

March 2019

Virtual Lucidity: A Media Archaeology of Dream Hacking Wearables

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In 2014, engineers and entrepreneurs began meeting up in San Francisco to explore how virtual reality and lucid dreaming headsets using electroencephalography and other kinds of biofeedback could stimulate altered mental states. They called these practices “consciousness hacking” and referred to research, financing, and design efforts around these wearables as a movement. Unlike Quantified Self practitioners who combine bodily self-tracking and population analytics to optimize health and productivity, these hackers prod their bodies to gain immediacy to their consciousness. By turning perception inward, they attempt to displace the mediation of technologies. They believe hacking the mind through data-driven stimulation can transform it into the ultimate medium for purposeful dreams, flow states, positive emotions, and secular revelations about the self, unconscious, and nature of experience. How do these practices reconcile New Age assumptions about the sacred essence of the self, with biopolitical assumptions about the self as a database to be rationalized according to the 24/7 demands of late capitalism? This essay uses media archeology to examine how discursive and material practices around consciousness hacking proffer a vision about the mind as medium that is futuristic yet ancient. By using the Consciousness Hacking movement as a starting point to investigate historical neuro-stimulative apparatuses for lucid dreaming, media archaeology can trace convergent trajectories of self-knowledge and self-making. This analysis traces connections from Bert Kaplan’s 1950s database of dreams, to crowdfunded EEG headsets that promise to unlock the secrets of the collective unconscious using big data analytics. By probing historical antecedents of datalogical fantasies, this project demonstrates the value of critical inquiry into the techno-spiritual undercurrent of contemporary technoculture, its models and mechanisms for the human sensorium, and its metaphors that we live by.

Keywords

Consciousness Hacking, wearables, media archaeology, immediacy, anthropology of dreaming, sleep science, New Age

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Cover Page Footnote

This research was supported by the Academy of Finland project Centre of Excellence in Game Culture Studies (CoE-GameCult, [312397])".

Introduction

In 2015, a panel of engineers and researchers gathered in a private university in Palo Alto to discuss the latest developments in “Dream Tech” with fellow practitioners of dream interpretation and augmentation. One of these technologies was a wearable headband that used electroencephalography (EEG) sensors and stimulation to encourage brain states that were conducive to lucid dreaming: a phenomenon where people are aware they are dreaming while they are dreaming and may exert some control over dream characters, narratives, or environments. Research with human subjects in sleep laboratories demonstrates that lucidity occurs during Rapid Eye Movement (REM) sleep and is a mental state that, with practice, can be activated at will.¹

These sleep scientists understand self-awareness and self-reflexiveness in dreams as rooted in some conception of the self, and therefore see dream lucidity as contiguous with other practices of self-development such as dream analysis, psychotherapy, and meditation.² These practices overlap with what is known as “dreamwork” and include mental, behavioral and communicational techniques and rituals to both interpret and produce dreams.³ This process of procuring or governing dreams has a long history and is often referred to as incubation, after a practice that was common in Greek and early Christian times.⁴ The EEG headset was promoted at the Palo Alto panel as taking the work out of dreamwork. This was done by comparing lucid dreaming to virtual reality:

Virtual reality ... is like the gateway drug to lucid dreaming, because lucid dreaming, once it's stable is like virtual reality from fifty years into the future where you have photorealistic, full immersion, full bodysuit that you can't even feel, [and] mind control to some degree over the environment. It's absolutely remarkable and you can do anything from flying, to talk to dead relatives. Your imagination is the limit.⁵

¹ Tracey Kahan and Stephen LaBerge, “Lucid Dreaming as Metacognition: Implications for Cognitive Science,” *Consciousness and Cognition* 3, no. 2 (1994): 248-249.

² Jayne Gackenbach, “Frameworks for Understanding Lucid Dreaming: A Review,” *Dreaming* 1, no. 2 (1991): 109.

³ Barbara Tedlock, “The New Anthropology of Dreaming,” *Dreaming* 1, no. 2 (1991): 161.

⁴ Steven Connor, *Dream Machines* (London: Open Humanities Press, 2017), 56.

⁵ The panel took place in Sofia University, an institution specializing in psychology with spiritual or religious orientations. This quotation is taken from a presentation by Jay Mutzafi, the host of the

This was one of many talks, demonstrations, and networking activities in the San Francisco Bay Area organized by the Consciousness Hacking network, which connects makers to developers and scientists interested in using consumer electronics to explore altered mental states. Consistent across Consciousness Hacking's events and online presence is a way of talking about the mind as a medium for experiencing content that is more immersive, spectacular, and meaningful than other time-based media.

