

**The Subject of Enhancement:
Augmented capacities, extended cognition and delicate ecologies of the mind.¹**

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Introduction.

A number of philosophers have argued for an inflationary understanding of human enhancement and human enhancement technology. This understanding of enhancement is used to demonstrate that there is not a difference in kind between emergent, biomedical enhancement technologies and accepted, assimilated technologies, which can nonetheless be considered “enhancement technologies” within the broader understanding of enhancement. The inflationary concept can then be deployed in ethically salient “anti anti-enhancement arguments”, used most prominently and I think effectively by Buchanan (2011a, p. 13; 2011b). While some of Buchanan’s arguments pertain specifically to biomedical enhancement, the argument and understanding of biomedical enhancement that he deploys also lends itself to a more generalized inflationary understanding of enhancement. Such a position implies that there is not a difference in kind between, for example, a note pad and pen and an as of yet undeveloped neural implant when both are used as prosthetic memory storage sites, or indeed a difference in kind between a still fictional memory enhancing neural implant and some existing “natural” memory storage processes (Clark and Chalmers 1998). In fact, in this example, there is good reason to consider many so-called “natural” memory storage processes, for example ones that make use of language, like association (see Baddeley 1988, cited in Carruthers 2002), to be enhancements; or so I will argue.

Buchanan defines an enhancement in the inflationary sense as “an intervention—a human action of any kind—that improves some *capacity* (or characteristics) that normal human beings ordinarily have, or more radically that produces a new one” (Buchanan 2011b, p. 5 – my emphasis). In this paper, I will use a slightly qualified version of this definition, which necessitates a link between enhancement and *technē*. *Technē* is understood simply and broadly here as “knowledge and ability directed to producing and constructing” (Schadewaldt 1979). *Technē* can be further nuanced by adding that it involves skill and dexterity as well as a process of perfection by which the knowledge in question is refined. Aristotle remarks that *technē* improves what nature on its own was unable to do (Aristotle, *Physics II*, 8, 199a15f). Technology is the product of *technē*. This qualification does not limit the scope of the enhancement concept in a significant manner but it does tie enhancement to *technē* as a particular type of activity. In this paper I will try to develop and defend the inflationary understanding of enhancement technology. I will do so in a manner that insists upon and expands the “capacity” approach to enhancement. I will also argue that the inflationary account of enhancement requires not just an extended but also an ecological understanding of the organism and specifically of the subject.

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However, as a consequent of these two arguments, I think that we are led to take a different view of the subject of enhancement than perhaps envisioned by proponents of the inflationary enhancement concept. I have in mind here the liberal anti anti-enhancement arguments put forward by Buchanan (2011a; 2011b) because I think them to be the strongest and clearest argument in favour of the inflationary concept of enhancement and deployment of this concept against anti-enhancement positions. Nonetheless, I think that these arguments miss or are silent on some of the conclusions concerning the human subject that they lead to.

In the first section of the paper, I will examine Buchanan's narrower definition of "biomedical enhancement" and argue that attempts to limit the enhancement concept are arbitrary and abstract. I do not think that this conflicts with Buchanan's position, but it does illustrate the difficulties in attempting to limit the enhancement concept and hence the attractiveness of the inflationary enhancement concept. I will also make some heuristic distinctions within the inflationary understanding of enhancement. In the second section, I will address the capacities approach to enhancement. In the third section I will examine an issue with the capacities approach stemming from what can be called the regressive problem. In this section, I argue that the capacities approach requires an extended or ecological understanding of both capacities and organisms. Section four makes the claim that language can be considered an enhancement technology. This claim about language pushes the inflationary enhancement concept and approach into strange territory regarding what I think is the presupposed givenness or stability of the subject of enhancement; territory that I think is unexpected and uncharted by the primarily liberal proponents of the inflationary approach. Here I will argue that many of the higher functions of consciousness, those that we would associate with the term subjectivity can be rightly viewed as technological enhancements, albeit suitably old and assimilated ones. This is not taken in consideration by most anti anti-enhancement arguments, wherein a subject qua *subjectum* qua *hypokeimenon* is seemingly presupposed as the raw material or platform of the enhancement project. I argue that the inflationary concept of enhancement deployed in said arguments undermines this presupposition. In the conclusion, I will examine some potential upshots of the inflationary and ecological approach to the subject of enhancement specifically I raise the possibility that if the subject is a product of technological enhancement, the product of *technē*, we must consider the possibility that the subject could also be enhanced away, so to speak, this may or may not be a desirable outcome.

