponents of cognitive enhancement drugs. But on the contrary, I have argued that there is no difference necessarily in the chemical influence that drugs and other forms of enhancement have on cognition.

Take for instance the use of the abacus to facilitate problem solving in maths versus taking Ritalin for the same purposes. Remember that the neuroethicists' argument against cognitive enhancement drugs is its unique direct impact on cognition. If we assume that cognition is contained to the head, this is a good argument against the use of these drugs as drugs have a direct impact on cognition, while the use of an abacus can only corroborate with cognition. I have however argued that this is not the right way of thinking about cognition; 'it ain't all in the head'. The use of abacus is therefore part of the Esher spaghetti; it is inextricably linked with and *constitutes* cognition. The chemical influence of the abacus is therefore as direct as that of enhancement drugs.

Levy (2007) expounds a similar argument to the one presented here. However his conclusion is that the consequence of the success of the ExC thesis is that means of enhancement ought to be viewed in gradations. However as I will demonstrate presently, it is problematic to only consider the chemical influence of cognitive enhancement drugs. This chapter is not intended to demonstrate that there are no ethical questions concerning the use of cognitive enhancement drugs. Rather, it is addressed at those who seek to claim that since cognition is "all in the head" the use of

drugs in cognitive enhancement is a dangerous new progression. I have demonstrated how currently many neuroethicists' arguments against the use of these drugs are motivated by the unprecedented direct impact that these drugs supposedly have on cognition. However, taking seriously the ExC thesis, cognition is not in the head. Those who wish to criticise the use of cognitive enhancement drugs must do so on other grounds.

## The Metaphorical Influence

### Ethical Concerns?

Neuroethicists' arguments fail because they are premised on an incorrect assumption. Other concerns have been voiced with regard to their arguments, too. They have been accused of overstating the empirical evidence that is currently available, and on which they discuss the consequences (Vidal, 2009). Further, there is no empirical data to suggest their concerns such as the changed personhood concern, are justified. Their concerns therefore are at best speculative (Abi-Rached, 2007). A substantive criticism of the neuroethics' position regards its inconsistency; one the one hand it appeals to normality but simultaneously argues that the standard of normality has shifted (Ortega & Vidal, 2007). Can we therefore conclude that there are no ethical concerns regarding the widespread use of cognitive enhancement drugs?

To draw this conclusion would be premature. The arguments discussed above rely on an incorrect premise of cognition, but some are concerns to which the chemical influence argument is not central. An example of such argument is the 'means matter morally' concern about the effect of cognitive enhancement drugs on the goals of society (Parens, 1998). This concern should be phrased in terms of another type of influence that these drugs have on society. Moreover, current debates in sociology and anthropology note the effects of the increasing focus on neuroscience in general of which cognitive enhancement drugs are a symptom. The issues discussed in these debates are in some respects similar to those in neuroethics that I focussed on previously; risk of a changing self and society. Sociological and anthropological analysis is motivated by discourse analysis; the concern that the self might change stemming from the fact that these advances in neuroscience have inspired a new discourse and new human kinds both of which change the self.

I will argue that we must discuss the concerns that might exist not in terms of the chemical influence of cognitive enhancement drugs–as I have demonstrated that those concerns can be discounted too easily- but rather in terms of its metaphorical influence. I will argue that this is a defensible way in which ethical concerns can be motivated. I will argue that the metaphorical element of cognitive enhancement drugs can influence people by the mechanisms that Hacking (1995) and Rose (1998) describe. I will argue that due to the kinds of minds that people have, categorisation and discourse have an effect on the self. Finally I will return to the 'mean matter morally' argument and restructure it in a way that it is premised on this form of influence. By means of this argument, I wish to refocus the current neuroethical debate regarding cognitive enhancement drugs.

## Metaphorical Influence

The central issue that is discussed by sociologists and anthropologists is the effect of seeing ourselves as biological beings; the effects of the increasingly prevalent assumption that we are solely our brains. This line of argument regards the influence that advances in neuroscience have on society, and society on neuroscience. Advances in the neurosciences influence the prevalence of this assumption. Similarly, a 'neuro' focussed society creates a need for a more brain based approach to research; "Simply gaining more knowledge about the brain was hardly the intention. […] all these projects and their scientific questions were catalysed by cultural and social claims" (Hagner & Borck, 2002, p. 507).