This essay draws from media archaeological approaches to analyze dream technologies from 1960s stroboscopic machines to contemporary neuro-stimulative wearables to show how Consciousness Hacking strives to apotheosize an enduring human desire for immediacy. This latest attempt to minimize media to its imagined experiential essence is predictably achieved through a sensory barrage of electrodes on wearables controlled by mobile interfaces and synchronized with web applications. These interfaces are in turn supported by a sprawling backend of databases and analytics that are indecipherable to users.

Consciousness Hacking is steeped in the New Age movement's hybridization of spirituality and technology. However, these Hackers' neuro-technological quest for a kind of immediacy instrumentalizes Western dream culture and distances it from historical connections to the numinous. This essay proposes that modeling the mind as an optimizable medium for experiential content short-circuits dreamwork's tradition of communicating subjective experiences. Data-driven dream stimulation urges users towards solipsistic mental experiences, eschewing human interpretation for machine learning. In this sense, dream wearables encourage modes of lucidity that atomize individual experiences, shrouding the vision of a collective unconscious within algorithmic black boxes. This analysis suggests recuperating the desire for communicative immediacy away from contemporary notions of connection and collation, and towards the archaic ideal of communion.

Media Archaeological Approaches

Media archaeology is a group of related approaches drawing from critical genealogy, which according to Foucault, engages with a profusion of lost events in order to uncover the incoherence of reified rhetorical formations. Critical genealogy attempts

Lucid Dreaming Podcast and developer of the Kenshō lucid dreaming wearable. The recording of the panel discussion was published on Consciousness Hacking's YouTube channel on December 15, 2015.

to illuminate something about the present by looking to the past; to retell stories that are operative in shaping contemporary beliefs, by dwelling on the contradictions and complexities of a reified discourse.⁶ Like critical genealogy, media archaeologists look to the past to critique the hegemony of the new that dominates teleological narratives around communication technologies.⁷ They do this by re-articulating the past not as a trajectory but as cyclical loops and kinks. This serves as an important counterpoint to deeply held assumptions about human technological progress as a linear or arborescent structure from primitive to complex.⁸

Despite its name, media archaeology does not derive from Foucault's archaeology of knowledge,⁹ which attempts to systematically describe a discourse object according to a specific set of rules. Unlike Foucauldian archaeology, media archaeology does not dissolve its object of analysis in order to reveal a system of rules and material practices.¹⁰ Instead, media archaeologists shift attention from cultural history to the particularities and agencies of artifacts and apparatuses.¹¹ The point that media were not reducible either to content or to sociological conditions was a crucial intervention made by media archaeological approaches. This emphasis on medium specificity and the technical and even mathematical aspects of transmission, processing, storage, and distribution is shared with software studies¹² and more generally, with German media theory.

Media archaeological orientations range in their technological determinism from Kittler's emphasis on media's structuring of sensory perceptions, modes of

⁶ Michel Foucault, James Faubion, and Robert Hurley. *Aesthetics, Method, and Epistemology* (New York: New Press, 1998).

⁷ Jussi Parikka, *What is Media Archaeology?* (Cambridge: Polity Press, 2012).

⁸ Siegfried Zielinski, *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*, (Cambridge: MIT Press, 2006), 7. Zielinski proposes the framework of "variantology" to emphasize the heterogeneity and relativism of local explorations into media over overarching or universal explanations.

⁹ Michel Foucault. *The Archaeology of Knowledge*, trans. Sheridan Smith (New York: Pantheon, 1972).

¹⁰ Eric Kluitenberg, "On the Archaeology of Imaginary Media," in *Media Archaeology: Approaches, Applications, and Implications*, eds. Erkki Huhtamo and Jussi Parikka (Berkeley: University of California Press, 2011), 52.

¹¹ Wolfgang Ernst. "Media Archaeography: Method and Machine versus History and Narrative of Media" in *Media archaeology: Approaches, Applications, and Implications*, eds. Erkki Huhtamo and Jussi Parikka (Berkeley: University of California Press, 2011), 241.

