

# The Prudential Rationality of Radical Cognitive Enhancement

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## Abstract

The debate in the philosophical literature regarding human enhancement has largely focused on whether or not enhancement is moral. I take a different approach, examining not the morality of enhancement, but rather whether it promotes or undermines human interests. I argue that, from the perspective of prudential rationality, small degrees of enhancement promote our interests, but enhancements of a sufficiently large degree are likely to undermine them. Radical enhancement is likely to undermine our relationships with other human beings and our ability to form and fulfil our life plans. I argue that, although radical enhancement would benefit us in some ways, the value we place on our relationships and our life plans and gives rise to *pro tanto* prudential reasons to reject radical enhancement.

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## 1. Introduction

The focus of my thesis is radical cognitive enhancement. The definition which I use throughout this thesis for radical enhancement is that it is the improvement of 'significant attributes and abilities to levels that *greatly exceed* what is currently possible for human beings.'<sup>1</sup> Radical cognitive enhancement would involve improving a person's cognitive capacities to a level far beyond that which any un-enhanced human could achieve. For instance, massively improving a person's memory, concentration, ability to reason, and solve problems would count as an instance of radical cognitive enhancement.

I argue that radical enhancement would be bad for us, expanding on several areas which were mentioned in Nicholas Agar's work but were underdeveloped.<sup>2</sup> The effect of radical enhancement on our relationships and on our life plans are the two areas which I argue provide the strongest reasons to reject radical enhancement. I offer an explanation as to the mechanisms by which our relationships and life plans would be damaged by radical enhancement.

I approach the issue of radical enhancement from the perspective of prudential rationality, although moral issues occasionally arise, such as choosing whether to radically enhance dependent children. It can be immoral to make choices for someone that it would be prudentially irrational for them to make for themselves. I argue that radically enhancing ourselves would predictably lead to the loss of some of the things that matter most to us. We stand to lose our relationships with other human beings and our ability to form and fulfil life plans. I argue that most of us have values and interests that give rise to *pro tanto* prudential reasons to reject radical enhancement. A *pro tanto* reason is just a reason which provides motivation for something,

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<sup>1</sup> Nicholas Agar. *Truly Human Enhancement: A Philosophical Defence of Limits* (Cambridge: The MIT Press, 2014), 2.

<sup>2</sup> For instance, Agar's examination of the effect of radical enhancement on human relationships occupies merely five pages.

it is not absolute and can be overridden if there are other stronger, competing reasons. In assessing the costs of radical enhancement, I focus on radical cognitive enhancement to highlight how a change that intuitively seems so obviously good for us is in fact likely to be against our interests.

The main use of Nicholas Agar's work in my thesis involves his concept of radical enhancement as a transformative change. Agar defines a transformative change as altering 'the state of an individual's mental or physical characteristics in a way that warrants a significant change in how that individual evaluates his or her experiences, beliefs, or achievements.'<sup>3</sup> I make use of this concept in explaining how radical enhancement would threaten our relationships with other human beings and our ability to form and fulfil life plans. The likelihood of damage to some of the most important things in our lives gives rise to prudential reasons to reject radical enhancement.

Questions about the prudential rationality of an action are different from the moral permissibility of that action. We can have prudential reasons not to engage in an activity even when we have no moral reasons against doing so. There doesn't seem to be anything immoral about transferring all of your savings to someone claiming to be a wealthy foreign prince who is (ironically) in need of funds but, nonetheless, if you care about your financial security you have prudential reasons to avoid doing so.

Although the prudential rationality of a decision can be separated from its moral permissibility, some choices which involve prudential rationality also have moral implications. If you are making a decision for a dependant such as your child, there may be moral as well as prudential considerations. In the case of radical enhancement, I think we have prudential as well as moral reasons not to radically enhance our children (so long as we cannot achieve the same degree of enhancement ourselves).

Degrees of harm and benefit matter as to whether something is prudentially rational or not. A small amount of something can be good and, at the same time, a large amount can be bad. A few coffees might be prudentially rational,

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<sup>3</sup> Agar, *Truly Human Enhancement*, xi.



making you more focused and productive due to its cognitively enhancing effects. If you continue drinking coffee the harms rise. Eventually they would increase to the point where they do not outweigh the benefits; caffeine intoxication can cause restlessness, insomnia, sweating, anxiety, and dizziness. Enough caffeine can even cause a heart attack. The relatively minor cognitively enhancing effects do not outweigh the unpleasant and sometimes serious risks of caffeine intoxication.

I argue that enhancement is similar to choices such as how much coffee one ought to drink in that small degrees of enhancement promote our interests whereas great degrees of enhancement are damaging to them. Radical enhancement brings increased benefits but the costs rise also. I argue that the costs increase such that they are not compensated for by the benefits. The likelihood that radical enhancement would undermine the relationships which we form with other human beings and our life plans gives us reason to reject it, given the value we place on them.

It is worth noting that, from the perspective of prudential rationality, whether we should undertake a given course of action depends both on the likelihood of the costs and benefits of action associated with the action, and on their magnitude. When using decision theory to decide upon a course of action, a sufficiently large cost can sway the result – even if there is a relatively low probability of it occurring. Consider, for example, a wager where if you decide to gamble you have a 0.99 probability of winning \$5,000 and a 0.01 probability of owing the bookkeeper \$500,000. Despite the probability of incurring the loss being relatively low, if we assume that all you care about with regards to the bet is monetary value, then taking the wager would be against your interests. The magnitude of the potential loss means that the expected monetary return on betting is negative.<sup>4</sup>

I think that the prudential rationality of radical enhancement bears a great degree of similarity to the kind of case described above. Although the outcomes are not certain and we do not know the probabilities involved,

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<sup>4</sup> The expected monetary value of taking the wager is -50 (in dollars), since  $(0.99 \times 5000) + (0.01 \times -500,000) = -50$ .

there is, nonetheless, a significant similarity. I argue that the potential costs of radical cognitive enhancement are very high and that the potential benefits are nowhere near commensurate. If this is correct, then *even if* the probability of radical enhancement having the costs I describe turns out to be relatively low, we may still have prudential reasons not to pursue it.

In the second chapter of my thesis I outline some of the benefits to enhancement and how they relate to radical enhancement. In Chapter 3, I then rehearse some of the arguments made by prominent opponents of enhancement, such as Leon Kass and Michael Sandel, and argue that these fail to show that enhancement would be bad for us. Despite this, I argue that some of their conclusions turn out to be correct when considering radical enhancement. My main concern in discussing the enhancement literature is not to argue that one side of the debate is correct but rather to identify potential costs and benefits and assess how they relate to radical enhancement.

In examining the arguments both sides put forward, I will focus primarily on those which could potentially affect the prudential rationality of enhancement, since this is my main concern. Arguments that are focused on harm to society are therefore not covered. I will return to the potential benefits of enhancement after having presented some of the most serious costs of radical enhancement, and argue that these costs outweigh the rewards.

In the fifth chapter of my thesis, I turn my attention to the effect of radical cognitive enhancement on human relationships. I argue that radical enhancement would predictably undermine some of our relationships by affecting the bases of these relationships. Shared interests matter for our romantic relationships and friendships. Radically enhancing ourselves (even if our friends and partners enhance as well) would predictably change our interests such that they are no longer compatible with those of our partners and friends thereby damaging our relationships with them. When it comes to the parent-child relationship, if we radically enhance our children but cannot

achieve the same level of enhancement ourselves the result is likely to be a weakening of the relationship.

As well as damaging our relationships, radical enhancement is likely to have a negative effect on something else of great value to us – our life plans. This topic forms the focus of the sixth chapter of my thesis. I argue that the life plans which we form are influenced by our interests and that our interests are dependent on the level of our cognitive capacities. A very significant increase in our cognitive capacities is likely to change our interests such that some of the things which previously interested us would no longer do and so we would gain new interests. One of the results this change would be that the life plan we had formed prior to enhancement would no longer fit our new interests and would be based on interests which we now no longer hold. Some people might be willing to sacrifice their life plans for the benefits of radical enhancement. The effect on our life plans is much worse, however, if we were to repeatedly radically enhance ourselves.

If the futurologist and acclaimed inventor Ray Kurzweil is right about the direction in which technological progress is headed, then we may soon gain the ability to augment our brains with computer interfaces or upload our minds into computer systems. This would enable what I refer to as Kurzweilian Iterated Radical Cognitive Enhancement (KIRCE). If our minds are connected to, or reside inside, computer systems, then we could benefit directly from increases in computer processing power. Each new breakthrough in computational speed would increase our cognitive capacities. Since the historical trend of processing power has been exponential, we should expect that our cognitive powers would be correlated with this trend. The effect of KIRCE on our life plans would be quite profound – and very bad for us.

Each new stage of radical enhancement brought on by increases in processing power would undermine our motivation to form life plans and our ability to fulfil them. After each stage of radical enhancement, our interests would shift with our increased cognitive capacities. If we were to form a life plan, the interests which inform the plan would change such that the life plan

no longer connected to us. If we were to try to fulfil a life plan, we would find that after a further stage of radical enhancement the life plan which we are striving to fulfil does not relate to our current interests.

The arguments I provide give *pro tanto* reasons to reject radical enhancement. They do not suffice to say that radical enhancement would be prudentially irrational for *everyone*. They can be overridden; for example, some people might truly prefer to have a greatly increased intelligence over their relationships with other human beings. If their preference is genuine, it would not be prudentially irrational for them to radically enhance. Nonetheless, for most people, radical enhancement would be prudentially irrational due to the value that they place on their relationships and life plans. My claims regarding the prudential rationality of radical enhancement are based upon plausible generalisations about what people want.

Much of the material in my thesis is speculative in the sense that I do not assess the feasibility of radical enhancement technologies. Instead, I assume that radically enhancing our cognitive capacities is possible and then examine what the likely consequences would be through the lens of prudential rationality. Due to the speculative nature of this enterprise, my arguments are intended to be read as inductive. I do not intend to say that radical enhancement would necessarily be bad for us but rather that it is likely to be and that this gives us prudential reasons to reject it were we to be given the option.

In the seventh chapter of my thesis, I endorse Nicholas Agar's idea of moderate enhancement (enhancing only within the normal human range), though I critique his supporting argument regarding the value of our capacities. One particularly interesting objection to moderate enhancement is the idea that the extended mind hypothesis is correct and, given this, we have already externally radically enhanced our minds so there would be no special danger posed by internal radical enhancement of our cognitive capacities. Against this idea, I argue that the extent to which a given enhancement would undermine our interests is in part dependent on how tightly the enhancement is integrated with our minds. What makes some

internal cognitive enhancements dangerous is the combination of their magnitude and how tightly integrated they are with our minds.

## 2. The benefits of enhancement and radical enhancement

There are a number of potential benefits of enhancement, both to the individual and to society. I will explore some of the benefits of enhancement which have been advanced by transhumanists and other enhancement advocates, though since my focus is the prudential rationality of enhancement I will not cover potential societal benefits. I will then examine how these benefits relate to *radical* enhancement. I have focused on the writings of John Harris, Allen Buchanan, Ray Kurzweil, and Nick Bostrom since they are some of the most prominent advocates of enhancement and offer some of the best arguments in its favour. My interest in these authors is not to directly argue that they are incorrect but rather to use their arguments to identify the benefits of enhancement which I will later make use of in assessing the prudential rationality of radical cognitive enhancement.

John Harris has been a strident defender of human enhancement. In his book, *Enhancing Evolution: The Ethical Case for Making Better People*, he defends the proposition that not only is human enhancement good for us, there is a moral obligation to use enhancement technologies to improve humanity.

Harris elucidates the promise of human enhancement through biotechnology as follows:

‘Wouldn’t it be wonderful if we humans could live longer healthier lives with immunity to many of the diseases like cancer and HIV/AIDS that currently beset us? Even more wonderful might be the possibility of increased mental powers, powers of memory, reasoning, and concentration, or the possibility of increased physical powers, strength, stamina, endurance, speed of reaction, and the like. Wouldn’t it be wonderful?’<sup>5</sup>

He compares biotechnological enhancement to enhancement by conventional means to rebut some of the criticisms that have been levelled against human

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<sup>5</sup> John Harris. *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton: Princeton University Press, 2010), 8.

enhancement. Harris notes that other technologies and institutions which enhance our capacities and improve our lives have been accessible initially only to the very wealthy in our societies and have therefore (initially) increased inequality.<sup>6</sup> Writing technology was initially only available to the privileged in society, however it is now ubiquitous. Advanced education was similarly out of reach for all but the elite but is now (fairly) accessible to most of the population. He writes of these enhancements, ‘we should be slow to assume that a good is too expensive, rare, or elitist to be pursued in the hope that eventually it can be made generally available, and that it therefore does not merit investment.’<sup>7</sup>

Harris argues that the reason we have to intervene in the ‘natural lottery of life’ with enhancement technologies is actually the same reason we use medical therapies to do so.<sup>8</sup> To show why neither normal species functioning, nor normal competition, nor equal opportunity provide reasons to use therapies, he uses a hypothetical of twin sisters, both of whom suffer from cancer. One can be cured and the other cannot. We do not think that we should not treat the curable twin for reasons of equal opportunity. Moreover, our reason for treating the curable twin is not based on equality. Rather, our reason is ‘saving a life that can be saved or alleviating pain, suffering, and distress.’<sup>9</sup> Our moral motivation for intervening in the lottery of life is based on the goods which would arise from doing so.

Harris elucidates his justification of enhancement as a moral duty as follows:

‘If, as we have suggested, not only are enhancements obviously good for us, but that good can be obtained with safety, then not only should people be entitled to access these goods for themselves and those for whom they care, but they also clearly have moral reasons, perhaps amounting to an obligation, to do so.’<sup>10</sup>

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<sup>6</sup> Ibid., 14.

<sup>7</sup> Ibid., 15.

<sup>8</sup> Ibid., 9-50.

<sup>9</sup> Ibid., 50.

<sup>10</sup> Ibid., 35.

Harris thinks that a cost-benefit analysis of enhancement gives us reason to pursue it. I agree that, with respect to moderate enhancement, a cost-benefit analysis would give us (at least) prudential reasons to pursue it. While Harris thinks that enhancements are obviously good for us, I think that enhancements of a very large degree are not so clearly beneficial and that there are in fact significant costs such that we have prudential reasons not to pursue them; I will argue for this position in Chapters 5 and 6.

Harris argues that there is nothing special about being human and that 'some exceptional abilities or some capacities for exceptional conduct may in the future also involve something which we are forced to regard as involving a step change beyond humanity.'<sup>11</sup> For Harris, this would not be bad whatsoever. He argues that there are no 'powerful principled reasons' to retain our humanity if we can evolve into creatures better than ourselves.<sup>12</sup> Harris compares trying to preserve our humanity to our ape ancestors getting together to block evolution.

I think that Harris is right that there is nothing special about being human; however, this does not mean that further change would not be bad for us. Harris correctly points out that it would be absurd for a group of our simian ancestors to try to block evolution but this misses a crucial difference between evolution and radical enhancement. Evolution does indeed produce substantial changes in the capacities of organisms, however these changes take place over very large periods of time and occur across many lifetimes. For instance, the hominid brain has more than tripled in size, but this change has taken place over 2.5 million years.<sup>13</sup> Radical enhancement is different in that these changes can occur within the lifespan of one individual, rather than across many generations. The changes that are brought about by evolution do not have the possibility of affecting the interests of individual organisms due to the timeframe over which they occur. Conversely, radical enhancement does have the potential to either damage or promote the interests of individual organisms precisely because the changes in capacities

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<sup>11</sup> Ibid., 39.

<sup>12</sup> Ibid., 40.

<sup>13</sup> P. Thomas Schoenemann, "Evolution of the Size and Functional Areas of the Human Brain," *Annual Review of Anthropology* 35, (2006): 380.



which it causes occur within one lifespan. Evolution affects the individual very little, but radical enhancement affects it a great deal.

Allen Buchanan examines two framing assumptions which he argues have distorted the enhancement debate in his book, *Beyond Humanity?* The first is that the most significant goods of enhancement apply to individuals rather than to society – he terms this ‘The Personal Goods Assumption.’<sup>14</sup> As Buchanan notes, some who subscribe to this assumption also hold that the risks of enhancement apply to society as well as to individuals. This framing assumption is false, according to Buchanan, since there are significant benefits to enhancements which apply at the societal level and cannot be reduced to benefits to individuals. Simply stated, his argument is that enhancement has been practised for much of human history, there is nothing (morally relevant) separating modern and historical enhancements, past enhancements have increased our productivity thereby increasing our wellbeing and, moreover, there are network effects associated with enhancement that mean that the value of an enhancement to an individual can increase the more individuals have that enhancement.

He begins by arguing (in a similar vein to Harris) that the enhancement of human capacities is ubiquitous in human history. He cites literacy and numeracy as among the most impressive cognitive enhancements.<sup>15</sup> He writes that ‘literacy increases our communicative abilities and our ability to commit ourselves to future actions ... it enables us to understand the past through written records and augments our capacity not just to remember but also to reflect on and find meaning in our experiences.’<sup>16</sup> He points to the importance of literacy for the scientific enterprise and how the application of science has extended our capacity for agency.<sup>17</sup> Agriculture is another enhancement which has massively improved human capacities.<sup>18</sup> It enabled some humans to do mental, rather than physical, work and the rise of cities

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<sup>14</sup> Allen Buchanan, *Beyond Humanity? The ethics of biomedical enhancement* (Oxford: Oxford University Press, 2011), 5-6.

<sup>15</sup> *Ibid.*, 38.

<sup>16</sup> *Ibid.*

<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*, 38-39.

and political institutions.<sup>19</sup> The agricultural revolution also led to better nutrition, which significantly improved human physical wellbeing through greater resistance to disease and increased longevity.<sup>20</sup>

Buchanan argues that the aforementioned historical enhancements demonstrate that there is nothing unique about the use of technology to improve ourselves, and that we should therefore avoid 'biomedical enhancement exceptionalism'. Although one might argue that these enhancements are external or environmental rather changes in us and therefore not relevant to the current debate about enhancing humans themselves, Buchanan has a ready response.<sup>21</sup> Environmental and external changes can cause changes in us; the better nutrition enabled by the agricultural revolution changed human bodies by freeing them from the stunting effects of under-nutrition and changed human minds by facilitating neurological development.<sup>22</sup> By examining historical enhancements, we can see that there is no inherent moral difference between biomedical enhancement and other enhancements, which have been ubiquitous in human history.<sup>23</sup>

He contends that we should not underestimate the effects of historical enhancement on human biology.<sup>24</sup> It is not just the case that they have affected our biology, they have also contributed to the evolution of the human genome.<sup>25</sup> He cites the growth of dairy farming in the Middle East and Europe creating selection pressures which led to the evolution of genes for lactose tolerance.<sup>26</sup> Historical enhancements have altered selection pressures and thereby made some previously adaptive traits maladaptive and vice versa.<sup>27</sup> Buchanan concludes that it is not the case that we can now change our biology whereas we could not before, rather that we are becoming

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<sup>19</sup> Ibid., 38.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid., 39.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid., 40.

<sup>24</sup> Ibid., 41.

<sup>25</sup> Ibid.

<sup>26</sup> Ibid.

<sup>27</sup> Ibid.

capable of deliberately changing our biology and in accordance with what we value, informed by scientific knowledge, rather than haphazardly.<sup>28</sup>

Buchanan is right that human history is replete with examples of enhancement. Yet all of these enhancements have been moderate in their magnitude. The history of human enhancement (at least thus far) might rightly be termed the history of moderate enhancement. Radical enhancement is different from historical examples of enhancement in that while they promoted our interests, radical enhancement threatens to undermine some of our most significant of them (as I will argue in Chapters 5 and 6).

