



THE CHALLENGE OF BIOTECHNOLOGY

From Habermas to Stiegler

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2 INTRODUCTION

With the discovery of the DNA double helix by Watson and Crick in 1953 scientists have been pursuing to unlock and discover the very mechanisms of life itself. The Human Genome Project was to be the crowning achievement of this search. But if anything, the sequencing of the human genome has shown that life is much more complicated than previously thought. But nonetheless its promises live on. While genomics concentrated on reading the human genome, the current “post-genomics” of synthetic biology is about recomposing human DNA (Zwart 2011, 338).

Transhumanist thinkers are highly optimistic of the possibilities of genetic manipulation. These possibilities are often articulated in terms of intellectual, physical and psychological capacities. Nick Bostrom, the head of “Future for Humanity Institute” at Oxford University, outlines an increased healthspan, increased cognition and emotion as three main benefits of enhancement technologies such as genetic manipulation. An increased healthspan means “to remain fully active and productive, mentally and physically” through one's entire lifespan. An increased cognition for Bostrom means not only a “heightened memory, longer attention span and better deductive reasoning” but also a heightened capacity to “understand and appreciate music, humor, eroticism” etc. The transhumanist ideal of progress is based on the view that the human species can gain the ability to direct its own evolution through the use of science and technology. Through biotechnology, humankind can gain the power to design its abilities and appearance on an individual and societal level, resulting in a self-directed human evolution. This is a highly optimistic view of science, technology and their capacity of elevating the human condition.

By enhancing one's genes and removing the ‘useless’, suboptimal or defective ones, they hope to rise above the capriciousness of a random genetic makeup (Bostrom 2003, 496). As such, they aim to gain control of their own most fundamental constitutive elements. Of course, many thinkers disagree about the desirability of such a development. Critics attack the desirability of genetic manipulation on an individual and societal level. A common theme is their affirmation of the supposed loss of something fundamental to what makes us human if we start manipulating our biological substrate. While transhumanists speak in terms of transcending the human condition, critics speak of transgressing a fundamental aspect of being human and living a worthwhile life (Lilley 2013, 18). Both transhumanists as their critics seem to still be disillusioned by the promise of the Human Genome Project and the idea of the genome as the blueprint of life.

I will concentrate on Habermas' insightful critique of genetic manipulation in his book “The Future of Human Nature.” According to Habermas, the invasiveness of

enhancement technologies is at its most shocking when it concerns what is believed to be the essential building blocks of every human. It challenges us to think about what it means to be human in the face of a possible ‘rewriting’ or ‘reprogramming’ of previously thought unalterable qualities. I engage with his critique at first hand by correcting some misconceptions about genes which motivate his arguments. But my main argument will come from Stiegler’s rethinking of what the human is. His conception of the process of becoming human has a nonessentialist character which diffuses most of Habermas’ concerns. I purport that genetic manipulation as a promise by technology, whether it is ever realized, forces us to rethink our understanding of what it means to be human and how we understand ourselves as humans and the role of technology therein. While discrediting Habermas’ claims is important, the question itself needs to change to be able to grasp the consequences of genetic manipulation for our self-understanding and its dangers.

Jürgen Habermas has many reasons to criticize genetic manipulation. He is mostly concerned with an “anthropological self-understanding,” which “provides the context in which our existing conceptions of law and morality are embedded.” He is concerned that genetic manipulation will change our ethical self-understanding as a species and therefore the self-understanding of a genetically programmed person, for worse. In turn this would “undermine the essentially symmetrical relations between free and equal human beings” (Habermas 2003, 23). Habermas’ arguments at times assume a gene deterministic point of view. That is why he believes by genetically manipulating humans, we rob them of their ability to view themselves as the authors of their own lives. Their future are in a sense pre-determined. This also results in the advent of unprecedented asymmetrical relationships between parents and children. That is why he opts for the use of genetic manipulation strictly as a therapeutic technology. One cannot decide for a child what his future should look like by fashioning his genes to serve a certain goal, but one can assume that there are certain conditions which no person could rationally want to live with.

The popular idea that genes have a determinative effect on human development is outdated. I use several authors to show Habermas’ conception of genes cannot hold and that without it, his larger conclusions can neither. But even the arguments that do not crumble when gene determinism does not hold are debatable at best. For example, the ethical self-understanding, which is an important point in his work, of a person is only affected for worse, Habermas claims, when this person has a genetic determinist self-understanding or when indeed our ‘humanity’ is spelled out in our genetic constitution as it were. Moreover, his advice for the banning of liberal eugenics in favor of therapeutic treatment only rests on the idea that there is an objective demarcation between what is an enhancement and what is therapy.

Habermas is not equipped to deal with this question because he does not grasp the severity of the constitutive role of technology in human development. I present Bernard Stiegler's philosophy as an alternative. According to Stiegler, human beings are technological beings right from the start. Habermas' instrumental approach misses the way technology is also a determinative force for human individuals and human society. For Stiegler, technological artefacts are the preconditions for human individuality by functioning as implicit mnemonic vectors thereby granting us access to a history upon which we can build and improve. This view evades Habermas' essentialist trap but still leaves enough room for the analysis of genetic manipulation as the novel and disrupting technology it is. It also allows us to see the dangers of such a new technology, not as the destroyer of some preconceived human essence, but in its hazardous consequences due to a systemic implementations in a competitive and proletarianizing capitalist society. Stiegler's critique is intertwined with his critique of consumerism. Genetic manipulation then entails a dissociation between one's own development and between the inheritance of generations.

Both Stiegler and Habermas are weary of genetic manipulation. But while Habermas' concern arrive from ethical conceptions and some outdated views on human genetics, Stiegler's concerns are predicated on the disruption of processes of individuation. These processes can create autonomous beings, but they can also disindividuate. Habermas seems to take autonomy in humans as a given. They have vastly different conceptual frameworks which may seem to amount to the same conclusion at the end. But further inspection will show that Stiegler's analysis allows us to reinstate the question of what it means to be human as a technological question. While Habermas can only resort to a containment of technological interventions to preserve current conditions of being, with Stiegler the possibility arises of adopting new technologies, such as biotechnologies, if the proper care of their ambivalent nature is taken to constitute new ways of being and coming to be.

3 THE STAKES OF BIOTECHNOLOGY

In the following I will provide an extended summary of Habermas' 2001 book 'The Future of Human Nature: ', adding my own comments and reflections where I find them necessary. In this highly insightful book Habermas tackles the question of genetic intervention. His aim is not to affirm or deny this novel application from an idealistic standpoint. His goal is rather to clarify ethical viewpoints that should be neutral to persons irrespective of their worldview. His analysis starts from the ethical self-understanding humans assume as a species. It is a politico-ethical analysis that aims to stay neutral with regard to particular worldviews. Habermas' practical philosophy aims to clarify "the moral point of view from which we judge norms and actions" (ibid, 3), thus taking a meta-ethical stance. He attempts to create

transparency over a “mixed up set of intuitions” in this essay. Habermas’ success is at best debatable. The mere fact that his work has called much warranted and unwarranted criticisms speaks for the failure to find common ground between different worldviews. In my critique, though, I will mostly concentrate on the scientific and ontological misconceptions Habermas’ arguments need to survive.

In short, Habermas’ view is that the modern concept of freedom makes a challenge to the permissibility of genetic manipulation. Adults can reflect on their lives critically and revise them. We can make our past our own or “responsibly take possession of” it (ibid, 13). But as soon as the genome of children becomes a malleable product, parents intervene in another person’s “spontaneous relation-to-self and ethical freedom.” Later generations can hold “the programmers of their genome responsible” for the unwanted consequences. This destroys “the boundary between persons and things.” When a person makes an irreversible decision about another, as is the case with the parent or engineer which performs the procedure, she challenges “the fundamental symmetry of responsibility that exists among free and equal persons.” There is no possibility of “self-critical appropriation of one’s own developmental history” whereby the balance to the “asymmetrical responsibility” of parents to children can be restored. The genetically altered adult would “remain blindly dependent on the non-revisable decision of another person” (ibid, 14).

3.1 MORALIZING HUMAN NATURE?

What we are by nature is now coming “within reach of biotechnological intervention.” For science this is just another “manifestation of our continuously extending control within our natural environment.” But according to Habermas our attitude changes as soon as this control crosses the boundaries between “outer and inner nature” from a “life-world perspective.” In response to this an attempt rises to moralize human nature, to protect it from destruction and manipulation. But societal transformation has always been driven by technological research and “changes in normative regulations have been produced as adaptations to societal transformations.” This is likely to proceed if the “instrumentalization of humanity’s inner nature can be medically justified by the prospect of better health and a prolonged lifespan” (ibid, 24). Because enhancing our “technological control of nature” is bound up with economic gains, prosperity and an enlarged “scope for individual choice,” it seems problematic to go against the advance of technological means of enhanced control over one’s bodily constitution. Thus Habermas perceives the moralization of human nature as a “dubious sanctification,” which attempts to erect “artificial barriers” to stop the same process which so greatly “enlarged the scope of our freedom” through a “disenchantment of outer nature” (ibid, 25). The scientific project which succeeded in explaining the world in mechanistic terms led to the disappearance of magical forces in the imagination of

individuals. This same project is now proposing to mechanize the workings of our inner nature in order to allow an enhanced engineering of the body and, as is promised by proponents and feared by Habermas, to do away with the nature we are bestowed with.

Habermas provides an alternative view on moralizing human nature, namely as the “assertion of an ethical self-understanding which is crucial for our capacity to see ourselves as the authors of our own life histories, and to recognize one another as autonomous persons.” He wants to take a different approach. Rather than an attempt to stop the progress of technology, Habermas’ moralization aims to “guarantee the conditions” for the preservation of modern “practical self-understanding.” This is rather a “self-referential moral action” (ibid, 26). It is not merely an elucidation of views, but an act which states and affirms a way of morally relating to oneself and others which deserves preservation. So Habermas does not locate the moralization of human nature in an a priori notion of what may be changed and what not. He is concerned with how a person may understand themselves, how this might be challenged by biotechnology.

Habermas uses the abortion debate to show how his point stands out from the normal moralization of human nature. He argues that the debate on abortion is not the same as that on genetic intervention. When a woman decides to opt for an abortion, her “right to self-determination collides with the embryo’s need for protection” (ibid, 30). In the case of genetic manipulation “the conflict is between the protection of the life of the unborn child and a weighing of goods by the parents.” This is an “instrumentalization of conditionally created life according to the preferences and value orientations of third parties.” In the abortion debate much attention has been put on the issue of whether a clump of cells may be seen as a “potential person and a subject possessing basic rights.” But Habermas is concerned with relationships. It is not about at which point an embryo possesses basic human rights and may not be intervened with from the outside. It is about the kind of relationship that we build with our offspring when we decide to work on their constitutional being.

Habermas situates morality in a “linguistically structured form of life.” Thus he does not believe the answer lies in an argument “concluding that the fertilized egg cell possesses human dignity.” He continues to note that our “attitude toward prepersonal human life” is of a different kind than our attitude toward nuclear energy for example. While the latter depends on how we rank “security and health compared to economic prosperity,” the former touches on “our own identification as human beings.” They touch on “the vision different cultures have of man.” “Advances in genetic engineering affect the very concept we have of ourselves as cultural members of the species of homo sapiens. If genetic intervention has this kind of impact will it become impossible for us to “see ourselves as ethically free

and morally equal beings?” (ibid, 41). Habermas fears this because he believes biotechnology might create a “dedifferentiation¹ of deep-rooted categorical distinctions” which consequently could create an “asymmetrical type of relationship between persons.”

