

# Moral Bioenhancement Through Memory-editing: A Risk for Identity and Authenticity?

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**Abstract** Moral bioenhancement is the attempt to improve human behavioral dispositions, especially in relation to the great ethical challenges of our age. To this end, scientists have hypothesised new molecules or even permanent changes in the genetic makeup to achieve such moral bioenhancement. The philosophical debate has focused on the permissibility and desirability of that enhancement and the possibility of making it mandatory, given the positive result that would follow. However, there might be another way to enhance the overall moral behavior of us humans, namely that of targeting people with lower propensity to trust and altruism. Based on the theory of attachment, people who have a pattern of insecure attachment are less inclined to prosocial behavior. We know that these people are influenced by negative childhood memories: this negative emotional component may be erased or reduced by the administration of propranolol when the bad memory is reactivated, thereby improving prosocial skills. It could be objected that memory-editing might be a threat for the person's identity and authenticity. However, if the notion of rigid identity is replaced by that of extended identity, this objection loses validity. If identity is understood as something that changes over time, moral bioenhancement through memory-editing seems indeed legitimate and even desirable.

**Keywords** Attachment theory · Internal working model · Propranolol · Reconsolidation · Rigid identity · Extended identity

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## 1 Introduction: Moral Bioenhancement and Memory-editing

Persson and Savulescu (2012) have stated that humans are ethically unfit to face the challenges of the present age, which shows the need for moral enhancement. Their argument rests on the fact that humankind is today facing two kind of threats “generated by the existence of modern scientific technology: the threats of weapons of mass destruction, especially in the hands of terrorist groups, and of climate change and environmental degradation” (Persson and Savulescu 2012:1). According to the authors, humans are not morally equipped to face such global problems within a democratic system, especially when it comes to environmental problems. In fact, most citizens seem unwilling to change their lifestyle for the benefit of others—those living in less developed countries, future generations, and non-human animals. Secondly, they point out that morality has biological roots related to evolutionary needs: cooperation in small groups has in fact proved to be fruitful. Therefore, in addition to being affected by social and cultural elements, moral dispositions such as altruism or the sense of justice are based in our biological makeup. Finally, Persson and Savulescu state that over time moral doctrines have been internalized and people have been naturally respecting them more and more. However, they note that such an improvement “has been modest in comparison to the formidable improvement as regards scientific and technological knowledge”. In short, there is a gap between what we *actually* do and what we *could* do morally, even though we are more ethically inclined than our ancestors.

In the light of the above, Persson and Savulescu envision the chance of moral enhancement by means of the latest biotechnological devices. In particular:

It is the motivational internalization of moral doctrines that we think could be sped up by means which the scientific exploration of the genetic and neurobiological bases of our behaviour might put into our hands. We call moral enhancement by such means *moral bioenhancement*; possible examples of moral bioenhancement would be drug treatment and genetic engineering (Persson and Savulescu 2012: 107).

They also clarify that the core moral dispositions are “altruism and a sense of justice as it primarily manifest itself in tit-for-tat.” By defining them as moral dispositions, the authors assume that “by themselves, they *always* issue in a morally correct treatment of the individuals to whom they are directed” (Persson and Savulescu 2012: 108). Therefore, in the present paper I will assume that:

(Def1) moral bioenhancement is an intervention on the nervous system or the precursor genes of the nervous system aimed at making the individual’s phenotype and/or behavioral profile more altruistic (meaning altruism as a willingness to consider the interests of others as equal to one’s own) and more oriented to justice (understood as the equal treatment of similar cases), compared to before the treatment. This means that decreasing antimoral emotions/dispositions is also part of moral bioenhancement.

Whether moral bioenhancement is morally justified, permissible and desirable—or whether it should even be compulsory—is an open question (Specker et al. 2014). There are two main positions on the matter: (1) (paternalistic) views in which moral bioenhancement can be imposed unbeknownst to the individual or against her will, for the greater good; (2) (liberal) views in which moral bioenhancement is freely chosen. A single person’s moral bioenhancement wouldn’t be enough, of course, to better face the global problems (weapons of mass destruction and environmental catastrophe) we have to deal with. It is therefore necessary that many people—most if not all—be morally enhanced. Therefore, there can be two possible scenarios, related to the two views on the issue: (2A) single people are persuaded of the need for moral bioenhancement and willingly choose to do it; or (2B) a liberal-democratic society decides by majority vote that some or most people have to undergo moral bioenhancement. Such scenarios have been envisioned and analysed by a number of philosophers. In particular, it has been claimed that all interventions of moral enhancement ultimately “undermine our freedom by reducing our options to act immorally”, as they fail to address the intellectual aspects of moral decisions (Verkiel 2016; cf.; Harris 2011, 2016; Sparrow 2014). But such an argument was at least partially rebutted (Douglas 2014a).

In the present paper I wish to explore the possibility of using recent techniques of pharmacological memory-editing as a means of moral bioenhancement, by affecting memories that have produced patterns of insecure attachment as per the theory proposed by John Bowlby. Insecure attachment, which is a rather widespread condition, often leads to personality traits that can result in immoral behaviour. Changing the key negative memories could thus improve the negative internal mental models of individuals with insecure attachment, inducing more moral behaviours in accordance to (Def1). The opposite approach is becoming more popular at present. In fact, a recent study has shown that the activation of mental representations of good attachment figures can reduce stress and boost coping (Bryant and Foord 2016). This study has experimentally proved that attachment activation can reduce consolidation of emotional and intrusive memories.

I also want to address one of the strongest objections to interventions of pharmacological memory-dampening or -erasing: that related to the authenticity and identity of the subject, which would be badly affected by memory interventions. The idea that identity should be preserved seems to partly converge with the view that moral bioenhancement would threaten freedom and agency (Bublitz and Merkel 2009). Therefore, considering the validity of this objection can be a useful contribution to the ongoing debate on the legitimacy of moral bioenhancement.

