

Evolution, Education and Genetic Enhancement

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We have reached a stage in history at which it seems possible to be an active part in the process of human evolution. We can use auto evolution to enhance the process of evolution. This type of enhancement can occur in a genetic or in a non-genetic way. In the first part of the article, I will distinguish four types of enhancement by means of which a posthuman can come into existence:

- 1 Genetic enhancement;
- 2.1 Non-genetic enhancement by means of education;
- 2.2 Non-genetic enhancement by means of e.g. diets, drugs;
- 2.3 Non-genetic enhancement by means of human-machine interfaces, i.e. mechanical or digital cyborgs.

Various types of enhancement can bring about changes which can get inherited and which therefore have the potential to enhance evolution so that the posthuman can come about, as I will show. The decision in favour of the process of genetic and non-genetic enhancement can be made autonomously or heteronomously. As actions related to autonomous decisions are usually morally less problematic than heteronomous ones, I will take the latter into consideration in part two of the article, in particular genetic and educative enhancement. Genetic enhancement has traditionally been seen as morally problematic, whereas this evaluation does not apply to non-genetic enhancement by means of education. I will show, however, that both processes can be seen as structurally analogous. These two heteronomous types of enhancement do not have to be morally problematic.

1. Enhancement and the Posthuman

The “posthuman” is a concept which comes up in various discourses both in the Anglo-American as well as in the Continental world, if one wishes to stick to this far from clear cut and blurred distinction. In the English speaking discourse, it is particularly prominent within the transhumanist movement. Within the literary and continental tradition, it comes up within post humanism. Transhumanism is connected more closely with the enhancement debate which takes place in the English speaking world among analytical ethicists. Posthumanism is a movement which is more closely connected to the so called continental tradition of philosophy, and there is a close link between posthumanist and postmodern thinkers. However, transhumanism and posthumanism have in common that they both reject the special status of human beings which has been connected with humanism.

Transhumanism affirms technological means in order to alter human beings which are for them “works in progress” to bring about the transhuman or the posthuman (Bostrom 2005, 1). The meaning of the concepts of the trans- and the posthuman differs significantly among transhuman thinkers. However, transhumanism upholds the fully rounded personality as an ideal which is similar to one type of the Renaissance ideal. Hence they affirm a type of ethical humanism.

Posthumanism, on the other hand, is characterised by the dissolution of absolute moral standards, and a type of perspectivism, and aims for a new anthropology. Posthumanists do not necessarily have any fundamental objections against technologically altering human beings. However, they do not uphold the absolute validity of the Renaissance ideal. Yet, there are concepts of the posthuman within the posthumanist discourse, too, e.g. the one from Katherine Hayles’ in “How we became Posthuman” (1999) or the cyborg of Donna Haraway’s “A Cyborg Manifesto” (1991, 1149-181). Sloterdijk is another philosopher who can be described as posthumanist, as he employs the concept of the

posthuman, e.g. in his speech “Regeln für den Menschenpark” (2001, 302-337). His recently published reflections concerning the anthropo-techniques represent a further posthumanist perspective, which is less optimistic concerning technological methods than transhumanist perspectives, but more open concerning enhancement methods than the traditional German discourse today which focuses on the concept of human dignity like Spämann or Habermas.

The posthuman in the transhumanist discourse can refer to a new step in evolution. The posthuman, then, would be a member of a new species. Other transhumanists uphold that the posthuman merely has qualities which go beyond the qualities of human beings, but cannot be regarded as a member of a new species. Transhumanists are discussing primarily genetic enhancement, and neuroenhancement by means of drugs/medicine to bring about the posthuman. Hence, two ways of bringing about the posthuman are:

1. Genetic enhancement;

2.2 Non-genetic enhancement by means of drugs, medicine, diet and similar means.

Within the posthumanist discourse, the concept of the cyborg is prominent, as described by Donna Haraway. Here, it refers to a new anthropology which considers the interaction between human beings and machines. A human being with a pacemaker can already be regarded as a cyborg, and therefore as a posthuman. Hence, another way of bringing about the posthuman is by connecting human beings with machines (2.3).

A third option of bringing about a posthuman, without employing gene technology, is by means of education (2.1). This option was put forward by Nietzsche in the context of the overbeing, the *Uebersensch*, as he upheld a version of Lamarckism.

