

# Generation Lobotomy: Kinase Inhibition Therapy, Memory Erasure and Identity Loss

**ABSTRACT:** This paper primarily explores the ethical debate surrounding the use of memory erasure for therapeutic ends. It argues that procedures such as kinase inhibition therapy, which can entail memory erasure in the individual, incur a high cost in terms of the integrity of our individual identities, thus jeopardizing our claim to individual rights and accountability. Therefore, we should reserve such therapies for the extreme cases in which the procedures have the potential to actually restore a person's autonomy. Furthermore, this paper goes on to explore which situations might fit this criterion, while still accounting for the cost of memory erasure in each instance.



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Michel Gondry and Charlie Kaufman's 2004 production of *Eternal Sunshine of the Spotless Mind* portrays two people who volunteer to erase each other from their memories after a bad fight. While the particular way in which the film depicts the memory erasure procedure does not exist, neurologists have been experimenting with an effective chemically based memory erasure process since 2006. Many other recent films play with the concept of memory erasure and loss, such as *Memento*, *Minority Report*, *50 First Dates*,

*The Butterfly Effect*, and more.<sup>1</sup> A fascination of the brain and mind and a desire to control them has leaked into modern popular culture, and science reflects the trend. Just because we possess the ability to manipulate memory and possibly cure many psychoses, however, does not mean that we should do so. Personal identity theory expressed by John Locke and David Shoemaker equate memory on a fundamental level with identity. As today's younger generations erase their memories – be it with kinase inhibitors, vodka or reality television – they also erase who they are,

1. James, Nick. *I Forgot to Remember to Forget*. *Sight & Sound*. 15.5 (May 2004): 16.



and undermine the relevance of human rights and moral responsibility. All forms of memory erasure, but especially institutionalized kinase blocking procedures, should remain a last resort alongside surgery for extreme cases of psychosis which hinder an individual's opportunity to live a meaningful life. Each memory erasure, after all, signifies a mini psychological lobotomy of personal identity.

Generally, laymen think of the memory as a filing system with memories and facts which we can access at will – hide that memory away in the folder of painful experiences, pull up the Spanish vocabulary files, keep that phone number readily accessible in the top drawer. The actual memory works nothing like this. As we have experiences and learn new things, we form a memory in our minds with a protein called  $Ca^{2+}$ /Calmodulin-Dependent Protein Kinase II (or just kinase, for short). Kinase presence forms proportionally to Long-term Potentiation (LTP), which indicates the creation of a memory.<sup>2</sup> This forms synaptic connections between the brain's different networks of neurons, the underlying mechanism of memory storage.<sup>3</sup> Each time we remember something, this process happens again – that is, we recreate the experience or knowledge with the kinase protein and reform the neural connections in our brains.

Medical memory erasure procedures work

by blocking the formation of kinase with a chemical inhibitor while recalling – and therefore attempting to recreate – a memory. A group of scientists from la Universidad de Chile and Brandeis University studied the effects of using a kinase blocking compound which they call CaMKIINtide on rats while engaging them in learning activities. CaMKIINtide effectively blocked LTP in both potentiated (already neurologically connected) and naïve (not yet connected) pathways.<sup>4</sup> This means that blocking kinase can both prevent new memory formation and degrade already formed memories. The mice could not achieve a full recovery even when all traces of the CaMKIINtide had left their systems. The study concluded that kinase “inhibition in the hippocampus leads to erasure of memory.”<sup>5</sup> Todd C. Sacktor of the State University of New York also studied kinase inhibition and concluded that the procedure does not damage the brain or prevent new memories from forming.<sup>6</sup> If performed repeatedly, kinase inhibition can effectively expunge a memory from the brain.<sup>7</sup> Neurologists believe that, in humans, this procedure could target specific experiences, leaving the rest of the brain completely unharmed.<sup>8</sup>