Buchanan argues that productivity and wellbeing are linked. He defines productivity as ‘how good we are at using existing resources to create things we value.’<sup>29</sup> Increased productivity does not guarantee increased wellbeing since sometimes what we value is not good for us; firearms brought increased productivity to hunting yet their contribution to wellbeing is probably outweighed by the human destruction they enabled.<sup>30</sup> Rather, increases in productivity create the potential for increases in wellbeing, whether the potential is realised or not depends upon a number of factors.<sup>31</sup> When we look to the past, we find that increased productivity has been a precondition of major gains in human wellbeing. Increased productivity has been achieved through the use of enhancement technologies such as agriculture; this constitutes evidence of an empirical link between enhancement and increases in wellbeing.<sup>32</sup>

Buchanan identifies several biomedical enhancements which might significantly increase productivity and create the potential for increases in wellbeing:

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<sup>28</sup> Ibid.

<sup>29</sup> Ibid., 44.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Ibid., 44-45.

- '1) Enhancements of the present cognitive capacities of human beings (for example, increases in attention, alertness, the speed with which information is processed by the human brain, and improvements in memory)
- 2) Enhancements which extend the duration of our lives
- 3) Enhancements that compress morbidity and disability near the end of life
- 4) Enhancements of the human immune system'<sup>33</sup>

As these kinds of enhancements have increased productivity in the past, we should therefore expect that they will do so again. Improved cognitive capacities would enable us to do what we do now more quickly and efficiently and, if we are right to value what we do, they will increase our wellbeing.<sup>34</sup> Buchanan points to the advent of computer technology significantly improving our productivity, adding several billion dollars to the US economy every year.<sup>35</sup> Increased lifespan and the compression of morbidity and disability has also been shown to increase productivity. Buchanan cites a study that states that a one-year increase in life expectancy increases labour productivity by 4 percent.<sup>36</sup> If a person is able to live close to the peak of their abilities right up until the very end of their lives, they will have a greater capacity for being productive as well as more time to do what they value for longer.<sup>37</sup> Improvement of the immune system has also increased productivity; vaccination has led to massive gains in productivity, preventing serious diseases which decreased our wellbeing and constrained our productivity.<sup>38</sup>

The benefits of enhancement that Buchanan identifies are likely to be increased substantially in the case of radical enhancement. The benefits gained by increased attention and information processing, for example, are likely to scale up with a greater degree of enhancement. However, I argue that as the degree of enhancement increases, so does the degree of harm. Were we to try to increase the level of benefit from enhancement by enhancing ourselves radically, we would encounter harms that would

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<sup>33</sup> Ibid., 45.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid., 46.

<sup>36</sup> Ibid., 47.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

outweigh the benefits we receive. In Chapters 5 and 6, I will argue that some of the things we find most precious to us are likely to be undermined by radical enhancement and we therefore have prudential reasons to reject it.

Buchanan argues that there are network effects associated with many enhancements.<sup>39</sup> Literacy, numeracy, and computers are examples of productivity-increasing enhancements which increase in value to the individual the more individuals have them. Enhancements which have network effects are not zero-sum. In zero-sum situations, each person has an interest in every other person not getting the good because that would reduce their own share; conversely, in non-zero sum situations, each person has an interest in others getting the good since this would make them, as well as those others, better off.<sup>40</sup> In the enhancement literature, positional goods have been extensively covered. These fit the zero-sum situation model; being tall is a positional good, it makes you better off (up to a point) only so long as others are not as tall as you. Buchanan argues that we should not ignore the enhancements which are likely to have network effects.<sup>41</sup> He acknowledges that not all enhancements have network effects but that when we consider the benefits and disadvantages of specific enhancements we should make sure to include the potential for increased wellbeing through these effects.<sup>42</sup>

The possibility of enhancements benefiting society as well as individuals undermines the Personal Goods Assumption since it omits this possibility.<sup>43</sup> The second framing assumption which Buchanan thinks has distorted the enhancement debate is what he terms 'The Market Goods Assumption.'<sup>44</sup> This holds that, due to the spectre of eugenics, enhancements will probably be an activity of the private sector. Buchanan argues that the second framing assumption is also defeated once the first has been undermined. In the case of enhancements which have productivity-increasing effects, governments may take an interest and provide subsidies, tax credits, or other incentives for

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<sup>39</sup> Ibid., 48-9.

<sup>40</sup> Ibid., 48.

<sup>41</sup> Ibid.

<sup>42</sup> Ibid., 49.

<sup>43</sup> Ibid.

<sup>44</sup> Ibid., 50.

enhancement.<sup>45</sup> If governments were to take an interest in enhancement, this would undercut concerns that the benefits of enhancement would be out of reach for those without significant financial resources.

Ray Kurzweil is a technologist who has argued that not only is radical enhancement good for us, but that it is the inevitable result of human technological progress. The thesis of Kurzweil's book *The Singularity is Near: When Humans Transcend Biology* is that soon technological progress will explode and human beings and society will be profoundly altered. This explosive technological growth is referred to by Kurzweil as 'The Singularity'.

Kurzweil writes that:

'The Singularity will allow us to transcend [the] limitations of our biological bodies and brains. We will gain power over our fates. Our mortality will be in our own hands. We will be able to live as long as we want (a subtly different statement from saying we will live forever). We will fully understand human thinking and will vastly extend and expand its reach. By the end of this century, the nonbiological portion of our intelligence will be trillions and trillions of times more powerful than unaided human intelligence.'<sup>46</sup>

He argues that we are in the early stages of the transition now, but we are fast approaching the point where growth will become explosive and the exponential trend behind technological change will become apparent.<sup>47</sup>

Kurzweil supports his view by arguing that exponential growth has been a consistent feature of technological progress. He argues for what he terms The Law of Accelerating Returns, which states that technological change is exponential and, furthermore, the 'returns' of this technological growth (for example, speed and cost effectiveness in the case of computer processors) also grow exponentially.

Moore's Law is cited by Kurzweil as a special instance of the Law of Accelerating Returns. Moore's Law states that the number of transistors which can fit inside a computer processor of a given size doubles every two

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<sup>45</sup> Ibid.

<sup>46</sup> Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology* (New York: Viking, 2005), 9.

<sup>47</sup> Ibid., 9.

years. Other technologies also seem to advance at an exponential rate. Dynamic Random Access Memory has been increasing in density at an exponential rate, as has the storage capacity of magnetic hard drives (though they are now being supplanted by solid-state drives using flash memory).<sup>48</sup> The costs of these technologies also follow exponential growth curves; they get cheaper at an exponential rate.

Of crucial significance to Kurzweil's thesis is that not only are these trends exponential, but they seem to persist through technological paradigms. Kurzweil charts the growth of computer processing power through different technological paradigms, starting with electromechanical computers, then through relays, vacuum tubes, transistors, and finally to the integrated circuit.<sup>49</sup> The exponential pattern of growth in processing power seems to persist through these paradigms, giving us reason to believe that processing power will continue to do so even once we reach the limits of current silicon-based computing technologies. The end of Moore's Law will therefore most likely not be the end of the exponential growth in processing power.

The consequences of The Singularity will be wide-reaching. We will become smarter, we will have new modes of interaction, scarcity will be overcome, and we will live for longer – eventually indefinitely. There will be a merger of our biological intelligence with computing; the non-biological portion of our intelligence will eventually dominate, and then supplant, the biological portion.<sup>50</sup> When this occurs, our intelligence will benefit from the advances in computer processor technology, and its expansion will be correlated with the growth in processing power.<sup>51</sup>

Kurzweil sees the merger of humanity and technology as opening the doorway to exciting new experiences and possibilities. Uploading would enable us to choose from a plethora of different physical appearances, emotional states, friends, and romantic partners (who will themselves have

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<sup>48</sup> Kurzweil would very likely argue that this represents a shift in the technological paradigm (from magnetic to flash memory based storage), and since exponential growth (historically) has persisted through paradigms, we should expect it to in this particular case also.

<sup>49</sup> Kurzweil, *The Singularity is Near*, 33-56.

<sup>50</sup> Ibid., 337.

<sup>51</sup> Ibid., 316-17.

these same opportunities). There is also the tantalising prospect of living indefinitely (or just as long as we desire to continue living).

One scenario which Kurzweil envisions is brain uploading. This would involve ‘scanning a human brain (most likely from within), capturing *all* of the salient details, and reinstating the brain’s state in a different – most likely more powerful – computational substrate.’<sup>52</sup> At present, when our physical bodies die, we die too. Kurzweil thinks that if we can transfer the pattern of information which makes up our brains into software and then store it in computer memory, we could escape the dependency which our lives have on our biology.<sup>53</sup> As long as we can keep porting our ‘mind file’ to current storage mediums and formats, we will be able to achieve a form of indefinite life.<sup>54</sup>

Of course, with mind uploading there are real concerns about how feasible it would be to upload our minds to computer systems. Nicholas Agar has argued that Kurzweil does not take seriously enough the possibility of mind uploading failing, as John Searle’s Chinese Room thought experiment suggests it would.<sup>55</sup> He argues that, unless you are certain that mind uploading would work, it would be irrational to upload. My concern with mind uploading is not to assess whether it would in fact be possible but rather to explore what the consequences would likely be if it *were* possible. I argue that this form of radical enhancement would have especially serious costs, especially if we were to keep enhancing our cognitive capacities as more powerful computing technologies became available. Kurzweil’s proposal would have profound effects on our ability and motivation to form and fulfil life plans; in Chapter 6 I explain this unique danger of Kurzweilian radical enhancement.

Kurzweil thinks that, despite the far-reaching changes The Singularity would bring, we would remain human. He writes that ‘most of the intelligence of our civilization will ultimately be non-biological’ yet ‘our civilization will

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<sup>52</sup> Ibid., 324.

<sup>53</sup> Ibid., 325.

<sup>54</sup> Ibid.

<sup>55</sup> Nicholas Agar, *Humanity’s End: Why We Should Reject Radical Enhancement* (Cambridge: The MIT Press, 2010), 58-70.



remain human – indeed in many ways it will be more exemplary of what we regard as human than it is today, although our understanding of the term will move beyond its biological norms.’<sup>56</sup> As I mentioned earlier with regards to Harris, I do not think that there is anything special about being human but there are things which are contingently connected to our humanity which do matter to us. In Chapters 5 and 6, I explain why radically enhancing our cognitive capacities would likely change our interests and values such that we lose some of what matters most to us.

Nick Bostrom is one of the few philosophers to deal directly with radical enhancement.<sup>57</sup> In his article ‘Why I Want to be a Posthuman When I Grow Up’, he describes what he envisions the life of a radically enhanced being to be like in order to set the stage for his argument that radical enhancement is desirable;

‘You have just celebrated your 170th birthday and you feel stronger than ever. Each day is a joy. You have invented entirely new art forms, which exploit the new kinds of cognitive capacities and sensibilities you have developed. You still listen to music – music that is to Mozart what Mozart is to bad Muzak. You are communicating with your contemporaries using a language that has grown out of English over the past century and that has a vocabulary and expressive power that enables you to share and discuss thoughts and feelings that unaugmented humans could not even think or experience. You play a certain new kind of game which combines VR-mediated artistic expression, dance, humor, interpersonal dynamics, and various novel faculties and the emergent phenomena they make possible, and which is more fun than anything you ever did during the first 100 years of your existence. When you are playing this game with your friends, you feel how every fiber of your body and mind is stretched to its limit in the most creative and imaginative way, and you are creating new realms of abstract and concrete beauty that humans could never (concretely) dream of. You are always ready to feel with those who suffer misfortunes, and to work hard to help them get back on their feet. You are also involved in a large voluntary organization that works to reduce

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<sup>56</sup> Kurzweil, *The Singularity is Near*, 30.

<sup>57</sup> Nick Bostrom, “Why I Want to be a Posthuman When I Grow Up” In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn, and Ruth Chadwick (Dordrecht: Springer, 2009), 107-136.

suffering of animals in their natural environment in ways that permit ecologies to continue to function in traditional ways; this involves political efforts combined with advanced science and information processing services. Things are getting better, but already each day is fantastic.’<sup>58</sup>

While in his work he refers to posthumans and posthuman capacities rather than to radical enhancement explicitly, his definition of what it means to be a posthuman is very similar to Nicholas Agar’s definition of radical enhancement in that the focus is the level of one’s capacities in relation to unenhanced human beings. Bostrom writes;

‘I shall define a *posthuman* as a being that has at least one posthuman capacity. By a *posthuman capacity* I mean a general central capacity greatly exceeding the maximum attainable by any current human being without recourse to new technological means.’<sup>59</sup>

He goes on to define what he means by a general central capacity, focusing on three capacities in particular, though I will only focus on his treatment of cognition, since this is directly relevant to the central focus of my thesis. He defines cognition as follows;

‘*Cognition* – general intellectual capacities, such as memory, deductive and analogical reasoning, and attention, as well as special faculties such as the capacity to understand and appreciate music, humor, eroticism, narration, spirituality, mathematics, etc.’<sup>60</sup>

Bostrom argues that there is a *prima facie* case that enhancing an individual’s cognitive capacities beyond the current human range would be intrinsically desirable for the enhanced individuals.<sup>61</sup> He supports his contention by examining what we seem to value as unenhanced beings, and constructing an argument based upon this.

Bostrom points out that we seem to value the improvement of our cognitive capacities. Like Harris, he sees enhancement (at least of the cognitive capacities) as being obviously good;

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<sup>58</sup> Ibid., 112.

<sup>59</sup> Ibid., 108.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid., 118.

‘Who wouldn’t want to remember names and faces better, to be able more quickly to grasp difficult abstract ideas, and to be able to “see connections” better? Who would seriously object to being able to appreciate music at a deeper level? The value of optimal cognitive functioning is so obvious that to elaborate the point may be unnecessary.’<sup>62</sup>

He thinks that the value that we place on improving our cognitive capacities is evident in the resources we allocate to education ‘which often explicitly aims not only to impart specific items of knowledge but also to improve general reasoning abilities, study skills, critical thinking, and problem solving capacity.’<sup>63</sup> Our use of substances such as coffee to improve our alertness further demonstrates our desire for improving our cognitive capacities.<sup>64</sup>

Bostrom acknowledges that a common desire for cognitive enhancement does not necessarily mean that there is a common desire for becoming posthuman. He points out that wanting to become a posthuman requires a desire for a great deal of enhancement and that it is logically possible that people only want a small degree of enhancement. He argues that despite this possibility, it is likely that people have an interest in enhancing their cognition a great deal.

He argues that those who already possess above-average cognitive capacities are no less desiring of enhancement of these capacities than those with below-average capacities. In fact, according to Bostrom, they appear even more eager to attain improvements than their below-average counterparts. To illustrate this point Bostrom uses an example of a musically gifted person; such a person is likely to spend more time trying to improve their musical abilities than a person who is less talented.<sup>65</sup>

Bostrom argues that this phenomenon is, in part, explained by the external rewards which those who excel in a given area receive.<sup>66</sup> An excellent musician might receive more money and esteem through a small

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<sup>62</sup> Ibid., 116.

<sup>63</sup> Ibid., 117.

<sup>64</sup> Ibid.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

improvement in their musical capacities than a person with a substantially lower level of ability.

The increase in external rewards is not the complete explanation for the more gifted having a greater desire to improve their cognitive capacities, according to Bostrom. He argues that even if we focus only on the intrinsic benefits of their capacities, we find the same result. He provides a thought experiment to support this claim where there are no external rewards resulting from the improvement of one's capacities:

‘If we imagine a group of people placed in solitary confinement for the remainder of their lives, but with access to books, musical instruments, paints and canvasses, and other prerequisites for the exercise of capacities, I would hypothesize that those with the highest pre-existing capacity in a given domain would be more likely (or at least not less likely) to work hard to further develop their capacities in that domain, for the sake of the intrinsic benefits that the possession and exercise of those capacities bestow, than would those with lower pre-existing capacities in the same domain.’<sup>67</sup>

Bostrom argues that the above thought experiment shows that unlike money, where a given amount has less utility to a millionaire than someone in poverty, there does not seem to be a decline in the marginal utility of improved cognitive capacities.<sup>68</sup> This suggests that there are ‘continuing returns in the “intrinsic” (in the sense of non-instrumental, non-positional) utility’ of improvements in cognitive capacities.<sup>69</sup> Bostrom argues that it would be implausible that improvements in our capacities within the current human range are intrinsically valuable, yet improvements beyond this range would lack this value.<sup>70</sup> From this he concludes that enhancing beyond the human level is intrinsically desirable.<sup>71</sup>

I think that Bostrom's depiction of the life of a posthuman and his argument intended to support its desirability are (largely) both correct. He identifies several goods that we would attain were we to radically enhance that would

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<sup>67</sup> Ibid., 117-118.

<sup>68</sup> Ibid., 118.

<sup>69</sup> Ibid.

<sup>70</sup> Ibid.

<sup>71</sup> Ibid.

otherwise be beyond our reach. However, his analysis misses the potential costs of such a transformation. He presents a vision which, by itself, is desirable yet it is likely that radically enhancing ourselves carries costs. As I will argue in Chapters 5 and 6, significant costs arise when dealing with great degrees of enhancement that do not seem to be present when considering enhancements of far smaller magnitudes. Once we acknowledge these costs, the desirability of radical enhancement is much less obvious.

The purpose of this chapter is to identify the very significant benefits of enhancement and the strong case they build for enhancement. Radical enhancement (as opposed to moderate enhancement) of one's cognitive capacities would increase the magnitude of the benefits received. I think the optimism of enhancement advocates is misplaced; when it comes to radical enhancement, the benefits of enhancement increase but the costs increase as well – and probably to such a degree that the benefits of enhancement no longer outweigh them. In Chapters 5 and 6 of my thesis, I argue that, despite the significant benefits of radical enhancement, some of the things we find most precious would likely be threatened by too great a degree of enhancement. Enhancement is good, but too much could be very bad for us. In the next chapter, I will assess some of the harms which bioconservative authors attribute to enhancement. I argue that the harms they describe do not apply to enhancement *in toto* (as the authors intend), but rather in the case of radical enhancement some of these harms might indeed arise.

### 3. Bioconservatives and the potential costs of enhancement

Advocates of human enhancement see technology as a means of improving humanity and surpassing the constraints of the human body. The prospects they have in mind include lengthening our lives, making us more intelligent, increasing our wellbeing, and so on. Among those advocating enhancement there are some who see enhancement as a means to go far beyond what is ordinarily possible for human beings. They advocate using technologies to make us vastly more intelligent, rational, and to increase our life spans far beyond what is normally possible. Throughout this thesis I will refer to such people as transhumanists.

The main criticisms of the transhumanist project have come from bioconservatives. Francis Fukuyama and Leon Kass both argue that there is something valuable about our humanity that would be lost were we to radically enhance ourselves.<sup>72</sup> Michael Sandel has a completely different concern – that the attitude of enhancement advocates is what makes enhancement wrong, rather than its consequences in relation to the enhanced.<sup>73</sup> In assessing the bioconservative literature, as with advocates of enhancement, I focus on arguments that may have some bearing on the prudential rationality on the enhancement enterprise. For this reason I will not cover arguments concerning social justice, nor will I consider the safety of enhancement. These are important concerns but beyond the scope of my thesis. My concern is, instead, whether we have reasons to reject enhancement, assuming that it is both feasible and safe.