Given the options mentioned, I can summarise that the posthuman can be brought about by means of human selection in the following ways:

1.1 We can enhance evolution by means of human selection, if we employ *genetic enhancement*. It might be possible eventually to alter genes such that even a new species can come into existence. It is possible that the decision for such an alteration will be made autonomously or heteronomously.

In addition, we can also bring about the posthuman by recourse to non genetic means of enhancement:

1.2.1 Nietzsche put forward education as a means to bring about the posthuman. Can education bring about changes which have an influence on the potential offspring of the person who gets educated? As inheritance depends upon genes, and genes do not get altered by means of education, one used to believe that education cannot be relevant for the process of evolution. Hence, Lamarckism, the heritability of acquired characteristics, has not been very fashionable for the same period of time. However, in recent decades doubts have been raised concerning this position which was based upon recent research on epigenetics. Together with Japlonka and Lamb I can stress that “the study of epigenetics and epigenetic inheritance systems (EISs) is young and hard evidence is sparse, but there are some very telling indications that it may be very important”. (Japlonka/Lamb 2005, 248)

Besides the genetic code, the epigenetic code, too, is supposed to be relevant for creating phenotypes, and it can get altered by means of environmental influences. The epigenetic inheritance systems belongs to three supragenetic inheritance systems which Japlonka and Lamb distinguish who also stress that “through the supragenetic inheritance systems , complex organisms can pass on some acquired characteristics. So Lamarckian evolution is certainly possible for them” (Japlonka/Lamb 2005, 107).¹

¹ “Heritable variation – genetic, epigenetic, behavioural, and symbolic – is the consequence both of accidents and of instructive processes during the development.” (Japlonka/Lamb 2005, 356)

A striking case is that of the evolution of language:

“Dor and Japlonka see the evolution of language as the outcome of the continuous interactions between the cultural and the genetic inheritance system.” (Japlonka/Lamb 2005, 307)

Given recent work in this field it is likely that stress², education³, drugs, medicine or diets can bring about epigenetic alterations which again can be responsible for an alteration of cell structures (Japlonka/Lamb 2005, 121) and of the activation or silencing of genes (Japlonka/Lamb 2005, 117).⁴ In some cases, the possibility cannot be excluded that such alterations can lead to an enhanced version of evolution. Japlonka and Lamb stress the following:

“The point is that epigenetic variants exist, and are known to show typical Mendelian patterns of inheritance. They therefore need to be studied. If there is heredity in the epigenetic dimension, then there is evolution, too”. (Japlonka/Lamb 2005, 359)

They also point out that “the transfer of epigenetic information from one generation to the next has been found and that in theory it can lead to evolutionary change” (Japlonka/Lamb 2005, 153). Their reason for holding this position is partly that “new epigenetic marks might be induced in both somatic and germ-line cells” (Japlonka/Lamb 2005, 145).

A “mother’s diet” can also bring about such alterations, according to Japlonka and Lamb (2005, 144) hence the same potential, as the ones stated before, also apply to the next method of bringing about a posthuman:

1.2.2 Non genetic enhancement by means of drugs, medicine or diets. As it has become clear already, such measures can lead to an enhanced version of evolution, given recent research in the field of epigenetics.

1.2.3 Finally, there is the option of creating posthumans by creating human-machine interfaces or cyborgs. The flourishing research concerning bionics is concerned with this option. Cyborgs stand for interfaces between human beings and mechanical or digital machines, which represent a certain type of posthumans, as they clearly go beyond the limits of what used to be regarded as a human. However, what is their potential for playing a role in evolution? In this case, there are no changes on a genetic or epigenetic level. In most of the cases, we have merely the combination of a mechanical or digital machine and a human being who might have capacities which go beyond the limits of what is normal for a human being. Yet, it can be thought, and some transhumanists from the University of Oxford have played around with this idea, that one can download the content of ones mind to the hard disk of a pc or upload digital content to ones mind. If it was possible to realise these procedures, they might have the potential of bringing about a completely new concept of evolution which could be described as autopoietical digital evolution. However, these options are so far from being actually realisable that I will not be concerned with them now. Hence, I can claim that human machine interfaces in some very few cases might lead to an enhanced version of evolution, but it is more likely that the enhancement in question applies only to the respective enhanced human beings.