¹² Wendy Hui Kyong Chun, "The Enduring Ephemeral, or the Future is a Memory." *Critical Inquiry* 35, no. 1 (2008): 148-171.

memory, and social relations,¹³ to Huhtamo's qualification that media are outcomes of discursive practices.¹⁴ Even though Kittler never aligned himself with media archaeology, his work within German media theory is foundational to its approaches and orientations.¹⁵ Kittler argues that certain media such as writing, phonography, or film can be considered paradigmatic for understanding the self and the world.¹⁶ In other words, media provide models for self-understanding because they were developed strategically to override the senses, and in doing so they are uniquely able to model our mental faculties after their own logic.¹⁷ German media theory is a transdisciplinary pursuit without shared methods or concepts¹⁸ but finds common ground in disrupting teleological or gradualist notions of media history.¹⁹ Similarly, divergent approaches in media archaeology are united by their resistance towards dominant media-historical narratives. This is often done by revealing how cultural logics are intertwined with the technological momentums.²⁰ This essay draws from

¹³ Friedrich Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999), xxvii. Kittler proposes that the phonograph, film, and typewriter are paradigmatic technical media that operate metaphorically, but in ways that are crucially different from writing. To summarize, phonography captures and hence gives us re-playable access to what Lacan referred to as the "real," an embodied experience of the world and the self that is anterior to semiotic order and linguistic meaning. Kittler suggests that the phonograph attunes our faculties to "the waste or residue that neither the mirror of the imaginary nor the grid of the symbolic can catch: the physiological accidents and stochastic disorder of bodies." Film captures and hence gives us access to what Lacan referred to as the "imaginary" - the mirror image of the body whose visual perfection contrasts with its embodied messiness and lack of coordination. Because of its function as a mirror, Lacan postulated that an infant's sense of self or ego arises from this imaginary. Finally, typewriting captures and hence gives us access to what Lacan called the "symbolic" - the ordered grid of the machine which purges all trace of handwriting, the body, and the soul, and in doing so purifies its texts of all semantics, meaning, and degrees of configuration. According to Kittler, typewriting and its orientation of our faculties to the grid of the symbolic laid the groundwork for the concept of information in telecommunications, which is inextricable from its militaristic roots.

¹⁴ Simon Ganahl, "From Media Archaeology to Media Genealogy: An Interview with Erkki Huhtamo." *Le foucauldien* 2, no. 1 (2016).

¹⁵ Parikka, *What is Media Archaeology?*, 67.

¹⁶ Friedrich Kittler, *Optical Media: Berlin Lectures 1999*, trans. Anthony Enns (Cambridge: Polity, 2010)

¹⁷ For example, to experience a perspective painting we must be trained to see a third dimension which is not there; to experience a film we must be made to see not the actuality of individual frames, but its fusion into an illusory whole.

¹⁸ Eva Horn, "Editor's Introduction: 'There Are No Media,'" *Grey Room* (2007).

¹⁹ Geoffrey Winthrop-Young and Nicholas Gane, "Friedrich Kittler: an Introduction," *Theory, Culture & Society* 23, no. 7-8 (2006).

²⁰ Ernst, "Media Archaeography."

these archaeological approaches to suggest how brain imaging and data analytics do not chart a straightforward path towards progress. Instead, these seemingly novel applications spiral around a persistent set of graphical techniques and presumptions.

Media archaeology also goes beyond the Foucauldian tradition's discursive and institutional concerns by investigating forgotten and obsolete apparatuses. This is done to understand how old technologies are remediated in contemporary devices and their imagined futures.²¹ This focus reveals how media often revive and recirculate techniques of communication that had been lost, neglected, or obscured. This entails attention to the material diagrammatics of technologies and how they mediate the technics of the body.²² Media archaeology shares this focus with a division of German media theory who study "cultural techniques," or operative sequences that constitute media such as techniques of the body and symbolic systems such as writing or measurement.²³ With these goals in mind, the next section traces the materialities of dream technologies from mechanical experiments to sleek consumer wearables, which will inform an analysis of its cultural logics, New Age contexts, and algorithmic politics.

Dream Technologies and Techniques

On the face of it, the trajectory of dream tech leading up to Consciousness Hacking seems like a straightforward progression from the mechanical and electrical to the digital. For example, the 1960s Dreamachine uses stroboscopic stimulation, the 1990s NovaDreamer uses electrooculography, while the 2010s lucid dreaming headsets use electroencephalographic (EEG) biofeedback and stimulation to invoke dream-like or dream experiences. However, this media archaeological analysis will illustrate how this development of dream devices have not progressed from rudimentary to complex. Instead, the basic premise of the mind as a kind of black box whose inputs can be manipulated for the output of dream content remains consistent.

