

# Journal of Cognition and Neuroethics

## The Neuroethics of Memory's Social Value: To What Extent Can Neurotechnologies That Manipulate Memory Be Permitted?

**Eisuke Nakazawa** 

The University of Tokyo

**Koji Tachibana** 

Chiba University

**Keiichiro Yamamoto** 

National Center for Global Health and Medicine

**Akira Akabayashi** 

The University of Tokyo

New York University

### Publication Details

*Journal of Cognition and Neuroethics* (ISSN: 2166-5087). February, 2023. Volume 9, Issue 1.

### Citation

Nakazawa, Eisuke, Koji Tachibana, Keiichiro Yamamoto, and Akira Akabayashi. 2023. "The Neuroethics of Memory's Social Value: To What Extent Can Neurotechnologies That Manipulate Memory Be Permitted?" *Journal of Cognition and Neuroethics* 9 (1): 1–11.

### **Eisuke Nakazawa**

Eisuke Nakazawa (ORCID 0000-0002-3320-3811), PhD, is a lecturer of Biomedical Ethics at School of Public Health, Faculty of Medicine, The University of Tokyo, Japan. He received his doctorate in Philosophy of Science from the University of Tokyo. His current research area is Biomedical Ethics, Neuroethics and Philosophy of Science. His recent publications include Sadato N, Morita K, Kasai K, Fukushi T, Nakamura K, Nakazawa E, Okano H, Okabe S. 2019. Neuroethical issues of the Brain/MINDS project of Japan. *Neuron* 101 (February 6, 2019):385–389. <https://doi.org/10.1016/j.neuron.2019.01.006>. And Ino Y, Nakazawa E, Akabayashi A. 2019. Health and welfare in Japan. *The Lancet* 394 (10209):1614–1615. (November 2, 2019) [https://doi.org/10.1016/S0140-6736\(19\)31805-7](https://doi.org/10.1016/S0140-6736(19)31805-7). He is a member of the International Neuroethics Society.

### **Koji Tachibana**

Koji Tachibana (ORCID 0000-0001-5203-7081), PhD, is an assistant professor of philosophy, Faculty of Humanities, Chiba University, Japan. He received his doctorate in Philosophy of Science from the University of Tokyo. His current research area is Aristotle's Ethics, Contemporary Virtue Ethics, Neuroethics and Space Ethics. His recent publications include Konrad Szocik, Mark Shelhamer, Martin Braddock, Francis A. Cucinotta, Chris Impey, Pete Worden, Ted Peters, Milan M. Ćirković, Kelly C. Smith, Koji Tachibana, Michael J. Reiss, Ziba Norman, Arvin M. Gouw, Gonzalo Munévar. 2021. Future Space Missions and Human Enhancement: Medical and Ethical Challenges. *Futures* 133 (October 2021) <https://doi.org/10.1016/j.futures.2021.102819>. And Koji Tachibana. 2019. Nonadmirable moral exemplars and virtue development. *Journal of Moral Education* 48(3) 346-357 (July 2019). <https://doi.org/10.1080/03057240.2019.1577723>. He is a member of the Aristotelian Society.

### **Keiichiro Yamamoto**

Keiichiro Yamamoto (ORCID 0000-0002-4763-4030), PhD, is head of the Office of Bioethics at the National Center for Global Health and Medicine in Tokyo, Japan. He received his doctorate in Ethics from the Kyoto University. His current research interests lie in Moral Philosophy, Bioethics, Research Ethics. His recent publications include Eisuke Nakazawa, Keiichiro Yamamoto, Alex John London, Akira Akabayashi, Solitary death and new lifestyles during and after COVID-19: wearable devices and public health ethics, *BMC Medical Ethics* 22 (89) (July 2021) <https://doi.org/10.1186/s12910-021-00657-9>; Kenji Matsui, Keiichiro Yamamoto, Shimon Tashiro, Tomohide Ibuki, A systematic approach to the disclosure of genomic findings in clinical practice and research: a proposed framework with colored matrix and decision-making pathways, *BMC Medical Ethics* 22 (168) (December 2021) <https://doi.org/10.1186/s12910-021-00738-9>. He is a member of the American Society for Bioethics and Humanities.

