**The Service View on Enhancement:**

**A New Evolutionary Perspective**

**Abstract**

In the enhancement debate, some have interpreted human evolutionary theory largely as supporting a liberal view of enhancements, regulated predominantly by individual autonomy. In this paper I argue that this interpretation of evolutionary science is misguided, sketch a more accurate representation of the state-of-the-art, and argue that this has significant ethical consequences. Enhancement ethicists should, much more than is typically the case now, take the social impacts of enhancement technology into consideration. I highlight one important social impact of enhancements: increases to the social status of the enhanced individual, with ramifications for other individuals in the group. Based on this I propose that not autonomy, but trust and service should be taken as the central ethical principles in the enhancement debate: the ethically commendable enhancements are those that are used for service and hence do not erode interpersonal trust.

Keywords: Enhancement – Evolution – Autonomy – Status Hierarchies – Trust – Service

1. **Introduction**

Evolutionary perspectives on enhancement interpret cutting-edge technologies as merely the latest modifications of human phenotypes and interactions with the environment. These perspectives can help generate new insights, for instance, by identifying fundamental similarities between the new and the ancient, such as those between computer-brain interfaces and writing. They can also inform ethical reasoning, and in the enhancement debate, two important arguments seem to have been directly informed by evolutionary perspectives.

The first, negative argument aims at undermining moral red lines – whether ‘human nature’ (Kass 2003) or a sense of ‘givenness’ (Sandel 2007). Thus, from an evolutionary perspective, there is no reason to expect any human phenotype to be universal and unchanging, casting doubt on whether ‘human nature’, at least when defined as a set of essential properties, can refer to anything at all (see Hull 1986). As for givenness, an even cursory familiarity with human evolution makes abundantly clear that humans have been technologically enhancing their ‘given’ capacities since the dawn of the *Homo* genus about two million years ago (Harris 2007). Hence it is similarly unclear what, if anything, givenness can refer to from an evolutionary perspective.

The second, positive argument has been to point to the need of enhancement given the currently maladapted state of human beings. Human evolution is summarized thus: humans have spent most of their evolutionary history in a particular type of selective environment (largely characterized by hunter-gatherer ways of life), and now humans are by and large maladapted to the challenges of contemporary society. Hence there is a strong rationale for experimenting with enhancement technologies: since our inherited capacities are suboptimal, enhancement holds the promise to upgrade our capacities and competences in order to ultimately increase well-being for all in society. (Variations of this argument are present in: Bostrom and Ord 2006; Persson and Savulescu 2012; Kahane and Savulescu 2015; Pugh, Kahane, and Savulescu 2016).

A pithy way of summarizing the negative and positive arguments is that the former supports the *right* to enhancement, while the latter supports the *duty* to enhancement. Nothing – not nature, nor God, nor givenness – can encroach on the right to enhance oneself; moreover, our current maladaptive state creates a morally urgent situation that should be meliorated. Both arguments support an overarching view I call the liberal view on enhancement (LVE):

The Liberal View on Enhancement. Since enhancements impact individual capacities, they are to be judged as Millian ‘experiments in living’: as long as they are justly distributed, and do not actively harm others, they are ethically commendable as expressions of individual autonomy.

Note that the LVE does not necessarily imply ‘enthusiasm’ (Parens 2015) towards enhancement technology. If an enhancement technology erodes individual autonomy, then the LVE advises caution[[1]](#footnote-1). Yet it should be noted that the LVE is, in fact, often paired with enthusiasm towards enhancement, since many contributions predominantly aim to highlight the reasons in favor of enhancement (Buchanan 2011; Harris 2007; Savulescu, Sandberg, and Kahane 2014; Kahane and Savulescu 2015; Agar 2005).

The first purpose of this paper is to undermine, on scientific grounds, the evolutionary perspective that is seen as supporting the LVE. The perspective is either outdated or misguided, and when it is updated in light of recent research (including, but not limited to Boyd and Richerson 1985; Henrich, Boyd, and Richerson 2008; Henrich 2004), a very different, more social picture emerges where humans are not maladapted individuals grappling in isolation with environmental challenges, but rather members of cultural groups they both develop in and contribute to.

The second, and more important purpose of the paper is to argue that this has far-ranging consequences for how we understand the ethics of enhancement. Enhancement ethicists should, much more than is typically the case now, integrate the social impacts of enhancement technology into their deliberations. Concern with the ‘just distribution’ of enhancements, which has been a way for the LVE to integrate social considerations (e.g. Buchanan 2000), is insufficient (for reasons I detail later).

This paper focuses on one type of social impact of enhancement in particular: the impact on social *status* of the enhanced individual. Drawing on the evolutionary anthropology of status hierarchies (esp. Henrich and Gil-White 2001; Price and Van Vugt 2014; van Vugt and Tybur 2015; Chapais 2015), I will reformulate the core conclusions of this research in a more familiarly ethical language: humans operate with an *ethos of service* that (to varying extents) constrains high-status individuals. This ethos consists of the informal norms and expectations that individuals who have been freely conferred status (a type of status called ‘prestige’, indicating, roughly, the competence of an individual) will in return provide some service benefiting the group.

Inspired by this, I will argue that human evolutionary theory suggests not the LVE but rather the ‘service view’ on enhancement, where enhancement technologies are evaluated according to their impacts on the ethos of service:

The Service View on Enhancement. Since enhancements are tools to increase competence and status of the individual, they should be judged according to how they contribute to or detract from the ethos of service. The ethically commendable enhancements are those that do not lead to zero-sum competitions for status, but are instead used for service.

While this is not a ‘moral red line’ argument, it does claim that it is morally problematic is using enhancements without explicitly prosocial intentions – aiming at enhancing one’s own well-being is insufficient.

As a caveat, note that this paper will not take a stance on the meta-ethical question of whether facts about human evolution can directly support or undermine normative and meta-normative views (Street 2006). However, in a minimal sense, different evolutionary perspectives are useful tools for the ethicist reflecting on the wider impacts of enhancement interventions, since different perspectives entail different models of how individuals causally interact with their physical and social environments. Social sciences could be similarly useful – and the boundary between cultural evolutionary theory and social science is objectively vague – but one added advantage of reflecting about evolutionary perspectives is that they describe dynamics that can be expected across cultures, for the whole human species (without being essential properties of course).

This paper is structured as follows. In section 2 I review how the LVE is supported by an individual-centered view of human evolution. It is a view that practicing scientists themselves have never really held, but recent developments – sketched in section 3 – have made it impossible to ignore the cultural and social dimension of human evolution. After introducing the connection between status, trust, and service (section 4), I present the main cautionary argument that many controversial enhancement technologies hold the potential to erode trust and prosocial intentions towards service (section 5).