## 2 Memory-Editing as a Means of Moral Bioenhancement

### 2.1 Treatment of Single Individuals

Humans have always tried to preserve their memory, as the general intuition is that memories are what make up one’s individuality and unique personal history. At the same time, though, humans have always wished to delete negative memories—those producing pain, or regret. The latter, though, has proven an impossible task to achieve individually, even with the help of specific exercises (Wegner et al. 1987). Only recently, thanks to progress in the knowledge of the biological bases of memory, have scientists hinted at the possibility of memory-editing and, eventually, memory-erasing. In this respect, I am here assuming that:

(Def2) memory-editing is a psychological (modification of the associative processes related to memories) or neurobiological (pharmacological and/or optogenetic) intervention in order to relieve or change the subjective negative valence of autobiographical memories or completely remove the memory trace of an autobiographical event.

However, *prima facie*, mitigating or erasing one or more strongly negative memories does not seem to be a means for moral enhancement. A situation in which such an intervention may produce moral enhancement is the case where an individual has suffered a serious violation of their integrity, such as an accident, a physical aggression, and a moral injustice. In that case, the individual may lose trust in other people or may want to get revenge, thus behaving in a selfish and anti-social way. Such behavior is not the result of a deliberate choice, but the effect of the trauma the individual cannot get away from. So, an intervention to mitigate or remove the negative memory, in addition to relief and increased well-being, could also produce a moral strengthening according to (Def1). In such a situation, the individual could autonomously choose to undergo memory-editing to achieve relief on a personal level and moral bettering on a social level: this would be the liberal scenario (2), where moral bioenhancement is freely chosen. However, if the traumatised individual committed a crime because of the negative experience that haunts her, the State could be authorized to impose a “health” treatment aimed at a rehabilitation of the subject (as argued for example by Douglas 2014b). In this case, the paternalistic scenario (1) might be more easily justified, given that the right to bodily integrity—at play when intervening on memories—seems no more important than that to freedom or gathering, which is denied by imprisonment. We are usually willing to accept that one who commits serious crimes should be imprisoned against one’s will for some time; likewise, we might accept that one should be treated against one will so as to contrast one’s propensity to anti-social behaviour.

## 2.2 Objections to the Treatment of Single Individuals

However, the situation is more complex than that. In fact, the liberal scenario, in which the subject agrees to the manipulation of his own memory, involves the so-called duty to remember and the issue of a “big change” in one’s unique identity. The paternalistic scenario, on the other hand, involves the right to mental integrity; also, it seems difficult to justify the right of the state to impose treatments for moral enhancement to traumatized individuals, if they do not commit serious crimes. So let’s have a look at the two cases separately.

As for the liberal hypothesis, some authors have argued that there is a “duty to remember” to witness specific or exceptional events, especially if the individual is the only one able to report those events (Liao and Sandberg 2008). Currently, in the absence of memory manipulation techniques, one is not liable for forgetting something: it seems unjustified to blame someone for a “natural” and involuntary fact. Instead, one is legally responsible when failing to do something one is obliged to do. The choice

to self-impose oblivion could fall in this latter category. Obviously, not all traumatic or painful events are unique or exceptional, so even assuming that there is a duty to remember, that duty does not hold in all situations, but varies case by case.

Furthermore, one could argue that memory manipulation would inevitably produce a “big change” in the subject’s identity, which is related to veridicity: if you change your memory, you can even change what you believe is true of the world and of yourself (Lavazza 2015, 2016). If memory is a form of epistemic evidence, then editing it would entail the danger of living in a false world, where part of one’s identity is threatened by the potential removal of the reasons for some of one’s choices (although in this case those would be mainly morally dangerous ones). This goes hand in hand with the issue of self-consciousness. If one attenuated the motivational value or removed the declarative memory of facts and events, one would no longer know the reasons for one’s habits or tendencies, and moral enhancement thus obtained would not really be a conscious and deliberate choice.

In general, memory-editing is aimed at improving personal well-being, which is related to the possibility of pursuing what one considers worthy and appropriate. Liao and Sandberg (2008), though, have noted the potential contrast between some values (truthfulness, self-knowledge), and individual well-being (such as pleasure or avoidance of pain). And one might think that the first are worth more than the second. But there are cases where the pain is unbearable (because of organic processes due to a malfunction of the mnemonic system and the regulation of emotions) to the point that those values are not even available. In other words, if an individual removes a fraction of memory, she will live in a partly false world, losing a portion of her narrative identity (a key episode of her life), and being unable to deal with the evil she has gone through. However, if she does not “recover”, she will be unable to do so anyway, paralyzed by pain and discomfort. Also, it can be maintained that memory-editing triggers a specific change, corresponding to the moral enhancement. It could be indeed the result of a medical intervention, but consistent with the subject’s second order wishes, as she may consent to the procedure to that end, appreciating behaviors that she will be enabled to have thanks to this intervention.

Some of the considerations I have just made also hold for the paternalistic scenario. In fact, one might argue that memory-editing exceeds the concept of bodily integrity (which is at play, for instance, when coercively lowering a pedophile’s testosterone to affect his sex drive (Bublitz and Merkel 2014)). Memory-editing affects mental integrity. And changing one’s mental integrity involves a strong impact on the subject’s agency, understood in a double sense: being considered a person worthy of respect and

being the master of one's own actions. Violations of this two properties can also be inflicted by imprisonment or by medical treatments such as forced administration of testosterone-lowering drugs. However, acting on cognitive skills (of which memory is perhaps the most important) entails a greater violation of agency understood as above. In this case, the subject's "moral liability" might not be enough to justify coercive treatments. In particular, if a compulsory treatment can be justified by the end of rehabilitation, this may not be a consistent goal if acting on mental processes. It can indeed be argued that it is precisely the person who committed the crime that we want to "rehabilitate", not another, mentally modified, one. Society usually wishes to improve *a negative aspect* of the person who committed the crime, not change their whole personality. As a consequence, some compulsory medical treatments might not be admissible, despite the moral enhancement they achieve, because of their effects on identity, veridicity and self-consciousness.