1. Inflating Enhancement.

Much of what is labeled the enhancement debate is concerned with defining enhancement: its relation to treatment, the limitation of scope to biomedical interventions, etc. Buchanan seeks to avoid getting stuck in these questions and thus adopts what he views as an "uncontroversial" definition of biomedical enhancement; "a *deliberate* intervention, applying *biomedical* science, which aims to improve an existing *capacity* that most or all normal human beings typically have, or to create a new capacity, by acting *directly* on the body or brain" (Buchanan 2011a, p. 23 – my emphasis). The key terms in this definition seem to be "biomedical", "deliberate", "capacity", and "directly". But how much does such a definition actually narrow the

scope of the concept? The term “biomedical”, while seeming to add specificity, in fact does little here other than constrain the alterations in question to being informed by biological sciences. By including enhancement in the frame of medicine, Buchanan already departs from the normal usage of the term (Buchanan 2011, p. 27). Medicine usually refers to a *technē* aimed at the restoration of health or normal function in the pathological organism or biological system. Certain forms of enhancement may fall within the scope of curative or preventative medicine: for example when the medical intervention establishes a new functional norm for the patient which is a qualitative improvement upon and not just a restoration of a previous non-pathological norm, resulting in a improvement in subjective well-being; vaccination that alters a population specific vulnerability to a pathogen would also presumably be considered a medical intervention that is an enhancement. However, many and perhaps most other improvements of a capacity beyond the normal scope of function are likely to fall outside of the scope of medicine, strictly speaking. The French philosopher Jérôme Goffette (2008), proposes the term “*anthropotechnie*” in order to allow a distinction between medicine, with its restorative aims and what he calls “*le bricolage de l’humain*” – technological tinkering with the human body with the aim of somehow “improving”. In a slight reformulation of Goffette’s concept, another French philosopher Sylvie Allouche (forthcoming) proposes that all technological intervention in and on the human body be brought under the umbrella of *anthropotechnie*, with medicine and enhancement being distinctions within this broader concept. Thus, if one wishes to continue to use the expression “biomedical enhancement” in a meaningful fashion, i.e. without excluding much of what would normally be considered enhancement, the scope of biomedical must be expanded to include Goffette’s concept of *anthropotechnie*: *technē* applied in or on the human body with the aim of making some kind of improvement according to the diverse criteria utilized by different individual, communities, etc; or it must be taken as akin to Allouche’s wider umbrella definition. There seems little if any good reason to limit enhancement to a biomedical context strictly speaking unless we open up the term biomedical such that it simply means something like “referring to biological function.” Buchanan seems aware of the limitation inherent in the use of the term “biomedical”, and indicates its redundancy in the ethical debate around enhancement:

The harshest criticisms of biomedical enhancements appear to apply to enhancements *per se*, whether biomedical or not. [...] if we accept that view, we would not only have to reject cognitive enhancement drugs, but must also regard literacy, institutions, and the agrarian revolution in a highly unfavourable light as well.[...] even if one accepts the controversial view that enhancement is not a “proper” end of medicine, that tells us nothing about whether an enhancement is morally permissible. (Buchanan 2011a, 26-27)

The requirement that an intervention be deliberate is likewise susceptible to several objections. There seems no good reason why the criterion of deliberateness should only apply to biomedical intervention, if it is to apply at all. But once we subject the broader definition of enhancement to this criterion it seems we would have to rule out precisely what Buchanan wishes to include, namely the use of written symbolic systems of communication. Such systems, at the very least, greatly augmented the human capacity to preserve and transfer information across time and

distance (I'll make a stronger claim about what language does later in the paper). Yet, it seems unlikely that the inception of literacy was initially conceived and pursued with this deliberate end. An enhancement might also occur as a cascade effect resulting from other distinct intentional alterations, which I think is likely in the case of literacy. Regardless, it does not seem obvious that the deliberate nature of an action which leads to an enhancement impacts upon the salient features of the alteration that occurs. We are better off limiting enhancement to being the result of *technē*, deliberate or not. This precludes conflating the activity of human enhancement with other processes wherein the capacities of the human organism are altered without any express intention or even human action, the proverbial bolt of lightning that gives its victim superpowers, or even the processes of (non-cultural) evolution – although even here we run into the problem of genetic and cultural co-evolution being intertwined such that it becomes difficult to abstract out phenotypic alteration linked to genetic evolution from that linked to some forms of human *technē*. Thus the limitation of the enhancement concept to a narrow conception of biomedical, or to intentional intervention, without opening the subsequent concept up to accusations of arbitrary abstraction, is problematic.