The problem here does not arise with genetic manipulation as the act itself, but the attitude in which genetic manipulation is carried out. Choosing which qualities a future person should have to be admissible as a member of society is dehumanizing. So he puts up the possible solution of approaching “the embryo as the second person he will one day be.” The idea of a “possible consensus” with the person this embryo one day will become is put forward as an attitude in genetic intervention which can prevent asymmetrical relationships. If we can assume for good reasons that not genetically modifying a certain embryo will lead to a life of misery and pain for the future person it will become, we are justified in performing this modification. The attitude then is of a respect toward one’s minimal requirements of a worthy life instead of dictating how their life ought to be. For Habermas this possible consensus can only rationally be assumed when dealing with the greatest of evils (ibid, 43). This is in principle an argument for negative eugenics and against positive eugenics. One cannot know what a future person will become and what they want, but one can assume that every person would be better off without a horrible illness or defect.

3.2 THE GROWN AND THE MADE

Habermas distinguishes between an “objectivating stance” and a “performative stance” (ibid, 42). The first attitude is like a “strategist anticipating and assessing the decisions his counterparts will make” while the second has an ethical orientation and seeks to “reach an understanding with a second person in the context of an intersubjectively shared world.” The performative is a stance we take which respects the autonomy and being of another while the objectivating stance is likened to instrumental reason which seeks to control and predict. According to Habermas these two stances are linked to our intuitions when dealing with the made or with the grown. Now with the advent of genetic engineering Habermas fears a dedifferentiation of these stances and between what is made and what is grown.

These stances are derived from Aristotle who postulates “an objectivating attitude” and a “performative attitude” which engages in “communicative action to reach an understanding with a second person in the context of an intersubjectively shared world.” The second attitude has an “ethical orientation,” while the first is like that of a “strategist anticipating and assessing the decisions his counterparts will make.”

¹ Which means nothing less than blurring the boundaries between these categorical distinctions.

Through the development of the experimental sciences nature became an object of “control by technological means.” Science was geared to this task. This caused the instrumental form of action to become predominant (ibid, 45). With the advent of the promise of bioengineering, our inner nature has become a candidate for the objectivating attitude. For Habermas this is a problem because of the lack of care we take in this objectivating attitude, all the while dealing “with self-maintaining systems, whose self-regulation we might disrupt.” The “cultivating or therapeutic attitude toward organic nature” is dedifferentiated, or muddled, with “the technical use made of matter.” Habermas also distinguishes a “biotechnological mode of action” which “differs from the technical intervention of the engineer by a relation of collaboration with the nature we thus dispose over.” A biotechnological intervention is not the same as building a dam because of the fact that a dam cannot talk back. The dam cannot even reflect on its constitution or mode of existence. A grown human can and will reflect on his genetic constitution and his intervened nature will become an issue for these reflections.

Parents who choose “a genetic program for their children” have intentions towards their child but the child does not “have the opportunity to take a revisionist stance.” They are “one-sided and unchallengeable expectations.” When the child becomes a person “this egocentric intervention takes on the meaning of a communicative action which might have existential consequences.” But these genetically fixed demands cannot be responded to (ibid, 52). Genetic manipulation encodes parental expectations in one’s genome, rendering them impossible to revise or reappraise. Such a child is geared toward a life project which they had no chance of arguing against imperiling their autonomy and “standing as a moral agent” (Rorty 2003). Thus, genetic intervention is only admissible when it serves a clinical goal because “the person carrying out the treatment may assume that he has the consent of the patient” which the embryo may one day grow up to be. The “objectivating attitude of the technician” can in this case be avoided. “Genetic interventions involving the manipulation of traits constitute liberal eugenics if they cross the line defined by the logic of healing which one may assume to be subject to general consent.”

These categories correspond to our ability to perceive ourselves as having a body and as being a body. In communicative actions we use our bodies to engage in conversation for example, but in blushing the body we are laid itself bare. When the categorical distinctions between the grown and the made collapse on each other, the objectivating attitude’s complete victory over the performative attitude is complete. In the act of genetically modifying an individual the practitioner takes on a technical stance in intervening in one’s natural capacities to suit the needs of the parents or some other institution. This creates an asymmetrical type of relationship and confronts the individual with their instrumentalized existence when they can reflect on this. This realization that one has always been the product

of another's wishes makes it impossible for the individual to reconcile their having a body with their being a body. It is a realization that alienates one from their bodies and can result in fatalism.

3.3 THE MORAL LIMITS OF EUGENICS

Knowing that one was genetically altered “may intervene in the self-relation of the person, the relation to her bodily or mental existence.” The change for a genetically altered person “takes place in the mind.” One adapts an “observer perspective” to one's own body. “The realization that our hereditary factors were subjected to programming” makes us “subordinate our being a body, to our having a body” (Habermas 2003, 45).

Thus Habermas seeks to explain “that natural fate and socialization fate differ in a morally relevant aspect.” It matters whether a child is confronted with “domestic socialization” or with a “genetic program” for their self-relation. “Efforts at character building are essentially contestable” because of “the interactive structure of the formation processes” (ibid, 62). The asymmetry in the relation between a parent and child can be fixed by a “critical reappraisal of restrictive socialization processes.” But this is impossible with genetic alterations. “It does not permit the adolescent looking back on the prenatal intervention to engage in a revisionary learning process.” This person cannot come to a “revised self-understanding” which “allows for a productive response” to the realization of one being genetically altered.

There is also another danger for liberal eugenics² according to Habermas. “With genetic programming a relationship emerges that is asymmetrical.” The consequences of genetic manipulation are irreversible. It is an asymmetrical relation because this person is barred from exchanging roles with his designer. This argument, which is an important issue in his book, does not concern itself with a “person's ethical freedom and capacity of being himself.” It rather concentrates on the type of relationship that is created with liberal eugenics for which there is no precedence. This relationship is marked by “a permanent dependence between persons who know that one of them is principally barred from changing social places with the other” (ibid, 65). This relationship is “foreign to the reciprocal and symmetrical relations of mutual recognition” that is, according to Habermas, the basis for “a moral and legal community of free and equal persons” (ibid, 76).

² “Any practice that entrusts the decisions about any genetic intervention of an unborn child to the discretion of the parents is referred to as liberal eugenics in Habermas' work (Habermas, pg. 78).

This is a key argument for Habermas. Genetic manipulation undermines the basis for morality and freedom within our societies by attacking the very foundations on which these concepts rest, namely the unaltered originality of every person and their subsequent symmetry to one another. It is exactly this conception that I want to contest by first addressing the misconceptions about the power of genes that inform Habermas' view and subsequently by suggesting an alternative conception of humanity. While Habermas also makes points about the admissibility of embryo research and preimplantation genetic diagnosis (PGD) I will concentrate on genetic intervention (Rorty 2003). These practices require a different analysis because they entail the destruction of embryos which have the potential of becoming human. The core of my project is analyzing genetic intervention, and in a much broader scope technology, in relation to human self-understanding instead of the moral status of embryos. The breadth of my arguments aim to diffuse Habermas' fears of an endangered symmetry between individuals and autonomy in individuals. These arguments do not make sense when applied to a practice which prevents the coming about of an individual in the first place.

4 CLOSING OF THE FUTURE

For Habermas, meddling with the genetic structure of humans is a transgression of the highest sort which can lead to disastrous effects on individuals and their relations. The underlying belief is that because genes are the building blocks of a human, they are the essential and most fundamental part in the development of an individual. Leon Kass, another bioconservative, rejects genetic manipulation on the ground of the moral repugnance it causes, which for him is a signal of the intrinsic transgression of what it means to be human that genetic manipulation entails (Kass 2000). While Habermas makes explicit that his argument is based on his views of the role of the genome in an organism's being and development and how they operate differently from culture, Kass does not make this explicit. He relates to the gut feeling people experience when thinking about human cloning and genetic engineering. Moral repugnance can sometimes be justified. But if this experience can be traced to a "metaphysical confusion about human nature" and the role of genes in its development (Powell 2012, 445), we should at least not accept Habermas' worries of the genetically manipulated human and society nor should we build on Kass' moral repugnance argument.

Both argue from an outdated biological understanding to develop a notion of what it means to be human. But what they believe to be human, or what an individual believes to be human is in this day and age already scientifically informed. As Lenny Moss describes:

“How we understand what it means to be human is a normatively structured and norm constitutive enterprise... A normative stand on biotechnology is... a normative stand on what it is to be human” (Moss 2007, 139).

According to Moss, Habermans and Kass are not just *de-scribing* a factual self-understanding, but are also at the same time always *pre-scribing* it. In the following I will attempt to debunk Habermas’ conception of how genes work by, 1) showing the analytical confusion which leads to a division between nature and nurture, 2) that there are different gradients of genetic determination of phenotype, of which only a small and exceptional percentage can be linked to specific genes, 3) why the scrutiny that genetic engineering receives is not unproblematically warranted.

4.1 GENETIC DETERMINISM

The idea that genes determine a person unilaterally in contrast to the environment which allows for a certain space for reflexivity, is outdated. I want to argue that neither genes nor the environment are more fundamental in the constitution of a person. In fact, the distinction between environmental factors and genetic factors and between nature and nurture are outdated modes of thinking. The interaction between the phenotype and genotype is a heavily complex process which leaves no room for one-to-one relations, albeit in the case of monogenic diseases. Habermas’ mistake is the byproduct of an obsolete mode of reasoning in the so-called nature versus nurture debate. It was commonly held that a feature of an individual was either the product of environmental factors or of genes (Lewontin 2006, 521). Even though we now know that genes do not have a privileged role in the development of individuals, the same analytical confusion which leads some to this conception of genes persists. According to Lewontin this confusion arises when a number of causes which holistically interact to produce a uniform product are separated into discrete elements when analysed. He argues for the recognition:

“that all individuals owe their phenotype to the biochemical activity of their genes in a unique sequence of environments and to developmental events that may occur subsequent to, although dependent upon, the initial action of the genes” (ibid, 520).

Thus, every individual is a product of their interaction within a specific environment and the events that unfold in this environment. These events can be caused by gene activity or cause gene activity themselves. Or they may happen completely independent of any gene activity. The activation of a gene, or set of genes can also have a multitude of effects which do not correspond with a specific phenotype. So it is very problematic to assign a stronger value to genetic factors than to environmental factors, like education, to the make-up of a person.

According to Resnik and Vorhaus (2006) most arguments against genetic modification assume a strong version of genetic determinism, which they show is not valid. Causal relationships can be deterministic or correlative. A deterministic causal relationship would be between me dropping a rock and it falling. A probabilistic relationship would be between smoking and getting lung cancer. Many smokers never develop lung cancer, but we nonetheless say that smoking causes lung cancer. When there is talk of something being genetically determined in biology, it is mostly about correlative determinism. There are three types of genetic determinism. A relationship is called strong, moderate or weak when a gene increases the probability of developing a trait by more than 95%, more than 50% or less than 5% respectively (Resnik 2006, 3). Strong genetic determinism is rare in biology.