The shift in focus to neuroscience is exemplified and exacerbated by cognitive enhancement drugs because cognitive enhancement drugs support the assumption that we are neurochemical beings. Since neuroscience is a relatively new science, its applications are being studied in a more established framework like medicalisation (Healy, 2004) and discourse analysis (Rose, 1998). Common to all these approaches is the focus on the effect the 'neuro' metaphor has on the self[25]. As Becker (qouted in Murphie, 2005) said "Whoever controls the metaphor controls thought".

[25] N.B. That the theories I will discuss are often about the effects of neuroscience in general. Cognitive enhancement drugs perpetuate the claim that claim that we are our brains, and as such intensify the neurochemical influence on society. When I talk of the effect of neuroscience in general, it will therefore apply to cognitive enhancement drugs, too.

Interestingly, the difference between the chemical and metaphorical influence has not been formally noted by either critical theorists or neuroethicists. While a few critical theorists note the irony of the neuroethics perpetuating the very thing they are against (Singh & Rose, 2006; Vidal, 2009) the two different types of argument corresponding to the two different types of influence are not distinguished.

The 'neuro-metaphor' has been talked about in different ways: the cerebral subject (Ortega & Vidal, 2007), 'brainhood' (Vidal, 2009) and the neurochemical self (Rose, 2004). Rather than focussing on the chemical influences of new life technologies, the neurometaphor focuses on the consequences of understanding ourselves in terms of our neurological make up. Already we understand the 'feeling good' effect of chocolate to come from heightened levels of serotonin, and the runners high to be the result of a rush of adrenalin. The advances in knowledge shape who we think we are. "Psychological and internalistic notions of personhood are substituted by somatic "bioidentities". These are constituted through "bioascesis", or practices and disciplines of the self [i.e. cognitive enhancement drugs] that reproduce the rules of biosociality at the subjective level" (Ortega & Vidal, 2007, p. 257). Knowledge about who we are literally affects who we are: who we take ourselves to be.

A statement about a collective change to the self assumes that there is such a thing as the collective self, and that this 'self' is motivated by a metaphysical understanding of the self. It also assumes that such understanding is measurable, that is to say, that it has a measurable effect. Bloom (2005) has performed a battery of experiments that all demonstrate that people are deeply dualist[26] and the way that they think and reason. Furthermore Vidal (2009) notes that most art that takes the concept of the self as its subject is very dualistic in its metaphors. It seems therefore plausible to conclude that the current prevalent idea (implicitly as well as explicitly) about who we are, is strongly dualist. The self is expressed in metaphysical terms in either in a formal (i.e. testing) or in an informal situation (i.e. in arts).

[26] By which I mean, dualist in their conception of the self. That is to say that people perceive their minds to be categorically different to their bodies. Think for instance of the lay perception of a dead body.

Rose (2004) analyses how the discourse of the self has changed over the past two decades. He holds that there is no self apart from the self in the discourse, just as there is no external reality worth discussing outside of what exists in the discourse. The question of how the self changes in that framework is thereby answered; the self is changed by a changed discourse. To accept this particular explanation of how the self is changed, one must accept the metaphysical commitments that are associated with that framework. Hacking (1995) offers an alternative explanation for how the self might be changed by virtue of metaphorical influence. He states that the discourse affects the self through the notion of dynamic nominalism, an explanation of how the self changes which requires a less radical departure of the metaphysical commitments that I have assumed so far.

To understand how the self can be changed by virtue of the increasing focus on neuroscience Rose (2004) and Hacking (2006) have described several mechanisms. I will describe the mechanisms through which the discourse (the prevalent ideas of the self) is changing. I will then argue that the changed discourse influences the specifications of a category, and that inventions of categories (human kinds) change us. And finally I argue, following McGeer and Petits's (2002) argument how the invention of categories can change the ontological status of the mind. McGeer and Petit have argued that human minds are self regulating minds. Self regulating minds interact with the belief that one has of oneself. As such, I will have argued that a changed discourse can change the self.