Kinase inhibition could be the next advance in psychotherapy, as psychologists could potentially use it to ease trauma, depression, anxiety, extreme

aggression, and a variety of other disorders. The scientific literature surrounding kinase inhibition research hints at its therapeutic benefits.<sup>9</sup> We should also imagine the arguments that could spring from this new technology for erasing memories of serial killers in hopes of reforming their behavior. Kinase inhibition therapy could make our society safer. Gondry and Kaufman hint towards a popular use of the procedure in the fictional world of *Eternal Sunshine for the Spotless Mind* for easing pain in the instance of the death of a loved one. Certainly most people can think of an event they would rather not remember. As autonomous persons with control over our own bodies, we should have free access to any procedure which might ease our suffering. Of course, decisions regarding the morality and legality of kinase inhibition therapy are not this simple. An argument for the legalization of heroin might echo this logic. With the capability of event specific memory erasure, as with narcotics, we bear the responsibility to analyze its implications in terms of who should have access to memory erasure, in what cases, and at what cost.

The kinase inhibition procedure would likely scare the living daylights out of John Locke, David Shoemaker, and the numerous other philosophers who for centuries have considered memory as an essential part of personal identity. The idea that memory plays a role in identity extends thousands of years into history. For example, Plotinus, a 3rd century

philosopher, whose ideas preceded Locke's, believed that the human soul comprises of knowledge and experiences which develop a unity of consciousness.<sup>10</sup> Two hundred years later, Augustine granted memory exclusive determination of self when he exclaimed, “What a great faculty memory is, how awesome a mystery! It is the mind, and this is nothing other than my very self.”<sup>11</sup> Identity theory morphed through the rise and fall of religion and paradigm, but memory remained a popular theme throughout.

John Locke's ideas connected memory with the concept of personal identity and ethical responsibility in the late 17th century. Locke attributed moral agency to a “self-reflective consciousness” that extends throughout the duration of an individual's life.<sup>12</sup> A “self” results from the unification of a person over time by memory.<sup>13</sup> So a middle-aged man and his former child self do not form separate entities, but only one identity because of the continuity of their experiences. Locke's claims imply that “one is justifiably held accountable only for those actions performed by a self to whom one's present consciousness extends, i.e., it is only for those actions I remember performing that I can justifiably be held morally responsible.”<sup>14</sup> Without some sort of experiential coherence moral responsibility would not exist; a human's biology and psychology undergo vast changes throughout their lives and only a unified

2. Lisman, John E., McIntyre, Charmian C. and Sanhueza, Magdalena. “Reversal of Synaptic Memory by  $Ca^{2+}$ /Calmodulin-Dependent Protein Kinase II Inhibitor.” (The Journal of Neuroscience) : 2. <<http://www.jneurosci.org/cgi/content/full/27/19/5190>> (9 November 2007).  
 3. Sacktor, Todd C. M.D. *Protein Kinase C Isozymes in Long-term Hippocampal Synaptic Plasticity and Memory Persistence*. (Albert Einstein College of Medicine, 2007): 1. State University of New York Health Science Center at Brooklyn, <<http://www.downstate.edu/pharmacology/sact.htm>> (9 November 2007).  
 4. Lisman, McIntyre and Sanhueza, 4-5.  
 5. Lisman, McIntyre and Sanhueza, 7-15.  
 6. Sacktor, 1.  
 7. *Science News*. “Inducible and Selective Erasure of Memories in Mice” from *Neuroscience Research News, Psychiatric Research*. (Science News: A Science News Site, 22 October 2008). <<http://www.molecularstation.com/science-news/tag/memory/>> (28 January 2009).  
 8. *Science News*.

9. *Science News*.  
 10. Barresi, John and Martin, Raymond. *The Rise and Fall of Soul and Self: An Intellectual History of Personal Identity*. (New York: Columbia University Press, 2006): 36-7.  
 11. Barresi and Martin, 72.  
 12. Shoemaker, David W. “Personal Identity and Ethics.” *Stanford Encyclopedia of Philosophy*. (Stanford University: 13 March 2007): 2-3. <<http://plato.stanford.edu/entries/identity-ethics/>> (9 November 2007).  
 13. Barresi and Martin, 143.  
 14. Shoemaker, 3.



consciousness, that is relational memories, maintains identity.