### 2.3 Memory-editing on a Big Scale

In the light of the above, memory editing as a means of moral enhancement appears questionable when applied to single individuals. Moreover, it would be ineffective in facing the global problems (environmental catastrophes and mass destruction weapons) that allegedly justify such measures. In this sense, memory editing techniques—both available and still being studied—could not be applied to a large scale on people who have some traumatic memories like those discussed above. Instead, in an amended liberal scenario (as we shall see) it is possible to envision applying memory-editing to a wide but specific group of people, namely those with dysfunctional attachment and therefore (often) characterised by low self-control, aggressiveness, dependency anxiety, social maladjustment, affectionless psychopathy, and delinquency (Bowlby 1940). People who have dysfunctional attachment find it difficult to respond to environmental challenges and stressors. In short, they are the most likely to lack the capacity and resources to consistently make the choices necessary to address the dangers due to climate change and the proliferation of weapons of mass destruction (Persson and Savulescu 2012).

Based on the paradigm of attachment originally developed by John Bowlby, I will argue that intervening on the memories of key moments related to attachment can positively affect the internal mental models of those with a dysfunctional attachment so as to enhance them morally. As said, advocates of moral bioenhancement seem to think that the moral capacity of individuals should be improved, in order to stay ahead of technology or planetary needs. In fact, at least those who express the risk of a global disaster and are calling for enhancement seem sufficiently equipped

to deal with the risk of catastrophe. Significantly improving the moral inclinations of a large group of people who are below average could therefore be an appropriate form of moral bioenhancement. Objections to such moral enhancement are mainly related to issues of identity and authenticity of the subject, which I shall address later.

## 3 Attachment and Behavioural Profiles

### 3.1 An Overview of Bowlby's Theory

The theory of attachment was developed by John Bowlby (1969, 1973, 1980) when he (temporarily) moved away from behavioral and psychoanalytic theories, mainly focusing on an evolutionary point of view, with the help of ethological and cybernetic studies.

(Def3) Attachment is "a biological instinct in which proximity to an attachment figure is sought when the child senses or perceives threat or discomfort. Attachment behaviour anticipates a response by the attachment figure which will remove threat or discomfort" (Bowlby 1960).

In a nutshell, infants are totally helpless and unable to survive in the natural environment, so evolutionary adaptation has led to the emergence of a specific genetic program that makes sure that children immediately form an attachment with their mothers to ensure survival. Mothers are also genetically programmed to bind with their children, feeling the natural need to keep them close. The threats of separation between mother and child trigger instinctive attachment behaviors and feelings of insecurity and fear. Attachment can be understood as an inner behavioural system, i.e. the way she manages her emotions, or as an external behaviour expressing those emotions. Bowlby's original theory suggested that newborns always get attached to a female figure—typically the biological mother—and never a male one. However, this view—called *monotropy*—seems today partially disproved.

Caregiving is what creates the relationship of mutual attachment: the child cries, eats, is pampered, while the mother responds to his needs and receives smiles and physical contact. The child must find a homeostatic balance in the attachment according to the (more or less hostile) environmental conditions and the (more or less reassuring) signals coming from the mother. In general, for Bowlby this bond is so crucial that if it is doesn't take place or breaks in the first few years of life, the child (and later the adult) will suffer serious negative consequences. In this sense, the decisive period, within which an adequate form of attachment should develop, are the first 2 years of life.

For Bowlby the bond develops over four phases. The first phase, in the first 2 months of life, is characterized by purely instinctive closeness and signaling to anyone who ensures nourishment and protection. The second phase, from 3 to 6 months, is characterized by direct communication to the mother. In the third stage, from 6 months to 2 years, the child wants to maintain proximity to the caregiver; it is the beginning of exploratory behavior, as well as separation anxiety. In the fourth phase, from 2 years old onwards, there is a relationship based on the set-goal, with the pursuit of goals and objectives set by environmental feedback. The relationship becomes reciprocal with the rise of intentional and planned behavior, which adapts to the responses of the mother. Finally, after 3–4 years, attachment theory is replaced by a general theory of emotional bonds.

Bowlby's first studies on children under 4 who had spent in the sanatorium a period of 5–24 months (without a replacement for maternal care) gave the expected results. The children (aged from 7 to 13) were more violent than average, showed less spirit of initiative, were more excitable but less competitive than those who had had a childhood in contact with the mother. Maternal deprivation, according to Bowlby, can even produce "an affective psychopathy": a psychiatric condition that makes people insensitive to others and unable to build personal relationships. Bowlby also discovered an increased incidence of crime and antisocial behavior among those who had suffered from maternal separation, deprivation or loss.

Bowlby's studies have found important developments in the work of other scholars. In particular, Mary Ainsworth has investigated the indicators by which to grasp what kind of relationship a child has developed with the mother. Different types of attachment can be witnessed in an experimental setting called *Strange Situation* (Ainsworth et al. 1978). The situation, characterized by mild stress, with short periods of exploration, separation from the mother and subsequent reunion with her, allows one to evaluate the behavior and the expression of emotions in children aged between 1 year and 18 months. It is not relevant here to describe the procedures in detail. In short, the patterns of relationship identified were the following.

### 3.1.1 Secure Attachment

It can be considered the most adaptive attachment style, thanks to a caregiver able to meet the child's needs in an appropriate and responsive manner. The mother who is sensitive to the child's distress signals allows him to grow up safely, to explore the environment and learn from experience positively.

