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Brain technologies of the self

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Summary

Taking care of oneself is increasingly interpreted as taking care of one's brain. Apart from drugs like antidepressants or ADHD-medicines, there are many more options to stimulate the brain. Brain products vary from books, food, soft-drinks, puzzles, toys, and games to – the topic of this dissertation – brain devices. Without undergoing any surgery, and without seeing a doctor, people can, for example, try to change their brain frequencies with light and sound machines. They can also use devices that work with electric or magnetic stimulation, like Cranial Electrotherapy Stimulation, transcranial Direct Current Stimulation, or Transcranial Magnetic Stimulation. Or they can try to change their brain waves with a neurofeedback device that provides feedback whenever their brain produces the intended brain wave activity, for example, in the form of the movement of a racing car or a Pac-Man on a computer screen. These techniques are promoted for various psychotherapeutic uses as well as for self-enhancement, and sometimes also for spiritual purposes and mind-altering effects. They can be bought on the Internet, used in brain clinics, or people can try to build their own brain machines.

Using a brain device to cure or improve oneself can be described as a contemporary 'technology of the self', an expression Michel Foucault used to refer to those techniques that 'permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality' (Foucault, 1988, p. 18). Different techniques, Foucault explained, are based on different forms of care and constitute different kinds of selves (Foucault, 1984a, 1988). People can work on themselves, for example, by taking antidepressants, seeing a psychoanalyst, or confessing one's sins – and hence they will perceive themselves as persons with chemical unbalances, repressed sexual desires, or struggles with the devil, which are basically three different ways of being oneself.

Following this idea of Foucault, this dissertation presents an ethnographical, historical and theoretical exploration of the mode of subjectivity that is constituted when people use a brain device to change themselves.

The first chapter gives an overview of the historical and contemporary uses of several brain technologies of the self, and analyzes why therapeutic brain devices do not have much scientific credibility yet. Following Ashmore et al. (2005), I argue that the scientific reliability of (therapeutic) effects partly depend on how findings are demonstrated, and for what public. Light and sound machines, for example, were often demonstrated with impressive histories – starting in prehistoric times, referring to recognizable and reproducible experiments, and full of famous spokespersons – but they were especially promoted as technologies for self-experimentation, and hence not so well presented in a scientific (public) domain. Electric and magnetic brain devices (like transcranial magnetic stimulation or transcranial direct current stimulation) are well demonstrated – with impressive histories, theatrical performances, and a professional demarcation policy – but representatives still have problems defending the therapeutic efficacy of these devices against skepticism, and hence attaining scientific credibility. Neurofeedback was historically promoted as both a scientific and a spiritual practice and until today experts have problems translating their therapeutic findings into experimental settings, and hence to transfer their results from a personal (spiritual and self-help) into a scientific (public and polemic) domain.

The first chapter analyzes why therapeutic brain devices do not have much scientific credibility yet, but the second chapter makes clear that this lack of approval does not mean that these devices do not have effects. My ethnographic research among clients and practitioners of neurofeedback shows that this therapy can change people's notion of themselves. Trying to change your brain activity with the purpose of improving yourself suggests that this self is, or is in, the brain. When explaining their actions, however, users make a clear distinction between their selves and their brains, with statements such as: 'It seems that at the moment you start focusing, your brain interrupts.' Apparently, people start doing neurofeedback

because they want to improve themselves, but to react to the feedback of their brains they have to distance their selves from their brains. In other words, the self is *extended* with the brain instead of coinciding with it.

Besides a self and a brain, other entities can also be identified. Neurofeedback users sometimes designate their subconscious, their will power, the computer, or the practitioner as the actor that trains their brain. When explaining their problems, they refer to various brain related entities like 'alpha and theta things' or 'yellow spot'. In addition to these brain-related entities, users involve their lives and psychology with statements like 'it is my life that made me quiet'. They describe themselves and the neurofeedback process in a rather computerized way ('my system resets itself'), and they often combine this materialistic view with spiritual practices like yoga or meditation. That is to say, users of neurofeedback constitute a new way of being themselves. This self can be described as an extended or 'layered' self made up of all kinds of entities that emerged in the neurofeedback process.

This change of the self should not be considered as only a matter of perception. According to neurofeedback users, the confrontation with the biological equivalent of their behavior gave them, for example, the experience of loss ('I had always thought I was controlled by myself'); of fear ('a bio-organic robot'); and of relief ('you lack a certain substance in your brain'). Some users encourage their friends or family members to do neurofeedback too. They often claim that they would prefer resuming sessions if their problems returned, and sometimes, clients buy the equipment to train themselves (or their relatives), or to set up their own clinics. That is to say, doing neurofeedback does not only change the way people see themselves, their problems and their responsibility, it also changes their behavior, their relationships and the way they handle new problems. The new way of seeing themselves because of the neurofeedback has created a new way of being themselves. It is important to stress this ontological change since it demonstrates the effects of neurofeedback: irrespective of the clinical results, the effect of neurofeedback is very clear in the sense that it creates a new way of being oneself.