1. **Individual-Centered Views of Human Evolution**

An argument both against the idea that evolved human traits are in some sense optimal, and for the necessity of enhancement, adherents to the LVE have often appealed to a certain outdated or misguided interpretation of human evolution. For instance, consider following passage:

After all, our brains are products of evolution, which is a blind process that hardly seeks to maximize the good, or make us morally best. Evolution ‘cares’ only about reproductive success. Moreover, even if the evolutionary process somehow led to what is in one sense an optimal result, this result may be optimal only in the environment in which our very distant ancestors lived. It is very unlikely to be optimal in our utterly different modern environment. (There was, for example, no police in the primeval savannas, nor were there planes or hijackers . . .) (Kahane and Savulescu 2015, p. 138)

Given this and similar passages by prominent ethicists[[2]](#footnote-2), one can infer that they have adopted a certain version of the picture of human evolution advanced by evolutionary psychologists in the 1980s and 1990s (with locus classicus being Barkow, Cosmides, and Tooby 1992). In this picture, the vast majority of human evolution took place in an environment of small-scale hunter-gatherer societies (the ‘environment of evolutionary adaptedness’ or EEA), and hence the human mind is built with innate cognitive mechanisms designed for the specific challenges of the EEA. Since contemporary social and physical environments are vastly different from the EEA, our evolved cognitive mechanisms are not necessarily adaptive to our contemporary large-scale, highly technological societies.

It is doubtful whether evolutionary psychologists ever held this simple and sweeping theory of the evolution of cognition. The most focus has been on certain types of cognition, such as mechanisms for sexual attraction, for food aversions, or for certain sexual taboos like incest (Buss 2019). To what extent it can be generalized to all human cognition is rather more doubtful – some (Buller 2006, 881) have distinguished between evolutionary psychology (the serious & detailed science) and Evolutionary Psychology (the caricature represented in wider academic circles and popular media). Without wishing to be too polemic, it seems as if commentators in the enhancement debate operate with Evolutionary Psychology.

Evolutionary Psychology implies an individual-centered view of human evolution. Individuals are the units of selection, and it is the problems faced by individuals in past social and physical environments that shape our traits today. This is readily compatible with the LVE, which only evaluates the impacts of enhancement technologies on individuals.

Two normative consequences can be drawn from this view of human evolution, both of which support the LVE. The first is the *duty to enhance*, given that humans are adaptive in the EEA but maladaptive in contemporary society. This can lead to considerations of *justice* being incorporated into the LVE (Buchanan 2000), since if an enhancement is clearly effective (e.g., a vaccine, or education) it should be made available to everyone, regardless of their income or even personal opinion.

The second normative statement is what could be called a *right to enhance*: there is nothing present in the inherited traits or states of affairs that should constrain individual autonomy. Natural selection tracks adaptive states in a fixed environment, but environments have changed significantly over the course of human history, and hence natural selection has been effectively directionless. Hence the dichotomy, in this view, between an a-moral and non-directed biological evolution followed by a rationally-directed evolution. There is a fundamental discontinuity between human life today and human life up to about 10.000 years ago, and evolution has simply given us the raw materials (bodies, minds) which we now can (or must) shape in light of moral ideals in general, and autonomy and justice in particular.

1. **Group-Centered Views**

It would be too simplistic to actually attribute individual-centered views to scientists; however, such views did seem to inform methodological approaches before, with an insistence on the importance of innate cognitive mechanisms and/or individual learning (see discussion in Boyd and Richerson 1985). However, consensus now is that humans’ behavior and cognitive capacities cannot be understood separately from social learning. For instance, tests comparing the cognition of human 2.5-year olds with similarly aged chimpanzees shows no significant differences with regards to individual problem-solving (Herrmann et al. 2007). The large difference concerns imitation, the most basic form of social learning: human infants and toddlers are uniquely adept at imitating adults. Without social learning and being embedded in a social group we are literally doomed: a common example is how most European explorers who were stranded after shipwreck died unless they met an indigenous tribe which welcomed and took care of them (Henrich 2016, chap 3).

The environment that is of most direct importance for individual humans is not the physical environment, but rather the cultural-social environment: the behavioral habits, the moral norms, the technological know-how. Humans add to this cultural environment in various ways: by discovering new techniques (like ways to make more effective stone tools), or by enforcing moral norms. Techniques and norms are ‘cultural variants’: they can vary between groups, and certain variants that allow individuals or groups to achieve success tend to spread. A group that was at the losing end of a conflict might spontaneously adopt the moral norms of the successful group, in the assumption that those moral norms (engendering better cooperation, for example) were causally responsible for success.

This is why, according cultural evolutionary theorists, are minds contain unconscious biases towards imitating very specific types of people: people that display a high degree of competence in an activity (e.g. hunting), or that are successful in some other way. We have a ‘success-bias’. We also a have a ‘conformism bias’: it is often a good strategy to imitate the behavior of the majority. Finally, we also have a ‘prestige bias’: we have a bias towards imitating prestigious individuals (for an overview, see Henrich, Boyd, and Richerson 2008). Thus while our minds are very plastic, capable of adapting to changing cultural environments, this does not mean that our minds are blank slates: there are considerable number of innate cognitive mechanisms which drive this social learning.

This entails a ‘community-based’ view of human evolution in the following sense. First of all, individual humans have not just a single fixed environment, but rather a physical environment and a cultural environment that vary at different rates. Hence evolutionary theory must not just understand how individuals have evolved, but also how cultural groups (i.e., cultural environments from the perspective of the individual) have competed with each other and adapted to the physical environment.

For purposes of this paper, I would like introduce the term ‘ethos’to refer to the set of common normative expectations in the cultural environment. An ethos thus may or may not coincide with an individual’s community. For prehistoric groups they did: different tribes had different habits, expectations, and moral norms. In contemporary societies it is much less clear what, if anything, the ‘community’ of an individual is. An ethos also is to be distinguished from the explicit laws regulating rights and duties. Instead the ethos refers to the more informal normative expectations humans may have of each other’s behavior. (In fact, changes in law often follow changes in the ethos, see Husak 2008, p. 18.)

1. **Status, Trust, and Service**

One aspect of the ethos that is especially important for enhancement ethics is how norms regulate interpersonal dynamics of competition on the one hand, and dynamics of cooperation or trust on the other. There may be norms and expectations that govern competitive and cooperative behaviors, though these norms will not always be explicitly encoded in law or institutional structures. These social dynamics both played a very significant causal role in the human evolutionary trajectory, and that continue play a very significant role in contemporary ethics and politics: the competition for status.