I will address the directness and capacity criteria in the next section. However it is helpful to make two other important intertwined distinctions within the inflationary enhancement concept. The first concerns assimilated and unassimilated enhancements, the second what we can call “weak” and “strong” enhancements. The assimilated-unassimilated distinction is central to the inflationary enhancement concept. Simply put, many technologies (in a broad sense) have been integrated into typical human capacity to such an extent that to speak of them of enhancements seems misplaced. Literacy is perhaps the best, but also a slightly controversial example—section four addresses the status of language as technology in more detail. Literacy is a *technē* that is used to acquire proficiency with an existing form of technology, written language. Within certain human populations, literacy—the capacity to work with symbolic language structures in written form—is no longer considered an enhancement, but a condition of unimpaired social function. We can call this an “assimilated enhancement.” In such populations, illiteracy of course exists, but it is impairment, equivalent to other forms of cognitive impairment. This example of course only applies to literate human populations, where symbolic written language serves an important social function. In other, contemporary or historical, non-literate societies, literacy may have been either irrelevant or an “unassimilated enhancement,” enabling the literate individual to communicate symbolically with members of other literate population groups, store information, etc. thus giving these enhanced persons some distinct advantages that go beyond the population norm. What we can see from this example is that enhancements are relative to specific population groups, rather than the species; and second what counts or does not count as an enhancement is environmentally structured. Hence to be literate in a population where literacy has no function is not an enhancement. A *technē* and the capacities it facilitates may be assimilated into a population to the extent that the enhanced condition becomes the normal condition relative to that capacity. Literacy, eyeglasses,

caffeine, vaccines, might all be considered examples of assimilated enhancement technologies.²

The assimilated/unassimilated distinction is closely tied to the weak/strong one. An enhancement can be considered weak if it augments a capacity within a scope that is typical for a population. To put it mildly I am a slow runner. If a biomedical intervention allowed me to compete within the top 10% of runners in my age group in Brussels (the city where I live), this would surely be an enhancement for me. But insofar as the enhancement does not make me an outlier in my (arbitrarily selected) population group (people living in Brussels), it would have to be considered a “weak enhancement”—one giant leap for me, no change really for mankind, or even the people of Brussels. If however a biomedical enhancement allowed me to line up against Usain Bolt or even beat him over 200 meters, this would have to be considered a strong enhancement insofar as it would place me as an extreme outlier on the scope of normal function relative to a population group (in this case perhaps all humans) and a specific capacity, running. Getting eyeglasses that augment my eyesight, which has deteriorated for natural reasons, would be an example of both an assimilated and weak enhancement. It is altogether normal within my social environment to acquire glasses to offset age related eyesight problems. Glasses may be an enhancement, but only in a weak and assimilated sense. Of course the deterioration of my eyesight may have occurred for a host of reasons, among which are probably that other enhancement technologies have already prolonged my life longer than my eyes may be evolutionary adapted for; and eyesight deterioration is related to the uptake of enhancement technologies like literacy, which makes possible not only books but also computers and other eyesight affecting technologies. For obvious reasons, enhancements that are available to entire or large segments of a population are more quickly assimilated than others and may go from strong to weak. Again using literacy as an example, learning a foreign language or two in contemporary European society might be considered a weak enhancement through the uptake of a well-assimilated technology (linguistic rules, writing, etc.). In pre-literate social environments, becoming literate would likely have been a strong enhancement – conferring on groups of enhanced, literate persons considerable degrees of influence and power: the uptake of an unassimilated technology which placed the recipient or user outside the scope of a normal population-typical capacity to communicate.