It is worth highlighting that my reading of bioconservative authors is unconventional in that I assess their work from the perspective of prudential

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<sup>72</sup> Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus, and Giroux, 2002).

Leon Kass, *Life Liberty and the Defense of Dignity: The Challenge for Bioethics* (San Francisco: Encounter Books, 2002).

<sup>73</sup> Michael Sandel, *The Case against Perfection: Ethics in the Age of Genetic Engineering* (Cambridge: Belknap Press of Harvard University Press, 2007).

rationality rather than morality. I am interested in the costs and benefits of enhancement whereas their intention is to offer moral arguments against enhancement. Despite the fact that I happen to agree that some of the costs they identify may transpire, I argue that these costs are restricted to radical enhancement and that they do not provide absolute reasons to reject even radical enhancement. This weaker claim would be unlikely to satisfy many bioconservatives who argue that enhancement is outright immoral, irrespective of degree, which is quite separate from my concern with enhancement.

My purpose in surveying the enhancement literature in this thesis is to argue that the major problem in the enhancement debate has been the failure to recognise the importance of the relationship between the degree of enhancement and the magnitude of the associated costs. The main opponents of enhancement are mistaken and yet, nonetheless, some of their conclusions actually turn out to be correct in the context of radical enhancement. The enhancement advocates identify real and non-trivial benefits of enhancing ourselves. While enhancement is prudentially good for us, radical enhancement increases the costs of enhancement to such a degree that it is against our interests. The arguments of transhumanists give us reasons to pursue moderate enhancement. However, as I will argue in later chapters, the costs of radical enhancement make it prudentially irrational despite its benefits.

### **Bioconservatives and arguments against enhancement**

Leon Kass has railed against many biotechnologies and sits squarely in the bioconservative camp. Broadly, Kass argues that biotechnologies (including those enhancement proponents would have us use) threaten human dignity. He thinks that the use of these technologies would undermine the features of humanity that make us unique; their use would impoverish our existence by making us no longer human.

In the introduction to his book, *Life, Liberty and the Defense of Dignity: The Challenge for Bioethics*, Kass claims that at present ‘human nature itself lies on the operating table, ready for alteration, for wholesale redesign.’<sup>74</sup> To illustrate the threat to our humanity that he envisions, he turns to Aldous Huxley’s novel *Brave New World*, which is often a centrepiece of discussions regarding the use of biotechnology.

In *Brave New World*, society is segregated into different classes, each of which has been genetically engineered to be suited to particular tasks.<sup>75</sup> The ‘alphas’ have had their intelligence increased whereas the ‘gammas’ have had theirs stunted so they are better suited to menial work. Love and exclusive and long-term relationships have ceased to exist; in *Brave New World* ‘everyone belongs to everyone else.’ Citizens are kept content through a regular supply of the mood altering drug Soma.

Kass sees Huxley’s *Brave New World* as a vision of a possible future, the most significant aspect of which he thinks is likely to come to pass. He thinks that we will lose our humanity; technology will make us happy by removing any distressing experiences from human life and replacing them with pleasurable ones, but will leave us without that which makes the human experience valuable. Elaborating further, he writes that ‘what is most repulsive about Brave New World is not inequality or lack of freedom, but *dehumanisation and degradation* – and, worst of all, that their posthuman state is neither regretted, nor recognised by anyone, and that they aspire to nothing humanly richer or higher.’<sup>76</sup> This is especially dangerous, he says, because although we readily see other dangers of technologies, dehumanisation is more difficult to recognise and therefore is likely to go unnoticed.<sup>77</sup>

One of the aims of transhumanists is the improvement of human happiness. Kass argues that this goal is not only unlikely to be realisable through biotechnology but is also not something we should even aim for in the first

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<sup>74</sup> Kass, *Life Liberty and the Defense of Dignity*, 4.

<sup>75</sup> Aldous Huxley, *Brave New World and Brave New World Revisited*. Reprint Edition. (New York: Harper Collins Publishers, 2005)

<sup>76</sup> Kass, *Life, Liberty, and the Defense of Dignity*, 9 (emphasis in original).

<sup>77</sup> *Ibid.*, 12.



place.<sup>78</sup> He casts doubt on the idea that we can use technology to increase our happiness. He argues that, due to human malleability, once we have what we desired we become accustomed to it such that we would be unhappy to lose it and yet we are not made satisfied by possessing it.<sup>79</sup>

Kass does not dedicate much space in his book to explaining exactly *how* certain enhancement technologies would undermine human dignity. One potential use of enhancement technologies that does come under scrutiny from Kass is extending the human lifespan. He thinks that, contrary to the intuitive position that an indefinite life span would be good, it would actually be bad for us to live forever. He writes, ‘to argue that human life would be better without death is, I submit, to argue that human life would be better being something other than human.’<sup>80</sup> Kass argues that to live forever would *not* be the same as living as we do now, only for longer, but rather to have an indefinite life span would remove a person’s humanity. Moreover, he argues that we mortals are actually *better off* than our immortal counterparts.

Mortality is good, says Kass. He offers four benefits of a finite life. The first is what he terms *interest and engagement*. He asks:

‘If the human lifespan were increased even by only twenty years, would the pleasures of life increase proportionately?’ Would professional tennis players really enjoy playing 25 percent more games of tennis? Would the Don Juans of our world feel better for having seduced 1,250 women rather than 1,000? Having experienced the joys and tribulations of raising a family until the last had left for college, how many parents would like to extend the experience by another ten years? Likewise, those whose satisfaction comes from climbing the career ladder might well ask what there would be to do for fifteen years after one had been CEO of Microsoft, a member of Congress, or the president of Harvard for a quarter century?<sup>81</sup>

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<sup>78</sup> Ibid., 46

<sup>79</sup> Ibid.

<sup>80</sup> Ibid., 265.

<sup>81</sup> Ibid., 266.

Kass' contention is that that the extension of our lives, and the corresponding increase in the number of experiences we have, would not increase our happiness and make us any better off than we are now.

Kass' view regarding the satisfaction which one could derive from living longer has been strongly criticised by John Harris. Harris thinks we would be able to find new ways to derive satisfaction from our lives if they were longer:

‘Suffice it to say that only the terminally boring are in danger of being terminally bored, and perhaps they do not deserve indefinite life. Those who are bored can, thanks to their vulnerability, opt out at any time. But those of us who do not have terminal failure of the imagination should be left to create new ways of enjoying life and doing good.’<sup>82</sup>

Harris' point regarding the ability of those with extended lifespans to ‘opt out’ is, I think, his most salient.<sup>83</sup> Even if it turns out that he is wrong about human beings being able to be interested and engaged indefinitely, there is nothing that would stop a person who had expended the joys of life from ending their existence. Indefinite life is, after all, different from immortality in its strictest sense.

The second benefit of mortality, according to Kass, is *seriousness and aspiration*.<sup>84</sup> He argues that the finitude of our lives is what grounds taking our life seriously and living it passionately.<sup>85</sup> Our plans and goals are tied to our mortality and the finitude our lives. If we knew that there was no limit to the time in which we could fulfil our goals, then our motivation to strive to achieve them would be undermined. There would be no urgency to any activity, rather than using the time in our extended lifespans to achieve more, we would be disengaged. Kass compares an immortal existence to the Gods in Homer's epics; he writes ‘Zeus and Hera, Apollo and Athena – for all their eternal beauty and youthfulness, live rather frivolous lives, their passions only transiently engaged, in first this and then that. They live as spectators of the mortals, who by comparison have depth, aspiration, genuine feeling, and

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<sup>82</sup> Harris, *Enhancing Evolution: The Ethical Case for Making Better People*, 64.

<sup>83</sup> Ray Kurzweil shares Harris' view and argues that if a person grows tired of living indefinitely they have the option to end their life. See Kurzweil, *The Singularity is Near*, 244.

<sup>84</sup> Kass, *Life, Liberty, and the Defense of Dignity*, 266.

<sup>85</sup> *Ibid.*, 226-7.

hence a real centre in their lives.’<sup>86</sup> He acknowledges that there may be exceptions, some activities may not require a limited time in order for us to be driven to engage in them.<sup>87</sup> The pursuit of knowledge is something that doesn’t seem to require the urgency of finitude. The best kinds of friendships would also be capable of indefinite growth, according to Kass. Despite these exceptions, for the most part living forever would be bad for us – we should opt to remain mortal.

It seems unlikely that the extension of our lives would undermine our motivation to live our lives passionately and to fulfil our goals. If this were the case, then we should expect that as human lifespans have increased that we are living our lives less passionately and achieving less than human beings were when their lives were shorter. This seems highly implausible; if anything, humans have achieved more in their extended lifespans and arguably are happier as a result. Though I doubt Kass’ claims regarding indefinite lifespans, with respect to indefinite life spans arising from one particular kind of enhancement I think he may (surprisingly) be right regarding seriousness and aspiration. In Chapter 6 I explain how this might happen, and how, if it does, it would be due to the means by which the elongation of our lives is achieved – not the elongated life itself.

Thirdly, Kass argues that our appreciation of beauty and capacity for love are dependent on our mortality.<sup>88</sup> He questions whether our appreciation of beauty might not be connected to the fact that we will die. Our desire to create beautiful artefacts which will outlive their creator is driven by the knowledge that our own lives are finite. Our taste for the beautiful is also connected to our mortality; our awareness of the ugliness of decay gives us a reference against which we can appreciate beauty. Love too, is made meaningful by the fact that we will die. Kass writes, ‘does love not swell before the beautiful precisely on recognising that it (and we) will not always be? Is not our mortality the cause of our enhanced appreciation of the

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<sup>86</sup> Ibid., 266.

<sup>87</sup> Ibid., 267.

<sup>88</sup> Ibid.

beautiful and the worthy and of our treasuring and loving them? How deeply could a deathless “human” being love another?’<sup>89</sup>

Lastly, *virtue and moral excellence* are connected to our mortality.<sup>90</sup> Being mortal means that it is possible to give our lives for a purpose.<sup>91</sup> We can rise above our attachment to survival and act in service of a higher goal.<sup>92</sup>

Moreover, we can sacrifice what short and precious time we have in order to do what is good.<sup>93</sup> Kass writes that ‘to suffer, to endure, to trouble oneself for the sake of home, family, community and genuine friendship, is truly to live and is the clear choice of this exemplary mortal.’<sup>94</sup>

To enhance would, according to Kass, be to lose what’s valuable about our humanity. We would be living impoverished lives that no longer could rightly be called human. This undesirable result is the main reason why we should not opt to enhance ourselves.

The political scientist Francis Fukuyama has also critiqued transhumanism in his book, *Our Posthuman Future*. He shares some of the same concerns as Kass, and draws on the ideas in Kass’ *Life, Liberty, and the Defense of Dignity*. Like Kass, he thinks that enhancement through biotechnology is likely to strip us of what is valuable about being human. He is in agreement with Kass that too much enhancement may turn us into the denizens of *Brave New World*, of which he writes ‘they no longer have the characteristics that give us human dignity ... their world has become unnatural in the most profound sense imaginable, because *human nature* has been altered.’<sup>95</sup> Indeed, Fukuyama conceives the aim of his book as being ‘to argue that Huxley was right, that the most significant threat posed by contemporary biotechnology is the possibility that it will alter human nature and thereby move us into a “posthuman” stage of history.’<sup>96</sup>

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<sup>89</sup> Ibid.

<sup>90</sup> Ibid., 267-8.

<sup>91</sup> Ibid.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid., 268.

<sup>94</sup> Ibid.

<sup>95</sup> Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus, and Giroux, 2002), 6 (emphasis in original).

<sup>96</sup> Ibid., 7.

Fukuyama engages more with the potential consequences of enhancement technologies than Kass. He takes issue with the use of anti-depressants, specifically selective serotonin reuptake inhibitors (SSRIs), being used to treat low self-esteem.<sup>97</sup> SSRIs are commonly used to treat anxiety disorders and clinical depression; however, they can also be used to enhance the moods of people who do not have these mental disorders. Fukuyama argues that there are dangers in giving SSRIs to people who have low self-esteem but are otherwise mentally healthy.<sup>98</sup> He writes that ‘virtually all human progress has been the by-product of the fact that people were never satisfied with the recognition they received; it was through struggle and work alone that people could achieve it.’<sup>99</sup> He questions whether Caesar or Napoleon would have desired to conquer most of Europe if they could avail themselves of pharmaceutical mood enhancers. While acknowledging that there are people (the severely depressed) who have a serious need for these substances, Fukuyama thinks that the use of SSRIs in contemporary society bears an unsettling resemblance to the fictional drug Soma in *Brave New World* – feeling anything less than satisfied with your lot in the world is looked upon as a condition to be erased and replaced by a hazy bliss.<sup>100</sup>

There is good reason to doubt Fukuyama’s claim that people would achieve less if they were happier. Mark Walker argues in his book *Happy-People Pills For All* that happiness is a cause of success, contrary to the intuitive position that it is only being unsatisfied that leads one to strive to better one’s situation. There is actually a bidirectional relationship between success and happiness; success causes people to be happy *and* happiness causes people to be successful. Walker draws on a number of psychological studies to provide empirical support for his argument. A meta-analysis conducted by Lyubomirsky, King, and Diener found correlations between happiness and success in the domains of work, relationships, and health.<sup>101</sup> The researchers also found that longitudinal studies (those which follow a population over

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<sup>97</sup> Ibid., 41-57.

<sup>98</sup> Ibid., 44-46.

<sup>99</sup> Ibid., 46.

<sup>100</sup> Ibid.

<sup>101</sup> Mark Walker, *Happy-People Pills For All* (Chichester: Wiley-Blackwell, 2013), 135.

time) showed that ‘happiness precedes important outcomes and indicators of thriving, including fulfilling and productive work (mean  $r=.24$ ), satisfying relationships (mean  $r=.21$ ), and superior mental and physical health and longevity (mean  $r=.18$ ).’<sup>102</sup> This shows that happiness is the cause of these outcomes rather than a result of them, since if it was success making people happy we would expect that it would precede people’s happiness. If Napoleon were to have availed himself of mood enhancing pharmaceutical drugs he would likely not have sat on his laurels.

The elongation of the human lifespan is another enhancement possibility which Fukuyama critiques.<sup>103</sup> Like Kass, he thinks that living a longer life is not necessarily any better than having an average lifespan, although his reasons differ from Kass’. He argues that older generations, laden with their outmoded ideas and values, will refuse to get out of the way of younger generations. He predicts that they will impede political progress and that societal change will therefore occur at a slower rate due to generation succession taking much more time.<sup>104</sup> He also argues that living longer may be bad for the individuals themselves. Fukuyama notes that we already live much longer than we did in the not too distant past, our lifespans have been increasing over time. He says that these additional years may not be accompanied by good health; many elderly individuals are afflicted with dementia or other debilitating conditions. Extra years might not equate to worthwhile years. There is yet another potential consequence of lifespan extension that Fukuyama draws attention to – its effect on familial and social connections<sup>105</sup>. He argues that since family life and work make up a significant part of our lives and that these will be less prominent in the later years of one’s extended life, our lives might turn out to be emptier and lonelier. He says that while retirement might seem like a reward now, if it were to stretch on for twenty or thirty years with no apparent end it may seem pointless. Those with elongated lifespans may find their lives to be

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<sup>102</sup> Ibid., 136-7.

<sup>103</sup> Fukuyama, *Our Posthuman Future*, 66.

<sup>104</sup> Ibid., 66.

<sup>105</sup> Ibid., 69-71.

devoid of fulfilment. Despite its intuitive appeal, Fukuyama thinks that extending our lifespans would not be good for us.

Similarly to Kass, Fukuyama's central concern is that enhancement may undermine human dignity. He says that what we may lose if we were to engage in enhancement 'would have to do with human nature: the species-typical characteristics shared by all human beings qua human beings.'<sup>106</sup> He argues that there is something that is essential and unique to human beings which he labels *Factor X*.<sup>107</sup> The ideal of human equality is connected to Factor X; Fukuyama writes that 'What the demand for equality implies is that when we strip away all of a person's contingent and accidental characteristics, there remains some essential human quality underneath that is worthy of a minimal level of respect – call it Factor X.'<sup>108</sup> A threat to Factor X is significant since Factor X is what grounds human rights and thereby makes it wrong to commit certain acts against human beings.<sup>109</sup> Fukuyama thinks that if we avail ourselves of enhancement technologies, the future will be dramatically altered. Our posthuman future would have more conflict and a more stratified society – our shared humanity would be lost.<sup>110</sup>

Jonathan Glover has critiqued Fukuyama's argument that enhancement would undermine our dignity.<sup>111</sup> Clearly, not every change to previously universal human characteristics would threaten human dignity. Someone genetically engineered to have green hair seems to have the same claim to human dignity as everyone else. Since not every alteration to universal human characteristics threatens dignity, in order to find those that do we have to decide which characteristics are essential to being human and which are merely contingently universal.

There are two problems that Glover identifies with trying to find the essential characteristics to being human. The first is how we should identify the

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<sup>106</sup> Ibid., 101.

<sup>107</sup> Ibid., 148.

<sup>108</sup> Ibid., 149.

<sup>109</sup> Ibid., 150.

<sup>110</sup> Ibid., 217-8.

<sup>111</sup> Jonathan Glover, *Choosing Children: Genes, Disability, and Design* (New York: Oxford University Press, 2006), 83-4.

essential characteristics of a human. He points out that prior to IVF some may have thought that being born in the womb of your genetic mother was essential to being human. With the advent of modern reproductive technology, we do not think children born by surrogates are not human. Glover argues that in determining the essential characteristics of humans we are not looking for some fact but rather a definition. When it comes to problem cases such as people with genetically engineered features, there does not seem to be any non-arbitrary 'right' definition for what is essential.

The second problem Glover identifies is that even if we did have a way of determining the essential characteristics of human beings, they would not necessarily all be valuable. He argues that there is no guarantee that a list of essential characteristics would 'include only things like rationality and imagination and not things like cruelty and aggression.'<sup>112</sup> If it turns out a terrible characteristic is essential to being human, it might actually be better to change our humanity than to remain human. Glover concludes that the importance of what is essential to humanity is unclear; we should preserve what is valuable but the connection between what is essential to humans and what is valuable remains to be shown.

The political philosopher Michael Sandel is yet another opponent of enhancement. He argues against enhancement but, unlike Kass and Fukuyama, his claim is not that the results of enhancement would be bad. Rather, the problem lies in the attitude of would-be enhancers.

He introduces the issue of the morality of genetic engineering with two examples, both taken from the real world.<sup>113</sup> The first is a lesbian couple who were both profoundly deaf who deliberately sought out a deaf sperm donor to ensure that their child would be congenitally deaf. The second is an infertile couple who purposefully used the eggs of a specific donor they selected for what they perceived to be her desirable traits. He states that we feel uneasy at both prospects, even though one seems to be a case of enhancement and the other a case of parents choosing to have a disabled child.

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<sup>112</sup> Ibid., p.84.

<sup>113</sup> Sandel, *The Case against Perfection*, 2-3.



To frame his own position, Sandel examines some of the common objections advanced against enhancement and finds them to be lacking. He rightly points out that the issue of the potential negative health consequences of enhancement does not settle the issue of enhancement. This is only a contingent feature of enhancement – we can imagine a possible world where enhancement did not have these negative consequences for human health.