* 1. **Dominance and Prestige**

The paradigmatic status hierarchy is the ‘pecking order’ among chickens, where a group of chickens quickly work out which individual may peck at food first, which individual second, and so on. The basic mechanism by which such status hierarchies evolved was to minimize conflict between individuals over finite resources in a population. Thus if two individuals can work out which individual would win in case of a conflict, then conflict – which lowers the outcome both for winner and for loser – can be avoided by the weaker individual deferring to the stronger individual. This minimization of conflict increases the average outcomes in a group (see van Vugt and Tybur 2015). Given how basic this ecological interaction is, it is not entirely surprising that such ‘dominance’ hierarchies are widespread among mammals, birds, fish, as well as invertebrates (Ellis 1995).

Humans have inherited such dominance hierarchies: we have deep-seated cognitive biases that betray this evolutionary heritage. Taller males and females are perceived to be better leaders and more intelligent; taller males are additionally viewed as healthier and more dominant (van Vugt and Tybur 2015; Blaker et al. 2013). A male’s physical strength is positively correlated with proneness to anger and application of aggression to achieve goals (Sell, Tooby, and Cosmides 2009) and negatively correlated with endorsing wealth distribution (Petersen et al. 2013).

Dominance need not be correlated with physical strength. In primates (and humans), an important contributor to dominance is the capacity to build alliances or coalitions (Chapais 1995). A small and frail chimpanzee may nonetheless be the dominant one if it can appeal to a powerful alliance. This dynamic is hypothesized to have been important in human evolution as well: some believe that our large brains are a consequence of the selection pressure for cognitive abilities to navigate complex social environments (Byrne et al. 1988).

While dominance has undoubtedly been important factor in human evolution, and while it undoubtedly continues to color our psychological biases, human status hierarchies are determined by dominance alone. As mentioned in the introduction, many anthropologists additionally identify prestige as a separate type of status (following Henrich and Gil-White 2001). Prestige is freely given to an individual (as opposed to forcibly taken), and indicates that the person is a high degree of *competence* in some activity, such that others would benefit by learning from him or her. Hence others confer various privileges on the prestigious individual, expecting the individual to contribute to their followers in some way.

Prestige thus evolved as a direct consequence of humans being a cultural species characterized by a high degree of social learning. Prestige hierarchies attempt to solve the same evolutionary problem as dominance hierarchies – work out how to minimize intragroup conflict when desirable resources (food, shelter, mates) are scarce. However, they do so by placing the individuals with most desirable competences at the top of the hierarchy, thus allowing status hierarchies to work to the benefit of the group as much as possible (and more so than pure dominance hierarchies).

**4.2 Trust and the Ethos of Service**

An important aspect of human prestige hierarchies is that individuals partaking in such hierarchies actively *expect* high prestige individuals to act in the best interest of the group. The latter is sometimes called the ‘service-for-prestige’ dynamic, where high-status individuals are expected to provide some form of service (expertise, risk, judgment, time) in exchange for prestige (Price and Van Vugt 2014). These expectations form norms that constrain high-status individuals, and when the latter flouts the norms, they are punished – in the very least by losing followers, and hence status (Price and Van Vugt 2014). Such expectations seem to be very much present in contemporary society. Punishments of transgression of social norms by a high-status individual, documented by a recent studies on transgressions by high-status actors (Kakkar, Sivanathan, and Gobel 2019), suggests that dominant individuals are punished much harsher than prestigious individuals, as the latter but not the former are attributed moral credentials.

Such norms act to counteract the possibility that an individual will convert his or her position of prestige into one of dominance that largely benefits the individual. For instance, prestigious individuals can easily convert their social networks into coalitions that can suppress a rival (see van Vugt and Tybur 2015). Such norms are especially important in contemporary society, given how status today is much more institutionalized than it was the evolutionary past. Job titles can signify competence (and hence prestige); however they also signify the power to hire and fire, promote and demote, and hence are also positions of dominance (Henrich and Gil-White 2001). This institutionalization explains, according to some, why the ‘dark triad’ of personality traits are significantly more prevalent among corporate and political leaders than among the general population (Machiavellianism, narcissism, psychopathy; see van Vugt and Tybur 2015).

The service-for-prestige dynamic is intensified by public displays of generosity and altruism – behaviors that characterize high-status individuals both in contemporary societies (billionaire philanthropy, royalty, etc.) as well as tribal societies (Henrich, Chudek, and Boyd 2015). Such displays can be partially explained as costly signals to reassure low-status individuals that the high-status individual will not seek to convert his or prestige into dominance (Smith and Bird 2000). It has also been suggested that the displays are efforts to increase the long-term prosociality of the community, since the high-status individual acts as a role-model and will have his or her behavior imitated (Henrich, Chudek, and Boyd 2015).

A first conclusion I would like to draw from this research is that the *Homo sapiens* operates with an *ethos of service*: there are implicit norms and default expectations that high-prestige individuals will contribute in some way to the good of the community – by putting their competence to good use, teaching others how to reach similar levels of competence, or by carrying out public displays of altruism. This ethos is not all-powerful: self-directed behaviors that damage the community are not precluded by the presence of an ethos of service. At some times it can be weaker; at others stronger. Nonetheless, such behaviors will be experienced as a flouting of the ethos by individuals, and hence an ethos can constrain even while not determining individual behavior.

A second conclusion is that humans, because they expect service, place *trust* in high prestige individuals. In the philosophical literature on trust, the two basic ingredients in interpersonal trust are typically recognized to be the intention and competence of the trusted agent (for summary, see Hawley 2012): thus, if person A trusts person B to do X, this means that, at the very least, A believes that B intends to do X, and that B has the competence to do X. The trust involved in conferring prestige is more vague that trusting a person to do a specific activity: conferring prestige on a good hunter does not only involve trusting their ability and intention to hunt well, but also that the hunter will use the position of prestige for the ‘good’ of the group (whatever that ‘good’ may be).

In contemporary context, trust in prestigious and highly competent individuals can be observed in the trust that is placed in the ‘professions’ – medicine or law, but science to a significant extent as well (Desmond 2019). Sociologists of the professions speak of such professions being oriented to a “service ideal” (Freidson 2001)[[3]](#footnote-3). Conversely, in this framework one would expect high dominance individuals, such as powerful politicians or businessmen, not to be trusted to high degrees, and this seems to be suggested by surveys[[4]](#footnote-4).

1. **The Service View of Enhancement**

In the preceding section I argued that contemporary (group-centered) evolutionary perspectives imply that humans, by default but not exceptionlessly, operate with an ethos of service and place trust in high prestige individuals. In this section I argue that enhancement technologies, because they aim at enhancing capacities, of necessity will erode trust if not implemented with ethical sensitivity to the potential impacts on trust and the ethos of service. First (in 5.1) I will illustrate how most of the significant enhancements are driven by a desire for status, I will then (5.2) show how enhancement by its nature can threaten to erode trust (the argument from trust), and finally in section 5.3 I will outline how the interrelations between enhancement, prestige, and trust can inform an ethics of enhancement.