2. The Capacity Approach

The above discussion has made it clear that enhancements are capacity relative (Buchanan 2011b, p. 76). To speak of an enhancement is to speak about a specific capacity, not an organism’s overall well-being. If we were to do the latter, the debate over the ethics of enhancement would become circular. Ethics aims at well-being or living-well, enhancement is defined in terms of improving overall well-being, thus

² Vaccination may be an interesting example here because the assimilation of vaccination technology may lead to an eradication of the disease risk that the vaccination was targeting, rendering, ideally speaking, the vaccination redundant and no longer an enhancement. In a environment where there is no risk of Tuberculosis, being vaccinated against TB would not be an enhancement—again emphasizing the environmental structuring and conditioning of the enhancement concept.

enhancement is by definition ethical. But the question of overall flourishing cannot be fully purged from the enhancement debate. By framing a discussion in terms of capacities we are still able and obliged to have a discussion about whether the alteration of a certain capacity does in-fact improve well-being or the organism's overall capacity to flourish within a specific set of environmental constraints. The alteration or augmentation of a capacity should be aimed at the overall flourishing of the organism if it is to be considered an enhancement. An improved capacity for long-term memory, to use a well-worn example, that makes the subject miserable can hardly be considered an enhancement in any relevant sense of the word. In an abstract sense, the functions underpinning the capacity for information retrieval may have improved in terms of their efficacy, but as it does not contribute to the flourishing of the organism, the capacity itself can hardly be said to have improved. Neither capacities nor the functions that underpin them can be meaningfully evaluated in abstraction from the overall condition of the organism in its relation to its environment. While enhancement must be understood as capacity relative, i.e. enhancements target capacities not the overall well-being of the organism, the evaluation of a particular technological intervention, whether it can be considered an enhancement or not must be made against the backdrop of the overall flourishing of the organism.

Capacities must also be understood as relative to the demands placed on the organism by its environment, not only in terms of their enhancement, but also in relation to their appearance. Capacities and underpinning physiological functions manifest in relation to environmental demands, in other words a capacity can be thought of in terms of the organism responding to a problem posed to it by the environment. Thus it is somewhat misplaced to think of either the capacity or the enhancement of a capacity as *in* or *on* the body. Capacities are manifest in the relation between the organism and its environment. Subsequently, the target of an enhancement, properly speaking, is also this relation. There are some capacities that may have become redundant due to changes in environmental demands. And in other cases a capacity may be potential, i.e. due to the breadth of reaction norms, an organism with a specific genotype may be said to possess the potential to exhibit a capacity if faced with a different set of environmental demands (Hull 1986, p. 9). This reinforces the environmental context-dependence of capacities. Here we must be sure to also emphasise the centrality of other organisms, both conspecifics and not, to the environmental demands placed on organisms.

The environments of and subsequent demands placed on the human organism are not only physical or vital, but also institutional. By institutional environments, I refer to sense structures or cultural objects. These may range from cultural superstructures like economic systems which play an important role in structuring and ordering of desires, meta-institutions like "the market" (to use Buchanan's example) or a national culture, and more narrow or specific institutions like an type of educational system or even specific educational institution (a university). Environmental demands upon human beings are in other words, to a large extent, socially structured. We might use the term "niche construction" borrowed from evolutionary biology to describe this phenomenon. Organisms, by their actions, and in the case of humans these actions are nearly always socially and culturally, i.e. institutionally, mediated, alter the pressures or problems that the environment poses. This is in some cases intentional, but not necessarily. Literacy and numeracy have

vastly altered the environmental pressures that human beings face, and both (broadly speaking) are likewise the tools or technē that humans most often use to address these pressures. Climate change as a result of human activities creates new pressures and problems within the environment. It is both the result of and addressed by means of institutional structuring of the environment. One important point to draw from this is that enhancements are for the most part not introduced as responses to “natural” or pre-given environmental challenges. In an institutional environment enhancements are perhaps more often than not responses challenges posed by the institutional restructuring caused by other enhancements. There is perhaps no better example than the current attention being given to “cognitive enhancing drugs” (so-called smart drugs) being used to improve performance in higher education or in the labour market. The needs or challenges that such supposed forms of enhancement address are entirely institutionally structured, that is they are created and maintained by other enhancements.