A potential objection to human enhancement, specifically directed at genetically engineering humans is that such a practice would undermine the autonomy of the children who were created by this program. Sandel thinks this objection to enhancement is not compelling.<sup>114</sup> Children cannot currently choose any of their traits, therefore we have no reason to think that putting the selection of what traits a child has in the hands of parents would lead to any loss of autonomy over simply leaving it to chance.<sup>115</sup> Secondly, the autonomy objection cannot assess the morality of people choosing to enhance themselves (since they are not undermining their own autonomy).

Interestingly, Sandel goes further than merely arguing that common objections to enhancement are incorrect. He defends the position that there is no moral distinction between enhancement by biomedical means and by conventional means (a view shared by John Harris).

The central claim that Sandel makes is that enhancement is wrong because of the attitude that it expresses and promotes. He writes: ‘the problem with eugenics and genetic engineering is that they represent the one-sided triumph of wilfulness over giftedness, of dominance over reverence, of molding over beholding.’<sup>116</sup> It is not immediately obvious what to make of this claim, however Sandel helpfully clarifies for the reader. He says that there are three features of what he calls ‘our moral landscape’ – humility, responsibility, and solidarity – and that these are under threat from enhancement.<sup>117</sup>

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<sup>114</sup> Ibid., 6-8.

<sup>115</sup> Of course, what traits a child will have is not *wholly* determined by chance but rather randomness acting within the boundaries of the possible combinations of sperm and egg.

<sup>116</sup> Sandel, *The Case against Perfection*, 85.

<sup>117</sup> Ibid., 86.

According to Sandel, parenthood teaches humility.<sup>118</sup> In our society, mastery and control are favoured, but in parenting we cannot control what kind of children we have. This teaches us to be ‘open to the unbidden’. This disposition is valuable, not just in the family, but in the wider world. Sandel uses the society presented in the film *Gattaca* as an example of the consequences of living in a world where we are not open to the unbidden. In *Gattaca*, a 1997 science fiction film, parents are able to select almost every characteristic of their children, such as their height, intelligence, and physical fitness through the use of genetic engineering technology.<sup>119</sup> The result is a society where genetic profiling is used for screening applicants for jobs, people seek partners with the genetic makeup they deem desirable, and there is segregation between ‘valids’ – those who are the result of genetic engineering – and ‘invalids’ – those who were conceived without such techniques. Sandel writes that: ‘A *Gattaca*-like world in which parents became accustomed to specifying the sex and genetic traits of their children, would be a world inhospitable to the unbidden, a gated community writ large.’<sup>120</sup> Our knowledge that our talents and abilities are not wholly our own also guards us from hubris. If our genetic make-up could be altered by biotechnology, we would likely not think of our talents as gifts rather than achievements for which we are responsible. Sandel acknowledges that this point does not apply to genetically engineered *children*, since they would still be indebted for their traits, except their debt would be to their parents rather than nature, chance, or God.<sup>121</sup>

The second feature that Sandel argues will be negatively affected is responsibility.<sup>122</sup> Interestingly, he argues that rather than human enhancement eroding responsibility, it would cause an explosion of it. Enhancement would lead us to attribute ‘less to chance and more to choice’.<sup>123</sup> We would be burdened with the responsibility for choosing the

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<sup>118</sup> Ibid.

<sup>119</sup> Ethan Hawke, et al., *Gattaca*. Motion Picture. Directed by Niccol, Andrew. Columbia Pictures, 1997.

<sup>120</sup> Sandel, *The Case against Perfection*, 86.

<sup>121</sup> Ibid., 87.

<sup>122</sup> Ibid., 87-9.

<sup>123</sup> Ibid., 87.

traits which will be most beneficial. Failure to win a sports match wouldn't be attributed to bad luck or the other team having trained better, but rather to the athlete's failure to acquire the appropriate genetic traits.<sup>124</sup>

Another of Sandel's concerns is that enhancement could mean that our responsibility for the traits of our children would become dramatically enlarged. Sandel writes 'as humility gives way, responsibility expands to daunting proportions.' Harris counters that it is not a failure of humility that leads to enlarged responsibility but instead 'a better understanding of responsibility in the presence of real and unavoidable choices.'<sup>125</sup> Failing to choose to enhance does mean that our responsibility is lessened. It is our ability to choose rather than our particular exercise of choice which gives rise to responsibility. Choosing not to act is still a choice for which we are responsible. Refusing to use powers we already possess does not lessen our responsibility for choosing (or not choosing) to exercise them in particular circumstances.<sup>126</sup>

According to Sandel, enhancement would undermine our sense of solidarity with others.<sup>127</sup> He uses insurance as an example to illustrate his point. We pool our resources together since we do not know when we may need assistance. In doing so, we may end up subsidising unhealthy people if we are in good health, or benefiting from others' contributions ourselves. Sandel explains, 'even without a sense of mutual obligation, people pool their risks and resources and share one another's fate.'<sup>128</sup> Insurance markets function due to the fact that people do not know and cannot control all of their risk factors. If genetic enhancement were practised, those who had enhanced and were thereby much more likely to remain in good health would not see much value in insurance. The effect would predictably be that the premiums of those not fortunate to enhance would increase dramatically. Although Sandel thinks this is concerning, he argues that the main danger of genetic enhancement is that 'it would make it harder to foster the sentiments that

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<sup>124</sup> Ibid.

<sup>125</sup> Harris, *Enhancing Evolution*, 118.

<sup>126</sup> Ibid., 119.

<sup>127</sup> Sandel, *The Case against Perfection*, 89-91.

<sup>128</sup> Ibid., 90.

social solidarity requires.’<sup>129</sup> If we can be said to be responsible for our traits, this would remove the reason we owe anything to the disadvantaged in our society. Sandel argues that the notion of giftedness is intimately connected with our reasons to help those less fortunate than us. We are not responsible for the traits which enable us to succeed, rather they are the result of the genetic lottery – were we unlucky we could have had other traits less conducive to success. A consequence of this fact, as Sandel points out, is that we cannot claim full credit for our flourishing in a market economy, it could very well have been different had we another set of traits. What follows is that we have an obligation to help those who were not lucky enough to have the same traits.

Were we to lose this sense of solidarity, the social consequences would be dire. Sandel thinks that the meritocratic aspect of our societies would become even more prominent. The successful would be unlikely to view themselves as fortunate, instead they would view themselves as wholly responsible for their success, thinking themselves ‘self-made and self-sufficient.’<sup>130</sup> Those at the bottom would be looked upon not as unfortunate and deserving compensation but as ‘simply unfit, and so worthy of eugenic repair.’<sup>131</sup>

Sandel’s argument against enhancement is another focus point for Harris. He contests Sandel’s claim that enhancement expresses a ‘drive to mastery’ which is harmful to our appreciation of the ‘gifted character of human powers and achievements.’<sup>132</sup> Harris questions why we should accept the ‘gifted nature of normalcy’ and not the gifted nature of disease. He argues that it cannot be the case that Sandel thinks we should accept the giftedness of life only when it allows a child’s natural capacities to flourish because this would include enhancements when they improve upon our ‘given’ capacities.<sup>133</sup>

Harris also considers Sandel’s application of the idea of giftedness to enhancement of one’s children.<sup>134</sup> Sandel thinks that because we do not

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<sup>129</sup> Ibid., 90-1.

<sup>130</sup> Ibid., 92.

<sup>131</sup> Ibid.

<sup>132</sup> Harris, *Enhancing Evolution*, 112.

<sup>133</sup> Ibid., 113.

<sup>134</sup> Ibid., 115.

choose the traits of our children and parental love is not contingent on what traits a child has, parenthood teaches humility and ‘openness to the unbidden.’ Harris reiterates his earlier point that there is much about the ‘unbidden’ which is bad, illness and diseases for example. Sandel does not think that in accepting children as gifts we should accept disease. We should instead be open to the unbidden only when it is part of a non-disfiguring relationship between parent and child which does not desecrate nature but honours it.<sup>135</sup> Harris points out that Sandel owes us an account of why we should honour nature in the sense that Sandel refers to and why enhancing it would be a desecration. We need a non-question begging account of honour and desecration, something which Sandel does not provide.<sup>136</sup>

As Buchanan notes, one of the major criticisms of enhancement relates to our character. Buchanan identifies two kinds of concern relating to our character: expressivist concerns, which hold that enhancement indicates bad character, and consequentialist concerns, which state that enhancement will damage our character.<sup>137</sup> One type of expressivist concern is that enhancements would create opportunities for us (even more than we already have) to express the bad elements of our character and thus should be avoided.<sup>138</sup> Buchanan argues that this position is untenable since if we are so vicious that we should avoid giving ourselves further opportunities to display our vices, then it seems that we should actually try to improve ourselves to become less vicious. If our character is as bad as it is presented in this expressivist concern, then we may be obliged to pursue moral enhancement.<sup>139</sup>

Buchanan argues that Sandel’s claim that we should reject enhancement because it expresses a desire for mastery which is incompatible with our sense of giftedness is flawed.<sup>140</sup> We can and do pursue enhancements, including biomedical ones, without exhibiting a desire for mastery. Buchanan gives the examples of having laser surgery on one’s eyes and of cognitive

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<sup>135</sup> Ibid., 116.

<sup>136</sup> Ibid., 116.

<sup>137</sup> Buchanan, *Beyond Humanity*, 69.

<sup>138</sup> Ibid., 73-4.

<sup>139</sup> Ibid., 74-5.

<sup>140</sup> Ibid., 78-9.

biomedical enhancement. If you have laser surgery and opt for overcorrection so you have 20/20 vision because it will improve your birdwatching, you clearly have not tried to achieve mastery. Similarly, if you were to enhance your cognition through biomedical means you have also not exhibited a desire for mastery. As Buchanan points out, if you did then literacy, numeracy, immunisation, and the use of computers would all be morally wrong.

Even with enhancements that more closely resemble radical enhancement, we still would not be exhibiting a desire for mastery.<sup>141</sup> Buchanan argues that if we were to significantly increase our lifespan to around 400 years we would still be able to appreciate a sense of giftedness. There would still be misfortunes; people would still die in wars, suffer from unrequited love, and invest in careers that fail, and there would still be actions with unpredicted consequences. In the absence of these misfortunes, there would be reason for appreciating giftedness; finding one's soulmate, being able to be part of a social movement, having read a book and it having made an impact on one's character, having children who grew up to be good, and so on.

Buchanan's critique of Sandel is sound. Sandel does not provide an account of 'the given' which explains why we should accept some of the things which comprise it while rejecting others. His claim that enhancers seek mastery is rather shaky; it is more plausible that parents want what is best for their children. Buchanan rightly points out many of the benefits of enhancement. I acknowledge all of the potential rewards of enhancement that he highlights; however, I argue that while these provide ample justification for moderate enhancement, they do not justify radical enhancement because of the special harms which arise that make it such that radical enhancement is likely to be bad for us.

A further critique of the use of the concept of dignity in the enhancement debate has come from Nick Bostrom. Bostrom argues that, rather than human enhancement posing a significant threat to human dignity, it could instead be used to improve it. In his article 'Dignity and Enhancement', he

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<sup>141</sup> Ibid., 80-1.

distinguishes between different concepts of dignity and decides to focus specifically on Dignity as a Quality. He describes Dignity as a Quality as ‘a kind of excellence; being worthy, noble, honourable.’<sup>142</sup> Persons can possess Dignity as a Quality to varying degrees and it can ‘be thought of as a virtue or an ideal, which can be cultivated, fostered, respected, admired, promoted, etc.’<sup>143</sup>

Bostrom quotes Aurel Kolnai’s description of the qualities which are associated with Dignity as a Quality, among which are ‘composure, distinctness, being inaccessible to destructive or corruptive or subversive interference, [and] self-contained serenity’.<sup>144</sup> He argues that these qualities could be improved through enhancement. He writes that enhancements that would improve our self-control, concentration, ability to cope with stressful situations, as well as ‘enhancements of mental energy that would make us more capable of independent initiative and that would reduce our reliance on external stimuli such as television ... perhaps also enhancement of our ability to withstand mild pains and discomforts, and to more effectively self-regulate our consumption of food, exercise, and sleep’ could improve our Dignity as a Quality.<sup>145</sup>

Our Dignity as a Quality could also be reduced by some enhancements. Bostrom points to enhancing our empathy and compassion as having the potential to undermine our Dignity as a Quality. Given the world we live in, such an enhancement might ‘diminish our composure and self-contained serenity’ and thereby reduce our Dignity.<sup>146</sup> Enhancing our drive, motivation, or emotional responsiveness could also reduce our Dignity by ‘destabilising a dignified inner equilibrium.’<sup>147</sup> Enhancements which make us better able to adapt to changing circumstances could ‘make us more susceptible to

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<sup>142</sup> Nick Bostrom, “Dignity and Enhancement,” *Contemporary Readings in Law and Social Justice* 1, no. 2 (2009): 86.

<sup>143</sup> Ibid.

<sup>144</sup> Ibid., 89.

<sup>145</sup> Ibid., 89-90.

<sup>146</sup> Ibid., 90.

<sup>147</sup> Ibid.

“destructive or corruptive or subversive interference” and undermine our ability to stand firm and quietly defy the world.’<sup>148</sup>

Whether any particular enhancement would improve or undermine our dignity would depend on the context, according to Bostrom.<sup>149</sup> Particularly important is the character of the person being enhanced. Were a person to have their capacity for compassion greatly increased, their Dignity as a Quality could be thereby *improved*, provided they have other mental attributes ‘such as a firm sense of purpose and robust self-esteem.’<sup>150</sup> These attributes would ‘help contain the sympathetic perturbations of the mind and channel them into effective compassionate action.’<sup>151</sup>

Bostrom also examines another possible source of enhancement reducing our Dignity (aside from making us into undignified people) – the very activity of enhancement.<sup>152</sup> He quotes Kass’ concerns regarding the potential for loss of dignity and writes that his concern seems to be that enhancement could lead to a total loss of dignity and its replacement with ‘positive Un-Dignity.’<sup>153</sup>

He uses an example to explain when enhancement as an activity might not increase Dignity or even lead to Un-Dignity. This could occur if someone were to take a cognitive enhancing drug simply to conform to fashion or because of the influence of advertising.<sup>154</sup> Such an enhancement would not be dignified and could even be undignified, since a person who possessed Dignity as a Quality ‘would be expected to exert more autonomous discretion about which substances she puts into her body, especially ones that are designed to affect her mental faculties.’<sup>155</sup> She could potentially still gain Dignity as a Quality from the cognitive enhancement; it is possible that greater cognitive powers would make her more able to resist advertising and the influence of fashions. Yet the act of enhancement may be undignified

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<sup>148</sup> Ibid.

<sup>149</sup> Ibid.

<sup>150</sup> Ibid.

<sup>151</sup> Ibid.

<sup>152</sup> Ibid., 94.

<sup>153</sup> Ibid.

<sup>154</sup> Ibid., 95.

<sup>155</sup> Ibid.



because her motivation for undergoing enhancement is inappropriate; her attitude and the behaviour it gives rise to are undignified.<sup>156</sup>

Although they disagree fundamentally regarding the morality of enhancement, transhumanists and bioconservatives are alike in that neither recognises the degree of enhancement as being relevant to whether it promotes or undermines our interests. Transhumanist authors (broadly) think that enhancement is good and those who have written about radical enhancement (such as Bostrom) think that in this case it would be the same as standard enhancement except the magnitude of benefits would greatly increase. Bioconservatives identify costs with enhancement, even moderate enhancement; enhancement is bad and radical enhancement is worse. I argue that when it comes to the prudential rationality of radical enhancement, both positions are wrong. Transhumanists identify real and substantial goods of enhancement, but in the case of radical enhancement costs arise such as to make it prudentially irrational for most people. Bioconservatives, on the other hand, are misguided to think that more moderate forms of enhancement are bad for us. In the case of radical enhancement, however, some of their concerns may (surprisingly) be justified, though they themselves would likely reject the application of their arguments to a limited subset of enhancement.

In the next chapter of my thesis I will explore some of Nicholas Agar's work concerning enhancement. Unlike the transhumanists and bioconservatives whose work I have presented, Agar emphasises the relevance of the degree of enhancement as to whether a particular enhancement is good or bad for us. Although he has also written extensively on the *morality* of radical enhancement, given the focus of my thesis I make use only of his work on the prudential rationality of enhancement.<sup>157</sup> His work occupies a space in the enhancement landscape between the transhumanists and bioconservatives; Agar endorses what he terms moderate enhancement but rejects radical enhancement. According to Agar, the degree of enhancement affects whether

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<sup>156</sup> Ibid.

<sup>157</sup> See for instance, chapters 6, 7, and 8 of Agar, *Truly Human Enhancement* and chapter 8 of Agar, *Humanity's End*.

it is prudentially rational to pursue it. Agar differentiates between *moderate enhancement* and *radical enhancement*. Moderate enhancement he defines as the improvement of human characteristics or capabilities within the human range. Radical enhancement goes further; it is the enhancement of human capabilities *well beyond* the human range. Moderate enhancement tends to promote our interests whereas radical enhancement is likely to undermine them. We therefore have prudential reasons to enhance ourselves moderately but also prudential reasons to reject radical enhancement. In Chapter 4, I outline some of Agar's concepts, particularly that of radical enhancement as a transformative change, which I utilise in later chapters of my thesis.

#### 4. Agar's transformative change

In his book, *Humanity's End*, Nicholas Agar argues that we should reject one specific kind of human enhancement – what he terms *radical enhancement*. He defines radical enhancement as ‘improving significant human attributes and abilities to levels that greatly exceed what is currently possible for human beings.’<sup>158</sup> Agar argues that radically enhancing ourselves would turn us into fundamentally different kinds of beings; we would transition from being human to posthuman.<sup>159</sup> Although the benefits of radical enhancement seem very significant and it appears obvious that it is something we should pursue, he thinks that once we understand the associated costs we would have prudential reasons to reject it.<sup>160</sup>

Agar argues that radical enhancement would predictably lead to the loss of many of the experiences which have great value to us.<sup>161</sup> He argues for a precautionary approach to radical enhancement; although the consequences he considers are not guaranteed, they are very dangerous and we therefore have reason to ask whether the defenders of radical enhancement can show us how these could be avoided.<sup>162</sup>

Agar's argument for the harmfulness of radical enhancement in *Humanity's End* is supported by a theory of value which he terms ‘species relativism’.<sup>163</sup> This is the idea that ‘certain experiences and ways of existing properly valued by members of one species may lack value for members of another species.’<sup>164</sup> The lives of posthumans might be very good for them but they are not likely to appeal to us. Just as they might view our existence as impoverished, lacking many of the interests and values which they hold dear, so too should human beings view posthuman existence.

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<sup>158</sup> Agar, *Humanity's End*, 1.

<sup>159</sup> Ibid., 2.

<sup>160</sup> Ibid.

<sup>161</sup> Ibid., 11.

<sup>162</sup> Ibid., 11-12.

<sup>163</sup> Ibid., 12.

<sup>164</sup> Ibid.

Agar gives many species-relativist arguments for why we should find enhanced posthuman existences inferior to unenhanced human existences.<sup>165</sup> For brevity's sake, I will only focus on a select few, which will feature in subsequent chapters of my thesis.

One type of radical enhancement which Agar argues would be bad for us is Ray Kurzweil's proposal to upload our minds into computer systems. This would enable massive increases in cognitive powers to follow from improvements in computer systems, which would comprise the substrate of our minds. Agar explicates his opposition to mind uploading as follows:

‘The manner of radical cognitive enhancement permitted by uploading may be worse than the more moderate variety compatible with the survival of our brains in light of some of our more significant desires. Many of the things that we desire may be contingent on our current level of cognitive powers. We want to promote and honour our strongest moral and political ideals. Radical enhancement may not remove our capacity to protect, promote, and honour these commitments. But it may remove our desire to do so. Concern about doing the things we currently want to do may, therefore, lead us to place a low value on radical cognitive enhancement.’<sup>166</sup>

I agree with Agar that radical cognitive enhancement of the kind proposed by Kurzweil is likely to be much worse for us than more moderate enhancement. In Chapter 6, I argue that what makes Kurzweil's kind of enhancement especially likely to be bad for us is how it lends itself towards repeated radical enhancement, and as a result, serious recurring costs.