### 3.1.2 Anxious-ambivalent Attachment

A mother with unpredictable responses, affectionate when she wants but unwilling to give affection on the child's demand, causes uncertainty, anxiety and poor ability to explore the environment. The child thus has an ambivalent attitude towards the same caregiver, oscillating between dependence and aggressiveness.

### 3.1.3 Anxious-avoidant Attachment

It is due to a caregiver who is insensitive to the child's signals and often rejects physical contact with the child. This creates distrust in the mother, leading the child to a so-called avoidant response, characterized by detachment and avoidance. The exploratory behavior is reduced, as well as the manifestation of emotions.

These three patterns have then been integrated with another one.

### 3.1.4 Disorganized-disoriented Attachment (Main and Solomon 1986)

This is the most maladaptive pattern, as it signals the failure in building a bond with the mother. In the *Strange Situation* the child does not show a consistent behavior, or a fixed strategy of approach and avoidance. The disorganized-disoriented attachment is due to caregivers who have suffered traumatic experiences or to situations in which the child is a victim of ill-treatment or abuse. This type of attachment is explicitly considered the cause of serious behavioral problems (Lyons-Ruth et al. 1993, 2013; Berlin et al. 2008a, b).

In general, according to Bowlby, secure attachment is so important because it enables the development of an internal working model, or a reference system for the child to understand himself, others and the world. This model affects all the thoughts, feelings and expectations of the individual in all his relationships, even in adulthood. The quality of primary attachment is therefore crucial in allowing a child to grow confident in other people, aware of his value and self-confident in society. Subsequent studies have highlighted the importance for the child to have various kinds of relationship with several people and not only with the mother or with the sole caregiver (Schaffer 1996). In many cases there were simultaneous bonds with different caregivers, in tune with a society that promotes multiple and open relationships (Cabrera et al. 2000). In addition, scholars have tried to analyze how attachment might continue to affect the construction of the child's personality and affect his life.

Being unable to use the *Strange Situation*, suitable only for children up to two years, different tests have been



carried out, such as the *Separation Anxiety Test* (Klagsbrun and Bowlby 1976), in order to investigate the child's reactions to separation from the mother through illustrations representing hypothetical situations. Children aged 5–9 years with secure attachment were anxious but able to cope, while those who have insecure attachment showed either exaggerated or paralyzing emotional reactions or disinterest and indifference (cf. Richters et al. 1988). This shows that the internal models developed based on the type of attachment have lasting effects, as shown by Main and colleagues (1985). The latter have also worked with the *Adult Attachment Interview* (George et al. 1985), which investigates childhood memories through storytelling (Crowell et al. 2008), especially looking at the consistency of the individual's assessment of their own subjective experiences. What has emerged is an interesting correlation between the characteristics of mothers examined with the Adult Attachment Interview and their children's type of attachment as shown by the Strange Situation. This could allow to hypothesize a transmission of mental models. Results that have emerged from longitudinal studies associate early attachment classifications and peer relationships with the children's functioning (Pearce and Pezzot-Pearce 2013; Moss et al. 1999).

### 3.2 The Role of Memory in the Internal Working Model

The theory of attachment does not only provide a description of the child's behavior and her interaction with the caregiver (see Camaioni and Blasio 2002:211–213). As mentioned, it also assumes the lasting continuity of the attachment. This is due to the child's establishment of complex mental models of both affective figures and himself. These representations are internal working models. They have the function of directing the individual's interpretation of the information coming from the outside world and to guide their behavior in new situations. The internal working models are mnemonic representations that result from episodic memory and semantic memory of the images that the subject has built of his parents and himself. In episodic memory, the information is stored according to sequences, in terms of episodes dated chronologically or events along with their space–time relations. In semantic memory, the information has the form of generalized sentences that concern the world. They are derived from the experience of the individual, what he has learned from others or from the combination of the two. The memories of the person's behavior are stored in episodic memory. The generalizations concerning the mother, father and the individual in question are stored in semantic memory.

In the pattern of secure attachment, the internal working models are constituted based on the positive representation of the caregiver as responsive to the child's needs. The

representation of the self is therefore marked by the feeling of being worthy of love and the idea that their needs are important. In situations of insecure attachment, the caregiver is represented as indifferent, cold and even hostile; the self is seen as unworthy of love and affection. The notion of internal working model is therefore the theoretical basis to understand how mental representations of the loved ones are established and develop: the primary models created in childhood strongly affect the development of future models as well as the subject's experience. Recent studies have shown the importance of autobiographical memories in determining the subject's behavior (Selimbegović et al. 2016). In particular, it seems that autobiographical memories of failure and success impact performance by shaping the perception of the upcoming task.

Of course, there are other theories related to developmental psychology. Some thinkers are critical of Bowlby as they believe he overestimated the importance of the relationship with the caregiver in the first stages of life. Another criticism is that there seems to be a degree of determinism in the idea of how nurture affects nature, while Kagan (1994), for example, highlights the relevant role of genetics. Pinker (2002) and Harris (1998), among others, believe that later relationships are more important in determining a person's identity. The debate is very complex and I cannot discuss it here in detail. However, there is enough scientific evidence to support the theory attachment for it to be considered in relation to the object of this paper—that is, memory-editing as a means of moral bioenhancement. Indeed, some theoreticians of attachment have suggested public policies to improve the child–caregiver relation to prevent dysfunctional patterns (Berlin et al. 2008a, b). Nevertheless, such psychological and social strategies seem unlikely to achieve significant large-scale results fast enough.