**5.1 Status Increase: The Social Function of Enhancements**

Status matters greatly. Status has colored our psychology: we are biased towards giving attention to high-status individuals, and are inclined to imitate them, whether their beliefs, moral norms, or routine behaviors (Atkisson, O’Brien, and Mesoudi 2012). Even 3- and 4-year old children identify high-status individuals and behave accordingly (Chudek et al. 2012). Status also matters dramatically for life outcomes. People from lower socio-economic classes have higher chance of disease, and mortality from all causes (Wilkinson 2001; Marmot 2005). High-status people, whether by education or wealth, live longer and healthier lives. It is not surprising that status itself is treated as a desirable and scarce resource. This is very clearly the case among chimpanzees (Chapais 1995; Foerster et al. 2016). As for humans, one should be cautious not to extrapolate and univocally analyze all human behavior as ways to compete for status; nonetheless, it is fair to say that status competition seems to play a large part in driving human behavior, not just among adults (von Rueden, Gurven, and Kaplan 2011) but even among children, where status competition takes the form of popularity contests and bullying (Redhead, Cheng, and O’Gorman 2018).

Turning towards the ethics of enhancement, in this subsection I would like to flesh out a relatively overlooked observation: ethically controversial enhancements are very often *de facto* enhancements that potentially increase status. In principle, adopting a broad definition, an enhancement is simply any intentional alteration of an individual capacity. So to take an exaggerated example: taking a pharmaceutical drug in order to be able to blink abnormally fast is an enhancement. Yet there seems to be no heated debate about the ethics of blinking enhancements: why? My suggestion here is that blinking rapidly is irrelevant in the competition for status. The enhancements that are viewed as ethically controversial are *often* (perhaps not always) those that can be used for status competitions.

As an illustration, consider height enhancement. What has counted as ‘short’ has fluctuated considerably over history (Steckel 1995); the administering of human growth hormone to short children comes with all sorts of health risks; and yet many parents are willing to consider it. The field of ‘cosmetic endocrinology’ (Allen 2017) has been flourishing because of deep-seated assumptions that short stature – even in healthy individuals without any growth hormone deficiency – is a kind of disability. Parents report wanting to enhance their child’s height for the sake of their well-being, and to prevent any disadvantages they might have in their social life and career (Allen 2017, p. 146). The reason for this, in light of the previous section, is painfully obvious: being tall, as a dimension of physical formidability, is unconsciously associated with having high status and hence those who are short will have to bear the full brunt of unconscious prejudices of others. This is a deep-seated psychological bias we share with many other non-human animals. Hence some judge short stature to be a “disability” mainly because of evolved prejudices against short people.

Many of the other most contentious enhancement technologies – performance enhancing drugs, enhancements of muscle mass – are related to an enhancement of status. Enhancements of muscle mass are another example of increasing one’s physical formidability, and in turn one’s perceived dominance status. It is doubtful that athletes would be interested in taking dangerous substances to run or cycle faster if there were not significant prestige (and power, in the form of money) to be earned with winning athletic competitions.

Note that not all bodily enhancements directly enhance status. For some enhancement interventions (again, defined broadly), the aim seems to lie squarely in health and not status: vaccinations to stimulate adaptive immunity, or glasses to correct for myopia.[[5]](#footnote-5) Another separate category of enhancements, including various kinds of cosmetic enhancement, aim to enhance sexual attractiveness and hence concern the competition for mates, which is related but distinct from the competition for status. Yet neither cosmetic enhancements nor therapeutic interventions seem to be the focal point of ethical debate.

The category of enhancement technology that is, arguably, the most ethically controversial, and at the same time the directly related to status, is cognitive enhancement. Whether through pharmaceutical means, or through increasing the intelligence of one’s offspring through embryo selection, cognitive enhancement raises the specter of the original population eugenics, which aimed at increasing the fitness of the most intelligent and discouraging reproduction (or preventing reproduction through forcible sterilization or euthanasia) by the least intelligent: eugenicists believed it would be “quite practicable to produce a highly gifted race of men by judicious marriages during several consecutive generations” (Galton 1869; cited in Kevles 1985 p. 4).

It should be noted that cognitive enhancements are, by and large, still speculative. We still do not which suites of genes correlate positively with intelligence, and are not able to select embryos for higher intelligence. The only cognitive enhancers currently available are amphetamines like Adderall, or pharmaceuticals that alter concentrations of neurotransmitters, like Modafinil or Caffeine. All serve to enhance arousal (and can also be used to suppress sleep), and are very crude and indirect tools to enhance useful cognitive abilities, such as problem-solving, memory, or specific competences like playing the violin. The latter are the target of futuristic speculative technologies like computer-brain interfaces (Sandberg 2014).

The cognitive enhancements with proven efficacy are artefacts: notebooks, shopping lists, computers, the Internet. Such artefacts are said to be part of our ‘extended’ cognition (Clark 1997), and allow us to convert a difficult cognitive task (e.g., retrieving a list from memory) to an easy cognitive task (reading that list). While there are some worries that such artefacts lead to an atrophying of certain personal (non-extended) cognitive abilities, by and large, the moral worries concerning the use of such artefacts are muted in comparison with, for instance, pharmaceutical cognitive enhancers (for a review, see Heersmink 2017).

Education is another effective enhancement intervention on our cognition – perhaps the most effective enhancement available today. One strong sign of this is how life-histories of humans are organized around receiving education: education is obligatory for young children well under the age of consent, and children must spend many years of their life receiving education. Another sign is how allocations of status, in the form of occupations, are largely made on the basis of certifications of educational attainment (“degrees” or “diplomas”). It would not unfair to say that education is seen, by and large, today as the closest thing we have to a morally unambiguous good. Nobody denies that education is a good. On the contrary, denying an education to someone is even seen as depriving them of a basic human right. The U.N. charter on human rights lists the right to education under article 26 – just after article 25, the right to “a standard of living adequate for health and well-being”.

Yet even education – like any cognitive enhancement, including artefacts of extended cognition (writing, Internet) – has a potential dark side within the perspective I am presenting in this paper. Because allocations of status are made on basis of education, there can be very intense competition in order to get into educational institutions that will give these status-conferring certificates. This competition for is striking in that the body of human knowledge that forms the basis of education is public domain, and freely available regardless of one’s status. The works of Shakespeare, Plato, or Newton are freely available for anyone to read and learn from. Yet, certifications of educational attainment convey more than mere competence: they can come to convey prestige in themselves. This may of course be due to the quality of instruction, but the dynamics are more complex: for instance, alumni who go on to hold prestigious occupations will then reflect on the prestige of an institution. In sum, education can also become a tool for dominance, a tool in the competition for scarce, high-status occupations.