David Shoemaker tests and expands on Locke's ideas, sufficiently defending them to classic critiques. Shoemaker's arguments that Locke's assumptions that "survival consists in identity" and "moral responsibility conceptually requires personal identity" stand up to attacks on their relevance, extremism, and minimalism, and come to the conclusion that Locke's ideas provide a stable basis for normative ethics. As far as he can, Shoemaker develops potential criticisms of Locke and attempts to respond to them. As Shoemaker discovers, because Locke's concepts provide solutions to practical concerns, they must pertain to the realm of moral theory and belong in a minimalist approach to ethics.<sup>15</sup> Shoemaker suggests a gradated way of looking at identity cohesion as people lose their older memories over time as a way of softening Locke's rigid understanding of memory cohesion.<sup>16</sup> Because he can respond to fully articulated complaints about Locke's ideas, Shoemaker concludes that they supply an excellent foundation for discourse on moral responsibility and personal identity. Shoemaker's most notable addition to Locke's philosophy says that as coherent entities throughout time, people have a moral obligation to their future selves.<sup>17</sup>

Other philosophical contributions reinforce Locke's argument that legitimizing any sort of moral responsibility requires a concept of

personal identity. Traditional stoicism links the idea of self-possession to self-responsibility, which translates into responsibility to humanity. Thus personal identity actually includes a sense of responsibility to the human community.<sup>18</sup> Leibniz articulated the flip side of this idea when he remarked that "it is memory or the knowledge of this self that renders it capable of punishment or reward" in his works released in the mid 18th century.<sup>19</sup> The contemporary criteria of personhood Mary Ann Warren and Michael Tooley outlined involves the ability to conceive of and identify with a future self, as well as possess "the capacity to have a concept of self as a continuing subject of experiences."<sup>20</sup> The modern concept of personhood – which provides guidelines for who human rights and responsibilities apply to – echoes Locke's views.

The culmination of history's ruminations on memory, identity and responsibility construct the modern paradigm, expressed by Locke, that a person's identity forms out of her or his collected experiences and elicits moral responsibilities to their self and each other. This conceptualization of identity makes sense when compared to a body-centered identity theory. We could think of identities as centering on an individual's physical body. This kind of identity theory avoids problems arising with Alzheimer's disease, bipolar disorders, and other mental issues. Our bodies are far from constant, however, especially in comparison

to our minds. Nicholas Wade describes how "although people may think of their body as a fairly permanent structure, most of it is in a state of constant flux as old cells are discarded and new ones generated in their place."<sup>21</sup> According to Wade, skin, bones, blood, and most of the body's tissues regenerate every few days to 15 or 20 years. Even the brain's neurons may experience turnover, and a person's DNA mutates.<sup>22</sup> Any theory of identity based on body may only pertain over the amount of time that any given bodily aspect remains intact – should we measure our identities based on our outward appearance, and convert to a new person every two weeks with our skin cells?<sup>23</sup> Do we constitute a new individual with every DNA mutation we experience, or with each new or lost neuron in our brains? In its most generous interpretation, a body-based identity theory at a minimum encounters problems cohering over the span of an entire lifetime, throughout which people not only visibly change but also shed and regenerate most or all of their cells.

Of the mind-based theories, memory best accounts for an entire lifetime and functions effectively under our current social and political person focused climate. Mind-based theories could focus on desires, beliefs, values or virtues. These tend to change just as often as bodily tissues, though. Memory must stitch these aspects of ourselves together to create any coherent concept of self that lasts

more than a moment. The American social and political philosophy assumes Locke's and Shoemaker's memory-based construction of identity; Robert A. Licht condenses this idea into our constitutional striving towards the image of the "truly free and morally autonomous individual."<sup>24</sup> Our American system requires a coherent notion of identity over time to which we may assign autonomy in order to reward rights, bestow responsibilities, and exact retribution in cases where people do not fulfill their responsibilities or infringe on other peoples' rights. Memory can provide that coherent notion. Thus a memory-based concept of identity not only seems more plausible in a cursory examination of the alternatives, but also fits the reality of our current American social and political setting, and so should allow us to analyze the ethics of that context.