### 4 The Best Memory-editing Technique in the Light of Attachment Theory

In the 1990s, James McGaugh observed that propranolol, a molecule hitherto used as a beta-blocker to treat hypertension, interferes with an key indicator which generally increases every time we are emotionally excited (Cahill et al. 1994). In this situation, in fact, the adrenal gland (activated by biochemical processes triggered by the amygdala) releases stress hormones, adrenaline and cortisol, which in turn cause the release of a large amount of norepinephrine. This neurotransmitter on the one hand allows memories of the event in question to mark the fear circuit and, on the other hand, generates symptoms that are typical of anxiety states: for example, tremor, tachycardia or sweating. The norepinephrine binds to  $\beta$ -adrenergic receptors of the basolateral amygdala ( $\beta_1$  and  $\beta_2$  receptors), which send out a

stream of molecules that signal the brain that the memory must be codified. According to this simplified description (which is not shared by all scholars), propranolol couples with the receptors, preventing their activity, thereby blocking the consolidation or reconsolidation of specific memory.

The first studies have focused on the relationship between emotions and declarative memory, identifying the mechanisms by which stress hormones make a memory more intense, vivid and long-lasting (Pitman et al. 2002). Propranolol seems to have little or no effect on the way we remember emotionally neutral information; instead, if taken while experiencing emotional stress, it suppresses the normal effects over in memory given by emotional arousal.<sup>1</sup> This confirms the fact that blocking the effects of adrenaline and noradrenaline secreted by the adrenal glands under stress seems to nullify the emotional reinforcement of the mnemonic process. This allows the individual to have the declarative memory but lacking the (negative) emotional component that usually accompanies it, manifesting itself as a variation of certain vital signs (heart rate, blood pressure, respiration) and feelings of anxiety, fear or distress.

Numerous experiments conducted with propranolol at first seemed to indicate that the molecule has some efficacy when taken a few hours after the traumatic event whose memory one wants to mitigate. Studies conducted in the emergency room on people involved in car accidents have confirmed that the efficacy of propranolol is affected by the time factor (Brunet et al. 2011). In addition, the treatment of people who had already developed a post-traumatic stress disorder (PTSD) has produced no significant results, with few exceptions (Muravieva and Alberini 2010). Recently, however, especially thanks to the research group of Merel Kindt, the administration of propranolol has given important results in the cancellation of fear responses (Kindt et al. 2009), beyond the traditional mechanisms of extinction according to the Pavlovian protocols.

For instance, subjects have been able to overcome the fear of spiders by alleviating the emotional reaction of fear caused by the sight of a spider, while remaining cognitively aware of the dangers of a spider bite. Secondly, scholars have acted on re-consolidation in order to impact on memories encoded by time. Reconsolidation is a mechanism by

which every time one recalls a memory, a complex molecular process takes place in our nervous system that makes the memory malleable at the biological level (Nader et al. 2000; Nader and Hardt 2009). This explains why the memory of episodes that are often recounted ends up changing over time. Exploiting the fact that a memory becomes malleable whenever it is recalled, it seems possible to intervene on traumatic memories even some time after the fact that has caused them (Soeter and Kindt 2011; Brunet et al. 2011; Elsey and Kindt 2016). In a nutshell, in a controlled laboratory environment, the person to be treated should recall the memory they want to mitigate and then take propranolol.

As seen above, according to Bowlby's attachment theory, the internal working models are mnemonic representations that result from the episodic and semantic memory of the images that the subject has of his parents and himself. In episodic memory, the information is stored according to sequences, in terms of episodes dated chronologically or events accompanied by their space-time relations. In semantic memory, the information has the form of generalized sentences that concern the world. They are derived from the experience of the individual, what he has learned from others or from the combination of the two. Here it might help to look at the proposal made by Conway and Pleydell-Pearce (2000). According to the authors, there is a Self-Memory System that binds autobiographical memory and personal identity, in which the encoding and retrieval of memories are partly guided by the purposes of the self.

We assert that autobiographical memory emerges from the intersection of two competing demands - the need to encode an *experience-near* record of ongoing goal activity and the simultaneous need to maintain a coherent and stable record of the self's interaction with the world that extends beyond the present moment. The first of these demands we call *adaptive correspondence* and the second, *self-coherence* (Conway et al. 2004).

Conway and colleagues (2001) introduced the SMS as a model of the relationship of autobiographical memories with the self. The SMS model postulated that autobiographical memories were the transitory mental constructions of a complex goal-driven set of control processes collectively referred to as the *working self*. A long-term self, which the working self can always access, stores long-term memories, divided between memories tied to autobiographical knowledge and memories related to the so-called conceptual self, i.e. knowledge about the person encoded objectively. "A self-defining memory (SDM) is a specific type of autobiographical memory that has the following attributes: affective intensity, vividness, high levels of rehearsal, linkage to similar memories,

<sup>1</sup> It might be useful here to give an operational definition of emotions as states provoked by elements counting as rewards or punishments, which have special functions. Rewards are what one wishes for, punishments are what one wants to avoid. An emotion can be the happiness triggered by a compliment or a caress, or the fear provoked by an angry face. Emotions serve to activate automatic and endocrine responses; to ensure the flexibility of behavioral ones; and to give facts and situations a positive or negative connotation (Rolls 2005). I am aware that the debate on emotions is open, and that this definition is not universally shared.

and connection to an enduring concern or unresolved conflict”. SDM “are linked to central goals or conflicts within the individual, while at the same time they provide integrative lessons or insights. Finally, these memories through their affective quality and content can play an important role in mood regulation processes for non-depressed individuals” (Conway et al. 2004).