To understand how neurofeedback users constitute a new way of being, it is also necessary to analyze how other actors help them creating this mode of self. As could already be observed in the interviews with users, 'the others' are not only humans (practitioners, scientists, or relatives), but also non-humans (computers, brain maps, games). Hence, the third chapter is based on the work of the sociologist of science Andrew Pickering who describes scientific practices as dances of agency between humans and non-humans. I show that not only the act of doing neurofeedback – trying to control your brain waves, for example by effecting a movement in a computer game – can be described as a dance of agency, but that the whole process involves various actors.

To become clients, people first have to be aware of their problems, their brains, and the 'solution'. Actors varying from relatives, psychiatrists, psychological tests, brain maps, neurofeedback practitioners, metaphors and success stories are involved in this awareness process. During the therapy, practitioners use tools like footstools, neurofeedback teddy bears, or movies to keep their client's attention. They do not only work with their client's brains, but also have to calm down their minds and posture their bodies. Moreover, when questioning practitioners about the neurofeedback process many more actors become involved, while it is not always clear who or what is the leading agent. Practitioners are not always the experts because they sometimes simply lack the knowledge, protocols do not always work, qEEGs can behave unpredictably, and computers sometimes appear to be the actors that define the training. As a result of these uncertainties, practitioners more or less experiment on their clients to find out which protocol, method or frequency range works for which client. That is to say, neurofeedback can be described as a process of trial-and-error-tinkering (Pickering 1995), in which human and non-human actors perform a dance of agency, without following a clear choreography.

The envisioned result of this all is a restored or improved client. To recognize this improvement, however, practitioners often have to help their clients by pointing out what is changed, not only in their client's brains, but mostly in their

feelings, performances or lives. For this, they appeal to many actors. Actors varying from parents, brain maps, to specific results can make the client conscious of his or her changed state, which can be found 'inside' of the brain (normalized brain waves), mind (a reduction of stress), body (physical experiences), or somewhere outside in the world (tests, performances). Another kind of result, however, is again a dance of agency, but now concerning the self of the client. Some of the actors that emerged during the neurofeedback process - brain waves, computers, colored spots - , keep on working on the self of the client.

Chapter four aims to better understand the emergence of these entities working on the self of the user. I analyze the lives and ideas of four central figures in the history of neurofeedback, and compose a historical ontology of the 'extended self'. I show that the 'discoverer of the human EEG', the German psychiatrist and psychophysicist Hans Berger (1873-1941), was driven by a personal and spiritual mission, but became increasingly frustrated about the complicated relationship between physical and psychical events. One of his followers, the British neurophysiologist and cyberneticist William Grey Walter (1910-1977), introduced the first brain wave stimulation technologies, and hence the first struggles between brains and subjects. Moreover, he connected brain waves to personality types by writing about brain brothers and strangers, and he entangled humans and machines by building robots with self-recognition and by describing the brain as an adaptive system. Two so-called 'founding fathers of neurofeedback', the American psychologists Joe Kamiya (1925) and Barry Sterman (1935), both performed experiments in which their subjects learned to train their brain at will, in order to become more spiritual, or to improve one's personality.

The self was connected to the brain in the work of Berger, replaced by the brain in the work of Walter, and restored as an autonomous entity that could act upon the brain in the work of Kamiya and Sterman. In these developments, brain related entities were distinguished, material and spiritual ideas became entangled, human-machine connections arose, and a complicated relationship between the brain and the self emerged in which they started to control each

other. Contemporary practitioners on the one hand state that neurofeedback gives control back to the client, but on the other hand use language that comes close to the terminology of Walter, for example, when talking about 'low levels of dopamine walking into your door'. Moreover, in line with the ideas of neurofeedback pioneers, some contemporary practitioners combine their materialistic brain therapies with spiritual practices, such as meditation or yoga.

Using a device to understand, control, or cure the self by the brain changes people's notion of their selves. Contemporary neurofeedback users – clients and practitioners – make a blend of technical, physiological, spiritual and personal statements to express themselves and how they deal with their problems. This 'new' way of self is personal and unique, but it is also a result of a historical quest to grasp the (spiritual) self with a brain device. This dissertation argues that trying to explain or improve the self by working on the brain constitutes an extended way of being oneself. Since this argument might disagree with many individual and scientific experiences, I finish with a reflection on my explanation of the extended self. I conclude that this self is complex, not because it is an activity of multiple entities, but because it contradicts common understandings of being a self. If we want to slow down this process of extending, for example, because it makes the self increasingly complicated to understand, feel free about or responsible for, it is worthwhile to start making it visible.