When we look back in history, there were times when this dual nature of education was more apparent than it is today. After all, for most of history, the distribution of the competences to read and write were not ‘just’ at all, and limited to high-status individuals. In ancient Greece, when systematic education was still a relatively new development in human history, sophists and philosophers alike were viewed with suspicion. Thus Isocrates (436-338 BC) was charged with “corrupting the youth”: endowing them with rhetorical skill in order to gain an unfair advantage over peers during court trials or debates over policy. Socrates, of course, was charged and sentenced to death over the same accusation: education, and the rhetorical and argumentative supremacy it afforded, was viewed with suspicion.

Many parents today are somehow aware, consciously or not, of this aspect of education. It is well documented how certain parents are more actively involved so that their children will gain access to status-enhancing educational institutions (Fingerman et al. 2012). The most common motivations cited are concern for the child’s future “well-being” and “success”, where the latter specifically means success in the competition for status (Segrin et al. 2013).[[6]](#footnote-6)

In sum, the ethically controversial enhancement technologies and interventions are often those that can be used as tools in competition for status, simply because such technologies and interventions allow their users to increase their competence. Competence can lead to prestige – in which case the society as a whole benefits – or can be converted into dominance – in which case mainly the individual benefits. This dual nature of enhancement is observable, even though not always recognized, in the most powerful cognitive enhancement currently available: education.

**5.2 The Cautionary Argument from Service**

In the case that enhancements are used for increasing status without any prosocial intentions (i.e., for service), the discussion in section 4 suggests two general consequences. First it increases distrust in people of high prestige, since it becomes less clear what they will offer in exchange for their prestige. Without service, prestige becomes more difficult to distinguish from dominance: the high-status person is able to procure a large share of societal resources, but without offering much in return. The second general consequence is that, in response, the competition for status increases, since the downside of being low status is increased. Both consequences are harmful for a community, since it weakens the information flow and cooperative increases in knowledge and competence that are stimulated in an ethos of service (Henrich and Gil-White 2001). Hence, it is unsurprising that anthropologists note that moral norms play a key role in enhancing the bargaining power of the lower status and suppressing tendencies to convert prestige into dominance (Chapais 2015).

Thus while there is nothing inherently morally problematic with using enhancements to increase a status-relevant competence, these considerations suggest the following cautionary ‘argument from service’:

1. Status is a resource that is both important and in finite supply. Hence there is competition for status.
2. Since many enhancement technologies endow their users with superior competence, they help their users accrue prestige are thus tools in the competition for status.
3. High-prestige individuals can convert their competence prestige into dominance, where their competence and alliances are deployed without regard for the good of the community.
4. The latter scenario represents an erosion of the ‘ethos of service’ and of trust in high-status individuals.

The argument from trust does not provide a red line, or “permanent constraint” on autonomy (Clarke 2016). It is a *cautionary argument*: it points to a danger arising from enhancement technologies, and seeks to guide autonomous decision making (and in this sense is more readily compatible with Kantian than with Millian autonomy). It outlines how more informed decisions can be made: it outlines how individual lives are interwoven with status hierarchies, and with norms and expectations of behavior. For individuals to make a *truly* autonomous decision, and not one that is inadvertently determined by a desire to increase status for its own sake, it would be beneficial to be aware of how status hierarchies can push one’s life experiment in certain unwise directions (e.g. prioritizing wealth).

The LVE tends to ignore all of these considerations. According to the LVE, enhancements are value-neutral: they can be put to good use or to bad use, depending on the decisions of autonomous individuals. If the enhancements can be used for considerable good, like vaccination, then in interests of justice they should be made widely available (Buchanan et al. 2001).

However, the argument here is orthogonal to considerations of distributive justice. The implication is that enhancement technologies *by their very nature* – regardless of whether that is the intention of the autonomous individual or not – affect other individuals in virtue of all being embedded in status hierarchies and constrained by competitive dynamics for status. Enhancement technologies are *designed* to increase competence, and in many cases the competence that is to be enhanced is one highly relevant for status (i.e., people tend not to enhance the speed at which they can blink). In this way, such enhancements have the potential to impact the users status, and, because status is a limited resource, to negatively impact non-enhanced people’s status. Moreover, because important life choices – education, profession – and important life outcomes – health, wealth – enhancement decisions that impact one’s own status will also impact others’ status and hence life outcomes.

The concept of a Millian experiment, at least with regard to many enhancement technologies, is an abstraction and does not fully describe the wider potential impacts of decision to enhance or not. The question is not how to avoid impact on others’ lives, but rather how to shape those wider potential impacts for the good. (This is then where the distinction between dominance and prestige comes into play: the distinction between using status purely in order to increase one’s share of societal goods versus using one’s status in function of service for others.)

This is a significant blind spot in the LVE, since it is only focused on individual autonomy, bolstered by a misguided ‘individual-centered’ interpretation of human evolution. The LVE does not recognize how a basic evolutionary dynamic – competition for status – both impact and are impacted by our autonomous ‘experiments of living’, even if nobody else is directly harmed. Our Millian experiments of living impact much more than just ourselves, our choices may engender trust or distrust, and lead to the community benefiting or mainly ourselves. Any responsible ethics of enhancement must take this into consideration.

**5.3 Policy and the Service View of Enhancement**

The argument from service concerns the intentions of individual persons – roughly, whether those intentions are prosocial or not – however, selfish decisions by themselves do not erode an ethos of service or erode trust. What is also needed is a normalization of those decisions. Whether certain individual decisions are viewed as normal or not depends on another set of expectations and moral norms, but this time not regarding the behavior of high-status individuals, but rather regarding the use of enhancement technology. Hence one can speak of an ‘ethos of enhancement’ guiding the application of enhancement interventions and technologies. In this section I will flesh out the service view on enhancement in these terms: the SVE implies that the ethos of enhancement should align with the ethos of service, and hence that the function of regulatory policies is to strengthen this alignment.

Let’s revisit the examples of cognitive enhancements and education. First, the case can be made that, in the current organization of education at universities, considerable effort is made to align education with an ethos of service. The Humboldtian education ideal, the basis for the modern university, was designed not just to impart knowledge but also to form character (Pritchard 2004). Also in the professionally-oriented education, the ultimate orientation is towards service, evidenced by how the codes of conduct regulating professions, like law, engineering, or medicine, orient their practitioners towards values such as justice, safety, and care (see Desmond 2019). Professionals receive a significant degree of autonomy, but this is only because significant trust is placed in professionals by clients, and by extension, by society (Freidson 2001).