Also consistent is the centrality of EEG techniques, which were pioneered by Hans Berger in 1925, based on the discovery of regular rhythms of electrical discharge in the brain. These techniques use electrodes attached to the scalp to measure the

²¹ Erkki Huhtamo and Jussi Parikka, eds. *Media Archaeology: Approaches, Applications, and Implications*. (Berkeley: University of California Press, 2011)

²² Parikka, *What is Media Archaeology?*

²³ Bernhard Siegert, "Cacography or Communication? Cultural Techniques in German media Studies." *Grey Room* (2007).

electrical activity of thousands of cortical neurons at the same time. What is measured is the different rate of interactions between nerve synapses that compose what has come to be known as alpha, beta waves and so on. These waves become predominant or recessive at different phases of sleep and can be charted and analyzed.²⁴ Tracing the history of sleep labs, Kenton Kroker states that EEG's graphical method provided an objective measurement of subjective experiences of dreams that was essential in framing sleep as an object of scientific study.²⁵

From cultural and technical angles, dream devices do not chart a grand narrative of progress but seem to be spiraling around the same Cartesian desire of overriding corporeal senses and biological functions through an imagined master code to program the mind. Within this spiral, the development of technological means pales in comparison to changes in the meaning of dreams and the purposes of their incubation. While dreams are still imagined to embody immediacy to some kind of truth, today this is less a cosmic truth of spiritual or artistic revelation and more a statistical truth of self-knowledge and biopolitical optimization. The rest of this section will outline the contours and contexts of these stroboscopic, electrooculographic, and electroencephalographic techniques and the shifting purposes of their dream incubation.

1960s: Gysin Stroboscopic Dreamachine

In 1960, the artist and poet Brion Gysin worked with engineer Ian Sommerville to create the Dreamachine, a flicker device designed as an art object to be viewed with one's eyes closed.²⁶ It was constructed from a 100-watt light bulb suspended within a perforated cardboard cylinder. When mounted on the turntable of a record player rotating at 45 or 78 revolutions per minute (rpm), the device produced a regular pattern of flickers. People sitting in front of the device with their eyes closed experienced trance-like hallucinations, some claiming to have entered hypnagogic states. These are liminal states of consciousness between drowsy wakefulness and light sleep where people report vivid yet dream-like visual and sensory experiences.²⁷ When

²⁴ Matthew Fuller, *How to Sleep: The Art, Biology and Culture of Unconsciousness* (London: Bloomsbury, 2018), 40.

²⁵ Kenton Kroker, *The Sleep of Others and the Transformations of Sleep Research*. (Toronto: University of Toronto Press, 2007), 263.

²⁶ The Dreamachine was officially unveiled in March 1962 at an exhibition titled THE OBJECT at the Musée des Arts Décoratifs in Paris.

²⁷ Jonathan Crary, *24/7: Late Capitalism and the Ends of Sleep* (London: Verso Books, 2013), 107.

it was exhibited at New York's New Museum in 2010,²⁸ visitors reported a range of experiences from relaxation to intoxication.²⁹

According to literary scholar Steven Conner, Gysin postulated that participants were seeing the reticular structure of the retina itself, an experience associated with amplified neural oscillations, in the range 7.5-12.5 hertz, which were induced by the Dreamachine's flicker pattern. This design was partially inspired by Gysin's hallucinatory experience while traveling on a bus through a long avenue of trees to Marseilles. Gysin recalled in his diary how he experienced a "transcendental storm of colour visions" behind his closed eyelids that felt like "I was swept out of time. I was out in a world of infinite number."³⁰

The writer William Burroughs, who was Gysin's friend and collaborator, connected this vision to neurophysiologist William Grey Walter's book *The Living Brain*. Walter proposed that EEG detecting techniques could be reversed by subjecting the brain to rhythmic pulses of light through various kinds of flicker apparatuses.³¹ The idea was to mirror the rhythm of the brain with the flicker of the light to learn more about encephalic systems by modulating incoming against outgoing signals. Walter compared this method of understanding the brain to the engineer's method of the black box, whose inner workings can be deciphered without peering inside.

The Dreamachine was devised and deployed in a nameless run-down hotel in the Latin Quarter of Paris where many figures of the Beat Generation literary movement including William Burroughs, Allen Ginsburg, and Jack Kerouac resided. It was a squalid rat-infested building with shoddy plumbing that became known as the "Beat Hotel." In addition to writers and poets, the eccentric hotelier welcomed musicians, painters, photographers, their models, and allowed her guests the freedom to live exactly as they pleased. This involved heavy drinking, experimentation with psychoactive drugs, and occult rituals such as scrying, a form of focused concentration akin to crystal ball gazing.³²

²⁸ A description of and recordings from the exhibit "Brion Gysin: Dream Machine" are available at the New Museum's Digital Archive.