### **Akira Akabayashi**

Akira Akabayashi (ORCID 0000-0003-0811-1955), MD, PhD, is Professor of Biomedical Ethics at School of Public Health, Faculty of Medicine, The University of Tokyo, Japan, and Adjunct Professor of Medical Ethics at Division of Medical Ethics, New York University School of Medicine, New York, USA. His research interests span cross-cultural bioethics, global bioethics, medical/clinical ethics such as informed consent, organ transplantation, and end-of-life issues, public health ethics, research ethics, and bioethics policy making. As an academic researcher, he has published more than 180 original articles and more than 20 books or chapters in English in addition to many Japanese publications. He was a former member of the board of directors of International Association of Bioethics. He was also honored as a *Fellow of The Hastings Center (USA)* in 2008. He is currently an editorial board of *Journal of Medical Ethics*, *Cambridge Quarterly of Healthcare Ethics*, *BMC Medical Ethics*, and *Asian Bioethics Review*.

**Corresponding Author**

Akira Akabayashi, MD, PhD

7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan

Department of Biomedical Ethics, University of Tokyo Faculty of Medicine

akira.akabayashi@gmail.com; akirasan-ky@umin.ac.jp

**Funding**

This paper is supported by JST RISTEX Grant Number JPMJRX21XX, and SPS KAKENHI Grant Number JP20H05717.

**Statements and Declarations**

The authors have no financial or non-financial conflicts of interest or competing interests to disclose.

# The Neuroethics of Memory's Social Value: To What Extent Can Neurotechnologies That Manipulate Memory Be Permitted?

Eisuke Nakazawa, Koji Tachibana, Keiichiro Yamamoto, and Akira Akabayashi

## Abstract

Memory manipulation technology has the potential to disrupt the social value of memory. Although the development of pharmacological interventions aimed at alleviating the fear conditioning that causes post-traumatic stress disorder has been challenging, there has now been significant technical progress in manipulating fear conditioning through the use of neurofeedback technologies. The manipulation of memory is often criticized on the basis of the social value of memory, as well as on the grounds of preservation of personal identity and authenticity. The social value of memory has been overestimated and has normatively hindered the application of memory manipulation technologies. Even if the manipulation of memory interfered with the social value of memory, it would be permissible, provided it was limited. When a memory is related to an illegal or unethical behavior, the preservation of memory's social value should be given priority. The modification of collective memory can also lead to historical revisionism. Recognizing the social nature of memory, and endorsing, preserving, and narrating it, is supererogatory.

## Keywords

Memory, Social Value of Memory, Neurofeedback, PTSD

## 1. Introduction

Memory manipulation technology holds promise as a treatment for post-traumatic stress disorder (PTSD). Treatment of PTSD involves both symptomatic treatment—the administration of drugs for depression and anxiety related to traumatic memories—and cognitive behavioral therapy (CBT) aimed at controlling the traumatic memories that are the root cause (i.e., alleviating fear conditioning). As for the latter, cognitive processing therapy, cognitive therapy, eye movement desensitization and reprocessing, individual CBT with a trauma focus (undifferentiated), and prolonged exposure have been strongly recommended by the International Society for Traumatic Stress Studies (ISTSS) (Bisson et al. 2019).

In 2018, the ISTSS also proposed neurofeedback and *yoga* as treatments for PTSD based on emerging evidence, while adding a warning that as of yet the quality of the evidence is low (Bisson et al. 2019). Neurofeedback has also been used to alleviate fear

conditioning in traumatic memory, including decoded neurofeedback studies using fMRI (Koizumi et al. 2016) as well as research using electroencephalograms (van der Kolk et al. 2016; Steingrimsson et al. 2020). With regard to pharmacological interventions aimed at alleviating the fear conditioning that causes PTSD, a number of randomized controlled tests of drugs such as hydrocortisone and propranolol have been conducted, but with no major success (Astill Wright et al. 2019). Yet, studies using animal models have given us hope for the future prospects of research on memantine and other drugs (Ishikawa et al. 2019).