Unlike in education, the informal expectations governing the use of cognitive enhancement is either much more vague and ambiguous, and this is reflected in how robust regulation lacking, at least in Europe (Maslen et al. 2014). Some uses of cognitive enhancement are clearly in function of service: the surgeon taking an amphetamine to keep alert for a long operation. By contrast, the motivations of the college student using a cognitive enhancer for higher grades are ambiguous: will the higher grades be used for the good of society (e.g., for the advancement of knowledge and understanding, or for professional service), or will the high grades be used in order to edge out rivals for a job at a high-status corporation (e.g., a law firm, or investment bank)? Of course both reasons can be present simultaneously, but the more the dominance-enhancing dynamic takes precedence, the more the ethos of service is weakened. Fellow students will the behavior with suspicion, trust will be eroded, and may jump on the bandwagon, leading to a vicious competition for positions of dominance.

To draw a more general lesson from these examples: the policy implication of the argument from service is not that there should be prohibitive legislation, but rather more education and character development. For instance, in the case of height enhancement, the appropriate response would seem to be an educational and a collective one: instead of helping short people enhance their height through growth hormones (with all the potential adverse side effects), it would seem to be more appropriate to make them aware how we – like many non-human animals – unconsciously associate physical size with status, but how this association has very little sense in contemporary society, where competence is determined by cognitive ability or willingness to learn from others rather than height. A separate education for the general population – the way schools have educational programs that suppress innate tendencies in high-status children to bully low-status children (Redhead, Cheng, and O’Gorman 2018) – would help the population at large to reduce such unconscious biases towards short people.

Likewise, any new enhancement technology – for instance, if we discover in some years how CRISPR gene-editing can be used to enhance some important cognitive ability – should be evaluated in terms of any disrupting effect it may have on the prosocial ethos of service. If the gene-editing manipulation would increase competence immensely, there would need to be an expectation of greater service to safeguard the ethos of service.

This type of ethics of enhancement would parallel what happens in professional ethics. The professions are very dependent on their practitioners conforming and perpetuating an ethos of integrity; although recent decades have seen a push for more external control (e.g. auditing), most professional activities would not be possible if there were not considerable trust in professionals telling the truth and largely acting to further the service ideals of their profession (Desmond 2019). Similarly, in the case of enhancement technologies, one can easily imagine an ethos being imparted through education rather than prohibitive rules.

By contrast, the LVE often seems to go hand in hand with skepticism towards regulatory policies. Consider following quote from a discussion piece published in *Nature*:

Human ingenuity has given us means of enhancing our brains through inventions such as written language, printing, and the Internet. . . . And we are all aware of the abilities to enhance our brains with adequate exercise, nutrition, and sleep.*The drugs just reviewed, along with newer technologies such as brain stimulation and prosthetic brain chips, should be viewed in the same general category as education, good health habits, and information technology*—ways that our uniquely innovative species tries to improve itself(Greely et al. 2008; my emphasis).

This is mistaken, because brain stimulation and brain chips can be administered without the individual being educated in the wider ramifications of increased competence. Views like the one of Greely et al. evaluate enhancements solely in terms of how they directly impact an individual’s capabilities and well-being. They ignore the impact on the community and in particular on the ethos of service in which the individual is situated. With education, a lot of effort is needed to achieve competence, and so one’s character changes in the process. Moreover, it is very much embedded in a network of relations: education is a gift from the older generations to the new generation. By contrast, enhancement technologies offer the prospect of being administered without the help of anybody else (except, at most, a technician or a doctor).

1. **Conclusion**

How autonomous are our Millian experiments of living? To what extent are these driven by the community we inhabit, with its norms, values, and patterns of behavior? And to what extent do our experiments of living – to enhance or not, for instance – affect the community which others inhabit?

Darwinian competition for status is neither good nor bad in itself. Without status on the basis of prestige social learning would be much less efficient: we learn imitating each other, and especially from imitating prestigious individuals, like role models. This social learning has been a pathway towards the ‘success’ of our species (Henrich 2016), and lies at the basis of human education: children have a bias to imitate parents, schoolchildren a bias to imitate their teachers. However, status need not always be placed in function of social learning (and the good of the group), but can instead be used as a tool to increase the dominance of the prestigious individual, so that that individual will be able to realize his or her preferences in any situation of conflicting interests.

In pointing to how enhancements, by their very nature, have the potential to erode an ethos of service, the argument from trust goes further than arguments that the distribution of enhancement technologies should be just (Buchanan et al. 2001) Enhancement technology can be justly distributed and the main ethos yet be one of dominance, where the technologies are used to achieve positions of dominance. Hence the ethics of enhancement should not just tell us when to enhance and when not to enhance, and who should and who should not receive enhancement, but also what the enhancements are to be used for. The latter cannot be determined by individual autonomy alone. The ethos – and not individual autonomy – is the core ethical principle by which enhancements are to be judged: whether the impact on the ethos leads to exploitation or service.

Word Count: 7715 words

**References**

Agar, Nicholas. 2005. *Liberal Eugenics: In Defence of Human Enhancement*. Malden, MA: Blackwell Pub.

Allen, David B. 2017. “Growth Promotion Ethics and the Challenge to Resist Cosmetic Endocrinology.” *Hormone Research in Paediatrics* 87 (3): 145–52. https://doi.org/10.1159/000458526.

Atkisson, Curtis, Michael J. O’Brien, and Alex Mesoudi. 2012. “Adult Learners in a Novel Environment Use Prestige-Biased Social Learning.” *Evolutionary Psychology* 10 (3): 147470491201000320. https://doi.org/10.1177/147470491201000309.

Barkow, Jerome H., Leda Cosmides, and John Tooby, eds. 1992. *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. New York: Oxford University Press.

Blaker, Nancy M., Irene Rompa, Inge H. Dessing, Anne F. Vriend, Channah Herschberg, and Mark van Vugt. 2013. “The Height Leadership Advantage in Men and Women: Testing Evolutionary Psychology Predictions about the Perceptions of Tall Leaders.” *Group Processes & Intergroup Relations* 16 (1): 17–27. https://doi.org/10.1177/1368430212437211.

Bostrom, Nick, and Toby Ord. 2006. “The Reversal Test: Eliminating Status Quo Bias in Applied Ethics.” *Ethics* 116 (4): 656–79. https://doi.org/10.1086/505233.

Boyd, Robert, and Peter Richerson. 1985. *Culture and the Evolutionary Process*. Chicago: The University of Chicago Press.

Buchanan, Allen, ed. 2000. *From Chance to Choice: Genetics and Justice*. Cambridge, U.K. ; New York: Cambridge University Press.

———. 2011. *Better than Human: The Promise and Perils of Enhancing Ourselves*. Philosophy in Action: Small Books about Big Ideas. New York: Oxford University Press.

Buchanan, Allen, Dan W. Brock, Norman Daniels, and Daniel Wikler. 2001. *From Chance to Choice: Genetics and Justice*. Cambridge University Press.

Buller, David J. 2006. *Adapting Minds: Evolutionary Psychology and the Persistent Quest for Human Nature*. MIT Press.