²⁹ The video interviews are available at WNYC's YouTube channel.

³⁰ Brion Gysin, *Back in No Time: The Brion Gysin Reader*, ed. Jason Weiss (Middletown: Wesleyan University Press, 2001), 113.

³¹ William Walter, *The Living Brain* (Harmondsworth: Penguin, 1963). Cited in Connor, *Dream Machines*, 51-52.

³² Barry Miles, *The Beat Hotel: Ginsberg, Burroughs, and Corso in Paris, 1958-1963*. (New York: Grove Press, 2000).

Steeped in Beat culture's spiritual and psychedelic experimentation, many residents interpreted the Dreamachine's visual effects to be otherworldly visions. Gysin framed these visions as a kind of "individualistic dream cinema" within the theatre of their minds.³³ He believed that the Dreamachine could free images from all representational mediums. He proposed that the future of painting was the mind, which could be an inexhaustible source of artistic revelation with the help of the Dreamachine.³⁴ This deceptively simple mechanical apparatus crystalizes a powerful belief about the mind as the ultimate screen that would underlie subsequent dream devices. The mirroring of its stroboscopic rhythms with brainwaves also captured an idea about biofeedback already present in early 20th century EEG technology, and would later be miniaturized in its most rudimentary form for consumer electronics.

Dream Cultures and Lucidity Incubation

Gysin's use of cinematic metaphors to associate altered states of consciousness with dreaming is not incidental. Psychologist Susan Blackmore offers that altered states are often self-reported as ineffable, involving a sense of the numinous, mystical, or religious. Key to this subjective experience is a transformed sense of self involving varying degrees of merger with the universe.³⁵ Anthropologists Schulman and Stroumsa offer that because of their liminality, "dreams offer a constant balance between the private world of latent images, fears, and hopes, and outside reality, cosmic as well as social."³⁶ In 2010, when reporting on its exhibition at the New Museum in New York, art critic Marina Cashdan described the experience of the Dreamachine as an almost transcendental place, "between imagination and reality, dream and real life."³⁷ Like the liminal experiences Gysin's machine was named after, lucid dreaming is a common and manipulable altered state of consciousness, reported to have occurred in fifty percent of people, with twenty percent experiencing them frequently.³⁸

³³ Connor, *Dream Machines*, 55.

³⁴ Marina Cashdan, "The Idea Machine: Brion Gysin." *The White Room*. Issue 1 (February 2011), <http://www.thewhitereview.org/feature/the-idea-machine-brion-gysin>.

³⁵ Susan Blackmore, *A Very Short Introduction to Consciousness*, (Oxford: Oxford University Press, 2005), III.

³⁶ David Shulman and Guy Stroumsa, eds., *Dream Cultures: Explorations in the Comparative History of Dreaming* (Oxford: Oxford University Press, 1999), 6.

³⁷ Cashdan, "The Idea Machine."

³⁸ Blackmore, *Consciousness*, 101.

Lucid dreaming is an altered state of consciousness where people have a reflexive awareness of the dream state while they are dreaming. This may include the ability to intentionally control dream environments or actions, which many sleep researchers understand as related, but orthogonal to lucidity.³⁹ Lucid dreams (and dreams in general) occur most often during Rapid Eye Movement (REM) sleep, a rapid, jerky, and binocularly symmetrical pattern of eye motility that typically runs in two to three cycles between 1 hour and 40 minutes to 4 hours and 50 minutes after going to sleep.⁴⁰ These eye movements cooccur with autonomic physiology such as a faster pulse and breathing and low muscle tone throughout the body. Lucid dreaming is also associated with electrical connectivity in the brain between the right and left hemispheres in the alpha and theta range. This connectivity is known as interhemispheric coherence, which measures the degree to which components of the brain are working in unison.⁴¹

The anthropologist of dreaming Barbara Tedlock explains that from a phenomenological point of view, “lucid dreaming tends toward sensory clarity, bodily presence, and an expansive emotional thrill or numinous religious feeling.”⁴² Experimental psychologist Jayne Gackenbach reports that several studies have shown that experiences of “transcending” during the practice of meditation, like lucid dreaming, are associated with EEG measurements of interhemispheric coherence.⁴³ She proposes that dream lucidity is contiguous with meditation on the level of brain activity, and also with dream analysis and psychotherapy. This is because the reflexivity in dreams, like practices of self-development, are rooted in some conception of the self. These practices overlap with what is known as “dreamwork” and include mental, behavioral and communication techniques and rituals to both interpret and produce dreams.⁴⁴

Dreams need to be translated into cultural forms such as stories, chants, songs, dances, visual depictions, and ritual artifacts to gain meaning through its

³⁹ Gackenbach, “Frameworks for Understanding Lucid Dreaming,” 111.