I will list two reasons for the relatively low amount of strong deterministic relationships between genotype and phenotype. First of all, the environment plays an important role in the expression of most genes (ibid, 4), as is also argued by Lewontin (2006). Genes are regulated by a wide range of mechanisms to increase or decrease the products of protein or RNA (see chapter 8 of Essential Cell Biology by Alberts et. al. for an in depth explanation of all the mechanisms involved in the expression of genes). Cells regulate the expression of genes depending on available nutrients, temperature, cell division cycle, metabolism, infection status and the specific role of that cell in the organism (Jacob 1989). So even if a person has a genetic disposition toward being a musician, a statement which is problematic in light of the current arguments, they will not be able to develop any kind of musical skills if their environment lacks the tools to encourage such an endeavor. Likewise, a disposition towards addictive behavior can never come to fruition if this person distances themselves from addictive substances.

“The complex interaction and interdependence of genes and environments, a fundamental and frequently ignored reality of biology, undermines the notion that genotype *determine* phenotypes” (Resnik 2006, 4).

Secondly, the development of an organism impacts how genetic information is converted into traits. This epigenetic mechanism can lead to changes in an organism’s phenotype without altering the genome:

“the diets of pregnant mothers could alter the behaviour of genes in their children and that these changes could last a lifetime and then be passed on in turn to their children. The genes were literally being switched on or off.” (Spector 2012, 8).

One might advance the notion that while genes indeed have no deterministic relationship with the phenotype, they do play a central role in the development of

an organism in the same way a manager takes the decisions on the direction his company will take. In this view genes are aided by non-genetic mechanisms in the development of an organism. While this account is tempting, there has until date been no sign of a substantive account of genetic information that extends directly to the phenotype and giving genes a privileged role in biological development (Powell 2012, 452; Godfrey-Smith 2000). In contrast to this view P. Alberch (1991) proposes a framework based on maps for identifying how genotypes are expressed in phenotypes. The genotype-phenotype mapping framework is a method to literally map the complex pathways the genotype takes ending at the phenotype, but maps can go both ways creating the conceptual basis for a two way model. Its added benefit is that the search is no longer to link certain traits to genes, bypassing the abyss of ‘one-to-one’ relations, but to understand the complex mechanisms, like RNA folding and protein function, which start with genotypes, but are not necessarily started *by* genotypes, that lead to certain phenotypes (for an in depth discussion see Pigliucci 2010).

Showing that genes have a different causal relationship than is widely believed is not enough to undermine Habermas’ point. The problem is located in the self-identification process of the genetically altered person. This process is dysregulated by the loss of an unaltered originality. What we need to do is show that genes are not the essential components of human beings and their self-identification. Showing that they do not have the causal relationship to the phenotype is just the first step in denting their magical power.

4.2 GENETIC ESSENTIALISM

Habermas’ fears as I have noted them allude to a genetic essentialism which is problematic. While he makes no explicit genetically essentialist claims, throughout his text traces of this bias can be found:

“Would not the first human being to determine...*the natural essence of another human being* at the same time destroy the equal freedoms that exist among persons of equal birth in order to ensure they’re different” (Habermas, 15)?

From this sentence it is clear that Habermas has an essentialist view of humankind and that this essence is located in one’s genes. Our genetic structures determine our properties according to his arguments. If this essentialism is not granted Habermas’ argument falls apart. Because genes then become just another factor in the multiplicity that makes up a human part of humankind. Although metaphysical essentialism has long been discredited, the structure of this essentialist thinking is more pervasive in our thought than we would like to think. In essence, pardon the irony, psychological essentialism is the psychological analog to metaphysical essentialism (Vosniadou 1989, 183). It is the view that entities have an underlying

nature that gives them their identity and properties. “Recent psychological studies converge to suggest that essentialism is a reasoning heuristic” that is unwittingly used by humans of all ages (Gelman 2015).

Ascribing essence to something can even happen when its essence is not known. This is called an essence placeholder and it has some implications. First, that category members share an underlying structure. Second, that there is “an innate, genetic or biological basis to category membership” (ibid). Third, that these categories have strict boundaries. In Habermas’ case this stability is inscribed in the genetic foundation for the equality of our relational and self-relational understanding. In other words, what Habermas is concerned about, is the fact that our self-understanding is genetically essentialist. And the foundation of what we call a free and moral society and an individual lies within this essence in the sense that without it we lose these capacities. These factors are perceived to be lost when one resorts to changing the biology that underlies our capacities for ethical and moral societies and individuals. Genes have become an essence placeholder for human beings, in Habermas’ work as well as popular thought, and this has important implications to how humans regard genetic information and subsequently genetic manipulation.

But why is it problematic to have an essentialist view of human membership? An essentialist view of human nature is problematic because “species are simply not the right sorts of things to have them.” Species in general are not natural kinds like gold, which has a microstructural property which is uniformly present in all gold samples. If this microstructure is changed, for example by changing its atomic number, it would cease to be gold. Being part of a species does not entail having the right genetic constitution with a “genome that explains the characteristic properties of its species and constitutes the sense in which the members of a species are fundamentally the same” (Lewens 2012, 460-1). Individuals can have the same intrinsic properties³ but still be part of a species or be part of the same species while having different intrinsic properties. What makes one part of the human species is on Lewens account nothing like a specific genetic makeup or its the unalteredness thereof.

Essentialist thinking tries to grasp particular species in an a-temporal understanding, but this misses the point that species are not like natural kinds and the individuals this species is made out of are not tokens of their class. “They are rather spatiotemporally restricted, weakly cohesive, evolving individuals with organisms as their constituent parts (Powell 2012b, 486).” To bring the discussion

³ Lewens writes only of genetic constitution in his article. He most commonly refers to ‘intrinsic properties’ throughout the article. But from his narrative it is clear that he is referring to genetic constitution or at least that they are replaceable.

back to Habermas' vocabulary, humans do not enjoy symmetrical relationships because of their genetic constitution as their adherence to humankind. Relationships arise throughout one's lifetime as the product of interaction and communication. It is the realization that the other is a complex being with whom I must co-exist in the Kantian sense. The asymmetry in parental relationships is not only resolved in reflection. It is the coming to age of the child, the formation of one's own life orientation and the ability to stand as emotional, physical and intellectual equals with one's parents. Realizing that gene determinism and essentialism are misfounded helps us to understand that it is this dynamic process which creates equal relationships which is not bound to a genetic structure. As Powell put it:

“Humans are united by virtue of the genealogical relations they stand in to one another, not by possessing similar intrinsic or even ecological properties (2012, 445).

5 SOCIALIZING FACTORS

Habermas' determinism and essentialism lie at the heart of his conclusions. That is why it is so important to show that genes do not have the special causal role in development as he describes nor can humans as a species be described in essentialist terms. Habermas' fears for the lost moral autonomy and responsibility, the advent of an unprecedented unequal relationship and his provision for a revisionist stance all stand on shaky ground when his presumptions have been debunked. Nonetheless, some important remarks have to be made to show why his arguments do not hold.

5.1 THE REVISIONIST STANCE

I can look back on my education and upbringing and decide that I do not accept what they have taught me or I can interpret their teachings in a different way. The idea here is that social factors are stored mentally which can in principle be recalled and reinterpreted and that biologically stored genetic information is unchangeable. This argument rests on the inconsequentiality of non-genetic factors in development. It also assumes that one can easily distinguish between genetic causes of traits and environmental causes. According to Patrick Bateson (2000, 11), whether a trait or skill is attributed to environment or genetic causes is often caused by how essential it is perceived to be. For example, parents may not change much about a child's environment to accommodate the development of musical talents, but they will do this if their child shows a slow development in reading. Habermas also assumes that non-genetic factors can have no effect on genetic factors. While

much is unclear about, this there are cases in which the effect of an environmental factor on gene expression persists even when it is removed and can:

“be passed through mitosis constituting a heritable epigenetic change... Mechanisms are now known to exist through which an epigenetic change might give rise to localized change in DNA sequence...converting an epigenetic to a genetic change...This hypothetical chain of events constitutes a potential route through which the environment might directly influence evolution” (for a detailed account of the biological mechanisms see Turner 2009)

I want to reference Bateson and Turner to show that Habermas’ clear distinction between environmental effects and genetic effects on which his revisionist stance stands is problematic. It remains unclear whether an individual can make use of the mechanisms outlined in Turner’s article to affect his own genetic makeup, but it does not matter. Changing one’s gene expression is enough for an individual when they do not have a genetic essentialism conception of themselves.

Habermas may contend that his argument does not pertain to certain traits or characteristics. His point is that education and environment themselves can be reflected upon. The problem with this argument is that we cannot even begin to reason before we are disciplined into a certain kind of thinking. Without this disciplining we would not be able to think and reflect at all. It is through this process that we can think, rationalize and take the revisionist stance toward our past. But the foundation that has been laid for reflection is itself the effect of that which we are trying to revision in Habermas’ situation. In our early years, the brain is shaped in all kinds of ways to accommodate for the outside world. In these formative years things like overstimulation or neglect can lead to developmental changes which may never be reversed, which are ingrained in the biology of a person. No amount of revisionism can change these early engravings. Habermas seems to think that our self-conceptions, worldviews and attitudes are attributes of our mind and thought. But rather these are the foundations for our mind and thought. They are what order our mind and thought. Many factors in the development of an individual which might be attributable to only environmental or psychological causes are irreversible, especially in early childhood (Bateson 2000).

Of course with time and the right exposure our attitudes, worldviews and such can be susceptible to change, which in turn motivates other modes of thought, action and a different mindset. This happens by way of revising what these things mean to a person. A child who has survived an abusive parent may never cure his engraved fears and reactions, which may incidentally come about by an environmental change to gene expression once again laying at odds the possibility of a strict dissection between genetic and environmental causes. But what this child can do is come to accept it as a part of who they are. This revisionist action does

not change anything that has happened but at the same time can change everything for the person. If we accept that genetics are not as deterministic as previously thought, is it then possible to take a revisionist stance toward one's genetic makeup? Lenny Moss' critique puts it sharply when he writes that Habermas' argument depends on the idea that:

“We are composed of genetically programmed traits and dispositions that, unlike the contingencies of upbringing and environmental context are irrevocable. To the extent that we could not possibly have the wherewithal to existentially grasp our contingent inheritance ‘in our freedom’ because we wouldn't have such freedom.” (Moss 2007, 149)

Moss accuses Habermas of “genetic performativism” which differs from genetic determinism in the sense that with the former, the phenotype already exists in some form in the genotype at conception. Genetic determinism does not need to make such a claim. But the real question Moss asks Habermas is where this revisionist freedom comes from in the first place, if we indeed are genetically programmed beings. Why can one curse one's parents for a random genetic makeup that does not coincide with one's life goals but not the random forces that naturally constitute them? Is it not the unwanted genetics that are rebelled against instead of its intendedness?

5.2 SELF-RELATION

Habermas also claims that one's self-relation, one's capacity to view oneself as a moral and free being is endangered when one's genetic makeup is partially the product of another person. One may come to curse one's fate when one finds that one's genes have been manipulated into something one does not want, or that one's accomplishments are in part due to one's altered genetic makeup.

“Parents who genetically enhance their children impinge on their capacity to-be-able-to-be-themselves. They fail to recognize the role of *human nature* [read genetic structure] in their self-identity formation” (Morar 2014, 4).

To genetically enhance a child is to rid them of the capacity of being the sole author of their lives and to truly be themselves.

“Eugenic interventions aiming at enhancements reduce ethical freedom insofar they tie down the person concerned to rejected, but irreversible intentions of third parties, barring him...from being the undivided author of his own life” (Habermas 2003, 63).