### Mechanisms that change the self

Rose states that we are "inhabiting an emergent form of life" (Rose, 2005, p. 16).

> "The new style of thought in biological psychiatry not only establishes what counts as explanation, it establishes what there is to explain. The deep psychological space that opened up in the twentieth century has flattened out. […] It no longer concerns itself with what the mind or the psyche. Mind simply is that the brain does. […] This is a shift in human ontology- in the kinds of persons that we take ourselves to be." (Rose, 2004, p. 192)

Due to the invention of electron microscopes and leading to the fMRI scan, increasing research has been pursued regarding the brain and its functions. Currently, these scans are used to research phenomena that were previously associated with the psychological

space; mental illness, desire, theory of mind (Rose, 2004). These mental phenomena are overwhelmingly researched in terms of the brain's involvement.

This has led to the increasingly precise way in which pathologies are defined in DSM iv[27], and to the prescription of drugs intended to mediate these pathologies. Due to the equation of mind and neurochemistry which has welded psychiatric explanation to neurochemical explanation, abnormal behaviour can now be directly addressed with medication. There is a revision of the DSM iv planned which has opened up discussion regarding the diagnostic criteria. The consensus so far seems to be that it would be most accurate, and most beneficial to include a neurobiological explanation in a diagnosis and not merely the symptoms.

These are Rose's observations about how the current neurologically focussed discourse has impacted the self. Moreover, they has focussed on how the increasing use of cognitive enhancement drugs perpetuate the idea of the neurochemical self. I will further explain how this type of influence of the self by means of that discourse is possible.

### Making Up the Self

"Thinking of me as an H, changes how I think of me" (I Hacking, 1995, p. 368). A dynamic nominalist holds that the invention of categories and the coming into existence of a new 'human kind' go hand in hand. Hacking proposes a theory of how this works. People are not only what they have done or will do, but also what it is possible for them to do. When a new category is called into existence, a new space of possibilities of being is opened up and one can either identify and conform or not identify and resist the discourse. This means that external views can influence the internal views of the self.

External views of the possible can change internal views of the self because our action depends on description. Intentional action is action under description (I. Hacking, 1995, p. 234) which means that the things that we do, we think, we feel, are intimately connected to the external description of action. Action here of course is not only behaviour that can be seen not to influence who we take ourselves to be. Action denotes

[27] DSM iv is the Diagnostic Statistical Manual fourth edition that is used to diagnose pathologies in psychology (American Psychiatric Association. Task Force on, 1994).

the act of taking cognitive enhancement drugs as much as it denotes the feeling like a neurochemical being.

There is a difference between natural kinds and human kinds. Human kinds change under description while natural kinds (rocks, llamas etc) do not. Humans can of course interfere with natural kinds in different ways that depend on description, but this is due to human inference. Natural kinds are not themselves restraint by description (as we are by the possibilities of intentional action). They are restrained by nature. For example, an understanding the growth cycle of tomatoes has increased the ways and manners upon which we can influence this growth; we can grow them bigger or change their colour. But it is the action that changes the tomatoes i.e. the use of fertiliser that enhances growth. What changes the tomato is therefore constrained by nature not by categories, in the way that humans can change purely as result of categories.

Hacking specifies that there is not one general story about making up people that can be said to fit any situation. He only argues that making up human kinds happens across vectors, the categorisation is a result of top down by experts and the categorisation that the autonomous person engages in. These categories have specifications; for instance the human kind 'gay' that came into being late 19th century is not only about a sexual preference, it has since carried connotations of the discourse: being sexually promiscuous, pink, flamboyance. The invention of the gay category and the accompanying discourse therefore opened up new ways of being[28]. Adherence to a category and its specifications leads to further development of the meaning of a category through interaction with the category. This is what Hacking refers to as the 'looping effect'.