Given the clinical benefits of controlling traumatic memories and alleviating fear conditioning, we examine in this study the social implications of memory manipulation, with a particular focus on the social value of episodic memory (Liao and Sandberg 2008). Episodic memory is the privileged possession of individuals who can recall it. Considering the interiority of such memories, it may sound strange to insist that memories have social value. And yet, episodic memory includes descriptions of events that have occurred in this world where we have lived with others. Being conveyed to other people through language, episodic memory can be informed to others and develop intimacy and empathy with them (Alea and Bluck 2003). Thus, episodic memory has, at its core, social aspect (Alea and Bluck 2003). A representative type of episodic memory with social value is eyewitness memory, which frequently plays an important role in criminal trials (Lacy and Stark 2013). One can easily imagine how people's fates could turn on whether or not such memories exist. If the results of a specific incident have social impact, then it naturally follows that an eyewitness' memory of the incident has social value.

The social value of episodic memory is produced by primarily being mediated through language. By definition, episodic memory, which is episodic, includes both cognitive and non-cognitive aspects (Tulving 1972). Cognitive aspects can be communicated to others through language. Non-cognitive aspects, on the other hand, are the emotions and impressions connected to a particular episodic memory. Because manipulating technology of an individual's episodic memory usually intervenes the non-cognitive contents of memory, it may be tempting to conclude that it has no impact on the social value of memory. Alleviating fear conditioning involves the manipulation of the non-cognitive contents of episodic memory. The social value of memory must be communicable and comprehensible through language, and if we hold that it is possible to consolidate only the cognitive contents of episodic memory, it is understandable that we may be tempted by such conclusions. However, it appears to be conceptually and empirically impossible to regard the cognitive and non-cognitive contents of episodic memory as two parts that have no influence on one another. Moreover, it may be possible

that, by sensing the demeanor of an individual who is recalling an episodic memory, non-cognitive contents can be directly shared through compassion. Therefore, manipulating episodic memory, regardless of what form the manipulation takes, has the potential to affect the social value of memory.

Several researchers have discussed the social value of memory and its dampening (Liao and Sandberg 2008; Kolber 2006). These pioneering studies show that the social nature of memory is sharply opposed to memory manipulation. Liao and Sandberg (2008), for example, refer to the memory of Neil Armstrong, who was the first to reach the moon, and to the memory of Holocaust victims. Kolber (2006) goes further and argues that the need for medical treatment can defend against memory dampening. Although there are many other issues to be discussed regarding memory manipulation, such as personal identity and authenticity (Lavazza 2018; Lavazza 2019), we will focus on the social value of memory in this paper and pursue it in depth. Thus, we address the following questions in the present study. If a particular episodic memory possesses social value, how should we ethically evaluate medical interventions that erase or alter it? Is preserving such memories as they are our duty, or is it an act of supererogation?

## **2. Discussion**

### 2.1. PTSD Treatment and Memory Manipulation

The disruption of episodic memory with social value during the course of treating PTSD, regardless of the type of disruption, must be permitted at the social level. It fits within the patient's right to treatment. For patients who possess traumatic memories and suffer from PTSD symptoms, to demand the preservation of such memories would place an additional burden on those deeply hurt by past events. This should be avoided. Consequently, even if a memory that possesses social value should disappear from existence by manipulation, society must simply accept it.

Taking into account the above discussion, let us consider the following scenario. The episodic memory possessed by Person A is the cause of A's PTSD. However, the health and well-being of someone else, Person B, depends on that same episodic memory. Imagine that A is an eyewitness in a murder case, and B is a family member of the victim. The episodic memory that threatens A's mental state is for B a priceless last memory of that family member, and its loss represents the disappearance of something very important to B. Even in this particular scenario, demanding the patient suffering from PTSD symptoms

to preserve the memory is impermissible. This is because, while A's episodic memory directly and causally affects his or her health, the causal relationship between A's episodic memory and B's health is ad hoc. Consider also the following extreme hypothetical. Person C is a witness to a massacre that occurred during a 20th century war, and now C is the only surviving witness. The preservation of C's memory has value to society, and C's memory is proof that these many victims existed and were killed during the war. Nonetheless, demanding C to stop PTSD therapy to preserve that memory would not be justifiable because such prohibition must require C to be the victim for society and such requirement is against Kantian notion of moral. If society were to force that C preserve the memory that cause PTSD, C would be regarded not as a person from the society, but as a mere storage device, i.e., something instrumental.