The French philosopher, Georges Canguilhem makes a very similar point about mental illness in his writings on the concepts of the “normal” and the “pathological.” What is and is not considered a mental illness is determined in large part by the person’s capacity to flourish within a specific institutionally structured environment (Canguilhem 2008, pp. 132-33). Even stronger, in many cases it can be said that the illness itself arises only within certain environments. A contemporary example is the meteoric rise in ADHD diagnoses, particularly in the USA. A 2013 survey from the Centre for Disease Control in Atlanta found that “that 11 percent of children ages 4 to 17 have received a diagnosis of the disorder, and that about one in five boys will get one during childhood.” These prevalence levels, and their steep rate of increase – 41% in the past 10 years go far beyond what many experts think is medically justifiable.³ Psychiatrist Richard Friedman has recently argued that changes in environment have created the situation where traits typical of patients diagnosed with ADHD have gone from being a “distinct evolutionary advantage” to pathological. Friedman writes in the *New York Times*: “In short, people with A.D.H.D. may not have a disease, so much as a set of behavioral traits that don’t match the expectations of our contemporary culture” (Friedman 2014). A more concrete instance of the institutional structuring of mental illness could be derived from the correlation in geographical discrepancies between the spike in ADHD diagnoses and the implementation of the No Child Left Behind Act in the USA (Hinshaw and Scheffler 2014).

The institutional structuring of mental illness and the contemporary debate about the use of “smart drugs” and cognitive enhancement are brought closer together by the fact that in the case of ADHD both target the same capacities, namely attention. The pharmaceuticals used to treat ADHD are also the most widely used as cognitive enhancers. It is likely the same type of institutional demands, productivity and efficiency within environment containing limited interpersonal support, that create an environment wherein the prevalence of ADHD increases and an increase in

³ “The lifetime prevalence in children has increased to 11 percent in 2011 from 7.8 percent in 2003 — a whopping 41 percent increase — according to the Centers for Disease Control and Prevention. And 6.1 percent of young people were taking some A.D.H.D. medication in 2011, a 28 percent increase since 2007”, see, <http://www.cdc.gov/ncbddd/adhd/prevalence.html> [last accessed 13 January 2015].

the capacity for focused attention beyond the normal population scope becomes an enhancement. However, in the case where attention-improving enhancement becomes assimilated and normalised, the scope of attention capacity considered at impairment level will likely also increase. Enhancement does not function in relation to an essential or fixed state of “normality,” enhancement structures the normal and the pathological. Another manner of putting this would be to say that environmental feedback from the uptake of enhancement technology “accelerates” the demands placed on the organism by the environment and consequently increases both the demand and uptake of enhancement technologies. As Lewis Mumford said: “Technology has one speed, faster!”

If this can be considered a medical-epistemological issue pertaining to the capacity approach, it also opens up an ontological question – the regressive problem. This problem is central to the argument I wish to make. The regressive problem poses the questions: To what do these capacities belong? How does an organism acquire its capacities? Is there an underlying *subjectum* or strata to which these capacities apply, or is the organism and by extension the subject a bundle of capacities?

3. The Ecological Mind

To recap: a capacity is a power to do something and the disposition toward the exercise of that power given certain environmental conditions. In this sense capacities are relative in their appearance and operation to demands that are placed upon the organism by environmental conditions. Capacities should be understood in terms of performances of the organism in response to demands from the environment, they are not essential properties of the organism. Capacities are underpinned by physiological function and manifest only in relation to problems posed by the environment, but a capacity is not grounded in either. In fact we might argue that the underpinning functions on which capacities depends are only manifest in relation to the capacity(s) itself insofar as it is a response to the environment. As Mumford argues (2006, p. 477) a ground endures between or without the manifestation of its consequent, what it grounds, in this case the capacity. This cannot be said of underlying physiological function. In fact, the distinction between capacity as power and physiological function is effaced here. The function, whose appearance is relative to the performance of the capacity becomes another manner of talking about the capacity itself in physiological terms. This leaves a problem however. Up to now I have spoken about capacities as belonging in some sense to an organism. From this it would seem reasonable to conclude that capacities are grounded in an organism, i.e. that the organism “enables, supports, affords, permits or points towards some future manifestation and endures between or without such manifestation” (Mumford 2006, p. 477). This obviously cannot be the case. As the organism is entirely dependent upon its capacities for its continued existence, it cannot be said to ground those capacities. There does not exist an organism prior to its capacities. Nor can capacities be considered essential properties of an organism as capacities are dependent on a context of environmental demands. The solution that we are left with is that the organism is itself a set of capacities that is disposed toward the acquisition of further capacities. The organism in this sense is both produced and ungrounded by the capacities that form it. An

organism thus consists of an ecology of relations manifest as a set of capacities.⁴ In terms of relations of supervenience, the organism supervenes on the set of capacities.