The way in which the initial category is invented is through means of investigation (I. Hacking, 2006). There are experts and professionals who produce, judge and validate knowledge, by various engines of discovery[29]. They use this knowledge in their practices affiliated with institutions. The institutions (which can be anything from TV. shows to academic institutions) give the experts their statuses and credibility. The goal of the

[28] How this interaction takes place is a highly complex process. There are multitudinous levels at which the classificatory systems of modernity are put into practice and problematised. To suggest an interaction is by no means to suggest a simple causal effect.
[29] These machines are counting, quantifying, creating norms, correlating, medicalising, biologising, geneticising, normalising, bureaucratising, reclaiming your identity (I. Hacking, 2006).

experts (as part of these institutions) is to help, control or research people who have been classified to be a certain '*kind*'. This is a very rough sketch of Hacking's general theory. What is relevant and interesting for the purpose of this paper is to consider in greater depth his idea that these categories influence that which is categorised.

Importantly, making up new 'human kind' by inventing new categories does not say anything about the prevalence of it occurring in society before it was 'made up'. For instance, there is historical evidence that the 'human kind' "gay" and its categorised qualities was only discoursed towards the end of the 19th century. However homosexuality, is a perpetual facet of human existence in a series of social and cultural discourses (I. Hacking, 1986). However, before it was a human kind, there was only same sex attraction there was no way of being gay, no way of experiencing oneself as belonging to that group, no way of interacting with others in a 'gay' way and no way of taking up that place in society. Furthermore, after inventing of each of these 'human kinds', an interaction between the label of the 'human kind' and the people in that category takes place which causes the category to change. In the case of the kind gay it has within our Western European society gone from a crime to a disease that was treated, to a socially acceptable and oft celebrated category. Yet gay remains only one part of the larger homosexual discourse in our post modern society.

It is not just the invention of kinds that shapes people; but also the changed specifications of a 'human kind' that influences the self. The recent shift to neurological explanations is changing specifications of human kinds (Vrecko, 2006). We can understand what the old category alcoholism's specifications are when we look at the treatment provided by the Alcohol Anonymous program, the most widespread and well known treatment for alcoholism. This program is focussed on the perpetual restructuring one's whole life. A person is asked to re-consider every part of their life, how they relate to them self and others, and the world. This programme presumes that the alcoholic is a deeply flawed self. People were encouraged to think of themselves as psychological beings.

What it means to be an alcoholic is changing, which can change the self as it opens up new possible ways of being. Specifications of this category are changing as evidenced by the fact that new treatments are available and increasingly popular which are based on a

neurobiological explanation of alcoholism; a radical departure from the psychological explanation. This treatment suppresses the urge to drink by affecting the neurochemistry of a person. The alcoholic is addressed not as a psychological being but as a neurochemical being. That this has opened up new ways of being is evident from testimonies given by people using these treatments. Controlled urge is not described as will power but as a suppressed reward system of the brain and loss of control is not described as a character flaw but a defective serotonin system. The way that the self is described is therefore wholly different.

The specifications of the human kind 'alcoholic' have changed, to be an alcoholic means something different now. The way in which you experience yourself and your place in society has been affected by this new means of phrasing what it means to be an alcoholic. The way in which this has changed is through the mechanism described above, the creation of knowledge by experts (new knowledge of the brain) as part of institutions (i.e. pharmaceutical companies) which discover with new ways of helping and understanding people (with medication prescription). These events change the possibilities of 'being' by changing the description of the 'human kind'. Changing understandings of neuroscience have lead to changed 'action under description' which is changing how we understand ourselves.

The increasing focus on neuroscience is not merely changing how we think of ourselves; it has changed what treatment is considered appropriate and how we view issues like responsibility. Hacking (2006) argues that categories come into being and develop through the interaction of which the self changes. He does not however mention anything about how this interaction takes place, how the mind allows for such interaction and the effects on the self.

The problem with Hacking is that he only describes by which means we change and does not specify what feature of the mind allows for this internalization to take place. To argue that cognitive enhancement drugs affect who we are, I have illuminated how production of knowledge occurs and is disseminated, and in which fashion mechanisms cause us to change. To argue conclusively that the self is influenced by metaphor I will argue that the mind is such that it allows internalisation to occur.