Given the model of memory-identity-ethics to work from, even targeted memory erasure undermines an individual's autonomy and thus their command of rights and responsibilities. Memory is the fabric that holds an individual's identity together. Without memory, the other aspects of a person such as their beliefs and values have no coherence. Memory erasure punches holes in the coherent experiences which define a person's identity. Much of the current discussion surrounding kinase inhibition therapy would like to suggest that these are only minute holes,<sup>25</sup> however

15. Shoemaker, David W. "Personal Identity and Practical Concerns." (Bowling Green, OH: Department of Philosophy Bowling Green State University, 13 March 2007) 9 and 28. <<http://www.bgsu.edu/downloads/cas/file27173.pdf>> (9 November 2007).

16. Shoemaker, 44.

17. Shoemaker, David W. "Personal Identity and Ethics," 10.

18. Barresi and Martin, 26.

19. Barresi and Martin, 138.

20. Popich, Michael Dr. "Mary Ann Warren and Michael Tooley's Criteria for Personhood." *History and Philosophy of Science*. (Salt Lake City: Westminster College, Fall Semester 2007). Handout and Class Discussion.

21. Wade, Nicholas. "Your Body is Younger than You Think," *The New York Times*, in Science. (The New York Times Company: 02 August 2005). <<http://www.nytimes.com/2005/08/02/science/02cell.html?ei=5088&en=65bd5e6cef9fec79&ex=1280635200&partner=rssnyt&emc=rss&pagewanted=all>> (28 January 2009)..

22. Wade.

23. Wade.

24. Licht, Robert A. "Rights and Wrongs About Rights." (Leadership U., 13 July 2002). <<http://www.leaderu.com/ftissues/ft9202/opinion/licht.html>> (28 January 2009).



we cannot begin to understand the full repercussions of memory erasure on personal identity with current research. Although not physically invasive, kinase inhibition affects the brain as permanently and with just as much risk as psychosurgery. Walter Glannon points out that science still does not know just “how all of the different systems of the brain interact... nor how intervening in these systems can affect the beliefs, desires, intentions, and emotions that constitute the human mind.”<sup>26</sup> In altering one part of the brain we may well cripple others. Until we know much more about how a particular memory may connect to other memories, to emotions, and to behavior, we might as well perform kinase inhibition as poke sticks through our foreheads and swing them back and forth the way Walter Freeman did in the mid 1900’s when performing lobotomies.<sup>27</sup> Kinase inhibition therapy costs, at minimum, minute portion of our identities, our autonomy, our rights and responsibilities, and potentially much more. The more common memory erasure procedures become, the less people have a grasp on the current paradigm of identity, and so the less human rights and responsibilities apply to everyone.

Psychiatrists and neurologists still use psychosurgery as a last resort treatment for dysfunctional individuals.<sup>28</sup> Glannon insists that individuals may not consent to a procedure which may alter their personalities and erase

their memories and so must have the support of a surrogate acting in their best interests to consent for them.<sup>29</sup> As Locke stipulates that survival consists in identity, erasing or severely altering identity indicates the death of that identity. As patients may not consent to suicide, they may not consent to psychosurgery. Forcing therapeutic psychosurgery on deviant individuals therefore falls out of the bounds of moral limits. A forced lobotomy or memory erasure is tantamount to murder.

Glannon justifies using psychosurgery and memory erasure in severe cases. He rationalizes that “when a neuropsychiatric disorder is so severe that it interferes with a person’s ability to have a normal life, the potential benefits of psychosurgery appear to outweigh the risks.”<sup>30</sup> The parameters of a “normal life” remain vague, however. Charles W. Lidz and Lisa S. Parker discuss the relationship between suffering and identity, authenticity and meaning, in developing who should receive therapy for their psychoses and who should not. Suffering, they consider, often forms an essential part of a person’s “authentic nature.”<sup>31</sup> As many individuals grow older, they lose their loved ones and their physical capabilities. Modern medicine could alleviate this suffering by erasing the incidences of their loved ones’ deaths. Lidz and Parker argue against this treatment, by claiming that “to deny the reality of this loss or to medicalize it is to deny his [a patient’s] commitments and his