One might argue that this argument can have an easy rebuttal by setting restrictions on what types of enhancements can be made. For example, one could say that while parents may choose to enhance a child's talent for a certain skill, they may not do this at the cost of something else. Or that specific things are not allowed to be changed, but that one is only allowed to enhance the epigenetic mechanism which cause certain genes to be expressed or not, allowing a child to pick up any endeavor more quickly than without this enhancement. But Habermas's argument also deals with the *intention* of the programming, not just its results. It is this intention to suit a person to one's needs that alienates from the authorship of one's life. As such it is rather about the authenticity of one's accomplishments rather than the types of accomplishments Habermas argues against here.

Let's grant for a moment that genes in fact do have this determinist power to program a person to become a great violin player. What is the authenticity of the accomplishments of a violin player who somehow, was genetically enhanced for this purpose? To say that this accomplishment is not their own is to say that the violin player had been a passive subject in the development of her skills. She simply had to pick a violin and start stroking it, the rest would be handled by their genes. It is obvious that this cannot be the case. Even if a person could be genetically modified toward a goal, they still would need to put in the work and effort to achieve mastery. But, still the objection may remain: "but they had a talent for it." If we see an especially gifted musician perform a piece that is unplayable to the layman, do we applaud them or condemn their natural giftedness? What difference does it make if one's talents arose from randomness or from an artificial process if the argument is about the authenticity of one's accomplishments? To support this claim one must have a strong gene determinist paradigm which is quite problematic because "genes make proteins, not behavior" (Bateson 2000, 63).

But, even still, a person's ability to-be-one-self is not bound up just by the authenticity of their accomplishments, but also with the knowledge that his "features were manipulated in order to purposefully act on his phenotypic molding" (ibid, 54). This argument cannot be evaded by dismissing it as genetically determinist because it does not bear on empirical facts. It does not claim that one is a complete product of their altered genes. It makes an existential point about a possible effect of knowing that one was genetically altered to suit certain needs. But what Habermas fails to see though, is that this existential reaction can only happen to a person who has genetic determinist intuitions in the first place. If one knows the synthetic mechanisms that would have shaped their phenotype and believe these unilaterally determine this phenotype one may take this objectivating stance towards one's body as Habermas describes. But once again this is not a necessary product of genetic manipulation, but rather of the emphasis that one puts on their genetic makeup as the essence of their being. Once again, one can take a revisionist stance to the *meaning* of their genetic modified self. In

the previous section, extensive attention has been put to doing away with the scientific confusions from which such an understanding may be contrived.

There is also a lack of empirical data for Habermas' position. Parents make various eugenic decisions with IVF and PGD, but clinical research suggests no "detrimental effect on the child's psychological development higher than the range of emotional environments to which children in naturally conceived families can be exposed" (Morar 2014, 15). While these are of course different from genetic enhancement as is conceived possible in the future, they are forms of pre-selection for certain traits which the parents desire.

The relation to oneself is not a rational foundation as Habermas seems to write. It is a contingent process which is formed through the experiences one goes through in their lives. The emphasis on self-relation should be on the relational aspect. Habermas seems to misconstrue identity as a rationally constructed manifest. But he nonetheless has a point. This relation can be disrupted through an invasion of the biological substrate. But instead of viewing this as a danger of genetic modification, we should view this as an opportunity to reconsider the kinds of ways we shape our identity. It is much more interesting to analyze how one may come to reconsider autonomy and authenticity when one believes oneself to be a product of choices without one's consent.

6 LIBERAL EUGENICS

Habermas' arguments lead him to reject genetic engineering as a morally acceptable way of enhancing humans, or designing them for a certain goal. He brings the second person hypothesis forward as an argument for therapeutic uses of genetic intervention. If we assume the embryo as a future human being we should only allow changes which we can surely assume will lead to a life that is unbearable and which no human would subject themselves to. So the only morally admissible genetic interventions are those that do away with destructive diseases or handicaps.

The problem with this argument is that what counts as therapeutic is highly fluid. A handicap is not only restricted to missing body parts but to anything that makes adequate functioning in a society impossible for a person. Illiteracy, for example, is a handicap because of the way our world has been shaped by text. If a majority of people is genetically enhanced, raising the bar for performance and efficiency to a level that is impossible to compete with for normal people, wouldn't that make a "normal" human handicapped, shifting the notion of what is deemed liberal eugenics? Furthermore wouldn't this person feel that their parents could have freed them from this strife if only they had chosen for genetic enhancement? So in a world filled with genetically enhanced humans, those who are *unaltered* may

oppose their genetic makeup. What I'm trying to say is that once we start genetically altering humans they will indeed have an issue with their manipulations, in the sense that it is an identity-giving feature for them. They may affirm it and live full lives or they may reject it and resent their parents. But this is more likely because of the novelty of being genetically altered. It is an identity shaping feature for them because it makes them different. This becomes an issue and they reflect on it and it will lead them to affirm or reject it. Furthermore, while one can argue about the subjectivity of what is deemed normal and what is deemed a handicap, the distinction between treatment and enhancement itself is problematic:

“It is our norms and values that define what counts as disease, not merely biologically based characteristics of persons, and the arbitrariness in these hard cases comes from inconsistently applying our values. Pointing to the line between treatment and enhancement is not, then, pointing to a biologically drawn line but is an indirect way of referring to valuations we make. We cannot point to such a line as the grounds for or basis for drawing moral boundaries since we are only pointing to a value-laden boundary we have constructed” (Daniels 2000, 313).

According to Daniels what counts as a disease, and thus which manipulation is a therapy and which an enhancement, has a normative dimension to it. After all, being gay was once a disease and children with ADHD were once simply unruly. Saying that we simply understand these conditions in a more enlightened way is too simplistic. The hard cases noted in this quote are about two boys who will both fail to grow taller than 160 cm without treatment. Johnny is a boy who suffers from a brain tumor and Billy simply has a genetic disposition to being short just like his parents. Johnny will receive growth hormones as part of a treatment but Billy will not because for him it would count as an enhancement. According to Daniels, this case makes the distinction between treatment and enhancement arbitrary for several reasons.

Johnny and Billy will suffer from equal (social) disadvantages if they turn out short. The underlying cause of their shortness will probably not affect how people will treat them. Second, both are short by chance. Daniels calls it the result of a “biological natural lottery.” Third, Billy’s preference to be taller is just as natural as Johnny’s as in it is not peculiar or extravagant: “It is a response to a social prejudice, heightism” (ibid, 311). So it is not the condition itself that creates a need for treatment or enhancement. It is in the context of a certain social structure of society in which being short is socially disadvantageous.

Daniels goes further in enlarging the arbitrary nature of what qualifies as a dysfunction and can therefore be a candidate for therapy. If we would learn which particular set of Billy’s genes make some receptors less responsive to growth

hormones, we learn “just which losing numbers in the natural lottery” attribute to his lower than average height. And if we learn which genes contribute to the brain tumor in Johnny’s brain we can trace “both Johnny’s and Billy’s shortness to specific genes.” If both have a genetic base for their shortness and both would experience the same disadvantages, Norman Daniels then asks us: “What justifies us in treating the normal but “bad” or disadvantageous genes differently from genes that lead to growth hormone deficiency or to receptor insensitivity to growth hormones? If we can remedy the effect of these genes with growth hormone treatment or other treatments, including genetic tampering, we might think it quite arbitrary to maintain the treatment-enhancement distinction” (ibid, 312).

7 THE CHALLENGE OF GENETIC MANIPULATION

Habermas attempts to constitute human autonomy and the basis for symmetrical relationships on one’s unalteredness at birth. As if this ethical self-understanding of the species, upon which moral autonomy rests, is always there instead of something to be strived for through mankind’s history and the individual’s development (Moss 2007, 149). His arguments stand on dubious ontological and scientific claims. As we have seen, individual autonomy is only in danger if genetic determinism would prove to be true. Current biological research seems to suggest that genes do not have a determinative role in the development of an individual’s life, nor do they determine behavior. Neither is the division between genetic factors and socializing factors easily made. The same goes for the division between therapy and enhancement.

It is not my aim to affirm a liberal viewpoint on genetic manipulation, i.e., that one should decide for oneself what is the right course of action. However, I am interested in the way technology comes to change the very nature of our being. Habermas claims that altering someone genetically may disrupt their self-relation in a negative manner. I want to make a more radical claim. Namely, the existence of the possibility of genetic manipulation alone, is a disruption. This means that even choosing to not alter one’s child may lead to Habermas’ feared resentment to the parents and a disrupted relation to self. “If only they had modified me to be more self-confident.” “If only they would’ve made me taller so I could play basketball with my friends.” With new technology, what used to be an inalterable natural fate now becomes a deliberate choice, whether one chooses to modify or to abstain from it. This is parallel to the question of whether one should be vaccinated or not. The knowledge of the possibility of vaccination alone makes one retroactively appropriate one’s current constitution of current possibilities. Even the notion that it is possible to change one’s supposed most fundamental constitution, albeit in theory, changes the natural status quo. We have already visited Lenny Moss’s position who affirms that one’s stand on science determines

one's stand on what it means to be human. And also Stiegler, who we will discuss more in depth in the next section, characterizes technology as performative (Stiegler 2011, 203).

Furthermore, according to Elizabeth Fenton, Habermas' approach to the problem of genetic manipulation is begging the question. In entering the debate we cannot already presume that the unchangeable biological substrate upon which, according to Habermas, we constitute our self-understanding is in danger when technology is starting to invade it (Fenton 2006, 36). If there is such a thing as human nature it must account for this possibility, meaning that our understanding of human nature is shown as erroneous through technological advancements. If we assume that human nature as we have understood it until now is coming into danger, then this nature is accidental and not a-historical. Slavoj Žižek also accuses Habermas of being philosophically relenting in his critique. Habermas already knows that our predispositions are the result of contingency.⁴ To protect the notions of dignity and autonomy Habermas attempts to curtail science. The paradox seems to be that autonomy can only survive when we prohibit science to enter certain domains, thus limiting our autonomy with regard to science. This solution prevents us from asking the real question:

“how do these new conditions compel us to transform and reinvent the very notions of freedom, autonomy, and ethical responsibility?” (Žižek 2004, 126)

To go further, the possibility of changing our biological substrate is a challenge to our self- understanding. Whether genetic engineering will live up to its promise or not, we are on the precipice of something completely unknown. Technology is threatening to challenge the unchallengeable: our very identity and humanity, as Habermas fears, by opening the possibility of changing what is perceived as the most fundamental element of our being ourselves. But unlike Habermas, I do not have essentialist intuitions and have no intention of protecting the conditions of our *current* self-understanding. Once again, whether this promise or danger comes true, the challenge remains, which is to think what we cannot yet think. We are challenged to articulate and formulate a kind of being which has been brought forward as a possibility through biotechnology.

A new understanding of what it means to be human needs to be articulated to accommodate this challenge. Because of the increasing noticeable invasion of technology in our daily lives it has become possible to understand that technology is not merely a tool. It is a constitutive part of human beings. Only after we have sufficient understanding of the relationship between humans and technology can

⁴ Žižek seems to still hold on to this genetic determinist paradigm as he uses the term ‘genetic contingency.’ But his subsequent arguments are poignant nonetheless.

the question of genetic manipulation be adequately stated. So, I understand the challenge of genetic manipulation as posing anew the question of what it means to be human. Through Bernard Stiegler, I want to make an attempt at such an understanding.