## Self Regulating Mind

The question that I am concerned with is how the self can be changed; what feature of the mind results in a changed self when the discourse changes, or when new human kinds are invented. Both humans and natural objects undergo constant re-categorisation but interaction with categories only occurs in humans. The theories discussed so far have failed to give an explanation of this.

Folk psychology is the non-academic knowledge of psychological terms such as belief and desire that people use in every day situations to make sense of their world. If the discourse concerning the self changed, would our folk psychology change and as a result the self: and what are the consequences?

Folk psychology is traditionally studied in terms of how people understand themselves and others. Interestingly, Vrecko states: "I think it is important to reflect upon the fact that the theories, treatments and explanations of the neurosciences are changing the understanding that lay individuals have of themselves and their world and are giving rise to what might usefully be thought of as a sort of "folk neurology" (2006, p. 300). But he does not discuss this in context of any of the existing folk psychological literature.

Traditionally, folk psychology is described as the body of knowledge with which we predict and explain the behaviour of others. If that is the purpose of this capacity, then becoming cerebral subjects would, at most, affect how we explain and predict behaviour of ourselves and others. This does not seem to amount to a changed self that is ethically problematic. However, folk psychology does not only have a predictive function, it also has a regulative function (McGeer & Pettit, 2002). A changed folk psychology not only influences understanding and prediction of behaviour but also how one regulates oneself.

Earlier I argued for a functional approach to what the mind is. As a consequence, things like computers, Martians and robots count as minded. However what sets people's minds apart from computer 'minds' is that they can be turned into neurochemical selves[30]. They

[30] This is a statement about the current state of affairs, and refers to regular computers. Perhaps in the future a self-regulative computer could exist.

can, McGeer and Petite (2002) argue, because of the regulative function of the mind. For a system to qualify as minded it must be intentional, and for something to qualify as intentional it must, "represent things as they appear within the constraints of its perceptual and cognitive organisation" (McGeer & Pettit, 2002, p. 282)[31]. An intentional system is a system that will adjust to incoming information and form beliefs that, depending on the situation will guide the system. According to this approach a minded system will therefore not have to have any beliefs about its constraints or what it requires: it is a routinised mind.

The existence of routinised systems directs attention to a more sophisticated type of system, a system that does form beliefs about its constraints and acts not only in accordance with them, but fully exploits them. Conforming to the constraints for these systems is more than brute conformity; they actively seek ways by which they intentionally self regulate and hold beliefs about how to conform to optimally pursue their goals. It is this feature of the human mind that explains how people can become cerebral subjects, and explains how a more severe change to the concept of the self is possible. To argue for the existence of a self regulating system, I will follow McGeer's (2002) line of argument which focuses specifically on belief.

Humans not only have beliefs, they also often express them. Beliefs in a routinised mind have a dual role, they simultaneously dictate and respond to action in an appropriate way, and beliefs dictate action. In a routinised mind, objects of belief are only represented in beliefs, whereas in human minds they are also represented in sentences. This is indicative of two capabilities, firstly this means that human minds can have beliefs about non-worldly things, and secondly that people attenuate to their beliefs. Both capabilities denote the ability to reflect critically upon beliefs, which is crucial to having a self regulative mind.

This ability is crucial because content attenuation underpins the capacity to identify constraints on rational belief formation. Objects of beliefs and sentences are never neutral, for instance the object of a sentence; 'I am my brain' bears certain properties, most commonly the property of truth or falsity. I take the property of truth to mean the disposition to assent to the claim, and falsity the disposition to dissent to the claim.

[31] For a full defence of this theory see Dennett (1978)

Further properties that a claim has are entailments; 'I am my brain' entails that 'cognition enhancement drugs can enhance cognition' and appropriate actions; taking cognitive enhancement drugs.