Another kind of enhancement that Agar argues is potentially bad for us is radical life-extension. Agar identifies a potential problem with extending our lifespans such that we can live indefinitely. Agar thinks that this would lead us to avoid doing many of the things we currently do because we would perceive them to be far too risky. In Chapter 6, I argue that this problem arises only in the case of one kind of enhancement and that radical

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<sup>165</sup> Ibid., 13.

<sup>166</sup> Ibid., 70.

enhancement of the kind Kurzweil proposes would not have this particular problem but nonetheless would be bad for us in another equally serious way.

Agar argues that cognitive enhancement could alienate us from the experiences and commitments that make us who we are.<sup>167</sup> He also argues that radically enhancing your children would be likely to alienate you from them. He argues that a number of experiences which we value would be lost if we were to radically enhance and that the best way to preserve them is to reject radical enhancement.<sup>168</sup>

Continued intellectual growth which derives from radical enhancement may be bad for us. As we grow from children to adults, the increase in our intellectual capacities gives rise to new interests which supplant our old ones.<sup>169</sup> However, eventually we reach adulthood, a period where we do not experience any further dramatic intellectual transformation.<sup>170</sup> Becoming an adult allows the formation of mature interests – ‘interests that may persist throughout our lives.’<sup>171</sup> Our mature interests can change, however the change in interests which we experience as adults is different from that which a child experiences when they become an adult. Our interests may change but we do not become alienated from our previous interests like children do when they become adults.<sup>172</sup>

Conversely, radical enhancement could cause us to never have any mature interests. Agar writes that ‘people whose indefinite life spans are accompanied by ongoing intellectual growth may ... present as a mutually unconnected series of commitments and interests.’<sup>173</sup> We will return to this point later, I think that radical enhancement depriving us of mature interests may be bad for another reason – the effect it is likely to have on our ability to form and fulfil life plans.

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<sup>167</sup> Ibid., 179-180.

<sup>168</sup> Ibid., 182.

<sup>169</sup> Ibid., 184.

<sup>170</sup> Ibid., 185.

<sup>171</sup> Ibid.

<sup>172</sup> Ibid.

<sup>173</sup> Ibid., 186.

Radical enhancement may also have a negative effect on our romantic relationships. If you were to radically enhance it may sever your connection with your partner, the difference in your intellectual capacities may make it difficult to maintain a relationship. One possibility which Agar considers is where both partners opt to radically enhance. He does not think that this is likely to be sufficient to preserve the relationship; the new interests and experiences which are opened up by radical enhancement make it unlikely that the partners will emerge with compatible interests.<sup>174</sup>

The relationship between parent and child is also threatened by radical enhancement. If we were to radically enhance our children, we would potentially be viewed by our children ‘as permanently in the “da-da” stage of development.’<sup>175</sup> We may lose the possibility for shared experiences with our children. He makes an analogy between radically enhancing one’s child and impoverished parents giving their children to Madonna. He writes ‘we value being connected with our children, even if we know that severing that connection would give them an objectively superior start in life. Few poor-world parents petition to have their children raised by Madonna, even if they believe that she provides material and educational advantages that they cannot match.’<sup>176</sup> I think the harmful effects on the parent-child relationship are even stronger than Agar presents them; this will be examined later in Chapter 5.

Agar expands upon his ideas presented in *Humanity’s End* in his second book on radical enhancement, *Truly Human Enhancement*. He departs from the idea of species relativism and introduces a concept which he terms ‘transformative change’. He writes that ‘transformative changes alter the state of an individual’s mental or physical characteristics in a way that warrants a significant change in how that individual evaluates his or her experiences, beliefs, or achievements.’<sup>177</sup> Some experiences which you value before undergoing a transformative change you would no longer value having undergone it and vice-versa.

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<sup>174</sup> Ibid., 186-7.

<sup>175</sup> Ibid., 191.

<sup>176</sup> Ibid.

<sup>177</sup> Agar, *Truly Human Enhancement*, xi.

Radical enhancement, according to Agar, is an instance of transformative change. To illustrate his concept of transformative change, he uses a thought experiment based on the film *Invasion of the Body Snatchers*. In the film, aliens come to Earth and begin ‘snatching’ people, turning them into ‘pod-persons’ who have very different beliefs and psychologies. If we suppose that the identities of body-snatched people are preserved, then it seems like a good example of a transformative change. Agar writes that ‘Snatching alters its victim’s mental and physical characteristics in a way that warrants a significant change in how that victim evaluates a wide range of her own experiences, beliefs, or achievements ... the change in evaluative belief is warranted by a change in mental or physical characteristics.’<sup>178</sup>

A pod-person would think that the life of a pod-person is very good once they have undergone the transformative change that turns them into such a person. This does not give us a reason to want to be pod-persons, however. We can make rational choices about how we want our lives to go and our values conflict with those of pod-people. As Agar writes, ‘claims about the goodness of the transformative change must appeal to the life plans or rational choices of the particular member [of a group].’<sup>179</sup>

The possibility of the experiences and achievements that we currently value losing their significance could be challenged by appealing to the fact that children undergo dramatic increases in their cognitive capacities and yet we think this is a good thing. As children age, they acquire new interests and place different values on their experiences and achievements. This seems to suggest that radical enhancement may in fact be good for us. Nick Bostrom and Toby Ord have argued that, just as it is good for children to grow up, ‘it might be good for adults to continue to grow intellectually even if they eventually develop into rather different kinds of persons.’<sup>180</sup> Agar thinks that there is a feature of the enhancement which occurs from child to adult that does not apply to enhancement of adults. The transition from child to adult

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<sup>178</sup> Ibid., 7.

<sup>179</sup> Ibid., 11.

<sup>180</sup> Nick Bostrom and Toby Ord, “The Reversal Test: Eliminating Status Quo Bias in Applied Ethics,” *Ethics* 166, no. 4 (2006): 656-679. Quoted from Agar, *Truly Human Enhancement*, 71.

‘takes us from beings incapable of life plans to beings capable of them.’<sup>181</sup>  
Subsequent enhancements do not have this effect.

Agar’s analysis of radical enhancement highlights something that the enhancement debate has previously ignored – the relevance of the degree of enhancement. When assigning prudential value to specific enhancements, the degree of the enhancement matters. Some enhancements have negative effects which are not present when the degree of enhancement is moderate but become pronounced when the degree of enhancement is very large.

I do not make use of Agar’s concept of species relativism in my thesis, partly because I have some reservations about whether radical enhancement actually constitutes a species change but primarily because I think it is an unnecessary complication in discussing the prudential rationality of enhancement. I think that whether or not radical enhancement constitutes a species change, it is prudentially irrational. Although in *Humanity’s End* Agar uses his concept of species relativism to argue that radical enhancement would likely have severely negative consequences, I think that his later concept of radical enhancement as a transformative change works equally well (if not better). The concept of transformative change is more suited to identifying what is likely to be bad about radical enhancement than species relativism. It is the results of a change in an individual’s evaluative framework, which *could* be caused by a change in species (though not necessarily only in that manner), which explains why radical enhancement would likely be against our interests. The notion of species is redundant in discussing the prudential rationality of radical enhancement; it is conceptually simpler to do without it. In the following two chapters, I make use of the concept of transformative change to explain how radical enhancement would threaten our relationships and our life plans.

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<sup>181</sup> Agar, *Truly Human Enhancement*, 79.



## 5. Relationships and radical enhancement

Some transformative changes have the potential to be very bad for us. One specific kind of transformative change – radical enhancement – could undermine, or even destroy, the relationships we have with other human beings. Radical enhancement is the improving of human capacities such as our physical, intellectual, or moral capacities well beyond the normal human range. Radically enhancing a person's intelligence, for instance, would involve making them vastly more intelligent than any human who has ever lived. As we have seen in Chapter 4, radical enhancement is an instance of transformative change; the change in a person's capacities would predictably give rise to a corresponding change in that person's beliefs, how they evaluate their experiences, and their interests. I argue that this change would have negative consequences for three kinds of human relationships.

To illustrate the point regarding the damaging effect of radical enhancement on relationships, consider the biblical story of Job. In the Book of Job, God is approached by Satan. He says to God that Job, a truly perfect and righteous man, is only so righteous because God has blessed his life.<sup>182</sup> God is unimpressed by Satan's assertion and wagers with him. In order to test Job's faithfulness he gives Satan permission to afflict Job as he sees fit, so long as he does not kill him.<sup>183</sup> Job is tormented by Satan; his livestock are killed, his properties are destroyed, and he is afflicted by agonising boils.<sup>184</sup> Worst of all, his children are killed when their house collapses on them.<sup>185</sup> He suffers immensely, but remains faithful to God in spite of what he endured – and he is rewarded for his faithfulness.

Job having proved his faith, God returns to him twice what he had before, double all the property he lost.<sup>186</sup> He is also provided by God (if we take a literal reading) with seven new, better, children to replace those who were

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<sup>182</sup> Job 1:8-11 (King James Version).

<sup>183</sup> Job 1:12.

<sup>184</sup> Job 1:14-17, 2:7.

<sup>185</sup> Job 1:18-19.

<sup>186</sup> Job 42:10.

killed.<sup>187</sup> That the children are indeed new, rather than his dead children resurrected, is suggested by the fact that Job names them. He names his first daughter Jemimah, the second Keziah, and the third Kerenhappuch.<sup>188</sup> They are described as the most beautiful women in the land.<sup>189</sup> Their superiority to Job's deceased children is further suggested by his naming of them.

Jemimah's name means, 'turtle-dove', a name used for graceful birds, plants, or precious stones.<sup>190</sup> Keziah's name was that of a prized variety of cinnamon. Kerenhappuch's name refers to eye-shadow.<sup>191</sup>

Job is satisfied with what God allots him. It seems, however, that Job still has reason for complaint. God did not return to Job the children who were killed, but rather gave him new children. Despite being returned his property, it appears as though Job could justifiably ask God to resurrect his dead children since it is a loss for which he still suffers – his daughters remain dead. The lesson we can extract from a literal reading of the Book of Job (which may appear obvious) is that we value our relationships. We would be sceptical of a deal that threatened to undermine or destroy them, even if there were benefits to be had.

The analogy between the story of Job and the transformative change of radical enhancement is this: something similar to what happened to Job would be likely to happen to a person undergoing radical enhancement. Job benefited from God's wager, he received twice the material possessions he lost, and also new, better, children to replace those who were killed. He also suffered a loss, however. He lost the relationships which he had with his children who were killed. If you were radically enhanced, you would be benefited in several significant ways. You would, however, also be likely to lose some things which you value. Predictably, your relationships would suffer.

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<sup>187</sup> Job 42:13-15.

<sup>188</sup> Job 42:14.

<sup>189</sup> Job 42:15.

<sup>190</sup> J. E. Hartley, *The New International Commentary on the Old Testament: The Book of Job* (Grand Rapids: Wm. B. Eerdmans Publishing Co, 1988), 543.

<sup>191</sup> Ibid.

Job would probably come to love his new daughters in time, and perhaps might even come to think that God benefited him, though it seems unlikely that he would take an offer which replaced his daughters with new ones. Moreover, it seems inappropriate, from the perspective of prudential decision making, for Job to sacrifice his actual interest in preserving the relationship which he has with his daughters in favour of the interests which he might come to have as a result of receiving new daughters. Job loves the daughters he has, the fact that he would come to love new daughters does not matter anywhere near as much to him.

The dramatic shift in interests which comes with a transformative change like radical enhancement would be likely to undermine relationships. Many people's relationships are at least partly based upon shared interests. If you were radically enhanced, it is likely that your interests would change due to the change in your capacities. Although relationships would not necessarily suffer because of this, it is likely that they would and a concern for prudential interests therefore gives us reason to oppose radical enhancement.

It is also likely that the great increase in your capacities would affect your ability to empathise. Part of the reason why we can empathise with others is that we can picture ourselves *as them*. We can think, 'What if that happened to *me*?' If we were to be radically enhanced this might no longer work so well. We might not be able to think about what it is like to be another human being in certain situations due to the fact we would be so far removed from the experiences of most humans. As a result of this, you would have a decreased ability to empathise with the unenhanced, and the unenhanced would have a decreased ability to empathise with *you*. Relationships require empathy to flourish; reducing people's ability to empathise would therefore be likely to undermine their relationships with others.

Three kinds of relationships could be negatively affected by radical enhancement; the parent-child relationship, romantic relationships, and friendships. The precise way in which each of these relationships would be undermined will differ, though there are several similarities across them. The role of shared interests is a more significant factor in the cases of romantic

relationships and friendships, while playing less of a role in the parent-child relationship. Empathy, however, is important for all three kinds of relationships, and therefore the decreased ability to empathise will affect them all. It has the most potential to cause harm in the case of the parent-child relationship.

### **The parent-child relationship**

Nick Bostrom has argued that the parent-child relationship could be strengthened through genetic enhancement. He thinks that more, rather than less, parental love and dedication might result from genetically enhancing one's child. Bostrom writes that 'some mothers and fathers might find it easier to love a child who, thanks to enhancements, is bright, beautiful, healthy, and happy.'<sup>192</sup> As we shall see, when it comes to radical enhancement, there are good reasons to doubt that Bostrom's prediction will come to pass.

In order for the parent-child relationship to be most beneficial for both child and parent there must be empathy, going both ways. The parent must be able to empathise with their child (to some degree), and likewise the child must be able to empathise with their parent. Of course, parents are not able to perfectly empathise with their children, often they are at a loss as to why their child thinks or acts as he or she does. However, they can understand to some degree what it is like to be a child since they were once children too. Children do not always understand their parents' experiences and the reasons why they act as they do, yet they can empathise to some extent with their parents.

Radical enhancement could undermine this empathy. If it turns out that genetic engineering is capable of, and eventually is utilised for, radical cognitive enhancement, this would be disastrous. Parents who opt to radically cognitively enhance their children through the use of genetic engineering technologies will suffer a major loss, as will their enhanced child.

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<sup>192</sup> Nick Bostrom, "Human Genetic Enhancements: A Transhumanist Perspective." *Journal of Value Inquiry* 37, no. 4 (2003): 498.

To be explicit, I do not think that all instances of the radical enhancement of children would undermine the parent-child relationship. Rather, the following discussion is targeted only at the radical cognitive enhancement of a child where the same cannot be done to the parent (for example, through genetic engineering of an embryo). My concerns with the effect of radical enhancement on the parent-child relationship do not apply to cases where both parties can be radically enhanced.

There are a number of psychological studies which provide empirical evidence that decreased parental empathy has negative effects on the child and the parent-child relationship.

Parental empathy is important for the emotional development of children. A study conducted by researchers at the University of Tennessee at Chattanooga assessed the effect of perceived parental empathy on the psychological development of children.<sup>193</sup> There are two types of empathy discussed in the psychological literature, cognitive empathy and emotional empathy. Cognitive empathy refers to a person's ability to understand what another person is thinking and feeling that comes from taking their perspective, while emotional empathy refers to a person's ability to feel the same emotions as another person is feeling.<sup>194</sup> The University of Tennessee study found that perceived emotional and cognitive empathy of both parents was correlated with higher levels of self-esteem and adjusted narcissism and lower levels of depression and maladjusted narcissism while parental love inconsistency was related to psychological maladjustment.<sup>195</sup> Maladjusted narcissism is detrimental to mental wellbeing and is contrasted with adjusted narcissism where a person's narcissism helps them, for instance by making them less prone to depression, loneliness, or neuroticism.

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<sup>193</sup> Nevelynn Trumpeter, P. J. Watson, Brian J. O'Leary, and Bart L. Weathington. "Self-Functioning and Perceived Parenting: Relations of Parental Empathy and Love Inconsistency With Narcissism, Depression, and Self-Esteem." *The Journal of Genetic Psychology* 169, no. 1 (2008): 51-71.

<sup>194</sup> Jessica A. Stern, Jessica L. Borelli, and Patricia A. Smiley. "Assessing parental empathy: a role for empathy in child attachment." *Attachment and Human Development* 17, no.1 (2015): 1.

<sup>195</sup> Trumpeter, Watson, O'Leary, and Weathington, "Self-Functioning and Perceived Parenting: Relations of Parental Empathy and Love Inconsistency With Narcissism, Depression, and Self-Esteem," 65.

Cognitive empathy is also related to parental responsiveness, which is defined as ‘the degree to which a mother demonstrate[s] acceptance of her adolescent and promote[s] her adolescent’s psychological autonomy.’<sup>196</sup> Gondoli and Silverberg found that mothers who reported that they were willing and able to understand their children’s perspective also tended to have higher levels of parental responsiveness.<sup>197</sup> They write that their findings ‘are consistent with the notion that a parent’s ability or willingness to decenter may be especially crucial to the expression of sensitive, nurturant parenting.’<sup>198</sup>

The importance of empathy for children to develop an attachment to their parents has also been studied. Attachment theory is the idea that ‘patterns of caregiving behaviour shape a child’s “internal working model” of the self and others, which informs socioemotional functioning throughout development.’<sup>199</sup> Parental behaviour which facilitates children’s attachment (consistent, sensitive caregiving) enables children to ‘develop secure working models of relationships’, whereas inconsistent, rejecting, or intrusive caregiving tends to lead children ‘to develop insecure working models and [places them at greater risk] for psychopathology.’<sup>200</sup> Stern, Borelli, and Smiley summarise their findings as follows:

‘Regarding parenting behaviours, PACES [Parent Affective and Cognitive Empathy Scale] empathy was positively related to children’s perceptions of parental warmth, suggesting that individual differences in parent empathy map onto differences in caregiving behaviour, particularly behaviour that conveys love and care. Relatedly, PACES empathy was associated with children’s attachment representations in the expected directions: First the positive association between parent empathy and children’s narrative coherence suggests that empathy plays a role in the development of secure, perhaps by motivating sensitive, responsive caregiving. Second, the association between parent empathy and

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<sup>196</sup> Dawn M. Gondoli, and Susan B. Silverberg. “Maternal Emotional Distress and Diminished Responsiveness.” *Developmental Psychology* 33, no. 5 (1997): 863.

<sup>197</sup> *Ibid.*, 866.

<sup>198</sup> *Ibid.*

<sup>199</sup> Stern, Borelli and Smiley, “Assessing parental empathy: a role for empathy in child attachment,” 2.