8 TOWARD A NONESSENTIALIST ACCOUNT OF HUMANS

The idea that what it means to be a human being, or at least what makes being a human worthy is somehow located in the genes or in some mental capacity of the brain, is at the heart of Habermas' critique of genetic manipulation. From this point of view the moral dilemma of whether one should genetically alter this essence becomes obvious. Thus, Habermas envisages an instrumental relation between human being and technology. Alternatively, Bernard Stiegler, a French philosopher, positions technology central in the evolution of humans. In the opening of *Technics and Time I* he asserts that technics has been repressed as a subject for philosophical inquiry, it is the unthought of philosophy (Barker 2013, 259). Thus, Stiegler attempts to rethink the relationship between technology and human being coming to understand the human condition as from its origin technical, whose development and evolution is intimately linked with and conditioned by the development of technology. Stiegler's account also entails that the Darwinist account of natural selection by adaptation is incomplete (Moore 2013, 18). The process of human becoming is not one of merely adapting to environmental milieu, but rather of adopting tools to adapt its milieu to its needs and hereby transforming itself, and being transformed by its milieu, not in the least by the technical milieu it lives in. To understand this we must understand his conception of technology, human evolution and human being itself.

8.1 THE HUMAN DEFAULT

Stiegler originally derives his characterization of the human from the Greek myth of Prometheus and Epimetheus, based on Plato's version in the Protagoras and of Hesiod's Theogony, which narrates the tragic conception of the origin of humanity in terms of mortality and technicity. These two immortal titan brothers were spared by the immortal Zeus when he ascended his throne at Olympus after his victory over the titans. Prometheus, whose name means foresight or fore-knowledge (*pro-methein*), was tasked by Zeus with going to Earth, to create all the living, mortal beings and granting them their distinctive qualities. However, his little brother Epimetheus, convinced Prometheus to give him the bag of qualities for the creatures of the Earth, so that he could take the task on himself. But Epimetheus had no ability of foresight (*Epi-methein* means after-thought) and was not as keen as his older brother. So it came to be that Epimetheus granted tigers their sharp claws and teeth, elephants their size, birds their keen eyesight and so on. But when

Epimetheus at the very end arrived at the humans, he discovered there was nothing left to give them. The human species was left bare and naked, without any distinctive qualities in a world full of keenly attuned predators and prey. Prometheus, wise as he was, realized they would have no chance surviving in this world full of strong beasts without any qualities. So he set out to steal some of the fire of Olympus to bestow it on humans. This fire (*pyr*) represents technology.

For Stiegler humans have a *défait d'origine* (lack of origin). Epimetheus' mistake has made us into beings who cannot survive without resorting to prostheses in the form of technics. But this original default is not a lack because the human exists only because of it and through the work of uplifting it. Mankind's lack of origin is at the same moment also a kind of developmental openness. This facet allows humans an accidental vector of development. It is this openness, this original default, which is the source of humanity's power and weakness as shown by Stiegler. This same constitutive openness, which entails openness to being rewritten by technics and adopting technics which allows us to anticipate change and transcend the need for survival of the fittest (Moore 2013, 32). Stiegler asserts that this accidental character means that the human has to constantly reinvent its way of being (Ieven 2011, 2). Subsequently the conditions for the possibility of such a process of development and invention lie exactly in technology as exteriorized memory.

8.2 TECHNOLOGY AS EXTERIORIZED MEMORY

With the French paleoanthropologist André Leroi-Gourhan, Stiegler understands human life as characterized by the externalization of memory in technics (Moore 2013, 22) and as the exteriorization of human experience. A technical artefact's form and composition is the result of the material inscription of individual experience and it operates as memory housed outside the individual, being material memory. This allows, for example, stone tools to operate as vectors of memory, as an object which externally houses memory. It is this aspect of technics, according to Stiegler, which is the precondition of the existence of the human, and of the continuation of acquired knowledge over the generations that typifies the human lifeform. The evolution of technology for Stiegler starts about 2.5 million years ago when the first stone tools were made and started to be used. These tools are engraved with the individual experience of the user through their form (Stiegler 2009, 203) and survive multiple generations, becoming available for the species at large and allowing the emergence and continuation of a vector of improvement. This inscribed experience as form defines the way subsequent generations will use and approach this tool. At the same time, it opens open up new possibilities as adoption and improvement of these tools. Their shape and usage determines how next generations will approach and reproduce them, but they also open the possibility for subsequent generations to sharpen or otherwise refine the stones, or

they may even start using them as spearheads. For Stiegler technical exteriorization starts at this point and continues to increase in both complexity and density, eventually forming a mnemotechnical⁵ layer of retention (Stiegler 2010, 9) which overarches society and without which it cannot function. On the process of exteriorization and the adoption of tools Stiegler says:

“The exteriorization process produces a new form of memory that can no longer be inscribed in Darwinian terminology ... acquired characteristics cannot be inherited ... because the individual animal's memory is erased at the moment of its death ... But technics opens the possibility of transmitting individual experience beyond the individual's life: technics supports a third level of memory ... Inheriting and adopting a tool means inheriting a part of the experience of the one(s) who bequeathed it: it is to adopt an experience, to make it part of one's own past even if one did not live it oneself.” (Stiegler 2011, 206)

This process thus creates a new kind of memory which is exterior to the central nervous system and in fact material, or as Stiegler sometimes refers to it, ‘the organized inorganic.’ In traditional accounts of living beings and their evolution, two types of memory are usually distinguished. First, the so-called epigenetic memory relates to the individual’s neural memory and by extension the whole phenotype. It is acquired on the basis of experiences throughout one’s lifetime and disappears with the death of the individual. It is therefore discontinuous and cannot inform the offspring. Second, the genetic memory, also known as the species or phylogenetic memory, is continuous and transmitted to the offspring via sexual reproduction. The experiences acquired in the individual’s life are not transferable to the genetic memory (Ieven 2011, 4). But Stiegler argues that with technical artifacts, a third type of memory comes into being. Through the inscription of experience in technical artifacts, which survive the individual, this knowledge becomes available to the whole of the species. These technical objects thus “constitute an intergenerational support of memory” (Stiegler 2010, 9). Stiegler calls this the epi-phylogenetic⁶ memory (Stiegler 2009, 206). It is this new exteriorized memory contained in an artefact, which is at first only implicitly mnemonic as it contains traces of usage and experience, that defines human individuation and at the same time opens up possibilities for new kinds of individuation. This third type of memory is the moment of humanity’s departure from the restrictiveness of Darwinian natural selection through adaptation (Moore 2013, 23). Technics then is the condition for the whole of cultures, traditions and

⁵ For Stiegler all technics are also mnemotechnics, meaning techniques which house memories. But it is only with the advent of writing that techniques for explicitly recording memory arrive.

⁶ ‘Epi’ referring to the individual level and ‘phylo’ referring to the species level. The ‘epiphylogenetic’ allows for the individual to work on the species.

the cultivation of the human mind. These important human aspects are only possible through the inheritance of technical artifacts:

“the epigenetic experience of an animal is lost to the species when the animal dies, while in a life proceeding by means other than life [technics], the being’s experience, registered in the tool (in the object) becomes transmissible and cumulative; thus arises the possibility of *heritage*” (Stiegler 2009, 4).

Stiegler identifies the emergence of the human, which he calls “the invention of the human”, as the interactive relationship between the social dimension, social organizations to be precise, the dimension of the human body and the dimension of technologies as technical prostheses, with technology receiving a central role as the condition for the social and the mental. These dimensions are transductively related, meaning they are only constituted within their interactive relationship to each other and do not have an ‘identity’ outside or prior to it. Each dimension has its own logic of development, or as Stiegler calls it, ‘process of individuation.’ The dimension of technology is in a transductive relationship to the social dimension in the sense that it is only in a certain ‘human milieu’ and by humans that technology is developed. The human body, or the ‘psychic apparatus’, is transductively related to the technical dimension because it cannot socialize without artefacts, that is technics and technologies in today’s time. One can only participate in a culture, which is to socialize, by upholding traditions, rituals, etc. Even if these would itself not be technics, or technological, their inheritance itself is only possible through artefacts. Thus, the social dimension is also transductively related to the other dimensions because it cannot perpetuate itself without the existence of artefacts, which are adopted by individuals (Stiegler 2010, 106).

This is Stiegler’s ‘general organology’. The human individual is a process, never finished and ‘essentially accidental’ (to put it paradoxically) that is individuated, is developed into an individual, through the co-individuation with the collective, articulated through a technical milieu consisting of technical artifacts, through their transductive relationship (Stiegler 2009, 7). This process remains in flux, they are meta-stable, meaning they are never absolutely stable in the configurations they form. The technical organs constantly transform and change, forcing the other two organs to co-adapt (Lemmens 2015b, 349). As such, the human individuation process is in constant flux as its mind is constantly inscribed by technical objects and exteriorized in technics, and “constantly rewritten through the internalization of these [same] objects” (Moore 2013, 24). A period where these organizations stabilize in a meta-stable configuration can be referred to as an epoch (Stiegler 2009, 71).

Daniel Ross explains how we can identify three great epochs of memory, which relate pretty transparently with the genetic, epigenetic and epiphylogenetic. The

first epoch is characterized by genetic conservation. It is the epoch of the coming to be of the DNA molecule which leads in to the second epoch, which is the epoch of nervous memory. Animals gain the capacity of retention and alter their behavior through their experience. The third epoch, which is the one we currently reside in, although one might argue not for long, is that of technical memory:

“...the inscription of form in inanimate matter by beings whose cortical evolution is then affected by this capacity and the specular capacity to ‘return’ to these technical objects...[which then] contribute to the formation of a non-biological process of becoming including the formation of socio-ethnic programs, idiomatic difference, technical inventions...what, following Simondon, Stiegler calls processes of psychic, collective and technical individuation.” (Ross 2013, 248)

A substantial shift in any dimension can shake the balance, creating a rupture in a current epoch of individuation. Habermas would comment that the current rupture of genetic manipulation is endangering our self-understanding as autonomous agents and therefore is a danger. With Stiegler, we can understand that technology is at the foundation of any process of individuation and as such any self-understanding and any kind of autonomy. Technology’s constitutive role becomes clear when we consider technical objects which accumulate and start to create a technical milieu. A stone tool becomes a spear, and one spear becomes an array of weaponry. Such a population lives a completely different life and holds completely different values. To show further how technology is not adequately described when seen as instrument I tell a story of two tribes.

8.3 TWO TRIBES

Imagine two tribes living on grounds divided by a large ravine. To get to either side a long journey of several days back and forth is required. The fields of the Tumu tribe are filled with all kinds of fruits, whereas the fields of the Wapti tribe have a rich hunting ground. Both tribes have barely enough to survive on their own grounds. Every month a small group of the Tumus travels to the Wapti side to trade fruit for meat. Because of the dangerous journey neither of the two tribes is certain if they will have enough food for the rest of the month. Both tribes exercise caution with their consumption.

One day, the Tumu travelers decide to build a bridge across the ravine. The monthly journey had become too dangerous and they were looking for alternative methods for trade. The travel time instantly becomes a matter of hours with little danger. To reimburse their efforts the ex-travelers ask a small fee to cross the bridge. People of both tribes can now trade on an individual basis and one does not need to be afraid of being without fruit or meat for a month. Both tribes start to consume

more freely. The infancy rate also lowers. Both of these things raise the demand for both commodities. This in turn puts more strain on the hunters and gatherers, forcing them to find new ways of raising their 'production.' The elevated traffic on the bridge creates a surplus of goods for the bridge owners which creates an elite class and new channels of trade.