The ability to identify constraints underpins the ability to implement constraints. The orthodox theory of constraint conformation assumes that one knows all the constraints associated with a belief and that as a matter of fact the system conforms to these constraints in a passive way. Firstly, there is a question regarding the accuracy of that statement. It seems that we often do not know all the entailments of a statement. If that were the case then merely knowing all the mathematical axioms would lead to knowing all the principles and formulae of maths. Despite the tale of Meno's slave[32], this does not seem to be the case. Secondly (bearing the former consideration in mind), it seems plausible that there are things that the system can do to further understand the constraints, which process unearth more of them. One could physically undertake action, or one could reflect on what the entailments are of a particular belief. At which point, the system can increase its responsiveness to these constraints.

We can begin to understand how a changed discourse due to the widespread use of cognitive enhancement can change the self. Belief attenuation leads to constraint implementation. For example, the belief that depression is underpinned by an imbalanced neurochemical basis in the brain is held by a self regulating system. It is attenuated as evidenced by a statement to this effect. As it is attenuated to, the system can identify constraints of this believe, both passively and actively. The self regulating system judges it to be true and it reflects on the entailments of this belief. The system self regulates by implementing the constraints it has actively sought to discover. If the belief is true then the depression felt by the self regulating system is perhaps not caused by a traumatised youth, but by an imbalanced neurochemistry. The self regulating system decides to inform itself about the neurochemical medication as opposed to going to therapy.

## A Changed Self

[32] Meno is one of the Socratic dialogues by Plato. It is a dialogue between Meno and Socrates in which Socrates argues that through questioning Meno, is able to bring out the mathematical knowledge that his slave already possesses. Whereby proving that certain knowledge is innate.

At the beginning of this section, I posed two questions; the first question was about the difference about human minds or computers and the second question was about the kind of influence that a changed folk psychology can have. The theory of the self regulating mind provides answers to both questions. The first question is already been elaborated on extensively above. The second question still needs greater elaboration.

Constraint implementation explains a phenomena that has until now gone unexplained. Folk psychology does not only explain and predict behaviour- it trains malleable minds in the functioning that makes such mapping possible; "trained in the constraints by which they are to regulate themselves" (McGeer & Pettit, 2002, p. 297). Folk psychology is used to teach children what is expected of them. Consider the phenomenon of parental scaffolding; the over-interpretation of a child's intentional actions[33] (Kaye, 1984). If one does not view the mind as self regulating it would not require training of this nature. McGeer and Petit (2002) use parental scaffolding in young children as an example. But it is not incompatible with their theory that the mind keeps regulating itself throughout life, which provides an explanation for why the self changes due to the metaphorical influence of cognitive enhancement drugs.

The mechanisms described by Hacking and Rose are akin to parental scaffolding; they guide our self regulating minds. They are the guidelines for how to behave and how to understand ourselves which impact constraint implementation.

I have argued that the mind is self regulating. This has complemented the arguments given by Rose (2004) and Hacking regarding our capacity to change as a result of the widespread use of cognitive enhancement drugs. By viewing the mind as a self regulating system we can understand how the metaphorical influence of cognitive enhancement drugs stands to change who we really are, how we understand others, and the behaviour we assume to be appropriate in a given situation.

Since this argument is sound and the chemical influence argument has been shown to be flawed, the focus in the neuroethical debate ought to change course and focus on the

[33] For example, a toddler puts a doll in a bed with no intention to put it to bed as such, but merely putting it down. This intentional action however is picked up by the parents as a caring behaviour and the parents tell her she is a good girl for tucking her doll in for the night. The child hereby learns what is acceptable behaviour.

different metaphorical influence that various means of enhancement have to motivate ethical concerns. The failure of the chemical influence argument only motivates the switch of focus in this debate. The success of the ExC thesis does not bear upon the success of the metaphorical influence argument.

### Means Matter Morally Revisited

People change due to a changing discourse and newly invented human kinds and the effect that has on our self regulating minds. In examining the metaphorical influence that cognitive enhancement drugs might have on the self, I have argued that they intensify the focus on neurosciences; we increasingly perceive ourselves as neurochemical beings. And that fact can point us to a new kind of ethical concern regarding cognitive enhancement drugs. These concerns are not premised upon any conception of cognition, but rather on the changing view that we have of the self. I will demonstrate how a changed conception of the self, in the way demonstrated above, can present ethical concerns. I will follow an argument that expresses ethical concern with the widespread use of Prozac[34] to cure depression, after which I will argue that the same argument can be made in the case of cognitive enhancement drugs.