identity.”<sup>32</sup> The goal of psychotherapy should not be to alleviate suffering but “to restore autonomy as authenticity.”<sup>33</sup> Psychiatrists can do this by subscribing to a commitment-to-self policy. For example, when a loved one dies, an individual will suffer, but they will not undergo an essential change in identity; actually, they fulfill a commitment to their relationship to mourn that individual rather than to forget them. The meaning behind the suffering makes it endurable.<sup>34</sup> Lidz and Parker emphasize that they do not mean to play the part of a “sadistic God,” forcing suffering on people for their own sake.<sup>35</sup> Rather, they specify that individuals whose suffering hinders the expression of their authentic selves should receive drastic treatment for their condition only after a professional takes sufficient time to get to know a person’s authentic self so that they may accurately judge. They leave it to us to evaluate which cases warrant memory erasure using these criteria.

The cost of memory erasure – some piece of our identities, autonomy, rights and responsibilities – is too great to take any but a strict interpretation of which cases and situations pose a great enough threat to personal autonomy to warrant kinase inhibition therapy. Obviously, vanity cases such as the lovers’ quarrel in *Eternal Sunshine of the Spotless Mind* should not qualify for memory erasure. Criminals should never erase their transgressions because they would no longer hold moral responsibility for them under Locke’s system. A few examples however, such as some rape victims and former prisoners of war, may benefit from memory

erasure as a psychotherapy in spite of its possibly devastating effects on identity. In a rape case in which the victim suffers severe trauma to the point he/she cannot emotionally function, in which psychiatrists have exhausted all other methods of therapy and can detect a definite deterioration of the victim’s autonomy to anxiety caused by trauma, erasing the incident of the rape could allow the victim to reclaim his life and his identity. Trauma can result in positive behavior; a rape victim may teach his friends to carry mace and take self-defense classes in order to prevent another occurrence. In a patient who cannot cognitively function because of the extremity of his trauma, no benefit will arise, and so although he loses an incredibly constructive part of his experiences, he will at least be able to enjoy the benefits of his other experiences once more.

Likewise, a former prisoner of war who suffered torture and humiliation should qualify for memory erasure if he/she fits the same circumstances: loss of autonomy, failure of other treatments, and detriment to her identity because of the trauma. This individual might act differently in the future because of her experience; for example, she might vote against allowing emergency powers in times of war that remove the rights of prisoners in her own country’s camps. If she loses her experience as a POW, however, she may vote the other way. Although kinase inhibition in her case would definitely alter the values and beliefs intrinsic to her identity, she could at least practice some expression of identity. These patients should

25. *Science News*.

26. Glannon, Walter. “Neuroethics.” *Bioethics*. 20.1. (Oxford: Blackwell Publishing Ltd., 2006): 52.

27. Glannon, 45.

28. Glannon, 45.

29. Glannon, 47.

30. Glannon, 46.

31. Lidz, Charles Q. and Parker, Lisa S. “Issues of Ethics and Identity in Diagnosis of Late Life Depression.” *Ethics & Behavior*. 13.3. (Lawrence Erlbaum Associates, Inc., 2003): 249.

32. Lidz and Parker, 257.

33. Lidz and Parker, 252.

34. Lidz and Parker, 253-5.

35. Lidz and Parker, 258.



receive treatment not because they suffer but because they no longer possess autonomy over themselves and can therefore no longer wield any sort of identity. The identity loss they will suffer as a result of kinase inhibition actually improves the situation of those whose experiences prevent them from forming any identity outside of their psychosis. Psychiatrists should only use memory erasure as a last resort preferable to lobotomy only in that kinase inhibition does not physically invade the brain.