⁴⁰ Eugene Aserinsky and Nathaniel Kleitman. “Regularly Occurring Periods of Eye Motility, and Concomitant Phenomena, During Sleep.” *Science* 118, no. 3062 (1953).

⁴¹ Gackenbach, “Frameworks for Understanding Lucid Dreaming.”

⁴² Barbara Tedlock, “Sharing and Interpreting Dreams in Amerindian Nations,” in David Shulman and Guy Stroumsa, eds., *Dream Cultures: Explorations in the Comparative History of Dreaming* (Oxford: Oxford University Press, 1999): 87-103.

⁴³ Gackenbach, “Frameworks for Understanding Lucid Dreaming,” 120.

⁴⁴ Tedlock, “The New Anthropology of Dreaming.”

communication.⁴⁵ In a footnote to *The Interpretation of Dreams*, Freud acknowledged the importance of what he called the “dream-work” of narrativization that coheres memories about dreams into communicable forms.⁴⁶ This work of narrativizing, attributing meaning to, and sharing dreams takes place in the context of personal stories and social goals.⁴⁷ What we think of as dreams, are always-already processed through an interpretive lens. Dream interpretation in Western culture can be traced back to the ancient Greek practice of oneiromancy, or dream divination. For example, the 2nd-century diviner Artemidorus’s five-volume *Oneirocritica* provides comprehensive, logical, and meticulous classifications of dreams according to length, subject matter, time orientation, and so on. These ancient categories consider the character and circumstance of the dreamer in tandem with dream content, thereby anticipating Freudian interpretation in important ways.⁴⁸

Dreamwork also includes the process of producing or governing dreams, which has a long history and is often referred to as “incubation,” after a practice that was common in ancient Greece, one of many cultures throughout history that considered dreams valuable sources of wisdom. For example, there is some evidence of dream rituals at the temple of the chthonian deity Amphiaraos at the ancient Greek city of Oropos, where the sick sought diagnostic dreams by sacrificing a black ram and sleeping on its spread-out skin.⁴⁹

Dreams are also central to many Native American societies, which see dreaming and waking reality not as compartmentalized worlds but as overlapping experiences. The goal of Native American dreamwork is to enhance self-knowledge and self-respect, as well as to make a connection to the world of spiritual beings. Within this tradition, dreams exist in a magical space that is created during the process of dialoguing with the imaginal world of deceased elders.⁵⁰ Children undergo training in dream lucidity to develop self-awareness, self-reliance, and to incubate powerful life-changing dreams. The incubation of lucid dreams in Native American, Euro-American culture, and to some extent Greek antiquity all involve some mental priming to consciously choosing to dream and shape the content of one’s dreams. For

⁴⁵ Barbara Tedlock, “The Poetics and Spirituality of Dreaming: A Native American Enactive Theory.” *Dreaming* 14, no. 2-3 (2004).

⁴⁶ Connor, *Dream Machines*, 63.

⁴⁷ Harilaos Stefanakis, “Speaking of Dreams: A Social Constructionist Account of Dream Sharing.” *Dreaming* 5, no. 2 (1995).

⁴⁸ Arthur S. Osley, “Notes on Artemidorus’ *Oneirocritica*,” *The Classical Journal* 59, no. 2 (1963).

⁴⁹ Connor, *Dream Machines*, 56.

⁵⁰ Tedlock, “The Poetics and Spirituality of Dreaming.”

example, lucid dreamers are trained to ask themselves if they are dreaming at regular intervals while awake in order to prime their sleeping consciousness to ask the same question within dreams to gain lucidity. However, Euro-American lucid dreaming differs significantly from these other traditions in its context, methods, and goals.⁵¹

Although Artemidorus's *Oneirocritica* paved the way for Freud's *The Interpretation of Dreams*, its divinatory purposes contrast with the relatively marginalized position dreams and its interpretation hold in the modern West. Anthropologists of dreaming Shulman and Stroumsa offer that "For Freud, as for modern Western civilisation as a whole, the dream has been fully subjectivized: it no longer refers to another world, outside the individual, nor as it any legitimate location within the public sphere."⁵² Psychophysicologists such as Kahan and LaBerge refer to this as the "deficiency view of dreaming," which stems from the Freudian claim that dreaming and waking are discontinuous. It follows from this line of thought that dreaming is characterized by primary process thinking such as magical thinking, symbolic displacement, and condensation, while waking is characterized by secondary thought processes such as adult logic and rationality.