Similar to the controversy that has been described above regarding cognitive enhancement drugs, the use of Prozac has elicited much ethical debate (Kramer, 1994). The concern expressed here is similar to the previously expounded 'means matter morally' argument. Prozac has sometimes been compared to aspirin: Prozac to cure a pain in your heart, aspirin to cure a pain in the head; similar cases of pain relief. However, to maintain such argument emotion has to be thought of as similar to pleasures and pains and the physiological states underpinning those. A pain in my knee is just that, it has no more meaning than a pain, it is a mechanical problem. But mental stress for example separation anxiety, is not only a series of meaningless pains, it is pain about something. When contrasting physical pain with emotional pain, the difference between the two reveals itself; emotional pain is always intentional: it is about something. If the event that caused the emotion was different, the emotion would be felt differently. A physical pain remains the same even if it is caused by different events. A scuffed knee is the same pain regardless of how you got it. Emotional pains or pleasures are not

[34] Prozac is the trade name of Fluoxetine, an anti-depressant. It is a selective serotonin reuptake inhibitor, which means that it reputedly has a less pervasive impact on the brain, and only targets the imbalance of serotonin which is thought to cause depression.

merely associated with events, events and people have meaning. Emotions are in and of themselves a way of interpreting and experiencing the world. And if, emotion is sourced in interpretation, then there should be a basic commitment to addressing those problems with understanding and insight.

Notice that if we argued that if separation anxiety was just a pain that had no meaning it would make good sense to treat it mechanically; the pain could be treated in a physiological way. Separation anxiety conceived of in that way is seen not to be the result of a neglectful father, an absent mother and a string of careless boyfriends. The emotion does not have anything to do with that, it is merely a meaningless pain. Taking Prozac to cure separation anxiety is treating a non mechanical problem using mechanical means. Means matter morally.

An objection to this argument could be that emotion is mechanical because symptoms of depression are as a matter of fact reduced by psycho-pharmaceutical drugs. However, the nature of pain is not determined by its method of relief. A bath might cure my headache, but the headache itself is still mechanical in character, and therefore the use of painkillers is not considered unethical.

Separation anxiety is a consequence of mistaken reasoning, and as such is often successfully treated as such. In psychotherapy the patient is made aware of the fact that to project a neglectful father upon a loving boyfriend is irrational. To treat this distress mechanically is to regard our rational self of little importance and this "Jeopardises our dignity as responsible persons who owe it to ourselves to struggle toward insight through dialogue" (Freedman, 1998, p. 145), and that it is an ethical concern.

I will reconstruct Parens' 'means matter morally' argument (1998) so that it is not premised on the cognitive assumption but rather addresses the metaphorical concern. His worry was that means and ends are equated where they should not be. One of his examples was that in order to boost someone's concentration, we could either reduce class size or we could hand out Ritalin. The difference that he highlighted between these two different options was that the one worked on the environment and the other one affected cognition. Following the above expounded argument, the difference between these two solutions is that the one is a mechanical solution and the other one is a

meaningful solution. The problem in this case is addressed by too much noise which is why that ought to be reduced, Ritalin might solve the problem but that does not make it ethically justifiable since it encourages us to view this child in a mechanical way thereby dehumanising him.

Cognition shares the features of emotion that are crucial to the success of this argument. Cognition is intentional; memories have content and problem solving can only be applied to a problem. Cognition is therefore also sourced in interpretation and reason and cannot be exhaustively explained by physical states. To enhance cognition therefore by mechanical means is inappropriate. One cannot assume that there is no difference between enhancing cognition by means of education or by means of cognitive enhancement. Enhancing cognition by means of drugs perpetuates and encourages a mechanistic view of the self which trivialises the rational self; means matter morally.