This story is an example of how technology drives humanity and in turn forces societies to change. Members of the Tumu tribe use technology to relieve their struggle for survival. But this bridge changes the way both societies relate to each other and themselves fundamentally. It even allows for the creation of a new elite and thereby changes the societal structure. Because of the possibilities it opens up it in fact forces other parts of both tribes to change their modus operandi. This bridge stands at the center of the daily lives of these tribes.

This is where the story becomes interesting. The people of both tribes still can't live contentedly. The traffic on the bridge has increased so much, the bridge owners are forced to set a quorum to ensure the bridge doesn't collapse. Sometimes traffic is completely stopped due to repair work. The people demand a wider and more sturdy bridge. It's impossible to have enough food for everyone because of the quorum. So the bridge owners decide to develop a new kind of bridge that can support more traffic without needing any repair work.

This new technology has changed the behavior of the two tribes by opening a new possibility for trade. But they also seem to be confused. They see the not-actualized bigger bridge as the reason for their lack of resources. But in reality it is their changed behavior caused by the bridge. The new bridge will be useful for a limited time. The increased traffic will grow populations, new classes will rise etc. The strain on the bridge will once again reach a limit.

None of these tribes can be understood by studying their genome or their culture. The Wapti people may have faster reflexes and hand to eye coordination due to their hunting lifestyle. Likewise, the Tumu may be sharper in discerning between different colours and stronger lower body strength due to extended periods of carrying baskets with fruit. None of these differences can be well understood without taking their living environment into account. But more importantly, with the advent of the bridge and the changed environment and culture even taking environment into account is not enough. One needs to realize this bridge which enables a total shift in culture, societal roles and even may lead to intermingling in between the tribes. It may lead to the new elite controlling the supply toward either side. They may demand people from other tribes to pay more. But there may also arise a realization of similarity and brotherhood because of the increased exposure to another. After all, humans are accidental creatures. Due to the need for more consumption the hunters might sharpen their skills and realize

the need for greater coordination and weapons. They are now not only working to feed themselves and their kin, but also to meet higher demands of consumption. The fruit gatherers may need to move further inland. They may develop ways to eat parts of plants which before were non edible. If one would visit these two tribes sometime after the construction of the bridge, they would be at a loss if they wanted to understand these people based on biology and culture alone. The two tribes develop in relation to the development of this bridge and so will the future trajectory of this bridge, or means of travel or any other kind invention, be developed in relation the new configuration between the individual, social and technical dimension.

The complete unraveling of the way of life of these tribes is realized by a new technology. Their new mode of existence is characterized by a changed configuration of the three organs which constitute their process of individuation. The bridge changed the pre-existing equilibrium, but it does not destroy it, it forces the other systems to change toward a new equilibrium. Also, the bridge did not come about randomly. It was a reaction to the existing conditions. But its potential was so great that it shook the previous configuration and forced all organs in a new configuration. While the current generation may devise ways to adopt this new technology, subsequent generations arrive in a completely different technical milieu and develop differently. It may no longer be enough to just wield a spear as a hunter, or carry one basket as a fruit gatherer. The bridge has both created new possibilities and forced the tribes to adapt to the new environment they live in. But this adaptation may also lead to adopting new ways of being.

9 FACING THE CHALLENGE

This organological approach to the human being is completely different from Habermas' approach. Stiegler puts technology at the center of human evolution and individuation. Furthermore, he argues that human self-understanding is mediated, even constituted, by technology, and as such is a historical process which can take on many different forms. To fully understand genetic manipulation from this organology of the human, we have to understand it genealogically instead of ontologically. This means, positioning it in the history of technical development of which it descends. This is a history of capitalism, starting from the Industrial Revolution, as proletarianization made possible by grammatization. According to Stiegler, the Industrial Revolution marked the industrialization of the process of exteriorization. This is problematic because human beings come to be less and less the centre of individuation, leading to the regression of adoption techniques and the rise of an industrially induced state of adaptation. This development starts with the dicretization of the work process of labourers, to the mobilization of marketing for the inducement of profitable consumption behavior and finally the exteriorization

of cognitive capacities itself with digital technologies. It is in this development that we should understand the coming era of genetic manipulation. But before we can understand the problematic nature of these developments we must understand how and why technology is inherently pharmacological.

9.1 PHARMACOLOGY

Technology may be one of the constitutive elements in the human being's coming to be, but for Stiegler it also has a pharmacological nature. A *Pharmakon* is a medicine and poison at the same time. Because of the human's originary default he is forced to employ prostheses in the form of technical artefacts to survive in this world. These *pharmaka* can cure or uplift human deficiencies, but they can also deepen or worsen them (Lemmens 2015b, 351). This ambivalent effect always happens at the same time, meaning technology is medicinal in its toxicity and poisonous in its medicality. Take for example chemotherapy which is a poison mobilized as medicine because of its toxicity. But technology's pharmacological nature means that it is always at the same time poisonous and medicinal.

Technology's pharmacological nature can be characterized as the dynamic by which technology robs us from that which it is an exteriorization of. It can emancipate us from the inherent weakness of our lack of origin, but it can also lead to a domination, which is the adaptation of the social and individual to the technical instead of its adoption. If the transductive relation of the three organ systems creates a co-individuated process of becoming from which the human, as a species and as an individual, comes forth, then one can speak of circuits of individuation. These circuits can be short-circuited in a system which does not take adequate care of the pharmacological nature of technology. The result is the domination of the psychic individual's consciousness by technology. In the case of the internet for example, one can adapt to the endless presentation of entertainment and information, passively clicking away at the next link. Or one can adopt the internet's possibility of interconnectedness and speed to connect themselves with peers all around the world or conduct research with an ease which is unprecedented.

The story of the two tribes shows the pharmacological nature of technology. The bridge which brings prosperity and comfort to the lives of the tribesmen also causes their subservience to ever rising consumption and a need for constant improvement. Habermas would agree with me on this analysis. But the question remains: should the bridge have not been built for this reason? Should the tribesmen's forgetfulness of the origin of their problem be a reason to prevent building the bridge? Even Habermas would have to disagree. After all, the situation in which they were was dire. The bridge creates a much better environment for both tribes. He could assert that the constant improvements being made to the bridge is where we should put the line. But this would precisely

miss the crux of the problem. He would make the same mistake as the tribesmen. Both place the problem on the technological infrastructure. But it is the forgetfulness of the origin of their problems that is key here. Their unbridled consumption habits is the key to the problem of this bridge that has begun to shape the lives of all tribesmen since its inception. It is resolving the forgetfulness that is brought upon by technology so that one can make a choice from reflection instead of fear or the need for increased consumption.

Pieter Lemmens mentions one's topographic orientation, which is enhanced with GPS systems. An unreflecting reliance on GPS combined with its increasing precision and applicability leads to a loss or disorientation of one's former, e.g. memory- or chart-based topographic orientation. In other words, the GPS's effectiveness, which is always embedded in a technical milieu, can lead to the adaptation of the individual's topographic awareness to the system's mapping of location. This would be a negative pharmacology, whereas a positive pharmacology is the individual's adoption of the increased possibility of orientation in the world. In the negative sense GPS holds the possibility to dominate our pre-GPS ways of orientation and in the positive sense it allows for structurally different, and hopefully better, ways of orientation in the world. The pharmacological nature of technology means that the positive possibilities can be the result of the negative possibilities and vice versa. It may be the case that our pre-GPS ways of orientation in the world need to be destroyed by the GPS for its positive effects to come to fruition. This negative and positive pharmacology is also applicable to the story of the two tribes, the negative pharmacological effects are those of the paradoxical effects of having less while more is available. A positive pharmacological effect would be if the hunters and gatherers engage in new kinds of foraging and hunting to meet their new demands. In this way they create new skills, new ways of being in the world, they inscribe themselves in new circuits of individuation.

While technology may have devastating effects on the individual level, it is also pharmacological at the societal level "because it is always creating a disequilibrium in the society in which it is developed and by which it is developed" (Stiegler 2011b, 41). Technology, as the condition for societal formations always carries the dangers within it of destroying the meta-stable configurations and destroying those circuits of transindividuation from which it springs forth. Of course one must keep in mind that in Stiegler there is no real opposition between the individual and the collective. A societal rupture is always also a rupture at the individual level and vice versa. Furthermore, the pharmacological effects of technology always spring forth within a certain practice or system. The technology itself is neutral, it is its implementation that has positive or negative effects. This implementation may have empowering effects and lead to new circuits of individuation and the development of new insights in the case of a positive pharmacology, or it might lead to de-skilling and proletarianization in the case of a negative pharmacology. It is in the

process of the Industrial Revolution that an industrialized process of exteriorization leads to an almost inescapable form of negative pharmacology.

9.2 GRAMMATIZATION

Even though human memory is originally exterior, the stone tool is not *made* to store memory. Mnemotechnologies as such arrive only after a certain time, in the Neolithicum (Stiegler 2005), marking a new stage in the epoch of technical memory. With the arrival of explicit mnemotechnics the process of technical exteriorization becomes a history of grammatization:

“Grammatization is the process through which the flow and continuities which weave our existences are *discretized*: writing, as the discretization of the flow of speech is a *stage* of grammatization” (Stiegler 2010, pg, 32).

More precisely, it “consists in a discretization, a discrimination, an analysis and a decomposition of flux or flows.” It begins with the discretization of the flow of language in an alphabet, constituting a system of writing through which thought itself can be exteriorized. beginning with the Industrial Revolution, grammatization surpasses the sphere of language and discretizes the gestures of work of the labourer, creating the possibility of the machine-tool and the factory. Through the twentieth century it continues into discretizing light and sound frequencies, bringing about the radio and television, which is in turn harnessed to create a culture of consumers. During the end of the twentieth century grammatization discretizes operations of understanding themselves through digital technologies (Stiegler 2013, 49). We will discuss these stages of proletarianization in the next section.

Grammatization is itself pharmacological because when memory is technologically exteriorized, it can become “the object of sociopolitical and biopolitical controls through the economic investments of social organizations, which thereby rearrange psychic organizations” (Stiegler 2010, 33). As such, it can either “proletarianize the psyche” or inscribe “it within a new circuit of transindividuation” (ibid, 43). We will see that just such a proletarianization has taken place since the Industrial Revolution, which has made technology itself industrial, creating a massive adaptive passivity in individuals. Genetic manipulation must be understood in this history of grammatization as proletarianization, and as its next stage, which may mark a new epoch. The next section is dedicated to explaining just this development.