If this is true, in cases of insecure attachment leading to dysfunctional behavioral styles there might be some specific episodes causing the failure of a secure attachment; as a self-defining memories, those may continue to play an important role in affecting the subject. The Adult Attachment Interview, used by Conway himself, also allows one to restrict the range of potential targets as relevant self-defining memories on which to act. The latter could be episodes that have damaged the relationship with the caregiver, which could be recalled and treated with propranolol. If the treatment was effective, the emotional burden caused by the memory in question could be relieved. The subject’s negative internal working models might be less influential on his behaviour, thereby resetting the working models themselves in a more neutral sense. This might produce a veritable moral enhancement, as the subject would gradually acquire the personality and behaviour typical of someone with secure attachment, such as trust in other people, openness and altruism. This is consistent with what has been suggested by Douglas (2013), who has claimed that moral enhancement can be reached by means of decreasing countermoral emotions. Of course, all of this is largely still speculative, but no less than other proposals for moral bioenhancement (Persson and Savulescu 2012). Memory-editing on subjects with a pattern of insecure attachment seems no less plausible than targeted drugs or administration of oxytocin. Memory-editing, indeed, seems to be able to guarantee a longer lasting result, as it would not be subject to constant medication.

It might be useful here to briefly hint at the relationship between the biological level (where propranolol acts) and the psychological level (where its effects are felt). The fact that a molecule can mitigate the emotional charge of a memory does not take away the fact that there is a cognitive component in the memory itself and in the role of that memory in the mental life of the subject. The activation and memorization of emotional reactions have a correlated brain effect that is today clear from the neurophysiological point of view and that can be modulated directly from the outside (with a drug). But the memory remains and can be processed at a higher cognitive level (functional), which is not so clearly localized in the brain. In this sense, different mechanisms are at work which, however, interact, and those of the upper level (psychological ones) use and cannot be separated from those of lower level (physiological ones).

## 5 Identity and Authenticity

### 5.1 Two Kinds of Identity

Memory-editing on subjects who developed an insecure attachment pattern is a form of moral enhancement likely to have a profound effect on the personality of the individual subject to it. To what extent is this pursuable and justified? What seems to be at stake here is the theme of identity and authenticity of the person. *Prima facie*, identity and authenticity appear to be important elements to preserve, even if we know that identity partly changes over time—often even because of the subject’s own will, even if arguably in those cases we are trying to go back to our “true” self. James (1890) distinguished three kinds of identity: the material self, related to physical aspects and bodily subjectivity; the social self, related to relationships and recognition; and the spiritual self, related to the psychological aspects that can be grasped by introspection. In the light of this, I will give a more unitary definition of identity functional to the present argument.

(Def4) Identity consists of what characterizes the individual at the personal and social level. It includes the individual’s personality traits, beliefs and dispositions (desires and goals); his autobiography understood as the consistent narrative of the facts and events that have involved him in a constant process of self-awareness and self-monitoring; the facts and public events that concern him, as projected by others on the subject.

In the light of philosophical and psychological knowledge we have, there are two conceptions of identity, each with its own empirical basis and historical genesis accompanied by a philosophical conceptualization. One is older and rooted in common sense, the other more recent and linked to the progress of empirical psychology and cognitive science. These are two ideal models that do not always appear in dichotomous form, as totally alternative: often they may fade into one another, according to theoretical contexts in which they are inserted (Neisser 1988 distinguished five different forms of “self”, including the extended self, that “is based on memory and anticipation”, while the private self “appears when we discover that our conscious experiences are exclusively our own”).

*Rigid identity* has a Cartesian origin in the modern age, but it dates back to ancient and widespread intuitions and concepts developed in many cultures; it is conceived as the self-consciousness of a thinking self, rather than of an extended body. This identity may partly change over time, but always maintaining a stable core, something that characterizes the person and can be discovered by introspection, because it is sometimes concealed by external influences. It



is what we traditionally think makes us unique and therefore must be preserved and cannot be sacrificed.

*Extended identity* is based on the feeling of the bodily self, which is its core. The extended identity lies in interpersonal relationships, because it is not something original or innate, but something that emerges in the interactions of the individual (who has an innate instinctual endowment, which limits what can emerge from the interaction) and from social and cultural elements. The psychological dimension and the temporally distributed self, made of events and relationships, give rise to a more or less coherent narrative subject to rewriting (which for some does not reflect a self as a true entity).

The idea of rigid identity involves the concept of authenticity.

(Def5) Authenticity is the consistency (and the second order identification of one's own desires, "à la Frankfurt") of the choices made by the individual - obvious choices or ones with potentially observable effects - with her identity (at any given time), or at least some of the relevant identity components for the choice in question.

One may wonder why authenticity is usually valued. The main argument in this sense can be summed up as follows. If one makes relevant choices that are in disagreement with one's identity, what follows is a forced change in the self: it is a form of betrayal, whereas respect for authenticity is a form of honesty and loyalty to the "true self". It's as if the self died and another one took over the same body. As for the social or objective aspects, the consequence is a level of unreality: inauthenticity implies disregard for facts (wanting to be someone one is not). Finally, coherence is often considered a value in itself, or an adaptive function, related to the adherence to the facts and social reliability that it guarantees. Now, the notion of a rigid identity is the outcome of several unsophisticated intuitions, but the notion of a "core self" is supported both empirically (Klein 2013) and philosophically—think of the original position proposed by John Rawls as the basis of his theory of justice. In it, a "veil of ignorance" ensures impartiality of judgment, since the parties are deprived of all knowledge of their personal characteristics and social and historical circumstances. It is therefore assumed that even without our biographical history we would have a (non-lockean) identity that allows us to take the most important decisions consistently.

The notions of rigid identity and authenticity seem to imply that invasive forms of memory-editing should be avoided. Consider the story—imagined by Erler (2011)—of young Elisabeth, who was always harassed in high school, but later was able to build a satisfying life. Her only concern is not being able to spend time with her

former classmates, now that they invite her to their parties, because they never apologized for what they did. A friend of Elisabeth's with a similar story, Sonya, is instead capable of letting the past go: she sees her new friends and doesn't suffer from the memory of being once bullied. Liz envies her and does not want to suffer for those past events, so she chooses to take propranolol. Her memories of schooldays lose sharpness and intensity, and Liz forgives her friends without them ever apologizing. Now she goes to their parties, her beautiful childhood memories are no longer dominated by negative ones, and her wellbeing has undoubtedly increased.