Buss, David M. 2019. *Evolutionary Psychology: The New Science of the Mind*. 6th Edition. New York: Routledge.

Byrne, Richard, Richard W. Byrne, Andrew Whiten, and Both at the Psychological Laboratory Andrew Whiten. 1988. *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans*. Clarendon Press.

Chapais, Bernard. 1995. “Alliances as a Means of Competition in Primates: Evolutionary, Developmental, and Cognitive Aspects.” *American Journal of Physical Anthropology* 38 (S21): 115–36. https://doi.org/10.1002/ajpa.1330380607.

———. 2015. “Competence and the Evolutionary Origins of Status and Power in Humans.” *Human Nature* 26 (2): 161–83. https://doi.org/10.1007/s12110-015-9227-6.

Chudek, Maciej, Sarah Heller, Susan Birch, and Joseph Henrich. 2012. “Prestige-Biased Cultural Learning: Bystander’s Differential Attention to Potential Models Influences Children’s Learning.” *Evolution and Human Behavior* 33 (1): 46–56. https://doi.org/10.1016/j.evolhumbehav.2011.05.005.

Clark, Andy. 1997. *Being There: Putting Brain, Body, and World Together Again*. Cambridge, Mass: MIT Press.

Clarke, Steve. 2016. “Buchanan and the Conservative Argument against Human Enhancement from Biological and Social Harmony.” In *The Ethics of Human Enhancement*, edited by Steve Clarke, Julian Savulescu, Tony Coady, Alberto Giubilini, and Sagar Sanyal, 211–24. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198754855.003.0015.

Desmond, Hugh. 2019. “Professionalism in Science: Competence, Autonomy, and Service.” *Science and Engineering Ethics*, October. https://doi.org/10.1007/s11948-019-00143-x.

Ellis, Lee. 1995. “Dominance and Reproductive Success among Nonhuman Animals: A Cross-Species Comparison.” *Ethology and Sociobiology* 16 (4): 257–333. https://doi.org/10.1016/0162-3095(95)00050-U.

Fingerman, Karen L., Yen-Pi Cheng, Eric D. Wesselmann, Steven Zarit, Frank Furstenberg, and Kira S. Birditt. 2012. “Helicopter Parents and Landing Pad Kids: Intense Parental Support of Grown Children.” *Journal of Marriage and Family* 74 (4): 880–96. https://doi.org/10.1111/j.1741-3737.2012.00987.x.

Foerster, Steffen, Mathias Franz, Carson M. Murray, Ian C. Gilby, Joseph T. Feldblum, Kara K. Walker, and Anne E. Pusey. 2016. “Chimpanzee Females Queue but Males Compete for Social Status.” *Scientific Reports* 6 (1): 1–11. https://doi.org/10.1038/srep35404.

Freidson, Eliot. 2001. *Professionalism, the Third Logic: On the Practice of Knowledge*. University of Chicago Press.

Galton, Francis. 1869. *Hereditary Genius: An Inquiry Into Its Laws and Consequences*. Macmillan.

Greely, Henry, Barbara Sahakian, John Harris, Ronald C. Kessler, Michael Gazzaniga, Philip Campbell, and Martha J. Farah. 2008. “Towards Responsible Use of Cognitive-Enhancing Drugs by the Healthy.” *Nature* 456 (7223): 702.

Harris, John. 2007. *Enhancing Evolution: The Ethical Case for Making Better People*. Princeton, NJ: Princeton University Press.

Harris, John, and Sarah Chan. 2010. “Moral Behavior Is Not What It Seems.” *Proceedings of the National Academy of Sciences* 107 (50): E183–E183. https://doi.org/10.1073/pnas.1015001107.

Hawley, Katherine. 2012. *Trust: A Very Short Introduction*. First edition. Very Short Introductions 325. Oxford: Oxford University Press. https://books.google.be/books/about/Trust\_A\_Very\_Short\_Introduction.html?id=lZIuLVq8-JEC&redir\_esc=y.

Heersmink, Richard. 2017. “Extended Mind and Cognitive Enhancement: Moral Aspects of Cognitive Artifacts.” *Phenomenology and the Cognitive Sciences* 16 (1): 17–32. https://doi.org/10.1007/s11097-015-9448-5.

Henrich, Joseph. 2004. “Cultural Group Selection, Coevolutionary Processes and Large-Scale Cooperation.” *Journal of Economic Behavior & Organization* 53 (1): 3–35. https://doi.org/10.1016/S0167-2681(03)00094-5.

———. 2016. *The Secret of Our Success: How Culture Is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*. Princeton: Princeton University Press.

Henrich, Joseph, Robert Boyd, and Peter J. Richerson. 2008. “Five Misunderstandings About Cultural Evolution.” *Human Nature* 19 (2): 119–37. https://doi.org/10.1007/s12110-008-9037-1.

Henrich, Joseph, Maciej Chudek, and Robert Boyd. 2015. “The Big Man Mechanism: How Prestige Fosters Cooperation and Creates Prosocial Leaders.” *Philosophical Transactions of the Royal Society B: Biological Sciences* 370 (1683): 20150013. https://doi.org/10.1098/rstb.2015.0013.

Henrich, Joseph, and Francisco J Gil-White. 2001. “The Evolution of Prestige: Freely Conferred Deference as a Mechanism for Enhancing the Benefits of Cultural Transmission.” *Evolution and Human Behavior* 22 (3): 165–96. https://doi.org/10.1016/S1090-5138(00)00071-4.

Herrmann, E., J. Call, M. V. Hernandez-Lloreda, B. Hare, and M. Tomasello. 2007. “Humans Have Evolved Specialized Skills of Social Cognition: The Cultural Intelligence Hypothesis.” *Science* 317 (5843): 1360–66. https://doi.org/10.1126/science.1146282.

Hull, David L. 1986. “On Human Nature.” *Philosophy of Science* 2: 3–13. https://doi.org/10.1086/psaprocbienmeetp.1986.2.192787.

Husak, Douglas N. 2008. *Overcriminalization: The Limits of the Criminal Law*. New York: Oxford University Press.

Kahane, Guy, and Julian Savulescu. 2015. “Normal Human Variation: Refocussing the Enhancement Debate: Normal Human Variation: Refocussing the Enhancement Debate.” *Bioethics* 29 (2): 133–43. https://doi.org/10.1111/bioe.12045.

Kakkar, Hemant, Niro Sivanathan, and Matthias Gobel. 2019. “Fall from Grace: The Role of Dominance and Prestige in the Punishment of High-Status Actors.” *Academy of Management Journal*, March, amj.2017.0729. https://doi.org/10.5465/amj.2017.0729.

Kass, Leon. 2003. “Beyond Therapy: Biotechnology and the Pursuit of Human Improvement.” *President’s Council on Bioethics, Washington, DC*.