As we have seen so far various types of enhancement can bring about changes which can get inherited and which therefore have the potential to enhance evolution so that the posthuman can come into existence. The decision in favour of the process of genetic and non-genetic enhancement can be taken by oneself, autonomously, or by a person x for a person y, heteronomously. As actions related to autonomous decisions are usually morally less problematic than heteronomous ones, I will take the latter into consideration in part two of the article, in particular genetic enhancement and education. Genetic enhancement has traditionally been seen as morally problematic, whereas this evaluation does not necessarily apply to non-genetic enhancement by means of education.

2 “Waddington’s experiments showed that when variation is revealed by an environmental stress, selection for an induced phenotype leads first to that phenotype being induced more frequently, and then to its production in the absence of the inducing agent.” (Japlonka/Lamb 2005, 273)

3 Jonathan M. Levenson and J. David Sweatt show that epigenetic mechanisms probably have an important role in synaptic plasticity and memory formation (2005, 108-118).

4 “Belyaev’s work with silver foxes suggested that there is a hidden genetic variation in natural populations. This variation was revealed during selection for tameness, possibly because stress-induced hormonal changes awakened dormant genes.” (Japlonka/Lamb 2005, 272)

Genetic enhancement and Education

Habermas criticised the position that educational and genetic enhancements are parallel events (Habermas 2001, 91) whereby he referred to a position held by Robertson (1994, 167). I, on the other hand, wish to show that there is a structural analogy between educational and genetic enhancement such that the moral evaluation of these two procedures ought to be analogous, too (Habermas 2001, 87). I have already referred to the first parallel structure in the initial part of my article when I put forward reasons why it cannot be excluded that both procedures bring about changes which can be relevant for evolution.

Firstly, I wish to put forward some reasons why there could be parallels between these two procedures. Both procedures have in common that decisions are being made by parents concerning the development of their child, at a stage where the child cannot yet decide for himself what it should do. In the case of genetic enhancement we are faced with the choice between genetic roulette vs. genetic enhancement. In the case of educational enhancement we face the options of a Kasper Hauser lifestyle vs. parental guidance. Given these options, it seems most plausible to conclude that genetic enhancement and parental guidance usually bring about better results for the offspring than the other options mentioned, as the qualities brought about by means of enhancement are based upon parental choices which normally are made on the ground of experience. Parents usually love their children and want them to have the best starting point in life possible. Of course, it is not always the case that parental decisions bring about good results, but as a rule of thumb it should be possible to say that it is far more often the case that parental influence leads to better options than states which would have come about by chance or without any guidance. Parents uphold qualities on the basis of their experiences, and having experiences in the context of ethical decisions is necessary for making good ethical decisions, as Aristotle has already remarked concerning the foundation of prudence. (NE 1142a)

Now, I will address two fundamental, but related claims which Habermas puts forward against the parallelisation of genetic and educative enhancement: Genetic enhancement is irreversible, and educative enhancement is reversible.

2.1 Irreversibility of genetic enhancement

One claim against the parallelisation of genetic and educative enhancement is that genetic enhancement is irreversible, according to Habermas. However, this claim is implausible, if not false, as recent research has shown.

Let us consider the lesbian couple who are both deaf and who have chosen a deaf sperm donor to have a deaf child. (see Agar 2004, 12-14) Actually, the child can hear a bit on one ear, but this is unimportant for my current purpose. According to the couple, deafness is not a defect, but it merely represents a being different. The couple was able to realise their wish and in this way managed to have a mostly deaf child. If germ line gene therapy worked, then they could have had a non deaf donor, changed the appropriate genes, and could have brought about a deaf child in this way. However, given the deafness in question is one of the inner ear. In that case, it would be possible for the person in question to later on go to the doctor and ask for a surgery in which he gets an implant, so that the person in question can hear. It is already possible to make such an operation and get such an implant.

Of course, it can get argued that in that case the genotype was not reversed but merely the phenotype. This is correct. However, the example also shows that qualities which came about due to a genetic setting are not irreversible. They can get changed by means of a surgery. Deaf people can undergo a surgery so that they can hear again, depending on the type of deafness they have or when the surgery takes place.