This marginalization of dreams can be contextualized within what cultural theorist Matthew Fuller suggests is a Western culture that understands sleep as a dormant, passive, and negative space that needs to be optimized by sleep science to augment waking functions.⁵³ For example, sleep science is routinely used to sell mattresses and pharmacological sleep aids. Kenton Kroker maintains that this marginalization of dreams takes place even in sociological studies, which ignore the pivotal role of dream research in the establishment of sleep science as a field.⁵⁴ Alexei Penzin adds that this logocentric view of sleep as outside rationality motivates contemporary practices that seek to manage and regulate lucid dreams.⁵⁵ In contrast to communal rituals of Native American incubation, Euro-American lucid dreamers typically read books on the topic and work alone or in small groups within secular settings. The goal of lucid dreaming in these cultures is to receive a personal feeling of control or mastery over one's own consciousness.⁵⁶ Western incubation practices motivated by optimization will be the focus of the rest of this section.

⁵¹ Ibid.

⁵² Shulman and Stroumsa, eds. *Dream Cultures*, 12.

⁵³ Fuller, *How to Sleep*.

⁵⁴ Kroker, *The Sleep of Others and the Transformations of Sleep Research*.

⁵⁵ Alexei Penzin, *Rex Exsomnia: Sleep and Subjectivity in Capitalist Modernity* (Kassel: Hatje Cantz, 2012).

⁵⁶ Tedlock, "The Poetics and Spirituality of Dreaming," 185.

1990s: LaBerge Electrooculographic NovaDreamer

In his popular lucid dreaming manual co-written with technology writer Howard Rheingold, psychophysicist Stephen LaBerge states that dreams about transcendental reality, whether God, the Void, or Nirvana, should not be taken as fact, but should not be dismissed either.⁵⁷ A guiding principle of LaBerge's lab research is that the physiology of the body can provide objective measures of subjective experiences. This principle also informs his development of biofeedback wearables for the incubation of lucid dreams. LaBerge's lab studies were some of the first to provide physiological evidence of lucid dreaming by showing how dreamers could intentionally regulate aspects of their dreams. This was accomplished by teaching subjects a series of eye movements while they were awake. Subjects were then instructed to perform the sequence when they became lucid in their dreams. This pattern of eye movements could be observed in the subject's sleeping body to indicate a state of lucidity.⁵⁸

The translation of dream actions into sleeping physiology inspired LaBerge to reverse the process. This was attempted by physically stimulating sleeping subjects with lights and sound to induce lucidity and influence dream environments. LaBerge's lab constructed a mask with sensors to detect eye movements, which was monitored by a computer. When the eye movement activity reached that of REM sleep, during which dreaming commonly occurs, the computer sent a signal to switch on flashing lights in the mask. This electrooculographic signaling procedure was modeled on sleep researcher Keith Hearne's laboratory prototype from the 1980s that used a respiratory monitor to track REM sleep and dream phases. Hearne discovered it was possible to direct the dream-process in various ways by introducing physical stimuli that might be incorporated into the dream narrative.⁵⁹ LaBerge's lab subjects were primed to notice the mask's flashing lights as it was incorporated in the dream environment. This procedure increased the incidence of lucidity.

LaBerge's laboratory prototype was developed for consumers as the NovaDreamer, which remains the most well-known dream incubation device from that period, and was extensively cited by the speakers and audience of the Dream Tech panel at Paolo Alto. *Tools For Exploration*, a 1990s mail-order catalog for meditation

⁵⁷ Stephen LaBerge and Howard Rheingold, *Exploring the World of Lucid Dreaming* (New York: Ballantine Books, 1991), 195.

⁵⁸ Kahan and LaBerge, "Lucid dreaming as Metacognition."

⁵⁹ Christian Sager, "The Silent Lucidity of Keith Hearne's Dream Machine," *Stuff of Genius*, January 24, 2014. <https://www.geniusstuff.com/blogs/silent-lucidity-keith-hearnes-dream-machine.htm>.

“mind machines”, New Age books, tapes, and software featured an image of the NovaDreamer on the face of a white model against a cosmic backdrop of luminescent fractals.⁶⁰ The catalog outlines the NovaDreamer’s customizability of cue brightness and duration, flash frequency, sound, and varieties of cueing patterns for invoking lucidity during REM sleep.