<sup>200</sup> *Ibid.*

children's emotional openness suggests that empathic parenting provides a secure base from which children can explore their emotional experiences and seek comfort during emotional distress; children's experience of parent's empathy may help shape a working model of emotion expression as acceptable or even essential in forging human relationships. Third, the negative association between parent empathy and children's dismissal of the parent suggests that empathic caregiving may socialize children's own empathic tendencies, orientating them toward (rather than away from) emotional engagement with others.<sup>201</sup>

Empathy also plays a role in the parenting strategies that parents choose to adopt.<sup>202</sup> A study investigating this relationship found that individuals who scored higher on a measure of empathy were less likely to choose physical punishment as a parenting strategy and that higher levels of endorsed empathy were correlated with decreased likelihood of endorsing ignoring strategies (though the latter applied only to children with good behaviour histories).<sup>203</sup>

A decreased ability to empathise is, in light of the psychological literature discussed above, likely to have negative effects on the quality of the relationship of parents and their children, and on children themselves. If radically enhancing one's child will have the effect of reducing a parent's capacity to understand the experience of their child and respond appropriately, then we have both prudential and moral reasons to reject this kind of radical enhancement. The prudential reasons have to do with the effect on the parent-child relationship; parents may lose the kind of relationship with their children that they could otherwise have had – something which most parents desire and value. Parents place a great deal of value on their relationship with their children, the fact that radically enhancing one's child may make this relationship worse is therefore a significant cost of radical enhancement. To the extent that parents value the relationship with their children, they have prudential reasons to not opt to

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<sup>201</sup> Ibid., 14-15.

<sup>202</sup> Christiane Brems, and Marie A. Sohl. "The Role of Empathy in Parenting Strategy Choices." *Family Relations* 44, no. 2 (1995): 189-194.

<sup>203</sup> Ibid., 192.

radically enhance them (provided they cannot achieve a similar degree of enhancement themselves).

The moral reasons have to do with the child; radically enhancing a child may deprive that child of a full relationship with their parents. The issue of identity arises here. If we assume that the identity of a possible child is preserved through the process of radically enhancing an embryo (through genetic engineering technologies), then there is a *prima facie* case that radical enhancement would harm them. As we have seen, radically enhancing one's child could undermine the ability of the parents to empathise with their children. The likely consequence of this, supported by the psychological literature, is a worse relationship between parent and child. Given this, in radically enhancing a child we may deprive them of the kind of relationship with their parents they otherwise could have had.

### **Learning *with* children**

A radically cognitively enhanced child would not be the same as an unenhanced child. In short order, they would be vastly more intelligent than their parents. The child would no doubt benefit greatly from their increased intellect, but they would not be able to have the same kind of relationship which an unenhanced child can have with their parent. The difference in intelligence between parent and child is likely to badly affect the relationship. As children, we look up to our parents. They understand how the world works better than we do, they teach us and help us to make sense of what is around us. Sometimes they even learn *with* us. This is a significant part of building the parent-child relationship and forms a major part of the engagement which parents have with their children. A radically enhanced child would predictably not see much value in learning from and with their parents. Trips to the zoo to learn about animals, to museums to marvel at the past and technological innovations, why would these interest a radically enhanced child? Their own intelligence and knowledge would very quickly outstrip that of their unenhanced parents and they would see little use for the activities which parents and children usually engage in.



Radically enhanced children would also probably not be able to understand their parents' beliefs and interests. The same would hold for the parents; their child's interests and concerns would be very different from their own. There would be little common ground for understanding one another and building a healthy relationship. Radically enhanced children would also be far less able to empathise with their parents and *vice versa*. A radically enhanced child's experience would be so far removed from that of their parents that they would not be able to understand their parents' position. Likewise, their parents, having never been radically enhanced children themselves, would be likely to struggle to empathise with their children, having no experience of their own to draw upon. We were all once children, but none of us were ever radically enhanced children.

Of course, it is still possible to have relationships with beings who are far less intelligent than ourselves. But the kind of relationship you form is much different. The well-known gorilla Koko, who is very intelligent in comparison with other gorillas and can use American Sign Language, has relationships with her carers.<sup>204</sup> Koko and her carers benefit from these relationships. Should we want our relationship we have with our children to be like these relationships, with (at least in terms of intelligence) the parent being like Koko and the child being like her carers? This inversion of the parent-child relationship would be bad for both child and parent. The parent would lose the valuable experience of being able to teach and learn with their child, and the child would lose the experience of having a parent who can guide them as they seek to understand the world. Radically enhanced children could well come to see their parents as embarrassments and wonder how they came from such lowly creatures.

One response to the concern about parent-child relationships would be to argue that enhancing the child's capacity for empathy as well as their intellectual capacities would prevent the relationship from being undermined. Even if it is possible to enhance both capacities, this still would not be enough to preserve the relationship. We arguably have a greater

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<sup>204</sup> Francine G. Patterson, 'The Gestures of a Gorilla: Language Acquisition in Another Pongid', in *Brain and Language* 5, no. 1 (1978).

capacity for empathy than any other creatures but this does not translate to us having relationships with non-human animals which are anywhere near as fulfilling as the relationships we form with other human beings. The difference in the capacity for empathy and intelligence between humans and non-human animals is a barrier to the formation of these kinds of relationships.

Sarah Chan and John Harris argue that the desire to be connected with one's children is a matter of personal preference. They write that the potential for the parent-child relationship being undermined 'does not show that creating posthuman children would be morally wrong. Nor does it show that it would always be the rational choice to avoid doing so ...'<sup>205</sup> According to Chan and Harris, people who lack the desire to have a connection of the kind in question with their children or who think that they would still share enough experiences, or who think that the benefits of being posthuman outweigh the loss of shared experience, will not have a reason to reject radical enhancement, and would be justified in creating posthuman children.<sup>206</sup> While true, this is not a satisfactory objection in the context of the prudential rationality of radical enhancement.

Most of us care a great deal about having a strong relationship with our children. Some do not share this concern, but they are likely to be a very small minority indeed. This objection also fails to address the impact of the lack of a strong parent-child relationship on the child. Some parents may not be troubled by the prospect of not being able to have as fulfilling a relationship with their child as they otherwise could have had, but their child would certainly be worse off than a child who could have this kind of relationship with their parents (if all else is equal). We want our children to be as well off as possible, but if we were to attempt to achieve this through radical enhancement, we run the risk of depriving them of something valuable. While we might not have *moral* reasons not to radically enhance

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<sup>205</sup> Sarah Chan, and John Harris "Post-What (And why does it matter?)." in *The Posthuman Condition: Ethics, Aesthetics, and Politics of Biotechnological Challenges*, edited by Kasper Lippert-Rasmussen, Mads Rosendahl Thomsen, and Jacob Wamberg (Aarhus: Aarhus University Press, 2011), 85.

<sup>206</sup> Ibid, pp.85-6.

our children (at least in some circumstances), we certainly have prudential reasons to opt not to.

Job lost the relationship he had with his children because of God's wager, we could lose or seriously damage our relationships with our children due to our concern for their wellbeing, which is, ironically, likely to be the main reason we would be motivated to enhance them in the first place.

### **Romantic relationships**

Our romantic relationships would also suffer from radical enhancement. At least part of our relationship with our romantic partner is based on common interests and values. We enjoy spending time with a partner who (to some extent) shares our interests, whatever they may be, and cares about what we care about. This is not to say that partners hold (or should hold) every interest and belief in common, just that most people's relationships are based on common ground.

Radical enhancement threatens the basis for this common ground, and thereby threatens romantic relationships. The dramatic increase in capacities which would occur if a person were to be radically enhanced would predictably give rise to different interests and beliefs on the part of the enhanced.

The 2013 film *Her* serves as a good illustration of the destructive effect of radical enhancement on romantic relationships.<sup>207</sup> In the film, Theodore Twombly (played by Joaquin Phoenix) falls in love with an artificial intelligence, Samantha (played by Scarlett Johansson). Their relationship blossoms; however, Samantha undergoes a form of radical enhancement and her cognitive capacities are greatly increased. This has a disastrous effect on their relationship, her beliefs and interests are changed, as is how she evaluates her experiences. In one scene, Theodore asks Samantha if she is talking to anyone else while she is speaking to him, after a pause she answers

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<sup>207</sup> Joaquin Phoenix, and Scarlett Johansson. *Her*. Motion Picture. Directed by Jonze, Spike. Warner Brothers Pictures, 2013.

‘8,316’. Theodore is shocked. From his evaluative framework this is not how relationships should work; he places value on exclusive attention. His evaluative framework is just as foreign to her as hers is to him; she sees nothing wrong with maintaining thousands of simultaneous conversations. Theodore then asks if she is in love with anyone else, she responds that she is in love with over 600 people. Again this appals Theodore, though Samantha of course does not find it at all problematic. Theodore and Samantha’s relationship is undermined because of the enhancement which she undergoes. They lose the ability to relate to one another because their interests, beliefs, and values become very far removed from one another. If one partner undergoes radical enhancement of their cognitive capacities, predictably their relationship with the other partner would likely suffer a similar fate to that of Theodore and Samantha.

The natural response to this concern is to suggest that both partners radically enhance so as to preserve their shared interests and values.<sup>208</sup> Although intuitive, this suggestion is unlikely to work as anticipated. When we look to other transformative changes, such as the change from child to adult, we find that although there are instances where interests and beliefs do survive through the change, most are unlikely to. Many children have an interest in toy soldiers and the game connect four, though these interests do not tend to last through the transition to adulthood. It is possible that an interest in toy soldiers and model tanks might translate in adulthood into a career in the military although for many children it clearly does not. More closely analogous to radical enhancement is the case of pre-romantic relationships. The relationships of childhood sweethearts do not tend to last into adulthood. As children age, their interests and beliefs change; the transformative change from child to adult tends to undermine their pre-relationships. So, although it is possible that the interests and beliefs of partners will change in such a way that they remain compatible, it is not very likely.

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<sup>208</sup> This paragraph borrows from Agar, *Humanity’s End*, 186-7.

Another seemingly plausible counter-argument is to point to the fact that although the radically enhanced might lose their relationship with their unenhanced (or even radically enhanced) partner, they will gain the ability to form objectively superior relationships with other radically enhanced people.<sup>209</sup> It is important not to understate the benefits of relationships between radically enhanced people; they probably will be able to form much deeper and intimate connections than we unenhanced humans could ever hope to. But this fact alone is not enough to motivate us to sacrifice our current relationships. The possibility of there being better relationships should be welcome news to those currently mourning the loss of a relationship. However, the cliché of there being ‘plenty more fish in the sea’ is rather odd advice for those who are in relationships.<sup>210</sup> It is true that it is very likely that no matter how much you value the relationship with your current partner, there is another person with whom you could have a relationship which you would value even more. If one were to apply the aforementioned cliché to one’s current relationships, there are already avenues aside from radical enhancement to seek out better relationships. You could use dating websites to keep an eye out for potential partners who are more attractive and compatible with you than your current partner. Most of us are not inclined to do so however, and the reason is more than just that we believe it is immoral or we worry about being caught. The reason is that we place a great deal of value on our current relationships, the possible relationships we could hold with others do not hold anywhere near as much value. We love and care for our partners *as they are*, with all of their eccentricities and flaws. The possibility of there being better relationships does not matter much to us.

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<sup>209</sup> Agar, *Humanity’s End*, 187.

<sup>210</sup> Ibid.

## Friendships

Friendships are also likely to suffer if people radically enhance. Just as romantic relationships rely on shared interests and beliefs, so do friendships, perhaps even more so. We enjoy spending time with our friends partly because we can engage in activities we jointly enjoy. We may share an interest in discussing science fiction films, rock climbing, or listening to classical music, for instance. Just as in the case of romantic relationships, radical enhancement would predictably lead to a change in people's beliefs and interests. You would likely discover that, post-enhancement, you no longer have the shared interests with your friends that you once had. Your interest in discussing science fiction films may be supplanted by other interests, your friend's interest in rock climbing may suffer the same fate. Your beliefs would also be likely to change with radical enhancement. If you share a common belief that Rawlsian contractualism is the best basis for constructing a just society, your belief may change. Your political beliefs would then no longer align with your friend's (whose beliefs would also probably have changed). Without shared interests and beliefs, it is doubtful that your friendship would survive, and even if it did, it would no longer be as strong as it once was.

As with romantic relationships, it is possible that you and your friend's interests may survive radical enhancement. It is also possible that your interests post-radical enhancement will be compatible with your friend's post-enhancement interests. Another possibility is that you would remain friends despite the lack of shared beliefs and interests. These possibilities are not very likely, however. If we consider our friendships which have ended, one of the reasons some of them have ended is that we no longer shared the same beliefs or interests with the person in question. The change in their (or our own) interests or beliefs made it difficult to maintain the friendship.

It is true that even if radical enhancement does undermine or destroy your current friendships, you could make new friends with other radically enhanced people. It is, however, still the case that the destruction or undermining of your current friendships would be a loss for you. As with

romantic relationships, the fact that you would be able to have new (and perhaps better) relationships does not seem to make it any less of a loss. We might be more willing to sacrifice our friendships than we would our relationship with our partner or our children but we should still be cognisant of the loss we would incur.

The story of Job, which I used to introduce the issue, is not perfectly analogous to radical enhancement. If you were to have your cognitive capacities greatly increased, no one would be killed nor would you have to suffer in the way Job suffered. But there is one significant similarity. Transformative changes can cause damage to, and even destroy, human relationships despite the fact that they may bring benefits. For most of us, the value we place on our relationships should lead us to reject many transformative changes because they are against our interests.

The point raised earlier regarding the relationships between the gorilla Koko and her carers and the parent-child relationship generalises. Humans can have relationships with non-human animals; some people say that their relationship with their cat is better than their relationships with other humans. Yet there are benefits which derive from the relationships we have with our children, with our romantic partners, and with our friends which are not commensurate with, and different in kind, to the benefits of relationships between humans and non-human animals, and which would be undermined by radical enhancement. Shared interests and beliefs between one's current partners and friends, empathy between parents and children, and learning from and with one's parents, these are what we stand to lose from radical enhancement and what could thereby undermine our relationships.

So far I have argued that the transformative aspect of radical enhancement is likely to undermine our relationships and that we therefore have a reason to reject radical enhancement. The more we value our relationships with our children, our romantic partners, and our friends, the less reason we have to radically enhance. Nonetheless, radical enhancement may be good for some people. If the goods of radical enhancement are the most valuable thing for you, then radical enhancement might be good for you. If your cognitive

capacities are the most important thing for you, then radical cognitive enhancement could be beneficial. But how many of us are like this? How many of us would be willing to undermine or destroy our relationships with those we care for to pursue these goods? In essence, who would willingly choose to be Job?



## 6. Radical enhancement and life plans

Most of us have some idea of the direction in which we would like our lives to go. We have desires and interests which inform our plan for our future. Some people aspire to be engineers, others artists, and yet others lecturers. We might want to master an instrument or a skill. How we choose to act is, at least in part, determined by the plan we have for our life. If we choose to study philosophy, it may be a choice driven by our desire to become a philosopher. The plan we have for our life is something valuable to us and affects our choices.<sup>211</sup>

Nicholas Agar has argued that radical enhancement would harm us by undermining our mature interests and potentially leaving us with no mature interests whatsoever (as I explained in Chapter 4). If we were to radically enhance our cognitive capacities, our interests would be likely to change. Our mature interests which enable us to form life plans would be supplanted by new interests. I think that Agar is right, however, the issue is more than just that our life plans will predictably be undermined. It will not be the case that enhancing and then enhancing further and further will mean that our life plans will keep changing with every new radical enhancement – the issue is even more serious than that. I argue that if Ray Kurzweil is right about the direction in which technology will go, we would, in fact, predictably lose the motivation and ability to form and fulfil any life plans whatsoever.

Mature interests are important, but they are not valuable in and of themselves. What is significant about having mature interests is the role they play in the formation and fulfilment of life plans. Having mature interests (and values) enables us to form a life-schema. We can map out how we want our life to go, informed by our values and interests, which we can be confident will persist through time.

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<sup>211</sup> Whether it is valuable only instrumentally, or intrinsically, is not a question which I consider here. It is indeed an important question, however for the purposes of the discussion which will follow it can be put to one side.

Of course, as we age our interests change. What matters to us when we are in our teenage years is not necessarily going to be the same as what matters to us when we are thirty (though, of course, it might be). The constituent interests and values of the bundle which inform our life plans often shift with time. We may eventually lose interest in playing the guitar or in reading science fiction, while we may gain new interests such as road cycling or studying the history of the Second World War.

What matters in terms of our ability to successfully form a life plan is not any particular value or interest but rather the bundle as a whole. Some changes to the bundle may not affect our ability to form a life plan. If we lose an interest in playing the guitar and an interest in calculus, it is unlikely that this would undermine our life plan to become an accomplished skier for instance. However, if we were to lose a great many of our interests or many of our values were to change, our life plan is also likely to be altered. A dramatic or traumatic experience has the potential to trigger this kind of change in one's life plan. As David Heyd and Franklin Miller have argued, life plans must have restrictions on the kind of change they can undergo, which they term 'constraints of revisability.'<sup>212</sup> New means for achieving goals and even new goals themselves can be adopted; however, after a certain degree of change the original plan would be supplanted with a new one.<sup>213</sup> If the succession of plans is too rapid, then we would lose the point of planning – the plans would lose relevance to our lives.<sup>214</sup> It is this scenario that I argue would be likely to occur if we were to keep radically enhancing ourselves and it will be discussed shortly.

Generally, however, the rate of change in our interests and values is slow and predictable. We can be quite confident that, from day to day, our interests and values will remain relatively stable but if your interests kept shifting, if say in one month you placed a great deal of value on your ability to write poetry but then the next month it mattered very little to you (and the same held for your other interests), it would be exceedingly difficult to map out

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<sup>212</sup> David Heyd, and Franklin G. Miller. "Life Plans: Do They Give Meaning To Our Lives?" *The Monist* 93, no. 1 (2010): 27.

<sup>213</sup> Ibid.

<sup>214</sup> Ibid.

how you wanted your life to go. Provided our bundle of interests and values is not subject to unpredictable dramatic shifts, it can be used in the formation of a life plan.

As well as undermining the formation of life plans, radical enhancement could potentially undermine our desire to fulfil our life plans. The knowledge that our bundle of interests and values will remain relatively stable provides the basis for attempting to fulfil our life plans. We know, with a good degree of confidence, that our future self will have a similar bundle of interests and will benefit from our present efforts to fulfil our life plan. Hence, we have reason to strive to fulfil the life plan that we form.

Radically enhancing yourself once would predictably lead to the supplanting of many of your interests and values with new ones. Increasing your cognitive capacities by a very large degree would mean that many of the things you currently value would no longer have much value to you. You might currently find it enjoyable to solve Sudoku puzzles; if you were to be radically enhanced the solutions to these would appear incredibly simple and it is likely you would lose interest in them. You would, however, be likely to gain a whole range of new interests – perhaps in far more complex puzzles – but they would not be the interests which you currently have.

This would lead to the undermining of your ability to fulfil your life plan formed prior to enhancing; many of the values and interests which informed its conception will likely no longer be present. The value-interest bundle will have been dramatically altered. While you would no longer have much motivation to strive to fulfil your previous life plan, you would, of course, be able to construct a new life plan, informed by your new interests and values, and strive to fulfil this new plan.

The transformative aspect of radical enhancement is what does the damage to our life plans. Radical enhancement changes the way an individual evaluates their experiences and accomplishments. What may have seemed a desirable experience prior to enhancement would be less so post-radical enhancement. If your life plan was informed by these experiences which you

desired, then the content of your life plan is likely to no longer be how you would like your life to go. Moreover, what counts as an accomplishment for you would also change; things which you previously desired to achieve will hold less significance for you and were you to strive for them, they would be less fulfilling.

Nick Bostrom has challenged the idea that radically enhancing ourselves would undermine our interests. He writes, ‘It is not clear why the ability to appreciate what is more complex or subtle should make it impossible to appreciate simpler things. Somebody who has learnt to appreciate Schoenberg may still delight in simple folk songs, even bird songs. A fan of Cézanne may still enjoy watching a sunrise.’<sup>215</sup> But, as Agar points out, ‘there seems to be a big difference between Bach’s Mass being valued in this kind of way and the kind of value that music lovers currently place on the work.’<sup>216</sup> The issue is not so much that radically enhanced people *could not* value certain things but rather that the degree of value which they would be likely to place on certain things would be substantially lower. This is precisely why radical enhancement would be likely to damage our ability to fulfil life plans we have formed prior to enhancement. Things which mattered a lot to us at the time we formed our life plan would no longer matter to the same degree once we had undergone enhancement.