This point is important to our narrower context which concerns the subject of enhancement because what applies to the relation between capacities and the organism also applies to capacities and subjectivity. We need not concern ourselves with a precise definition of subjectivity so long as we can agree that encompassed in our understanding of “subjectivity” we mean cognitive function and self-reflectivity. This is a limited and possibly incorrect or incomplete definition depending on what precisely what one wishes to signify with the term “subject,” but I do not think that relevant to my point. For the sake of this paper, when I talk about subject this entails some form of reflexive subjectivity. By reflexive subjectivity I mean simply the capacity or power of the subject to ask itself something, most basically, “what am I doing?”

As a capacity or bundle of capacities, subjectivity, in this sense, is a response to problems posed by the environment, namely the ancestral environment in which conscious subjectivity first emerged. Reflexive subjectivity was certainly not the only response to whatever challenges our pre-subjective ancestors faced, but it is the one that stuck, so to speak. Likewise, subjectivity may no longer be the only possible response to continued ecological challenges. Supposing that by subjectivity we refer to a set of capacities and that some of these capacities are complex in that they are grounded in other capacities, and bearing in mind the definition of capacities as being relative to demands placed upon the organism by the environment (ecological challenges), it then seems safe to say that subjectivity is an ecological concept: reflexive subjectivity is an ecology of capacities and ecological challenges. This tells us something about enhancement also, and specifically the idea of a cognitive enhancement, one that augments the subjective powers of the mind. As enhancements are capacity relative and capacities are relative to demands placed on the organism by the environments, the target of a cognitive enhancement properly speaking is potentially the relations between the set of capacities that entail subjectivity and its environment. This need not necessarily be the case as enhancements could also target cognitive capacities not involved with subjectivity, although given the difficulty of arriving at a comprehensive understanding of subjectivity or consciousness (regardless of whether we mean the same thing by these terms), it seems impossible to know what these subjectivity independent cognitive capacities would be.

This is already an argument for an extended mind and subjectivity. Clark and Chalmers original argument showed that cognitive processes were extended outside of the head, hence their famous line “it ain’t all in the head.” Fingers, abacuses, notepads and other tools were all component, formative parts of the cognitive processes they were involved in and not somehow external prostheses. Subsequently, in terms of their relations to the cognitive processes they are a part of the note pad, the “normal” memory retrieval process, and the fictional neural implant have no difference in kind or indeed general function. Moreover, the mind or subject that

⁴ This still does not address the question of where capacities come from? This question lies at the heart of Mumford’s argument in “The Ungrounded Argument”: there are powers that are ungrounded. This is outside of the scope of this paper. It suffices here to establish that capacities are not grounded in the organism.

integrates technological artifacts into its extended processes and thereby augments its powers of cognition (or indeed affectivity) is both enhanced and extended.

4. The Subject of Enhancement

In the argument for an ecological understanding that I advanced above it does not make sense to think of subjectivity in any other way than being extended. Subjectivity is a capacity that functions as a relation or operation between the organism as a set of capacities and its surrounding environment. The function of this capacity is in relation to ecological challenges. I wish to take this argument one step further and argue that the reflexive subject itself, in the fashion that I coarsely defined it above, is likely to be dependent upon technological enhancement for its existence rather than simply being the ground that is enhanced. This argument requires two steps. The first is to argue that reflexive subjectivity, at least in some of its higher, more sophisticated functions, is dependent upon language. The second part of the argument is to say that language is a form of technology. It is an artifact, tool, and result of human technē.

In order to establish the centrality of language to reflexive subjectivity it is not necessary to make unjustifiably strong claims about the formative relation of language to subjectivity, consciousness or thought. Strong claims of this kind would consider language necessary for all thought. Such claims have been introduced in various ways by Davidson (1975), Dummett (1981) and McDowell (1994) among others (cited in Carruthers 2002). As Carruthers (2002, p. 661) points out, these arguments “depend in one way or another on an anti-realist conception of mind – claiming for instance, that since we cannot interpret anyone as entertaining any given fine grained thought in the absence of linguistic behaviour, such thoughts cannot even exist in the absence of such behaviour.” The strong claim about the role of language in facilitating thought also seems to preclude any forms of animal cognition, which given recent studies in animal cognition seems unlikely (see Andrews 2014 for a detailed analysis of the evidence for animal cognition). Perhaps the strongest version of the argument for both the formative role of language in thought and language as a technology comes from Dennett (1991). Dennett argues that human consciousness itself is a “huge complex of memes” (210), linguistically based ideas, or concepts which are transmitted, retained and undergo a process akin to natural selection. As Carruthers points out, this makes the concept-using mind a social construction (2002, p. 661).