Although we do not yet see kinase inhibition procedures often, we do see other forms of memory erasure all the time. Stephen Bertman specifically cites a condition which he calls “Self-induced Oblivion” – that is, “seeking temporary oblivion in a bottle,” or chronic alcoholism.<sup>36</sup> Much like kinase inhibition, repeated episodes of alcohol-induced memory loss can result in permanent brain damage. Each time someone drinks so much she can’t remember what she did the night before, she loses memories, disconnects pathways in the brain, and undermines her identity. If an individual drinks to alleviate a specific experience, his repeated reaction to obliterate that memory with alcohol will ultimately result in confusion, disorientation and finally permanent memory loss.<sup>37</sup> Alcoholism mirrors kinase inhibition in method and consequence, except that in the extreme cases where kinase inhibition could actually benefit a patient, alcohol would not restore their autonomy. Alcoholics undergo extreme changes in personality and future goals as they become addicted. Alcohol abuse therefore

can only create brain damage and memory loss without hope for repair,<sup>38</sup> and therefore undermines an individual’s identity. College as a society promotes universal human rights and yet participates in a culture which promotes bingeing till black-out. Students, when they repeatedly mess up their minds with alcohol, forfeit the lofty ideals which education pursues.

Evaluating portrayals of memory erasure in pop-culture can give us clues as to common social attitudes regarding such procedures as kinase inhibition therapy. Although *Eternal Sunshine of the Spotless Mind* refrains from explicitly commenting on the moral implications of the memory erasure procedure which it depicts, Mary quotes a few verses of Alexander Pope in the film that frame the movie conceptually and place its plot in the context of a discussion of memory and identity. Mary reads:

How happy is the blameless vessel’s lot!  
The world forgetting, by the world forgot  
Eternal sunshine of the spotless mind!  
Each pray’r accepted, and each wish  
resign’d.<sup>39</sup>

Although Alexander Pope seems to celebrate his forgetful subject through exclamatory punctuation, these lines come across as more melancholy than joyful. The exclamatory phrases feel more like cries of desperation than of actual happiness. Pope creates this melancholic tone by coupling his supposedly jubilant phrases with connotatively depressing

language. The first phrase rhymes the vessel’s “lot” with a reminder that they have “forgot” and been forgotten by the world, and so live in complete isolation. The lighthearted, innocent sunshine imagery of the vessel’s “mind” Pope couples with “resign’d” to remind his reader that the vessel sacrifices his or her dreams when they trade their experiences for mental purity because they lose any reference for future identity. Pope agrees with Locke in that an individual without memory is “blameless” – they have no responsibility but also no rights, which reinforces their isolation and articulates another possible meaning of “each pray’r accepted, and each wish resign’d.” Most poignantly in this passage, Alexander Pope never gives his subject a name or even refers to them as a person. Instead, they have become simply an empty “vessel,” which carried an identity before they sacrificed it alongside their memories. Throughout the film, Gondry juxtaposes the image of Joel, undergoing the memory erasure procedure, with Mary and Stan “fooling around” with alcohol, marijuana and each other.<sup>40</sup> By including this passage in his film, Gondry casts the situation and the topic

of memory erasure in a melancholic light; the characters of *Eternal Sunshine of the Spotless Mind* achieve peace, but at the price of their identities.

With pseudo-lobotomies potentially entering the market in the form of the kinase inhibition therapy we must consider the damage memory erasure inflicts on personal identity and how that undermines the rights and responsibilities of humanity. The kinase inhibition procedure blocks memory reformation and can effectively erase them from the mind; as the prevalent personal identity paradigm correlates identity with a person’s coherence of experiences, erasing memories weakens personal identity. The danger of sacrificing personal identity lies in that human responsibility and accountability to one another relies on the concept of personhood and identity. Therefore psychiatrists should only resort to kinase memory erasure in extremely severe cases, where leaving the patient untreated would result in an even greater loss of autonomous identity. Reckless use of mind erasure – like the common reckless use of alcohol - will destroy people’s memories, identity and place in society, leaving them effectively lobotomized. ♦

36. Bertman, Stephen. *Cultural Amnesia: America’s Future and the Crisis of Memory*. (Westport, CT: Praeger Publishers, 2000): 20-1.

37. Bertman, 21.

38. Bertman 21.

39. Alexander Pope, from *Eloisa to Abelard* in Gondry, Michel. *Eternal Sunshine of the Spotless Mind*. (Anonymous Content, Focus Features and This is That Productions, 2004).

40. James 18.