With respect to radical enhancement undermining achievement, Bostrom has a similar reply. He writes,

‘If some challenges become too easy for posthumans, they could take on more difficult challenges. One might argue that an additional reason for developing post-human cognitive capacities is that it would increase the range of interesting intellectual challenges open to us. At least within the human range of cognitive capacity, it seems that the greater one’s capacity, the more numerous and meaningful the intellectual projects that one can embark on. When one’s mind grows, not only does one get better at solving intellectual

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<sup>215</sup> Bostrom, “Why I Want to be a Posthuman when I Grow Up,” 132.

<sup>216</sup> Agar, *Humanity’s End*, 143.

problems – entirely new possibilities of meaning and creative endeavour come into view.’<sup>217</sup>

What Bostrom argues is true but it misses the importance of the role that achievement plays in our lives. Many people’s life plans are influenced by what they desire to achieve. While it is true that if a person was able to easily achieve what was previously very difficult they would still have many other challenges left open to them, people’s life plans very often involve what they would like to achieve. Changing the value which someone places on certain achievements is therefore likely to undermine that person’s motivation to fulfil a life plan crafted prior to radical enhancement.

Moreover, there is satisfaction which is gained from making progress towards fulfilling one’s life plan. If the value which one places on their achievements was to be reduced, they would lose some measure of the satisfaction which they could gain from having progressed in the fulfilment of their life plan. Completing a degree is a valuable achievement for those who undertake it. Looking back on what they have accomplished, a graduate can feel proud that they have overcome the obstacles which they have faced and finished a fairly intellectually taxing endeavour. For many people who attain a degree it fits into a larger plan of the direction in which they want their lives to go. Radically enhancing such a person’s cognitive capacities would likely reduce the value that they place on the progress they have made towards their life plan by completing their degree.

For those who have already achieved their life plan the results would be worse. One of the joys of achieving one’s life plan is being able to reflect on one’s past accomplishments and feel satisfaction. If a person who had already achieved the content of their life plan were to radically enhance, their past achievements would no longer seem anywhere near as significant. From the perspective of someone radically enhanced, many human endeavours would probably seem trivial. What would be a very intellectually challenging task for an unenhanced human would be simple for a radically enhanced mind. Looking back at one’s achievements and the attaining of your life plan (prior

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<sup>217</sup> Bostrom, “Why I Want to be a Posthuman when I Grow Up,” 132.

to enhancement) would not hold anywhere near the same significance once your mind has been radically enhanced.

### **Iterated radical enhancement and life plans**

The most serious threat to our ability to form and fulfil our life plans comes from iterated radical enhancement. Iterated radical enhancement can be contrasted with single-shot radical enhancement. In single-shot radical enhancement, a person is radically enhanced once and undergoes no further radical enhancements. In iterated radical enhancement, a person undergoes a series of radical enhancements. One way in which this could happen would be if it becomes possible to upload our minds into computer systems or, more feasibly, if we are able to augment our cognitive capacities with computer-brain interfaces.

If we were to undergo iterated radical cognitive enhancement, we would have little motivation to strive to fulfil our life plans. Why would we bother trying to fulfil a life plan if, predictably, more enhancement will change our values such that we no longer desire the content of that plan? Moreover, what reason would we have for forming life plans in the first place if the values that guide us will in short order be profoundly altered and the life plan we form will very likely not be connected to the values that our (more) radically enhanced future self will have? It is the relative stability of values across a human life that gives us the ability to construct and fulfil our life plans. Iterated radical enhancement would put this in jeopardy.

Ray Kurzweil's exploration of technological exponential growth, which was presented in Chapter 2, suggests that computer processing power will continue on its historical pattern of exponential growth. If we utilise computing technology to upload or augment our minds, then our cognitive capacities will very likely track this growth. As new computing technologies are developed which enable faster computation, we would see our cognitive capacities expand in line with them. Superficially, this seems quite desirable; who wouldn't want to keep increasing their intelligence – becoming able to

solve problems faster and becoming more and more knowledgeable? If Kurzweil is right, however, and the exponential growth of computational power continues and our biology eventually merges with computer hardware, and our minds with software, then the rate at which computational power increases will be correlated with the rate at which our ability to form and fulfil our life plans is undermined.

The merger of humanity and technology means that the predictable exponential growth in computer processing power would increase our cognitive capacities. If our cognitive capacities were to directly follow the path of processing power, this would be very bad indeed. Our interests and values would change at a rapid and increasing rate. We would have little reason to form and then try to fulfil our life plans since the values and interests which inform them would be ever changing at an accelerating pace.

If the rate of change of our cognitive capacities increases enough, then eventually the only stable value will be a commitment to enhancement itself, and the only life plan that could be fulfilled is the enhancing of ourselves. We would be left in a state where our values and interests would constantly be in flux, shifting at an ever-increasing pace. While this might be an attractive prospect to some and may not even constitute a threat to our identity, it is unlikely to seem desirable to most people. There is something valuable in being able to craft a plan for how you want your life to go and then to be able to strive to fulfil it, especially if you eventually are able to realise it. There is great satisfaction to be had in crafting, and then subsequently fulfilling, a life plan. Iterated radical enhancement could deprive us of this.

### **Kurzweilian iterated radical cognitive enhancement and indefinite life**

Iterated radical enhancement of the kind that Kurzweil proposes would be a form of indefinite life. In Chapter 3, I described Leon Kass' opposition to immortality. He argued that our plans and goals are tied to the finitude of our

lives.<sup>218</sup> Immortality itself (or at least living indefinitely) may not be bad; immortality which is achieved through iterated radical enhancement would, however, be bad for us. Although Kass is right that some goals seem to be tied to the finitude of our lives – retirement, for example – there are many that are not. Our goals and plans are, however, tied to our interests and values which are (at least in part) dependent on our cognitive capacities. Our goals and plans would indeed be undermined through Kurzweilian iterated radical cognitive enhancement (KIRCE), but not due to the indefinite nature of our existence. Rather, as I have argued, they would be undermined because of the shifting nature of our interests and values caused by each radical enhancement. Uploading or augmenting our minds might turn us into the Greek gods whose passions are only transiently engaged as Kass predicts that immortality would, but it would be due to our decreased desire and ability to fulfil our plans when we know that the values and interests that informed them will predictably change and not due to our indefinite lifespan itself.

Agar has also written in opposition to extending our lives indefinitely. In addition to the practical difficulties in achieving the goal of effectively living forever (such as overcoming the constant assault of ever-evolving bacteria and viruses), he points to a major cost arising from living forever. He argues that if we knew that our lives would extend indefinitely, barring some external interference, this would undermine our motivation to engage in behaviours involving risk.<sup>219</sup> Activities which we previously enjoyed would seem far too risky if we lived indefinitely. An indefinite life span would make us much more risk-averse than we currently are; driving a car is deemed to be an acceptable risk to fulfil our goals since the benefits outweigh the slight risk of death. If we lived indefinitely, however, even the small chance of death would make driving unacceptably risky. We would stop venturing overseas on planes or even engaging in fairly mundane activities such as sports because the risk of prematurely terminating our indefinite lives would appear too great.

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<sup>218</sup> Kass, *Life, Liberty, and the Defense of Dignity*, 226-7.

<sup>219</sup> Agar, *Humanity's End*, 109-132.



This objection works fairly well in identifying a cost with some forms of indefinite lifespan extension. If we were to attain indefinite lifespans but remained in our relatively frail biological bodies, then we would indeed have good reason to avoid activities that could put this at risk. While applying quite well to *biological* immortality, Agar's objection does not apply to immortality arising from Kurzweilian iterated radical enhancement. If indefinite lifespans arise from iterated radical cognitive enhancement in the form of mind uploading or, more plausibly, mind augmentation, then we would have far less to fear from activities which would terrify biologically immortal beings. At present, we have designed means of protecting information storage and processing systems which are far superior to those which have evolved to protect our minds. The flight recorders or 'black boxes' which store cockpit voice data, the pilots' control inputs, and other information about the plane are incredibly sturdy. They are typically rated to withstand an impact force of 3400 *g* (an impact of 3400 times the force of gravity), temperatures over 1000°C, and depths of 6000 metres.<sup>220</sup> For these reasons, they can survive crashes, including those that kill every passenger on an aircraft. If our minds could be protected in a similar manner we would have little to fear from flying, even if we had indefinite lifespans.

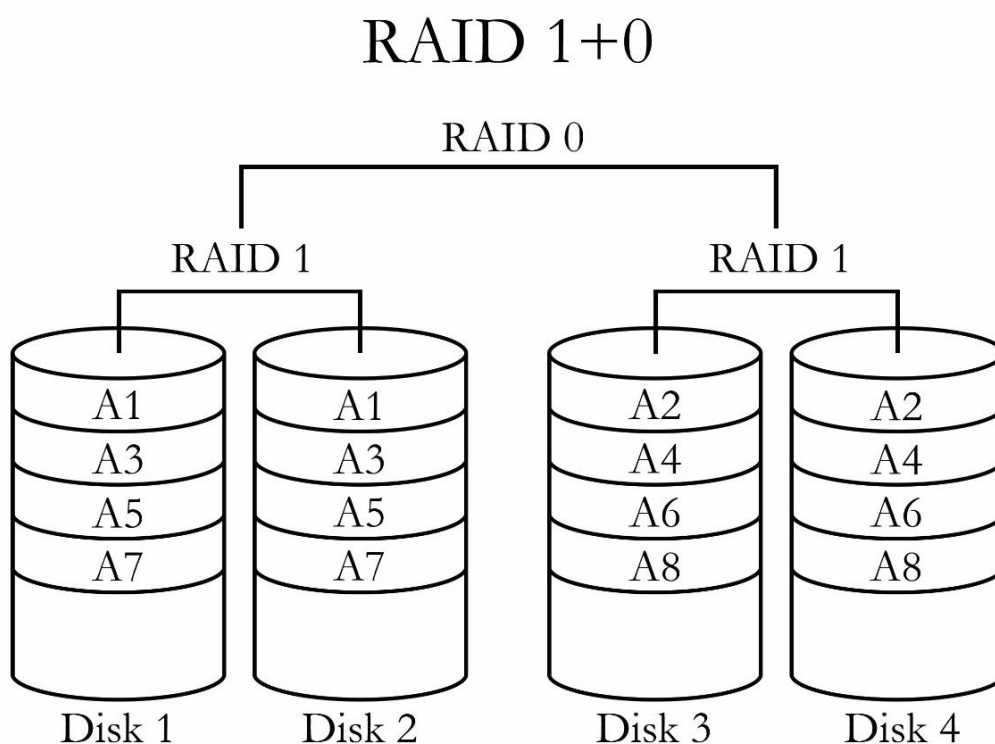
As well as physically protecting computer systems (such as encasing them in protective structures as with flight recorders), we have developed sophisticated means to protect the data stored within them. The data storage technology RAID, short for Redundant Array of Independent Disks, is one such technology which is widely used in servers and other corporate environments. RAID works by combining separate storage drives into one logical unit called an array to improve performance, add redundancy (duplicating segments of data on more than one drive to protect against data loss from drive failure), or both, depending on the configuration.<sup>221</sup> One type of RAID is what is referred to as RAID 0; in this configuration data is

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<sup>220</sup> Pascal Andrei, Uwe Bartels, and Volkmar Neeb. "Flight Data Recovery: Time for Evolutions." in *Flight Airworthiness Support Technology*, August 2011, 18.

<sup>221</sup> Derek Vadala, *Managing RAID on Linux* (Sebastopol: O'Reilly and Associates Incorporated, 2003), 2.

‘striped’ and segments of it are spread across two or more drives.<sup>222</sup> This has the benefit of increasing the performance of the drive array but offers no redundancy and is more prone to data loss than using one drive.<sup>223</sup> If one of the drives fails, all of the data in the array would be lost since segments of it were spread across the two drives. Another configuration is RAID 1; here data is ‘mirrored’ across two or more drives, a complete copy of the data on one drive is stored on the other.<sup>224</sup> This has the benefit of added redundancy; if one drive in the array was to fail, all of the data would be recoverable (unlike RAID 0). Another configuration called RAID 1+0 combines the benefits of both RAID 0 and RAID 1. Striping and mirroring are used to improve performance and add redundancy at the same time.<sup>225</sup>



*Figure 1: A RAID 1+0 array showing mirroring across the RAID 1 arrays and striping across the RAID 0 array*

In RAID 1+0, drives are striped and mirrored. When writing data to the RAID 1+0 array, the first segment of data is written to the first array

<sup>222</sup> Ibid., 19-20.

<sup>223</sup> Ibid.

<sup>224</sup> Ibid., 21-23.

<sup>225</sup> Ibid., 26-27.

comprised of Disk 0 and 1, where it is mirrored across both disks. The next segment of data is written to the second RAID 1 array, comprised of Disk 2 and 3, which is mirrored. Both RAID 1 arrays are themselves part of a RAID 0 array; data can be written to and read from both RAID 1 arrays simultaneously, increasing performance. If we underwent KIRCE, then we would be able to utilise RAID or similar technologies for the purpose of protecting our minds, which would be reliant on a software substrate.

Kurzweilian radical enhancement would enable us to take advantage of the information protection already in use in computer systems. The manner in which information is stored within our brains makes us vulnerable.

Currently, when we forget something we are at risk of never remembering it again. Additionally, damage to the brain such as concussion can cause people to struggle with reasoning, concentration, and other mental tasks. If our minds could be transferred to computer systems, we could be less concerned about the risk of impairment. If you suffer a brain injury, it is quite serious given the current limitations of medicine. If you lose a drive in a RAID 1+0 array, fixing the problem is fairly simple. The array can be rebuilt simply by replacing the drive – no information would be lost in the process. The point is not that as non-biological beings we would necessarily make use of RAID, but rather the fact that this technology exists indicates that it may well be easier to protect our minds if they were non-biological.

### **The radically enhanced: A preference for virtual or real experiences?**

Agar's prediction regarding the experiences of beings with indefinite lifespans is that they will live vicariously through second-hand experiences, the actual experiences being perceived as too risky. This would not necessarily be the case with the kind of immortality outlined above. It might still turn out that people live through the second-hand experiences of others if we attain indefinite lifespans through KIRCE. This would, however, not be due to experiences being too dangerous to attempt, but instead due to

people's interests which would predictably change due to their cognitive capacities being radically enhanced. Mind augmentation or uploading would both increase our cognitive capacities and open up a range of new experiences and activities which we could engage in. It is possible that these new activities and experiences (many of which would be virtual) would engage the interests of radically cognitively enhanced beings more than experiences and activities out in the world. Kurzweil himself envisions that in a post-singularity world some people who he terms 'experience beamers' will send their sensory experiences and the neural correlates of their emotional reactions out to the internet, allowing others to 'plug into' their experiences.<sup>226</sup> Whether beings which arise from KIRCE will prefer to engage more in virtual reality and 'tap into' the experiences of others (or purely simulated experiences) rather than have these experiences themselves will depend on the value (or lack thereof) they place on actual experiences.

Robert Nozick's famous 'Experience Machine' thought experiment suggests that we (as human beings) prefer actual experiences to simulated ones, and for this reason would reject an offer to connect ourselves to a machine which provided pleasurable experiences which were not connected to reality.<sup>227</sup> Although there is some psychological evidence that casts doubt on whether a preference for reality over simulation is what motivates our intuition not to connect to Nozick's experience machine (rather than a status-quo bias), many people clearly do prefer that their experiences are actual.<sup>228</sup> Whether radically cognitively enhanced humans will share this preference for their experiences to be actual rather than virtual is uncertain. Their values and interests will predictably change but it is not clear whether the change would drive them to, or from, actual experiences. With regard to beings which have undergone KIRCE, it could turn out that they will no longer engage in activities which they enjoyed prior to being enhanced (as Agar predicts). If this is the case, however, it would not be due to their assessment of the risk

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<sup>226</sup> Kurzweil, *The Singularity is Near*, 316.

<sup>227</sup> Robert Nozick, *Anarchy, state, and utopia* (Oxford: Blackwell, 1974) 42-45.

<sup>228</sup> See Felipe De Brigard, "If you like it, does it matter if it's real?" *Philosophical Psychology* 23, no. 1 (2010): 43-57.

involved in those activities, but rather due to their altered values and interests.

### **Iterated radical enhancement and relationships**

The problems which arise with respect to relationships and radical enhancement would be compounded in the case of KIRCE. Single instances of radical enhancement would undermine our relationships but iterated radical enhancement has the potential to have worse effects. Radical enhancement would be likely to undermine our relationships; iterated radical enhancement would be likely to seriously damage our ability to maintain our relationships once the process of KIRCE is underway. After each stage of radical enhancement, a person would be likely to put their relationships under threat. Even worse, if others opt to keep radically enhancing themselves and you do not, then you might end up being unable to form friendships or romantic relationships with those people. If you want to continue to form relationships with those around you, you may find yourself in a Red Queen's Race like the eponymous character from Lewis Carroll's *Through the Looking Glass* – having to keep enhancing just to keep being able to have relationships. The tragedy of being in this race would be that even though you would be able retain your *ability* to form relationships, you would experience the recurring destruction of the relationships which you form after each stage of radical enhancement (just as you would experience the recurring destruction of any life plans you form). Your ability to maintain relationships would predictably be damaged by iterated radical cognitive enhancement.

## 7. Moderate cognitive enhancement

Moderate enhancement is defined by Agar as ‘the improvement of significant attributes and abilities to levels *within or close to* what is currently possible for human beings.’<sup>229</sup>

In enhancing ourselves moderately, we are able to preserve what we value, which is dependent on our current degree of cognitive powers. It seems, however, that by forgoing radical enhancement we would miss out on substantial increases to the instrumental value of our cognitive capacities. Agar has a solution to this problem; he proposes that we can still attain the instrumental goods that radical enhancement would bring without enhancing ourselves.

Agar uses the distinction created by Alasdair MacIntyre of external goods and internal goods to distinguish between the instrumental and the intrinsic value of human capacities.<sup>230</sup> MacIntyre uses the example of playing the game of chess to differentiate between what he terms external and internal goods which result from the exercising of our capacities.<sup>231</sup> The external goods of playing chess are merely contingent. They include things like the prize-money received from winning a tournament. It is possible to gain the prize-money by other means such as stealing it; the connection between prize-money and playing chess is therefore contingent, not necessary. The internal goods of playing chess, on the other hand, are tied to the activity – you can receive them only through playing chess. Internal goods are attained by planning out your strategy and trying to anticipate your opponent’s moves and your own countermoves.

Agar argues that the instrumental value of a capacity is in its ability to instantiate external goods while the intrinsic value of a capacity is in its

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<sup>229</sup> Agar, *Truly Human Enhancement*, xi. (emphasis in original)

<sup>230</sup> *Ibid.*, 28.

<sup>231</sup> Alasdair MacIntyre, *After Virtue: A study in Moral Theory* (Notre Dame: University of Notre Dame Press, 1984), 188.

ability to instantiate internal goods.<sup>232</sup> By radically enhancing ourselves, we massively increase the instrumental value of our capacities but we reduce their intrinsic value.<sup>233</sup> By moderately enhancing ourselves, we can preserve the intrinsic value of our capacities, though it seems that we might lose some of the substantial gains in instrumental value which could have been had.