It is important to note that it is problematic to state that changed personhood is an ethical concern. It is a problem because it implies that there is an ultimate measure of personhood, which is neither discussed nor easy to give, due to the relative nature of 'real personhood'. The idea that there is an ultimate self is problematic in combination with the theories discussed here. The strength in the 'means matter morally' argument is that it does not presume a correct form of personhood, rather it makes the more sophisticated point that means that are different ought not to be thought of as similar. It is as a result of this rather elegant conclusion that this argument can present ethical concerns.

In this section I have argued that we are psychological beings on the verge of turning into neurochemical beings. The way in which we are researched, governed and discussed by experts change who we are due to the fact that we possess self regulating minds. Self regulating minds do not merely respond passively to the beliefs they hold, they conform to those belief and their entailments. After arguing that the chemical argument fails, I have set out a positive account of ethical concerns regarding cognitive enhancement. As such my argument has refocused the discussion about the possibility of a changed human nature due to cognitive enhancement drugs to the influence of the metaphorical nature of drugs and not the chemical nature of the drugs.

## Conclusion

This thesis has aimed to refocus the current ethical discussion regarding the use of cognitive enhancement drugs. I have argued that the current arguments used to argue against this means of enhancement, due to a risk of changed personhood, rely on the cognitive assumption. The cognitive assumption is the assumption that cognition resides solely in the head. The cognitive assumption has led to arguments against the chemical influence that drugs have on the self. These arguments state that cognitive enhancement drugs are significantly different from other means of enhancement, and as such, ethically problematic where other means are not, due to the unique chemical influence that they have on cognition.

The cognitive assumption is one that is held tacitly and without defence thereof. A recent theory of cognition has cast doubt on the accuracy of this assumption. The ExC thesis argues that cognition extends beyond the head; cognition does not reside solely in the head. I have provided a defence of this theory by addressing the most challenging criticisms. The criticisms, I argued, are the result of misinterpretation of the two main theses of the ExC thesis; functionalism and causal spread. I have demonstrated that when the combination of these theses is properly understood, the criticisms are refuted.

The success of the ExC thesis has consequences for the soundness of the arguments expounded by neuroethicists. The ExC thesis proves their assumptions regarding the location of cognition wrong. As a consequence it can be argued with confidence that there is no chemical difference between the influence that drugs exude on the self and these of other more traditional means of enhancement. The ethical concerns that were expounded by the neuroethicists were premised on the unique chemical influence that drugs have on cognition. As such, these arguments fail. The chemical influence argument, I demonstrated how the chemical influence argument is therefore not useful in asserting ethical problems regarding cognitive enhancement drugs.

Since it has clearly been shown that there is no difference between drugs and other means of enhancement in the chemical influence that they exude, this influence cannot

be used to motivate ethical concern. There is however an important difference between drugs and other means of enhancement, the metaphorical influence. Cognitive enhancement drugs, I have argued, perpetuate and contribute to an increasing focus on the neurosciences. There is an increasing tendency to equate mental states with brain states and see the self as its neurochemical make-up. Cognitive enhancement drugs are the cause and result of this tendency.

There are various mechanisms that I have described that create and disseminate knowledge through which it becomes widespread. The dominant discourse of the self is changing from the psychological self to the neurochemical self. The shift in discourse is opening up new possibilities of being, that creates new possibilities of action. I have argued that the human mind is self regulating, and that as such it can be trained by these mechanisms to form to such constraints of self regulation.

I have argued that cognitive enhancement drugs have a metaphorical influence on the self. This is explained by analysing the dominant discourse of the self. I have argued that the self can be changed by a shift in discourse only through the kinds of minds that we possess. Intentional action is action under description which means that changing description can change the action. Furthermore this type of change is unique to humans due to internalisation of these arguments by having self regulating minds.

There *is* therefore a difference between cognitive enhancement drugs and other means of enhancement. The difference is that this form of enhancement encourages a certain view of the self, where other means do not. I have argued that one can apply the means matter morally argument in a defensible way to this difference between means. As such there is a defensible case to make that cognitive enhancement drugs are ethically problematic.

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