One could object that the consequences of educational enhancement can get reversed autonomously whereas in the case of genetic alterations one needs a surgeon or external help to bring about a reversed state. This is incorrect again, as I will show later. It is not the case that all consequences of educational enhancement can get reversed. In addition one can reply that by means of somatic gene therapy, it is even possible to change the genetic set up of a person. One of the most striking examples

in this context is the siRNA therapy. By means of siRNA therapy, genes can get silenced. In the following paragraph, I state a brief summary of what siRNA therapy has achieved so far.

In 2002 the journal “Science” referred to RNAi as “Technology of the Year”, and McCaffrey et al. published a paper in the journal “Nature” in which they specified that siRNA functions in mice and rats. (2002, 38-9) That siRNA’s can be used therapeutically in animals was published by Song et al. in 2003. By means of this type of therapy (RNA interference targeting Fas) mice can get protected from fulminant hepatitis. (Song et al. 2003, 347-51). A year later it was shown that genes at transcriptional level can get silenced by means of siRNA. (Morris 2004, 1289-1292) Due to the enormous potential of siRNA, Andrew Fire and Craig Mello were awarded the noble prize in medicine for discovering RNAi mechanism in 2006.

Given the empirical data concerning siRNA, it is plausible to claim that theoretically the following process is possible and, hence, that genetic states do not have to be fixed: 1. An embryo with brown eyes can get selected by means of pre-implantation genetic diagnosis – PGD; 2. The adult does not like his eye colour; 3. He asks medics to undergo siRNA therapy to change the gene related to his eye colour; 4. The altered genes bring it about that the eye colour changes.

Another option would be given, if germ line gene therapy worked which it does not so far. In that case, we could change a gene using germ line gene therapy to bring about a quality x. The quality x is disapproved of by the later adult. Hence, he decides to undergo siRNA therapy to silence the altered gene again. Such a procedure is theoretically possible. However, we do not have to use fictional examples to show that alterations brought about by genetic enhancement are reversible, but one must simply have a look at the latest developments in gene therapy.

The 23 year-old British male, Robert Johnson, suffered from Leber’s congenital amaurosis which is an inherited blinding disease. Early in 2007, he had a surgery at Moorfields Eye Hospital and University College London’s Institute of Ophthalmology which represented the world’s first gene therapy trial for an inherited retinal disease. In April 2008 the “New England Journal of Medicine” published the results of this operation which revealed its success, as the patient has had a modest increase in vision afterwards, and no apparent side-effects. (Maguire et al. 2008, 2240-2248)

In this case it was a therapeutic use of gene therapy. As genes can get altered for therapeutic purposes, it shows that they can get altered and that they could get altered for non therapeutic ends, too, if one wishes to uphold the problematic distinction between therapeutic and non therapeutic ends. The examples mentioned here clearly show that it is not the case that qualities brought about by means of genetic enhancement do not have to be irreversible. However, the parallels concerning genetic and educative enhancement go even further.

2.2 Reversibility of educative enhancement

According to Habermas, character traits brought about by educative means are reversible. Because of this assumption, which he must hold, he rejects that educative and genetic enhancement are parallel processes. Aristotle disagrees, and he is right in doing so. According to Aristotle, a *hexis*, a basic stable attitude gets established by means of repetition. (EN 1103a) You become brave, if you continuously act in a brave manner. By playing a guitar, you turn into a guitar player. By acting with moderation, you become moderate. Aristotle makes clear that by means of repeating a certain type of action, you establish the type in your character, you form a basic stable attitude, a *hexis*. In the “Categories”, he makes clear that the *hexis* is extremely stable. (Cat. 8, 8b27-35) In the “Nichomachean Ethics” he goes even further and claims that once one has established a basic stable attitude it is impossible to get rid of it again. (EN III 7, 1114a19-21) Buddensiek has interpreted this passage correctly by pointing out that once a *hexis*, a basic stable attitude, was formed or established, it is an irreversible part of the character according to Aristotle. (Buddensiek 2002, 190)

Aristotle’s position gets support from Freud, who put forward the following claim: “It follows from what I have said that the neuroses can be completely prevented but are completely incurable” (Freud after Malcolm 1984, 24) whereby *Angstneurosen* were supposed to represent a particularly striking example. (Rabelhofer 2006, 38).