Was this an authentic choice? The true self (rigid identity) is also related to the main characters of one's narrative identity, which shape our life and the way we interact with others: personality traits translating into specific reactions to certain events, with those traits justifying such reactions; personal preferences and aversions (sexual orientation, self-image, moral or religious commitments). Being yourself therefore means showing yourself as you are (for example, it means not pretending to be heterosexual if you are homosexual) and refusing to change some of your peculiarities in situations where you may be tempted to do so—even though changing might not be wrong as such. Erler argues that Liz's choice is indeed inauthentic, because by partially deleting her memories Liz changes her natural response to the situation (which isn't the case with Sonya, as her forgiveness comes natural). For her character and convictions, Elisabeth would not naturally forgive without getting an apology first. Her inflexibility could also serve as a deterrent to bullying, but now that she has changed her reaction she will no longer do things like campaign against it.

Of course, over time one may naturally change one's natural reaction to something, but perhaps maintaining the same conviction or instead with good reason to change. The point is that the "natural" change is gradual, it lets us envision how we might be afterward compared to how we were before, therefore making such choice authentic, true and justified. With the choice of oblivion, instead, the transition is immediate: there are no intermediate stages and it requires no effort, which makes it impossible to compare the two situations. Also, we completely depend on others to implement this choice (the producers and distributors of the drug). Finally, as a consequence of memory-editing, to go back to our example, Liz might be induced to adapt to things instead of fighting bullying: something related to conformism rather than her authentic self. So, memory-editing might damage authenticity, creating new or false emotions and attitudes, undermining our natural propensity to react in a certain way to given events. Therefore, according to Erler, there is a moral reason against memory-editing: the duty to preserve authenticity.

In addition to personal authenticity, there can also be objections to memory manipulation related to the risk of losing touch with reality (Glannon 2011). Consider this case. A young scholar, very emotional and anxious, has a small failure during a conference that he considers very important for his career. The thought of that event continues to distress him and threatens to jeopardize his public activity. He then decides to undergo treatment with propranolol to weaken the memory of the event that has deeply troubled him. In general, this seems a morally unobjectionable decision under any point of view. However, what led the young man to the first failure may be a structural weakness, which in this way he will not even begin to deal with, exposing himself to a number of other potential failures. If in the face of first faux pas he can still resort to memory manipulation for specific episodes, his colleagues will still clearly remember his signs of inadequacy to the role. The scholar then might end up ruining his career, despite being personally serene and confident for a while. His “brain” world will eventually be challenged by external reality, consisting of the fact that he is no longer valued as an intellectual. At that point, memory manipulation will no longer suffice, unless he chose a form of delusional solipsism denying unchangeable facts. The point is not just that it is impractical to remove a trauma related to what other people know, but rather than one should deal with the objective world outside of one’s consciousness.

These objections may also apply when editing memories related to insecure attachment, even if they were to lead to a form of moral enhancement. In fact, mitigating a strongly negative memory linked to the interaction with the caregiver violates the identity and authenticity of the subject. This does not mean we cannot try to change what we consider painful or dysfunctional, but the change must take place in a conscious process that starts from our self and is driven by it, in accordance with our desires and goals. The use of the drug makes us take a “leap” that bypasses consciousness and gives us a somewhat different identity. This results in a violation of rigid identity and its authenticity.

## 5.2 Extended Identity Without Authenticity

The concept of extended identity is based on much empirical research in developmental psychology and psychology of personality (Marras and Meini 2016). The child begins his life with a bodily self-consciousness linked to the recognition of causal effects produced by physical bodies (Gergely and Watson 1999). The “contingency detector” is innate in children, who at 3 months of age have one body schema, i.e. one procedural representation of information on parts of their bodies, without any real self-image. The first self is therefore the ecological one, given by the individual acting on the environment (Neisser 1995). Damasio

(2010) supports the idea that there is a hierarchy of selves, from the homeostatic alterations of the body subjected to stimuli of the environment to the proto-self, the nuclear-self and finally the autobiographical-self.

In this sense, there is a naturalized concept of consciousness: a purely relational concept (neither innate nor primordial). The conscious mind, in this view, is a set of different forms of active relationship between the living organism and its environment; self-consciousness is the representation of the subject regarded as one of the possible objects. The child, in other words, experiences himself without self-knowledge and without having a concept of self. Bodily self-consciousness makes us discover that we exist, something we learn over time (Brownell et al. 2012). Even the image of the body as a whole and as one’s own takes time, and is only completed when the child can see himself from the outside, becoming progressively able to consider himself as an object as well as a subject. Identity must therefore be understood as a process and a conquest. First we must know ourselves (also) in relation to the environment and the others, in order to reach self-consciousness. Different forms of identity are constructed over time: the first, as said, is the bodily one, followed by the mind, which is achieved by emotional introspection.

Emotions are felt in the body and then internalized in the physical world. The child’s mind in the first 2 years, according to Gergely and Watson (1999), is not self-transparent: it does not know to discriminate individual emotions, as claimed by numerous cognitive scientists (Meltzoff and Moore 1977). This is in accordance with the constructivist perspective on emotion (Barrett and Russell 2014), for which only positive or negative characters—activation and quiet—are universal and innate; everything else is the result of culture. The categorial knowledge of emotions is a gradual process in the interaction with others, as posited by Ryle, Wittgenstein and Sellars. The adult is the master of emotions, which emphasize, drive the attention and send signals for modulation (Csibra and Gergely 2009). The child instead is unable to understand or self-monitor her states, as they would be overwhelming in this phase. Therefore the first dyadic relationship with the caregiver is essential. The same applies to the awareness of one’s internal states, which for some is strongly constructivist, since the child turns her mentalizing capacity in the third person towards herself and includes the active role of others (Dunn 1996).