Agar's solution to this problem is to argue that rather than using technologies to radically enhance ourselves, we should focus on improving the technologies which we use.<sup>234</sup> He argues that we should externalise enhancements, as opposed to internalising them.<sup>235</sup> In so doing, we would be able to gain some of the external goods which radically enhancing ourselves would bring, while preserving the intrinsic value of our capacities.

I agree with Agar that we should forgo the radical enhancement of our cognitive capacities. Invoking MacIntyre's distinction between external and internal goods to support this conclusion is problematic, however.

Throughout *Truly Human Enhancement*, Agar refers to internal goods yet we are not given an example of what exactly an internal good might be. Even in MacIntyre's chess example we are not given a clear picture of an internal good. We are told what gives rise to these goods (planning out strategies et cetera), but there is no example of an internal good itself. It does not appear as though an internal good of chess could be enjoyment since obviously activities other than chess bring enjoyment. Perhaps it could be a kind of enjoyment or satisfaction which *only* comes from playing chess. This seems like a suitable candidate but it is debatable whether there is such an enjoyment which is specific to chess. It seems just as likely that the enjoyment that people get from playing chess could be attained from other activities.

Instead of arguing that our capacities have intrinsic value by virtue of their ability to instantiate internal goods, it is far simpler to jettison the use of the internal-external goods distinction and to argue that radical enhancement

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<sup>232</sup> Agar, *Truly Human Enhancement*, 29.

<sup>233</sup> Ibid., 33-53.

<sup>234</sup> Ibid.

<sup>235</sup> Ibid.

would undermine some of what we value the most. To argue that we should not enhance ourselves radically because it would reduce the intrinsic value of our capacities requires an account of exactly what the internal goods we would lose *are*. Given the difficulty in ascertaining what exactly internal goods are, it is better to simplify the argument for moderate enhancement.

The reasons for rejecting radical cognitive enhancement have to do with the effects I have argued it would have on our relationships and on our ability to form and fulfil life plans, as I described in Chapters 5 and 6. Moderate enhancement would not have these effects; in enhancing ourselves only moderately, we could preserve some of the things which matter most to us while still giving us some of the benefits which enhancement can bring.

### **The extended mind hypothesis and enhancement**

One argument which has the potential to undercut the proposal that we should enhance our technologies while refraining from radically enhancing our cognitive capacities is the Extended Mind Hypothesis, advanced by Andy Clark and David Chalmers.

Clark and Chalmers argue that our minds extend beyond our bodies.<sup>236</sup> They advocate a form of externalism about the mind; they argue that certain external features of the world play an active role in our cognitive processes.

To illustrate the concept of extended cognition, Clark and Chalmers present three scenarios:

‘(1) A person sits in front of a computer screen which displays images of various two-dimensional geometric shapes and is asked to answer questions concerning the potential fit of such shapes into depicted ‘sockets’. To assess fit, the person must mentally rotate the shapes to align them with the sockets.

(2) A person sits in front of a similar computer screen, but this time can choose either to physically rotate the image on the screen, by pressing a rotate button, or to mentally rotate the image as before. We can also suppose, not

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<sup>236</sup> Andy Clark, and David Chalmers. “The Extended Mind,” *Analysis* 58, no. 1 (1998): 7-19.



unrealistically, that some speed advantage accrues to the physical rotation operation.

(3) Sometime in the cyberpunk future, a person sits in front of a similar computer screen. This agent, however, has the benefit of a neural implant which can perform the rotation operation as fast as the computer in the previous example. The agent must still choose which internal resource to use (the implant or the good old-fashioned mental rotation), as each resource makes different demands on attention and other concurrent brain activity.<sup>237</sup>

They posit that, in terms of the cognition present, scenario (1) is equivalent to scenario (3). They further point out that, in terms of the computation structure, scenario (2) is the same as scenario (3); the difference lies in it being ‘distributed across agent and computer instead of internalized within the agent.’<sup>238</sup> They argue that we cannot say that, in terms of the amount of cognition present, the scenarios are different on the basis of the skin/skull boundary since this would be begging the question – the very thing that is at issue is whether that boundary represents the edge of our minds.<sup>239</sup>

If the extended mind hypothesis is correct, it seems as though we have already radically enhanced ourselves. We have computer systems to store information we would like to access later, the capacity of which far exceeds that of the brain. We have developed all manner of tools to make solving problems far easier; for example, computer-aided design software. If the extended mind hypothesis is right and we have externally radically enhanced our cognition already and these enhancements seem obviously good for us, what would be wrong about utilising *internal* radical enhancements as well as external ones?

The difference between external and internal enhancements lies in their effect on our interests. We currently have software that can solve Sudoku puzzles faster than human players. To someone who enjoys playing Sudoku, solving the puzzles with an algorithm is not very appealing; people enjoy Sudoku for the mental challenge that it offers them. The fact that the puzzles

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<sup>237</sup> Ibid., 7.

<sup>238</sup> Ibid.

<sup>239</sup> Ibid., 7-8.

could be solved easily with the aid of software does not diminish people's interest in Sudoku. Internalising an enhancement which enabled people to solve Sudoku puzzles with the same degree of ease as Sudoku solving software would be different. Internalising an enhancement usually involves making it very tightly integrated with someone compared to externalising that enhancement, the likely effect of which is that their values and how they evaluate their experiences would change.

It is worth noting that in Clark and Chalmers' third scenario, the neural implant which performs rotational operations can be effectively 'turned off' by the agent choosing to use mental rotation instead of the implant. It certainly counts as a case of internal enhancement, however it differs from internal enhancements such as cognitive enhancement by genetic engineering. Having the ability to disable an enhancement reduces the degree of integration. The point is not that internal enhancements are more *accessible* than external ones (though they likely would be), but that they are more closely linked to the other parts of the mind. For instance, compare Clark and Chalmers' neural implant to one which cannot be disabled. It appears as though both are similarly accessible and yet the neural implant which cannot be disabled is far more tightly integrated with the other parts of the mind than the one which can.

In the case of Sudoku puzzle solving, internalising the enhancement would make it such that rather than having unaided internal cognitive processes and the ability to utilise external resources such as a Sudoku solving program, the internal cognitive processes would be altered such that Sudoku puzzles were remarkably easier to solve. That internal cognitive resources are tightly integrated to us means that there is little choice whether to engage them or not. We can choose to use a calculator to work out the answer to a mathematics problem because the calculator is not tightly integrated into ourselves – it is loosely connected to the rest of our mind allowing us to avoid using it if we wish. If you were to improve your internal cognitive processes to the level that you could solve Sudoku puzzles with as much ease as a Sudoku solving program, you would not have the choice to avoid engaging these internal processes. Sudoku puzzles would appear far easier than they

were prior to your enhancement. Unlike having access to a Sudoku solving program, internalising the ability to very rapidly solve these puzzles would predictably reduce the enjoyment you would receive from completing them. They would no longer require struggle or mental effort. It would be the equivalent of asking someone who enjoys mathematical problems to solve for  $x$  where  $8 = 2x$ . It would pose no challenge to such a person and would bring them little enjoyment. What makes internal radical cognitive enhancements likely to be bad for us is the magnitude of the enhancement in combination with the high degree of integration.

Of course, although one's interest in Sudoku puzzles would probably be reduced were one to internalise Sudoku solving enhancements, you would gain other interests which you would find enjoyable. Perhaps a far more complex version of Sudoku or some similar Sudoku-like game would hold an internally radically cognitively enhanced person's interest. Nonetheless, internalising radical enhancements of a great magnitude would undermine your current interests, supplanting them with others, which, prior to enhancement, hold little value to us.

	High degree of integration	Low degree of integration
High Magnitude of Enhancement	Cybernetic implants	LHC Computing Grid
Low Magnitude of Enhancement	Modafinil	Abacus

*Table 1: Examples of cognitive enhancements of varying magnitudes and degrees of integration*

In table 1, I have categorised several enhancements in terms of their magnitude and their level of integration with the other parts of our minds to serve as examples to better cache out the various possible combinations of these aspects of enhancements.

The abacus is a prime example of an enhancement which has both a low magnitude of enhancement and a low degree of integration. An abacus can enable a person to quickly perform calculations that would be difficult with unaided human cognition. It can be used with decimal and hexadecimal number systems and can be used for multiplication, division, addition, subtraction, as well as finding the square root and the cube root. Despite its usefulness, the abacus' capabilities are quite limited compared to contemporary calculating devices. For instance, a number can be multiplied on an abacus only if it has  $(n-3)/2$  digits or less, where  $n$  is the number of rods on the abacus.<sup>240</sup> So a standard 13-rod abacus cannot multiply a number with more than 5 digits with any other number and an abacus with fewer than 5 rods cannot be used for multiplication whatsoever.<sup>241</sup> A modern graphing calculator is vastly more capable, having the ability to perform logarithmic and trigonometric functions, solve algebraic equations, and perform other advanced functions while operating at a much faster speed and being able to manipulate far larger numbers.

As well as having a low magnitude of enhancement, the abacus is also poorly integrated with the other parts of our mind. In interfacing with the abacus, we have to use our visual system to deliver information about the positions of the beads on the rows to our brains so that we can determine which beads are where and which we should move when performing an operation. In manipulating the beads, we must use our hands; the speed at which we can calculate is thereby limited by the speed at which we can move the beads.

The computer system at the European Organization for Nuclear Research (known as CERN) for the Large Hadron Collider (LHC) is a cognitive enhancement of a very high magnitude. The LHC is the world's largest particle collider; it generates an immense amount of data every time beams of protons collide. To store and process this information requires a very large number of computing resources. The 15 petabytes (15 million gigabytes) of data which is generated per year is stored and analysed in a computer system

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<sup>240</sup> F. M. Brueckler and I. Matić, "The Power and the limits of the abacus," *Mathematica Pannonica* 27, no. 1 (2011): 29.

<sup>241</sup> Ibid.

called the Worldwide LHC Computing Grid which is spread across 170 centres in 41 countries.<sup>242</sup> The LHC Computing Grid enables the storing and processing of information which would be impossible for the unaided human mind. As a cognitive enhancement, its magnitude of enhancement is very large indeed.

Despite the impressive capabilities of the Grid, it is very poorly integrated with the other parts of the human mind. To utilise and interpret the results which the Grid generates still requires our visual and locomotor systems to see the visual representations of the information and to use computer mice and keyboards to navigate through computer programs. In terms of its integration with the rest of our cognitive processes, it is hardly superior to the abacus.

An example of an enhancement with a high level of integration but a low magnitude of enhancement is the drug Modafinil. Modafinil is a psychostimulant drug which is used to treat narcolepsy or attention deficit disorders and has also been shown to have cognitive enhancing effects in healthy individuals. It has been shown to improve performance in tasks which make use of working memory (responsible for the short-term storing, processing, and manipulation of information). Improvements were shown in tests of digit span (the number of digits which a subject can memorise), visual pattern recognition memory, and spatial planning (the use of spatial memory, responsible for storing information about one's environment and its spatial orientation).<sup>243</sup> The cognitive improvements enabled by Modafinil are statistically significant but are relatively minor in comparison to radical enhancements.

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<sup>242</sup> Cian O'Luanaigh, "The Worldwide LHC Computing Grid," *European Organization for Nuclear Research*. Accessed April 15, 2016. <http://home.cern/about/computing/worldwide-lhc-computing-grid>.

<sup>243</sup> Ulrich Müller, Nikolai Steffenhagen, Ralf Regenthal, and Peter Bublak, "Effects of modafinil on working memory processes in humans," *Psychopharmacology* 177, no. 1 (2004): 161-169.

Danielle C. Turner, Trevor W. Robbins, Luke Clark, Adam R. Aron, Jonathon Dowson, and Barbara J. Sahakian, "Cognitive enhancing effects of modafinil in healthy volunteers," *Psychopharmacology* 165, no. 3 (2003): 260-269.

As an enhancement, Modafinil is very tightly integrated with the rest of our mind. It works by directly interacting with the brain. For this reason, receiving the benefits of Modafinil does not require any additional effort once it has been ingested and absorbed. This is in contrast to computer systems which require the relatively sluggish interaction between the brain and the computer via the visual and locomotor systems.

The 1995 animated film *Ghost in the Shell* offers a good example of an enhancement which is both high in its magnitude and its degree of integration.<sup>244</sup> The film is set in a near future where many people have access to advanced abilities through cybernetic bodies and brains referred to as ‘shells’. The protagonist, a government security agent, muses in one scene about the capabilities of their shell, ‘Metabolic control. Enhanced sensory perception. Improved reflexes and muscle capacity. Vastly increased data processing speed and capacity ...’ The implants which are added to the brain replace their functionally inferior biological counterparts so that the most enhanced in society have little to none of their original brains remaining.

The cybernetic brain implants in *Ghost in the Shell* are enhancements of a very high magnitude. Not only are they much faster at processing information than the biological human brain and superior in terms of their information storage capacity, they also make learning much quicker. Those with the implants can access vast amounts of information by directly accessing the ‘data-net’ – a computer network similar to the internet – through the implant.

The implants have a high level of integration with the rest of the mind. They replace parts of the human brain and interface directly with the parts which remain. For those who are ‘fully-cyborg’ the implants replace all of the brain’s biological material, perhaps the highest level of integration which any enhancement could achieve.

The kind of radical cognitive enhancement presented in *Ghost in the Shell* is precisely the type which is likely to be bad for us. The brain implants are both

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<sup>244</sup> Atsuko Tanaka, Akio Ōtsuka, and Iemasa Kayumi. *Ghost in the Shell*. Motion picture. Directed by Oshii, Mamoru. Shochiku, 1995.

high in their magnitude and their degree of integration. They greatly increase and expand one's cognitive capacities and their very high level of integration means that they are very accessible and there is no practical way to disable them and remain a functioning person. The upshot of this is that having such a brain implant is likely to change your interests and your values; cybernetic implants are more comparable to the intellectual growth from child to adult than they are to the use of a calculator.

Given my arguments in Chapters 5 and 6, if we desire to preserve our relationships with other human beings and our life plans we should enhance ourselves only to a moderate degree, at least with respect to enhancements which are highly integrated with our minds. In the case of enhancements that are poorly integrated with our minds, the degree of enhancement does not have the same effect; enhancements of a high magnitude which are poorly integrated do not threaten our interests. Rather, these enhancements promote our interests since they make us better able to achieve what we value instead of changing what we value.

## 8. Conclusion

The focus of my thesis has been the prudential rationality of radical enhancement. My interest has been in the costs and benefits of radical enhancement in relation to whether radical enhancement promotes or undermines our interests.

There are real and significant benefits that an individual could receive were that individual to be radically cognitively enhanced. As we saw in Chapter 2, having greatly increased cognitive capacities would allow someone to recall information quicker, focus better, and solve problems faster, which would improve performance in a variety of tasks and also open up a range of new and enjoyable experiences. The benefits of radical enhancement are not trivial, yet, as I have argued, we have strong prudential reasons to reject radically enhancing ourselves.

In Chapter 3, I outlined some of the arguments of bioconservatives and the potential costs of enhancement through the lens of prudential rationality. I argued that, while the costs they identify are not likely to arise in moderate enhancement, in the case of radical enhancement some of them may in fact arise.

In Chapter 4, I explained Agar's concept of radical enhancement as a transformative change. The significant point is that since our interests appear to be related to the level of our cognitive capacities, the great increase in these capacities in the case of radical enhancement would be likely to cause a shift in our interests.

In Chapters 5 and 6, I put Agar's concept to use in explaining why radical cognitive enhancement is likely to be bad for us. I argued that the most compelling reasons we have to opt not to radically enhance ourselves are the effects which radical enhancement is likely to have on human relationships and on our ability to form and fulfil life plans.



The likely effect of radical enhancement on our relationships was explored in Chapter 5. I argued that the parent-child relationship, friendships, and romantic relationships would be negatively affected by radical enhancement. When it comes to the parent-child relationship, I argued that radically enhancing one's child (when the parent(s) cannot achieve a similar degree of enhancement themselves) is likely to undermine empathy between child and parent and reduce the value of activities such as learning *with* one's child to the child. With respect to friendships and romantic relationships, the shift in our interests and values which follows radical enhancement is likely to undermine these relationships since they depend (to an extent) on these being held in common.

In Chapter 6, I argued that radical enhancement would be likely to damage our ability to form and fulfil life plans. I considered two possible kinds of radical enhancement, single-shot radical enhancement and Kurzweilian Iterated Radical Cognitive Enhancement (KIRCE). Single-shot radical enhancement is likely to undermine our motivation to fulfil life plans which we formed prior to enhancing; however, the effect of KIRCE would be much worse. What makes KIRCE dangerous with respect to our life plans is its iterated nature. KIRCE would likely involve *repeated* radical enhancement and, as a result, recurring costs. I argued that, in the case of KIRCE, these costs would be likely to damage our motivation to form, and our ability to fulfil, any life plans whatsoever.

I have argued that the two strongest prudential reasons we have to reject radical enhancement come from the value we place on our relationships and our life plans. The probability of radical enhancement damaging some of the things we value the most means, to the extent that we value these things, we have reasons not to enhance ourselves. The benefits of radical cognitive enhancement are substantial, yet it threatens some of our interests which are more valuable to us.

The arguments which I have offered against radical enhancement have been intended only to provide *pro tanto* reasons not to enhance. They depend on certain values which are not universally shared. For some people there may

be reasons to radically enhance which override the reasons which I provide against enhancement. Nonetheless, the desire to plan one's life and to maintain one's relationships with others is common to the majority of people; for most of us, radical enhancement is against our interests.

I do not intend to promote a kind of luddism about enhancement technologies but rather a call to caution. In Chapter 7, I explored Agar's concept of moderate enhancement and his argument supporting it. I endorsed the concept of moderate enhancement, but critiqued Agar's use of MacIntyre's internal/external goods distinction. I argued that a conceptually simpler argument against radical enhancement and in favour of moderate enhancement was preferable. By enhancing within limits we can ensure our more fundamental interests are protected while receiving (some of) the benefits of enhancement technologies. To the extent that we care about our relationships and our life plans, we should only moderately enhance ourselves.

In discussing moderate enhancement, I also examined an argument which had the potential to undermine the significance of the distinction between radical and moderate cognitive enhancement – Clark and Chalmers' Extended Mind Hypothesis. If Clark and Chalmers are correct and external features of the world play an active role in our cognitive processes, then it would appear that we have already radically enhanced ourselves, since technologies which aid our internal cognitive processes (such as computers) are ubiquitous. Furthermore, there does not appear to be any perceptible harm being done to our interests by the use of such technologies; if anything, they seem to have promoted them. Against this potential line of argument I argued that what matters in determining whether an enhancement is likely to have the negative effects I described in earlier chapters is not the magnitude of the enhancement alone, nor whether it is rightly considered an internal or an external enhancement. Rather, I argued that the potential for a given cognitive enhancement to undermine our interests stems from a combination of its magnitude and its degree of integration with the other parts of the mind.

The potential costs of radical cognitive enhancement which I have described in my thesis might seem implausible, especially to transhumanists. However, to reiterate a point from my introduction, even if we grant that the probability of these costs arising is low, most of us are still likely to have prudential reasons against radically cognitively enhancing ourselves. The value that we place on our relationships and on our ability to form and fulfil life plans is great enough that, despite the uncertain probabilities involved, radical cognitive enhancement is likely to be against our interests – even if we ascribe the potential harms a relatively low probability.

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