Leaving aside the validity of these strong linguistic mind positions, I do not think it is necessary to adopt such controversial positions to argue that the higher-level cognitive functions that we associate with the term subjectivity are language dependent. It suffices to say that language is necessary for normal social development and enculturation, concept and belief acquisition. Language is necessary for the acquisition and deployment of indexicals, including I, my, you, we, he, she, it as well as certain temporally relative concepts like today, yesterday, past, present, future, etc. It seems fully plausible that thought is possible without the use of indexicals, but the self-reflexivity that we associate with higher-level functions of subjectivity does not seem possible without the use of linguistic indexicals. The fundamental self-reflexive question, “what am I doing now?” is not conceivable without the acquisition of indexical concepts. Helen Keller, the deaf, blind and mute child who famously

learned to sign and became a writer and campaigner provides what I think is the best phenomenological evidence on this point. In her autobiography she writes: “When I learned the meaning of 'I' and 'me' and found that I was something, I began to think. Then consciousness first existed for me” (Keller 2013, p. 56)

The indexical example also makes the point that language is a technology that is acquired by organisms endowed with the specific capacity for language acquisition. There is most certainly evolved neural architecture which allows for some organisms to acquire language and others not, and also allowed for our ancestors to have first developed natural language, but this does not detract from the fact that language functions as a tool. It is a tool that we use without knowing what we are doing to become subjects capable of asking ourselves precisely that question.

Clark (1998) makes a similar argument that language is a cognitive tool, greatly augmenting our powers by allowing us to “off-load” cognitive tasks like memory or calculation onto linguistic signs. Frank et al. (2008) have recently also shown experimental evidence to support the claim that “number words do not change our underlying representations of number but instead are a cognitive technology for keeping track of the cardinality of large sets across time, space, and changes in modality” (p. 819). Lacking linguistic tools to express exact quantity does not preclude someone from being considered a reflective subject, but Frank et al.’s findings do support the argument that language in general is an acquired technological enhancement of cognitive capacity. Another set of experimental evidence suggests similar conclusions about language as a technology. Children from poor families have a far lower exposure to language and particularly vocabulary than children from middle and upper class families with parents in professional occupations. By the age of two this language gap had expanded to a six-month gap in cognitive skills central to language acquisition (Fernald et al. 2013). Poverty gaps in language processing have a knock-on effect on memory and cognitive control mental functions (Perkins et al. 2013). These studies demonstrate, among other things, that language functions as a tool for the acquisition of other cognitive capacities. We can speak here not only of a language gap, but also of an enhancement gap that can be correlated with economic class.

5. Conclusion

Liberal political thought has been frequently criticized for its atomistic premises concerning the autonomous rational subject (Honneth 1995, chapter 14). The critique has often focused on the neglect that liberal theory has purportedly shown for the intersubjective dimensions of subjectivity and its constitution. A similar critique can I think be made here against liberal anti-anti enhancement arguments put forward by theorists like Buchanan. The neglect here is not for the intersubjective or cultural dimensions of subject formation. Rather an autonomous rational subjectivity as the fundamental platform of the enhancement project is assumed. What is seemingly neglected is that this platform is itself a technological enhancement. Reflexive subjectivity is an enhancement technology, the result of human technē.

Unlike some other less calm minds, Buchanan is fully aware of what he calls the practical challenges and objections facing specific enhancement endeavors (Buchanan 2011a, p. 226; 2011b, p. 23). His argument is that these are specific

practical concerns pertaining to particular types of enhancement, not general objections to the concept or project. What he refers to as the “Practical Worry,” which is also voiced in the earlier *From Chance to Choice* (2001) is that some “strongly” enhanced persons will make erroneous judgments about their moral superiority vis-à-vis the un- or differently enhanced and use these judgments to justify forms of discrimination. There is of course a great deal of precedent for these types of judgments being used as rationale for egregious behavior. Buchanan is nonetheless correct that this is a particular practical concern and not a valid objection to the idea of intentional technological enhancement writ large. Buchanan has enough faith in the rational powers of reflexive subjects to ask ourselves “what are we doing?” and find ways to mitigate the threats posed by these kinds of practical challenges.