9.3 PROLETARIANIZATION

“A process of proletarianization is the destruction of an associated milieu, that is, of a milieu of existence. It is only possible to exist, for a psychic individual,

by contributing to the individuation of its milieu and by co-individuating with other psychic individuals.” (Stiegler 2013, 130)

Proletarianization, for instance, is the separation of producer and consumer and is characterized by a *loss of knowledge*. What does this mean and what are its consequences? The proletarianized worker’s knowledge passes into the machine. His craftsmanship is grammated in specific movements which can be reproduced by a machine in a factory. Once this knowledge is exteriorized, the labourer becomes dissociated with his work, he then becomes a function of the machine-tool. As such, the center of the labour process is no longer the worker, but the machine (Stiegler 2011, 37). In a past milieu, of associated work, workers “fashion an experience in which they cause their milieu to evolve.” They adopt their tools to their work and are transformed⁷ through their usage, as are the products of their labour. The worker, their labour process, the tools used in this process and their products are all co-individuated through the individual’s participation in this milieu. He is associated with this transformation. “Proletarianization is that which excludes this participation of the producer from the evolution of the conditions of production, and through which he works.” In this milieu it is no longer the individual that is individuated (ibid, 37-8), but the machine. The labourer becomes a serf to the machine and technical milieu in which this machine is located. To speak in concrete terms, the transformation, or individuation, of this machine does not happen in the process of work, but in an office, somewhere far away. The criteria for this transformation are dissociated from the labor process itself and are subject to capital interests of efficiency. The possibility of framing labourers as dehumanized parts of a production process which are to be as efficiently organized as possible is opened by this dissociation. The labourers then are to be configured in a way that they can best serve this machine, and with each “update” they are to be reconfigured. This is what it means to be a dissociated worker. Workers no longer adopt technology to fashion a way of work, they are adapted to the machine. This constitutes a loss of knowledge of know-how and in time leads to a loss of knowledge in general as “labor power becomes a commodity.” “The worker becomes an instrument in the service of a tool-bearing machine” (ibid, 39) To put it slightly differently. The worker does not *need* to know. They only need to know the movements of their bodies, which are also atomized and predicated on the needs of the machine, needed for handling their specific tasks. A proletarianized labourer can work without ever knowing what it is they are producing or even see the fruits of his “labour.”

⁷ Transform is to be read here also as trans-form. As the formation of that which transcends all singularities and individuals. As the formation of those forms of work which transcend all workers, but in which they all participate and transform through their participation.

If industrialization leads to a proletarianization of the producer by reproducing the motor behavior, the gesture of its craft, mnemotechnologically through a process of grammatization of this craft, then hyperindustrialization is “the reproduction of the motor behavior of *consumers*.” If the producer is robbed of his know-how, his *savoir-faire*, as it passes into the machine, the consumer is robbed of his know-how-to-live-well, his *savoir-vivre*. The consumer, just as the producer, is desindividuated, becoming nothing more than “an instance of purchasing power” (Stiegler 2005). The industrial revolution made “immense gains in productivity and new levels of prosperity possible,” but nevertheless encountered a limit, which is the tendency of profit to fall, or the dis-adjustment of production and consumption. Radio and television made it possible to harness the attention of consumers and thereby solicit their libidinal⁸ energy, or rather exploit their desires, through the use of marketing. Harnessing attention may seem innocent, but not when considering every current experience is shaped against the background of all previous experiences and every future projection is in turn formed in relation to these two. What marketing then achieves is a massive synchronization of experience, constituting the formation of a synchronized background experience through which all new experience is shaped. With the analog technologies of radio and television, this relation is still one-sided:

“This industrialised perceptual conditioning, systemically devised by a capitalism striving to overcome its limitations by conquering markets no longer just territorially but ‘spiritually’, operates by systemically exposing minds to manufactured...television commercials, with the goal of significantly contributing...to their stock of memories...[which] form the selection criteria of primary retention⁹, this is a matter of conditioning perception itself.” (Moore 2013 , 253)

Broadcasting technologies entail a new separation of producer and consumer. With written mnemotechnics one cannot be a reader without being able to write also. There is no separation of producer and consumer as the coding and decoding of the literal recording is housed inside the individual¹⁰. Likewise, the receiver of language cannot hear language without being able to speak it. Language is always an exchange and all members transform language itself through their participation within this linguistic milieu; they fashion a process, or circuit of individuation, by which the milieu as all participants are co-individuated. This process is at once

⁸ The libido is a concept derived from Freud which has a very specific and central role in Stiegler’s work, but its original meaning is sufficient for the present work.

⁹ Primary retention should be understood in Husserl’s sense, being experience. Secondary retention then is memory, the background which shapes primary retentions.

¹⁰ This is not to say writing cannot be negatively pharmacological.

individual and collective. One is individuated by the linguistic milieu one is born in, determined by it, but at the same transforms this milieu, creates its future trajectory by being a participant in it. But with broadcasting technologies such an associated milieu is poisoned, leading to a dissociated milieu. The media deprives the individual of participating in the transformation of the linguistic and cultural trajectory, reducing them to a mere consumer of this milieu. With broadcasting technologies one is reduced to a receiver without the ability to participate in the formation of what is broadcasted.

The collective individuation is no longer a function of the participating individuals but of industrialized media and this technology's transformation is guided by capital interests. Industrialized media also invades in this way the formation of culture creating a milieu of dissociation in which individuals are disconnected "from their relation to collective individuation" (Stiegler 2010, 59). Marketing takes away the possibility of defining social practices in association (Stiegler 2013, 74), it rather grammatizes the libidinal energy into 'drives' which are supposed to be satisfied by consumption, but in reality this leads into frustration which is once again through marketing displaced "on a very short-term basis toward the newest object of consumption" (Stiegler 2010, 83).

The grammatization of gestures made the industrialization of production possible. The grammatization of audio and visual memory made possible an industrialization of consumption through grammatizing desire into drives. "The transindividuation process as process of adoption has been short-circuited and replaced by a process of adaptation" This regime of adaptation was first imposed on producers and began to pervade "every aspect of everyday life" in the twentieth century by the proletarianization of the consumer (Stiegler 2013, 102). It would be a matter of adoption if:

"techno-industrial change was co-produced by society itself. But the organization of consumption presupposes, on the contrary that the becoming of social systems must structurally submit to the becoming of the economic system, something enabled by granting the latter full control over technological becoming, that is, over the technical system - this submission being obtained by capturing and harnessing the attention of consumers, by diverting their libidinal energy toward objects of innovation and by controlling their behavior via marketing." (Stiegler 2010, 82)

With the "passage of mnemotechnics into mnemotechnologies" it is memory as forms of knowledge that are industrialized (Stiegler 2005). With the advent of digital devices, all forms of knowledge are grammatized via cognitive and cultural mnemotechnologies (Stiegler 2010, 33). If the past stages of grammatizations entailed a loss of savoir-faire and subsequently savoir-vivre, the stage of cognitive

capitalism entails the loss of theoretical knowledge (ibid, 30). “The proletarians of the nervous system are no less deprived of knowledge than are the proletarians of the muscular system” (ibid, 46). This “proletarianization of the theoretical” occurs by short-circuiting the associated milieus, causing dissociation, of “the highest levels of human activity” (Stiegler 2013, 33). This is the milieu of logos, or of thinking with reason, which is for Stiegler always a dia-logos, or a dia-logical milieu. Just like the linguistic milieu and the milieu of associated work, those who enter this milieu of dia-logos, by dialoguing, co-individuate themselves and “each participant is individuated with the other.” This may happen in the form of competition, for example in sports or strategy games, whereby the individuals individuate themselves against the other. But it may happen in agreement, “in which case it enables the production of a concept.” This interaction is the constitution which Stiegler terms, using Simondon’s terminology, the transindividual (ibid 2013, 18). It is these associated circuits of concept forming, in which individuals share and participate, that are industrialized through cognitive technologies. Ideas are then no longer “conceived and produced by those who merely submit to them” (ibid, 19) but are industrially produced which leads to the adaptation to *doxa* instead of the adoption of technics to produce, that is to co-produce and fashion, a way of ‘thinking for oneself.’

Stiegler’s assessment of the process of grammatization seems quite apocalyptic. Whether the increasing delegation of knowledge and memory to technologies truly “induces an obsolescence of the human, who finds itself more and more at a loss, and interiorly empty” is contestable. But his analyses are striking, and whether his conclusions are justified, these proletarianizing tendencies are relatable and plausible. It is also important to note that Stiegler does not argue that no meaningful living is possible after this triple proletarianization. One can always find ways of adopting technology, even within such a dominant technical milieu, to embed themselves in new circuits of individuation, combating the disindividuating system they find themselves in. The point is that the system itself induces adaptation and proletarianization thereby making adoption a case of struggle against the predominant trajectory of the milieu we find ourselves in. Thus one must rebel against it, instead of allow themselves to be co-individuated with and by the milieu they find themselves, or the collective which they have been disconnected from.

These three stages of grammatization have induced a generalized proletarianization that leads to “generalized irresponsibility” and a continued dissociation leading to the continued disconnection of “the psychic individual from their relation to collective individuation” (Stiegler 2010, 59). Each stage of grammatization has resulted in a further dissociation. Once a milieu is discretized into its constituent parts which can be reproduced in technologies, like the gestures of labourers in mechanical movements or the thought processes of experts in protocols increasingly digitalized, they become more and more the objects of control, of

quality control, of efficiency evaluations. Genetic manipulation must be understood as a new stage of grammatization, as the grammatization of genetic memory with the danger of a new proletarianization through the industrialization of the genetic. We must first develop an organological understanding of genetic manipulation before we can assess its pharmacological danger.

10 THE GRAMMATIZATION OF LIFE

The human is thus co-individuated in a process of interaction between the three organ systems and *with* these systems, just as all three systems are co-individuated *with* each other. Stiegler's introduction of epochs in these configurations is what makes this analysis most striking. When we view the human being in an essentialist viewpoint, major shifts in the status quo endanger its existence. But when it is co-constituted as a process with other forces, it has the ability to rise from the disruption of a certain circuit of individuation by adopting the rupturing technology. The promise of genetic manipulation is such a disruptive force that it breaks down old certainties and forces us to look around and rethink our relation to oneself, others and the world. More precisely, it is the current epoch, or the current stage in the same epoch, of individuation that is endangered by genetic engineering. Hitherto, genes could only indirectly be influenced by technology and social structures. These were mediated by processes of discipline and adoption of tools. But with the coming of genetic manipulation, the technological organ is able to directly operate on genes. Technological operations infect biology and the nature of these operations are necessarily defined through political and social considerations. While one might have been able to uphold the belief that the biological body had at least some degree of independence from the technological and social dimensions, this belief becomes completely untenable in the face of genetic manipulation. As such, the body, more specifically one's genes, become a candidate for ethical and political considerations. Through the knowledge of genes and a certain understanding of how they are supposed to work, technology has opened a new possibility, which under the logic of capitalism and unbounded acceleration must be exploited, that interferes with how we understand ourselves.

One must ask the question of what it means to be human when this shift happens. Habermas does not think this question. He rather seeks to preserve an epoch of human self-understanding. In defending this current epoch, or maybe a past epoch already, he must reinterpret human self-understanding with a genetic foundation. In doing this he is effectively trying to stop history in its tracks. He surely understands that the current constellation of human understanding is a historically developed paradigm. But because the continuation of science, or rather technology, is destroying the foundations of this paradigm he must resort to an ethical bondage of science and technology. He attempts to close humanity's developmental

openness in favor of the current self-understanding. Paradoxically this is the destruction of autonomy. It is to stop autonomous thought and development in its tracks and substitute it with dogma (Žižek 2004, 126).