## 2.2. Boundary Between Treatment and Enhancement

The use of neurotechnology to manipulate episodic memory that goes beyond PTSD treatment requires a more careful ethical analysis. Techniques beyond PTSD treatment refer to medical practices conducted without a PTSD diagnosis, i.e., medical practices not covered by public insurance. Therefore, this represents the use of medical techniques for the purpose of enhancement. There may certainly be advantages to manipulating memories for those who do not suffer from PTSD. Imagine the case of Person D and Person E. In the past, D had a heated argument with friend E. Even now, D dislikes E. D has difficulty behaving in a carefree way when sharing space and communicating with E, and thus behaves in a way that lacks initiative. No physician would diagnose D with PTSD. Yet, if possible, D would prefer to manipulate the memories of the past argument in order to suppress the emotional reaction toward E. By doing this, D desires to behave in a more carefree and active manner when communicating with E. D's desire does seem to be understandable.

In addition to closely examining memory manipulation technology from the standpoint of safety, it must also be subjected to ethical scrutiny from the standpoint of personal identity. As mentioned before, however, we focus only on the social value of memory here. The question we must ask is: Is it socially permissible to manipulate episodic memory with social value for the purpose of enhancement even if such manipulation undermines the value or even eliminates it? We believe it is, because an individual has ownership over his or her own memories. Ownership in this context is a concept similar to intellectual ownership like an idea created by a person. Regardless of

whether or not a given episodic memory possesses social value, the will and freedom of the individual based upon such intellectual ownership who undergoes memory manipulation must be respected. The permissibility of altering episodic memory should not be determined based on whether there is a diagnosis, or whether the purpose is enhancement, but should instead be left entirely to the individual's needs.

Yet, there are also episodic memories with social value for which manipulation is impermissible. Imagine another person, F, who is a murderer. For F to manipulate or erase the memory of the murder would unjustly advantage F when giving testimony at trial. At the very least, erasing the memory would provide some sort of advantage to F. Manipulation of this type of memory cannot be socially permitted. It is not simply that F is immoral for committing the crime, but also that the act of attempting to erase that memory is even more immoral since it is kind of destruction of evidence. Thus, when the episodic memory with social value is related to an illegal or unethical behavior, the manipulation of such memories must not be permitted.

### 2.3. Social Value of Personal Memory and Collective Memory

An episodic memory possessed by an individual is unique to that individual, and the individual alone has privileged access to the memory's contents. Thus, when an episodic memory possessed by an individual has social value, its social value is endorsed by sharing the contents of that memory with others through language. In this manner, such memories are conceptualized and become collective memory. As discussed previously, through compassion, the non-cognitive contents of memory can also modify collective memory. We have argued that in the case of personal memory, memory manipulation should be left up to the free will of the individual. When it comes to collective memory, however, memory that holds social value must not be manipulated arbitrarily. Imagine a new technology was developed to manipulate collective memory on a large such as a past war. We can find its precedents in neurological technologies that are already partially implementable through media that make use of subliminal effects, as well as the older method of 'school education.' However, from the standpoint of protecting the property of humanity, it would be immoral to use such manipulation to obliterate the memory of a past war and other large collective memories.



#### 2.4. Virtue of Preserving Memories with Social Value

If an individual conscious of the social value of his or her memory opts not to go through with manipulating it, even though preservation of the memory brings up negative emotions, then he or she is praiseworthy. In other words, his or her choice is supererogatory. Imagine the case of another person, Person G. G is a firefighter who in the past encountered many tragic fires. G experiences feelings of sadness every time he or she recalls the memory of past fires. Yet, recalling these memories is not accompanied by pathological symptoms. G believes that maintaining as much detail as possible of these memories is valuable for literacy efforts that aim to increase the public awareness of fire safety measures. G has the right to freely control this episodic memory. By choosing not to alter these memories, however, G contributes to society as a narrator. G's actions deserve praise in moral terms. Acknowledging the memory has social value and preserving it, and then narrating it, is supererogatory.