A lot of time has passed since Freud and research has taken place. However, in recent publications concerning psychiatric and psychotherapeutic findings, it is still clear that psychological diseases can

be incurable. (Beese 2004, 20) Psychological disorders are not intentionally brought about by educative means. However, a lot of empirical research has been done in the field of illnesses, and their origin in early childhood. By showing that irreversible illnesses can come about due to events or actions which have taken place in childhood, it becomes clear that the same can happen by means of proper educative measures.

Medical research has shown and most physicians agree that PostTraumatic Stress Disorders can not only become chronic, but also lead to a permanent personality disturbance (Rentrop et al (Ed.) 2009, 373). They come about due to exceptional events which represent an enormous burden and change within someone's life. Obsessional neuroses are another such case. According to the latest numbers, only 10 to 15 % of patients get cured, and in most cases it turns into a chronic disease. (Rentrop et al (Ed.) 2009, 368) Another disturbance which one could refer to is the borderline syndrome, which is a type of personality disorder. It can be related to events or actions which have taken place in early childhood, like violence or child abuse. In most cases this represents a chronic disease. (Rentrop et al (Ed.) 2009, 459)

Given the examples mentioned, it is clear that by means of actions and events which have taken place during ones lifetime, one can get into permanent and irreversible states. In the above cases, it is of disadvantage to the person in question. In the case of an Aristotelian *hexis*, it is an advantage for the person in question, given one establishes a virtue in this manner.

To provide further intuitive support for the position that qualities established by educational enhancement can be irreversible, one can simply think about ones learning to ride the bike, tie ones shoe laces, play the piano or speak ones mother tongue. Children get educated for years and years to undertake these tasks. Even when one moves into a different country or if one does not ride the bike for many years, it is difficult, if not impossible, to completely get rid of the capacity one has acquired before. Hence, it is very plausible that educative enhancement can have irreversible consequences, and Habermas is wrong twice. Genetic enhancement can have consequences which are reversible, and educative enhancement can have consequences which are irreversible. Given these insights, the parallelisation of genetic and educative enhancement gets additional support.

Conclusion

In a related paper, which is not yet published, I dealt with further reasons in favour of the parallel structure of genetic and educational enhancement, whereby I particularly focused on the questions of autonomy, instrumentalisation, equality, and the therapy/enhancement distinction.

Given the above analysis, I am already bound to conclude that Habermas is wrong concerning two fundamental issues when he denies that educational and genetic enhancements are parallel events. In order to reach a clearer understanding of which types of genetic enhancement ought to be undertaken and which not, I would have to discuss the moral status of the embryo, and analyse which concept of the good ought to apply on a political level. A reply to both questions could only be given within separate articles.

What I wish to stress so far is that negative freedom is a precious achievement. During the Enlightenment, we have freed ourselves from the paternalistic oppression of religious and aristocratic leaders. Thereby, we have successfully established the right to live according to our own concept of the good, as long as it does not interfere with the rights of someone else. Consequently, I suggest that *In dubio pro libertate* is an adequate principle for a democracy. If there is a conflict between several groups of a certain, significant size, then I suggest that it usually ought to be more liberal opinion which ought to be legalised. Hence, a state should refrain from making normative demands based upon metaphysical and religious prejudices.

Even if the parallelisation of educational and genetic enhancement is given, it does not solve the elemental challenges connected to it like the question concerning the appropriate good as a basis of enhancement. One important issue in this context was raised in a recent report. It summarises well the complexity and relevance of this issue which is the reason why I quote it in full length at the end of my paper. It provides a basis for further investigation and studies which have to follow the conclusion of this article:

“Some have argued at least with regard to education that children possess a further right beyond health and safety. Article 26 of the United Nations Universal Declaration of Human Rights states that everyone has the right to education and that education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. These rights in turn suggest duties for parents and society. If education is a kind of social enhancement, this lays the groundwork for claiming that other kinds of enhancements might be the right of children and correlative duties of parents and children. Will, for example, children of the future be expected to receive enhancements of their bodies that lead to ‘the full development of human personality’? Exactly what might be required will depend on the facts of the situation, of course. As we have said, context matters. But what this account shows is that there is at least a possible line of argument that supports not only the right of children to be enhanced, but also a duty of their parents or society to do this” (Allhoff et al. 2009, 32).

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