Does the argument that the subject of enhancement, qua enhancement itself, cannot necessarily be assumed as the permanent and stable platform of the enhancement enterprise undermine the claim that our rational powers will allow us to address the practical challenges associated with the enhancement project? There is a possible scenario in which I think that it might. I have argued for a conception of subjectivity as both an ecological concept and a technology. Put simply we do not know how delicate an ecology the subject is, how susceptible it might be to technological disruption. A situation could arise wherein the reflective function of subjectivity, which sits at the basis of practical and indeed moral judgment is an impediment to meeting certain institutionally structured environmental demands. Certain economic or political conditions might fit the bill. We have already seen evidence that novelty seeking went from being an advantage in an ancestral environment to a cognitive impairment within current conditions. Could we envision certain economic conditions where a similar shift occurs with regard to our reflective capacity, where it stands in the way of improved efficiency of another cognitive capacity and we seek to technologically dull this capacity, this upsetting the platform of rational reflective subjectivity that the enhancement project was supposedly built upon? This may seem a dystopic vision of a totalitarian technological society, perhaps it is.

The French philosopher Alexandre Kojève described something similar in a letter to Leo Strauss and also in his lectures on Hegel’s *Phenomenology of Spirit* where he described the end of history as the triumph of market capitalism: “In the final state there are naturally no more human beings in the sense of a *historical* human being. The “healthy” automata are “satisfied” (sports, art, eroticism, etc.), and the “sick” ones get locked up (Strauss 2013) [...] “The disappearance of Man at the end of History is not a biological catastrophe. Man remains alive as an animal in harmony with Nature or given Being” (Kojève 1980, p. 158). Kojève also linked this to a change in the function of language: “*The definitive annihilation of Man properly so-called*” also means the definitive disappearance of Human Discourse (*Logos*) in the proper sense. Animals of the species *Homo sapiens* would react to sonorous or mimed signals by conditioned reflexes, and their so-called discourse would be similar to the so-called language of the bees” (Kojève 1980, p. 160). Kojève’s vision of the present is simply a reminder that there is no guarantee that what initially appeared as a technological enhancement in an ancestral environment, the existence of the future and the past generally speaking with the development of the technology (the relevant temporal indexicals) to conceptualize these ideas, and with it the rational, historical and indeed subjective human being, will perdure throughout any and all technological

alterations of augmentations of its capacities. What was technologically mediated into existence can also be mediated out of existence.

Another, perhaps less dramatic, possibility presents itself alongside Kojève's depressing vision of the present. The ecology of subjectivity might be delicate in ways that we do not know and the suppression of the reflexive aspects of our subjective function might happen without us realizing or desiring such a thing, perhaps as a result of another enhancement, a drastic improvement of working memory or another form of cognitive processing that no longer requires us to condense processed information into generalisations or concepts which subsequently greatly changes the nature of our subjectivity such that it does not resemble the platform which we are working with today.

There is of course no reason to automatically assume that subjectivity is a necessary aspect to human flourishing. Aristotle's understanding of flourishing as involving the exercise of our rational capacities was after all one that assumed human beings were essentially rational thinking beings. Non-subjective human beings might find ways to flourish that are ultimately less damaging to the future prospects of the species. It is after all the enormous power of instrumental rationality, certainly a higher technologically enhanced dimension of subjectivity, that has allowed human beings to exceed four of nine "acceptable environmental-change boundaries," putting the existence of the species at grave risk (Steffen et al. 2015). But this is not the human enhancement – or perhaps better, human salvage – project of liberal theory. In the final analysis, I agree. That most amazing piece of technology, the human subject will need to gather all its powers to avert disaster. Kojève was wrong, the biological catastrophe is upon us. In fact we do not lack the cognitive powers to avert the crisis, the lack seems elsewhere, in an economic system, that while considered an enhancement itself lacks subjectivity and hence the capacity to conceptualize the future. The ecology of subjectivity menaces the ecology of life that give rise to it, and for this reason we must watch carefully over the subject of enhancement to ensure that its capacities are not diminished for we will need them.

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