### **3. Conclusion**

Episodic memory can possess social value, and memory manipulation technology has the potential to violate this value. The use of memory manipulation technology to treat PTSD is legitimate. Moreover, even if the purpose is for enhancement, memory manipulation technology should be respected as an exercise of individual freedom, and therefore it follows that the disruption of memory's social value should be permitted. Immoral memories, however, are an exception, and the revision of collective memory requires much caution. In general, the preservation of memory is supererogatory, and the act of those who preserve episodic memory with social value is worthy of praise. Recognizing the social nature of memory, and endorsing, preserving, and narrating it, is supererogatory.

### **References**

Alea, Nicole, and Susan Bluck. 2003. "Why are you telling me that? A conceptual model of the social function of autobiographical memory." *Memory* 11 (2): 165–78. doi:10.1080/741938207

- Astill Wright, Laurence, Marit Sijbrandij, Rob Sinnerton, Catrin Lewis, Neil P. Roberts, and Jonathan I. Bisson. 2019. "Pharmacological prevention and early treatment of post-traumatic stress disorder and acute stress disorder: a systematic review and meta-analysis." *Translational Psychiatry* 9 (1): 334. doi:10.1038/s41398-019-0673-5
- Bisson, Jonathan I, Lucy Berliner, Marylene Cloitre, David Forbes, Tine K. Jensen, Catrin Lewis, Candice M. Monson, Miranda Olff, Stephen Pilling, David S. Riggs, Neil P. Roberts, and Francine Shapiro. 2019. "The International Society for Traumatic Stress Studies new guidelines for the prevention and treatment of posttraumatic stress disorder: Methodology and development process." *Journal of Traumatic Stress* 32 (4): 475–483. doi:10.1002/jts.22421
- Ishikawa, Rie, Chiaki Uchida, Shiho Kitaoka, Tomoyuki Furuyashiki, and Satoshi Kida. 2019. "Improvement of PTSD-like behavior by the forgetting effect of hippocampal neurogenesis enhancer memantine in a social defeat stress paradigm." *Molecular Brain* 12 (1): 68. doi:10.1186/s13041-019-0488-6
- Koizumi, Ai, Kaoru Amano, Aurelio Cortese, Kazuhisa Shibata, Wako Yoshida, Ben Seymour, Mitsuo Kawato, and Hakwan Lau. 2016. "Fear reduction without fear through reinforcement of neural activity that bypasses conscious exposure." *Nature Human Behaviour* 1:0006. doi:10.1038/s41562-016-0006
- Kolber, Adam J. 2006. "Therapeutic Forgetting: The Legal and Ethical Implications of Memory Dampening." *Vanderbilt Law Review* 59 (5): 1561–1626.
- Lacy, Joyce W., Craig E. L. Stark. 2013. "The neuroscience of memory: implications for the courtroom." *Nature reviews. Neuroscience* 14 (9): 649–658. doi:10.1038/nrn3563
- Lavazza, Andrea. 2018. "Memory-modulation: Self-improvement or self-depletion?" *Frontiers in psychology* 9: 469. doi: 10.3389/fpsyg.2018.00469
- Lavazza, Andrea. 2019. "Moral bioenhancement through memory-editing: A risk for identity and authenticity?" *Topoi* 38: 15–27.
- Liao, S. Matthew, and Anders Sandberg. 2008. "The normativity of memory modification." *Neuroethics* 1, 85–99. doi:10.1007/s12152-008-9009-5
- Steingrimsson, Steinn, Gorana Bilonic, Ann-Catrin Ekelund, Tomas Larson, Ida Stadig, Mikael Svensson, Iris Sarajlic Vukovic, Constanze Wartenberg, Olof Wrede, and Susanne Bernhardsson. 2020. "Electroencephalography-based neurofeedback as treatment for post-traumatic stress disorder: A systematic review and meta-analysis." *European Psychiatry* 63 (1): e7. doi:10.1192/j.eurpsy.2019.7

- Tulving, Endel. 1972. "Episodic and semantic memory." In *Organization of memory*, ed. E. Tulving and W. Donaldson, 381–403. New York: Academic Press.
- van der Kolk, Bessel A, Hilary Hodgdon, Mark Gapen, Regina Musicaro, Michael K. Suvak, Ed Hamlin, and Joseph Spinazzola. 2016. "A Randomized Controlled Study of Neurofeedback for Chronic PTSD." *PLoS One* 11 (12): e0166752. doi:10.1371/journal.pone.0166752