10.1 EXTERIORIZATION BECOME INTERIORIZATION

The process of exteriorization has come to a full circle and is starting to interiorize. With genetic manipulation the process is reversed and the relationship between epigenetic, phylogenetic and epiphylogenetic memory becomes closer. Technology, through surgery, is able to directly impose on the genetic. Before this it was only very indirectly (mediated by still rather slow selection processes) able to do so through the mediation of technics. Of course genetic surgery is only possible through the mediation of a whole scala of technologies, but nonetheless, one is directly working on the genetic memory through genetic manipulation. At the same time, it is also the abandonment of prostheses. Genetic surgery does not create prostheses, because it does not need to. We are at the precipice of the reversal of an epoch of technical exteriorization. With genetic engineering and other biotechnologies the age-old process of technical exteriorization that spawned human being is enabling a technical interiorization of exteriorly produced knowledge products, being knowledge of genetic structures and mechanisms, in an industrial context (Stiegler 2016). Once such a practice becomes profitable we will see the arrival of the biogenetic-industry which will mass fund the development of new marketable genetic manipulations sold as enhancements.¹¹

While internalization has always been a vital part of the human individuation process, genetic manipulation is nothing less than the promise of “internalization itself...being prostheticized, industrialized and economized according to industrial conditions” (Stiegler 2013, 116). It is also at the same time the control of inheritance, or the automation of selection in programmes (ibid, 129). Following the three stage of proletarianization discussed earlier, this amounts to a “massive proletarianization of interiorization” (ibid, 131). This proletarianization is a fourth stage of grammatization since the Industrial Revolution. It entails a further dissociation and alienation of individuals. But what exactly is being proletarianized at this stage? We as individuals are participants in a genetic milieu which

¹¹ I share Habermas’ vision that the free market is orientated toward profit which will seek to capitalize on whimsical consumer choice (Habermas, 2003, pg. 48). Depending on the strength of such a coming industry, they will push the genetic determinist narrative which is problematic for obvious reasons. But the need for a responsible political regime (Stiegler, 2016) to counteract such a danger is not only a question of genetic engineering. It is a question of transhumanism, technological innovation as new forms of economic exploitation and capitalism as the dominant force in society as a whole.

individuates us but whose transformation we collectively and individually create through the life we live and the choices we make.

We are determined by and produce the genetic milieu at the same time. If genetic manipulation ever becomes a standard, it will inevitably, i.e., when capitalism remains our primary socio-economic condition, be accompanied by capital interests. The existence of companies whose objective is decoding genetic knowledge and laying patents on this knowledge, thus commodifying it, (Suarez-Villa 2001), medical standards for discussing genetic modifications (Baltimore et.al. 2015) and ethical considerations such as Habermas' contribute to the alienation of participants in their genetic milieu. Genetic manipulation as a societal standard accomplishes nothing short of a genetic proletarianization creating a society of gene consumers. Furthermore, such an industrialized practice is only possible by a total grammatization of the processes of the human body, by a complete analysis of how the genetic informs the epigenetic and vice versa. If we look at the history of grammatization, such a development entails a dissociated genetic milieu of an unprecedented level. It is the dissociation of one's own body and inherited genetic memory, the dissociation of generations. Genetic manipulation's danger is then not, as Habermas suggests, the destruction of an essential biological given which makes us human and makes possible those things we find important. It is the continuation of a process of grammatization and proletarianization harnessed for capital interests leading to a hollowing-out of the individual which is reduced to a consumer, meant to consume blindly. It is yet another domain for economic exploitation to investigate and capitalize upon.

The standardization of inheritance disrupts the associated milieu of intergenerational transmission, with all the dangers described. Likewise it also possesses the power to disrupt the processes of interiorization. The criteria of selection, which we do not choose freely but do constitute in association, become industrial standards. This may seem superfluous after criticizing Habermas for his genetic determinism. After all, if genes do not have the magical power we believe them to have, why does this matter? The issues do not rise from the manipulation of the genetic per se. They arise from the dissociation from the milieu of genetic transformation. Inheritance then becomes adapted to the logic of technology, instead of technology being adopted to enhance intergenerational transmission of *savoir-faire*, *savoir-vivre* and knowledge. This is yet another level at which the opposition of producer and consumer is created. The production of new genetic generations becomes another case of rational engineering instead of procreation.

11 WHAT THEN OF HABERMAS

At the heart of Habermas' thought is his idea of a communicatively structured form of moral being. This current constitution comes under threat through genetic manipulation. While it is clear how his objections differ from the sanctity argument, something which he wants to avoid, I wonder how it differs from guaranteeing conditions of a certain self-understanding. He ties the condition for a moral self-understanding to a genetic unalteredness. His points differs from the sanctity argument, but nonetheless postulate a fundamental need for an ethical self-understanding which is only possible by being unaltered and is needed for another kind of fundamental need, that is to view ourselves as the authors of our own lives and recognize others as equals. He does not sanctify anything, but in making these things fundamental he alludes to their untouchability and that any kind of worthy life and society needs these as pillars. The language Habermas uses differs from the sanctity argument, but its structure remains predominantly the same. A person's self-understanding is described as ethical and autonomous only if their biology is unaltered, and this kind of understanding becomes a necessary condition for a worthy life.

What I have attempted to do is make explicit the assumptions of his thinking and also why they do not hold. I want to offer a possible solution for the predicament of our self-understanding through Stiegler. The human in Stiegler does not have a biological essence. Technology is a constitutive part of the process of human individuation, which means that our self-understanding is itself preconditioned by technology and the technical milieu. The human being is a creature who can "create a future for itself through the inheritance and *adoption*" of technics and has no "essential basis in biology" (Moore 2013, 27). For Stiegler, humans are organological beings constituted by the interplay of technological organizations, social organizations and the psychic apparatus. Nonetheless, Stiegler is not one-sidedly positive about genetic manipulation. But his critique is systemic in nature, meaning that the ability to genetically enhance humans is not problematic in itself. It has the power to be problematic in a specific system, or in terms of Pieter Lemmens, in a certain organological configuration.

One might think that Stiegler's analysis is in line with Habermas' ethical considerations. But Stiegler's analysis of the danger of genetic manipulation is in fact more radical than Habermas'. Its dangers cannot simply be averted by picking and choosing the kind of treatments we might deem therapeutic. First of all there is no clear line between what is an enhancement and what is a therapy, and Stiegler's intertwining of technology with the process of human development, individual as well as societal, makes this problem even clearer. Genetic manipulation's real danger is the grammatization and industrialization of processes of interiorization

and inheritance. Like the three stages of proletarianization, genetic manipulation, as an industry and without the proper care for its pharmacological nature, entails another form of dissociated milieu. When selection criteria are grammatized and made as efficient as possible, inheritance is no longer a milieu of association by “sexual difference” (Stiegler 2013, 129) nor are selection criteria of individual interiorization developed through a process of individuation and adopted. We are rather *adapted* through technology to the appropriate selection criteria and those genetic memories are inherited which are deemed rational to inherit.

While Stiegler’s induced passive adaptation terminology is clearly analogous to Habermas’ fear of the loss of autonomy, there is a difference. Habermas seems to take for granted that autonomy is acquired, through a process of education and upbringing. The worth of autonomy is not having it, but in the process of attaining it. He merely wants to preserve the conditions in which he believes autonomy exists. Stiegler recognizes and analyzes this process of the creation of autonomy, which is itself thoroughly technicized as something that must be acquired. By laying out his proposed solution to genetic manipulation Habermas’ himself is inducing adaptation. These ethical analyses “merely enable us to dispense with thinking what is being called into question” (Stiegler 2013, 127). Habermas describes genetic manipulation in the beginning of his work as a “categorically new possibility of intervening in the human genome as an increase in freedom that requires normative regulation.” The alternative is viewing it as a “self-empowerment for transformations that depend simply on our preference and do not require any self-limitation” (Habermas 2003, 12). The irony is that normative regulation by its nature removes the need for self-limitation. And in light of Stiegler’s analyses, normative regulation does no less induce dissociated milieu than market mechanisms. Both eliminate the power to engage in a co-individuation, in the case of genetic manipulation, between criteria of interiorization and inheritance. Moreover, while such abstract ethical analyses are important, it is naïve to believe the criteria of selection rests on ethics. The development of genetic manipulation and their marketability are subject to criteria of profitability. Whereas Habermas’ work entails a closure of the discussion on genetic manipulation, Stiegler’s work opens new ways of understanding, ourselves as well as technology and genetic manipulation.

One might return to Habermas’ distinction between the grown and the made, stating that in fact they are analogous to Stiegler’s distinction between associated milieu and dissociated milieu. In this line of reasoning, the circuits of transindividuation are grown in an associated milieu, in a dissociated milieu, they are made, which leads to disindividuation because the individuals in this milieu cannot participate in its transformation and are reduced to serfs. The objectivating stance and performative stance also seem find their place in this analogy. But Habermas remains in the realm of ethics in this distinction, while Stiegler enlarges the scope

of his analysis. He is able to do so because he has a consistent theory of technology and human becoming, whereas Habermas does not employ a general theory of technology as a constitutive element in human evolution and individuation in his analysis of the dangers of genetic manipulation. He remains in an instrumental paradigm. Moreover, the criteria of the development of dissociated milieu, like that of the factory, are also grown. But they are just not grown by the participants of the milieu they affect. What we have seen is an increasing displacement of the criteria of transformation of milieu from the participants in a milieu to engineers, marketing, digital technologies and soon genetic standards. The inhabitants of this milieu thus lose any kind of power over this milieu. They lose their autonomy in the strict sense of the meaning of the word: auto-nomos. They are not able to create their own laws.

But these fundamental disruptions do not unequivocally destroy the capacities for adoption and transindividuation. They open the possibility of a new “age of new forms of inheritance”(Stiegler 2011, 222) and interiorization. What is needed is the development of a pharmacological approach to the advent of a society of genetically manipulated humans. A society which is made up of individuals whose genetic memory is controlled through industrial genetic manipulation. How would an associated milieu, which can produce ethically autonomous and symmetrical relations in Habermas’ terms, be created in such a society? Attempting to contain genetic manipulation to a problematic therapeutic implementation is no solution.

The difference between Stiegler and Habermas can ironically be made clear by the title of one of Stiegler’s works: “What Makes Life Worth Living.” It would seem strange for an author like Stiegler to choose such a normative title. But this title receives a whole different meaning when the emphasis is laid on “Makes” instead of on “Worth”, as Habermas’ analysis seems to focus on. Stiegler’s work is descriptive in the sense that it analyses the processes by which one is instilled with the feeling that life indeed is worth living. Of course, even Stiegler derives normative claims from his analysis. But these are claims which open the discussion on what shape an associated milieu should take. Habermas’ analysis on the other hand presents them on a silver platter, which is not a problem or a critique on his well-thought framework. Rather, they are in a sense too early.

We must anew pose the question of the human, as I have done through Stiegler in this work and we must ask the question of what we want to select. And who are those that select? What are their criteria (ibid, 223). We must enter in a dialogue with the coming of this age of genetic manipulation. Leaving the criteria of selection to experts and market mechanisms leads to adaptation, and once again to a further proletarianization. Once selection criteria of interiorization and inheritance become manipulable, we, as individuals and as a society, must also take responsibility for them. Habermas is correct in assessing that genetics come into

the realm of ethics when they are manipulable. But asking “What we should select,” is not enough. One must situate the question within the economic dimension of technological development and also ask who the selectors are and what their criteria are, as Stiegler does. Then one must ask how to develop, or maybe rather sustain, a milieu of associative selection criteria. It is in such a milieu, which is to be preserved as it is never a given, that one can adequately ask and develop a framework of which manipulations are ethically warranted. It is only when these questions are addressed that Habermas’ analysis can serve a purpose.

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