Kevles, Daniel J. 1985. *In the Name of Eugenics: Genetics and the Uses of Human Heredity*. 95. Harvard University Press.

Marmot, Michael. 2005. *Status Syndrome: How Your Social Standing Directly Affects Your Health*. A&C Black.

Maslen, Hannah, Thomas Douglas, Roi Cohen Kadosh, Neil Levy, and Julian Savulescu. 2014. “The Regulation of Cognitive Enhancement Devices: Extending the Medical Model.” *Journal of Law and the Biosciences* 1 (1): 68–93. https://doi.org/10.1093/jlb/lst003.

Parens, Erik. 2015. *Shaping Our Selves: On Technology, Flourishing, and a Habit of Thinking*. Oxford University Press.

Persson, Ingmar, and Julian Savulescu. 2012. *Unfit for the Future: The Need for Moral Enhancement*. OUP Oxford.

Petersen, Michael Bang, Daniel Sznycer, Aaron Sell, Leda Cosmides, and John Tooby. 2013. “The Ancestral Logic of Politics: Upper-Body Strength Regulates Men’s Assertion of Self-Interest Over Economic Redistribution.” *Psychological Science* 24 (7): 1098–1103. https://doi.org/10.1177/0956797612466415.

Price, Michael E., and Mark Van Vugt. 2014. “The Evolution of Leader–Follower Reciprocity: The Theory of Service-for-Prestige.” *Frontiers in Human Neuroscience* 8. https://doi.org/10.3389/fnhum.2014.00363.

Pritchard, Rosalind. 2004. “Humboldtian Values in a Changing World: Staff and Students in German Universities.” *Oxford Review of Education* 30 (4): 509–28. https://doi.org/10.1080/0305498042000303982.

Pugh, Jonathan, Guy Kahane, and Julian Savulescu. 2016. “Bioconservatism, Partiality, and the Human-Nature Objection to Enhancement.” *The Monist* 99 (4): 406–22. https://doi.org/10.1093/monist/onw013.

Redhead, Daniel, Joey Cheng, and Rick O’Gorman. 2018. “Status Competition and Peer Relationships in Childhood.” In *Encyclopedia of Evolutionary Psychological Science*, edited by Todd K. Shackelford and Viviana A. Weekes-Shackelford, 1–9. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-16999-6\_3639-1.

Rueden, Christopher von, Michael Gurven, and Hillard Kaplan. 2011. “Why Do Men Seek Status? Fitness Payoffs to Dominance and Prestige.” *Proceedings of the Royal Society B: Biological Sciences* 278 (1715): 2223–32. https://doi.org/10.1098/rspb.2010.2145.

Sandberg, Anders. 2014. “Cognition Enhancement: Upgrading the Brain.” In *Enhancing Human Capacities*, edited by Julian Savulescu, Ruud ter Meulen, and Guy Kahane, 69–91. Oxford: Blackwell Publishing Ltd. https://doi.org/10.1002/9781444393552.ch5.

Sandel, Michael J. 2007. *The Case against Perfection: Ethics in the Age of Genetic Engineering*. Cambridge, Mass: Belknap Press of Harvard University Press.

Savulescu, Julian, Anders Sandberg, and Guy Kahane. 2014. “Well-Being and Enhancement.” In *Enhancing Human Capacities*, 1–18. Oxford: Blackwell Publishing Ltd. https://doi.org/10.1002/9781444393552.ch1.

Schiffrin, Holly H., and Miriam Liss. 2017. “The Effects of Helicopter Parenting on Academic Motivation.” *Journal of Child and Family Studies* 26 (5): 1472–80. https://doi.org/10.1007/s10826-017-0658-z.

Segrin, Chris, Alesia Woszidlo, Michelle Givertz, and Neil Montgomery. 2013. “Parent and Child Traits Associated with Overparenting.” *Journal of Social and Clinical Psychology* 32 (6): 569–95. https://doi.org/10.1521/jscp.2013.32.6.569.

Sell, A., J. Tooby, and L. Cosmides. 2009. “Formidability and the Logic of Human Anger.” *Proceedings of the National Academy of Sciences* 106 (35): 15073–78. https://doi.org/10.1073/pnas.0904312106.

Smith, Eric Alden, and Rebecca L. Bliege Bird. 2000. “Turtle Hunting and Tombstone Opening: Public Generosity as Costly Signaling.” *Evolution and Human Behavior* 21 (4): 245–61. https://doi.org/10.1016/S1090-5138(00)00031-3.

Steckel, Richard H. 1995. “Stature and the Standard of Living.” *Journal of Economic Literature* 33 (4): 1903–40.

Street, Sharon. 2006. “A Darwinian Dilemma for Realist Theories of Value.” *Philosophical Studies* 127 (1): 109–66. https://doi.org/10.1007/s11098-005-1726-6.

Vugt, Mark van, and Joshua M. Tybur. 2015. “The Evolutionary Foundations of Status Hierarchy.” In *The Handbook of Evolutionary Psychology*, edited by David M Buss, 1–22. Hoboken, NJ, USA: John Wiley & Sons, Inc. https://doi.org/10.1002/9781119125563.evpsych232.

Wilkinson, Richard G. 2001. *Mind the Gap: Hierarchies, Health and Human Evolution*. Yale University Press.

1. For instance, moral enhancement through pharmaceutical means has been argued to erode autonomy (which in turn is central to a certain understanding of moral capacity). See (Harris and Chan 2010) [↑](#footnote-ref-1)
2. For instance, Bostrom and Ord 2006, p. 665-666: “… our current environment is in many respects very different from that of our evolutionary ancestors … [and] places very different demands on cognitive functioning than did an illiterate life on the savanna”. Or Pugh, Kahane, and Savulescu 2016, p. 407: “.. the relatively contingent and arbitrary features of human nature, selected as they were blind evolutionary processes…” [↑](#footnote-ref-2)
3. This a remarkable terminological convergence between sociologists and evolutionary scientists (‘service-for-prestige’). [↑](#footnote-ref-3)
4. The same rough pattern is evidenced in surveys in the US (<https://www.pewresearch.org/fact-tank/2016/10/18/most-americans-trust-the-military-and-scientists-to-act-in-the-publics-interest/>) as well as in the Netherlands (<https://www.rathenau.nl/en/knowledge-ecosystems/trust-science-netherlands>) and the UK (https://wellcome.ac.uk/sites/default/files/monitor-wave3-summary-wellcome-apr16.pdf). [↑](#footnote-ref-4)
5. Whether such enhancements should be called ‘enhancement’ or rather a therapeutic intervention is a separate issue. [↑](#footnote-ref-5)
6. There are question marks how effective overparenting is in the longer term, especially with regards to the effect on independence and academic motivation (Schiffrin and Liss 2017). [↑](#footnote-ref-6)