In the hypothesized preeminence of mindreading and third-person mentalistic thinking (Carruthers 2009, 2011), self-monitoring and introspection serve to make order between the different images of us that are returned to us by others, as already emphasized by Mead and James. The child internalizes what others tell him and his identity derives in large part from what his identity is for

others, how others see him and define him. The identity that emerges in this way then evolves as a subjective identity. The child experiences himself as a person who has a biographical continuity over time due to memory, which gives him an identity in space and time. This reconstruction of the formation of identity is supported by the observations made by Luria (1977) on “primitive” peoples, characterized by physical and social rather than psychological self-consciousness. Illiterate members of pre-industrial societies allegedly struggle to represent an internal mental space, lacking the adequate cultural socialization in the development phase that allows one to conceive oneself as an intentional subject.

Identity, in this view, should therefore be conceived as narrative: the construction of psychological self-consciousness develops in the interaction between mentalization, autobiographical memory and social-communication skills, modulated by socio-cultural variables. The child begins to rationalize his identity as autobiography around age 5–6 on average (Fivush 2011). This means that the set of autobiographical memories becomes a story of life with a progressive acquisition of unity, purpose and meaning (McAdams and McLean 2013). Social and cognitive skills improve autobiographical reasoning skills, that is, the ability to connect the events of one’s life in a meaningful way. This implies temporal coherence (easy to achieve), but also causal and thematic coherence, which require a self-reflective capacity that can grow or change over long phases of existence. Experimental studies have shown this variation, particularly from childhood to maturity (Habermas and Silvera 2008). The construction of identity therefore goes through the autobiographical narrative, which is not an innate endowment but a fragile psycho-cultural construct, always at risk of disintegration (Kernberg 1967). Ultimately, self-consciousness (as identity) is not characterized as a given, immediate primitive: rather, it is achieved through a bumpy path of construction always exposed to risks of disintegration, which cannot be separated from interpersonal relations.

One could add here that the rigid identity vs. extended identity issue cannot prescind from the wider social context in which the subject lives. In fact, the greater the influence of the social environment the greater the extended component of identity as opposed to the innate qualities of the self. Furthermore, the relation with relevant figures other than parental ones also plays a role in the development of the subject’s identity, for better or worse. This means that those we could call “secondary attachment figures” might constitute a first form of support for the memory-editing process, contributing to orientating it as proposed earlier. However, it shouldn’t be excluded that the same social environment (made up, say, of the relations developed in adulthood) might also have a negative influence on the

subject’s moral dispositions, fully or partly nullifying the memory-editing process.

To sum up, in this context of extended identity, the idea of authenticity loses its basis and loses its constraining power as a regulative ideal. If identity is understood as extended—based on scientific evidence—then the necessity to protect the rigid identity from change have no reason to exist, and therefore the objection against memory-editing no longer applies. Even without embracing a totally deflationist perspective on the self, the idea of extended identity makes it acceptable to envision changes in one’s personality, when the objective is seen as positive. The idea of authenticity loses grip if identity isn’t rigid but extended: memory-editing would then violate no moral obligation to protect the authenticity of the given subject’s personality. The fact that identity changes over time—posited by the notion of extended identity—doesn’t mean that any change is good or should be wished for. There is no rigid identity to preserve, but this doesn’t justify a sort of “cosmetic neurology”—as it has been defined—changing any aspect of one’s personality at will. The case of moral enhancement through memory-editing, instead, seems a generally shareable objective. Any mother, in fact, would like her child to have a secure attachment pattern, if she could choose. And any mother would accept external help if she failed to achieve that goal herself.

## 6 Conclusion

Moral bioenhancement generally seems a very “positive” idea: a subject modifies their biological makeup to achieve a better result in terms of communal living. This is typically related to problems that cannot be faced with the tools for moral improvement available at the moment. However, this notion of moral bioenhancement is subject to much criticism, especially if proposed as compulsory within a paternalistic framework. Indeed, even if freely chosen, moral bioenhancement raises several objections, as it doesn’t comply with the subject’s authenticity (and freedom).

In the present paper, I have rather discussed a more “negative” proposal of moral bioenhancement: it would “take away” something from the subject by removing or mitigating dysfunctional memories causing insecure attachment, which in turn badly affect the subject’s moral dispositions. Moral bioenhancement via memory-editing could generally lead to an improvement of the condition of the person, as well as being socially beneficial. In fact, insecure attachment is often a harbinger of discomfort for the subject. The main problem, however, is that memory-editing collides with the classic, strong objections related to identity (understood as rigid, *a la* Descartes) and authenticity. I have tried to show that the data of empirical psychology

and cognitive science make it possible to propose a different idea of identity, which I have proposed we call extended identity. It is shaped by the environment, by relationships and culture, in a precarious and ever-changing balance. It follows that there is no idea of authenticity that can be associated with this type of identity. If we accept this conceptualization of identity, which relies heavily on recent empirical data, the main objections to memory-editing drops, and this “negative” moral bioenhancement acquires greater justification and legitimacy.

It seems to be mainly a factual question whether moral bioenhancement through memory-editing should be recommended or not, but one must not underestimate the perception that each has of their own identity. If people prevalently feel aligned with a rigid identity model, based on deep insights, it does not seem permissible to ignore this fact. Further research and philosophical reflection is thus needed before taking steps towards moral bioenhancement through memory-editing.

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**Compliance with Ethical Standards**

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