LaBerge qualifies in his lucid dreaming manual that when used in home settings, the NovaDreamer was an effective aid in stimulating lucid dreams, but not more so than practicing conventional dreamwork techniques such as dream diaries, affirmations, and visualizations. He also qualifies that many of the human subjects in his lab studies were experienced in dreamwork and incubation techniques. In a recent panel organized by Science and Nonduality, a conference network of scientists exploring New Age concerns about consciousness and spiritual enlightenment, LaBerge revealed that a new NovaDreamer was in development for the neuro-technological age.⁶¹

2010s: Electroencephalographic Lucid Dreaming Headsets

While the Consciousness Hacking network acknowledges its debt to the community of practice facilitated by the *Tools For Exploration* catalog, it insists that the new generation of mind machines it promotes “is not your dad’s biofeedback.”⁶² According to the network’s website, the key difference between the old stroboscopic and electrooculographic devices and today’s wearables is their ability not just to sense the brain or explore the mind, but to change it through neuro-feedback. This change is possible by miniaturizing electroencephalography (EEG) lab equipment into wearable consumer electronics.

EEG was pioneered by Hans Berger in 1925, who discovered that the brain’s electrical activity occurred in distinct patterns. Developed for lab settings, EEG uses electrodes to measure electrical potential differences across points on the scalp. What is measured is the different rate of interactions between nerve synapses, which are

⁶⁰ *Tools For Exploration* was referenced on the Consciousness Hacking network’s website as a precursor to modern neuro-feedback wearables. The catalog is available at <https://issuu.com/terrypatten/docs/toolsforexporationvol7num1winterspr>.

⁶¹ “Lucid Dreaming with Alan Wallace, Stephen LaBerge, Fariba Bogzaran,” Science and Nonduality Conference, published January 27, 2016. <https://youtu.be/PozGrXvTITc>.

⁶² This is the subheading on the “about us” section of the Consciousness Hacking website <http://www.cohack.life/time-machine>.

categorized into patterns such as alpha, beta, and other waveforms, as well as interhemispheric coherence. These electrical patterns correlate with physiological measurements such as REM sleep and subjective experiences such as dreaming. EEG is also used in experimental settings to control computer interfaces such as the movement of a cursor on a screen or the functioning of external devices. These techniques are known as Brain-Computer Interfaces (BCI), which use algorithms to translate the electrophysiological input of a user (lab subjects trained to perform particular thought patterns) into outputs to control external devices.⁶³

EEG is an old technique. Science and technology historian Kenton Kroker maintains that EEG's rhythmic analysis and graphical recording were groundbreaking for sleep science because they combined neurology, psychiatry, and physiology.⁶⁴ EEG provided an objective measurement of subjective experiences and framed sleep as an object of scientific study. Medical anthropologist Matthew Wolf-Meyer offers that EEG's graphical method has to be understood in relation to the 19th-century invention of statistical norms. When applied in medicine, statistical averages marked out pathology from normalcy and established spatiotemporal regimes and rhythms for governing sleep across populations.⁶⁵ Today, instead of biomedical grade skullcaps outfitted with multiple electrodes, lucid dreaming wearables such as the iBand can monitor brainwave patterns wirelessly in the comfort of one's bed.

The iBand is part of a class of sleep-tracking wearables that upgrade the core functionality of the NovaDreamer using EEG sensors, which are advertised to detect REM sleep more accurately than commercial electrooculography. During REM sleep, the iBand, which is worn on the forehead, triggers a pre-programmed sequence of flashing colored lights and pre-recorded audio prompts or musical tracks to remind the dreaming subject that they are dreaming. Like the NovaDreamer, these physical cues are designed to penetrate the dream narrative to induce lucidity. Like other self-tracking wearables, the iBand syncs with a smartphone app to monitor and analyze body movement, heart rate, and body temperature during sleep. In conjunction with EEG data, the iBand provides personalized analysis of sleep patterns to maximize restfulness by using simulated sunlight to wake the user up during optimal moments during their sleep cycle.

⁶³ Jonathan Wolpaw et al., "Brain-Computer Interface Technology: A Review of the First International Meeting." *IEEE Transactions on Rehabilitation Engineering* 8, no. 2 (2000).

⁶⁴ Kroker, *The Sleep of Others and the Transformations of Sleep Research*, 9.

⁶⁵ Matthew Wolf-Meyer, *The Slumbering Masses: Sleep, Medicine, and Modern American Life* (Minneapolis: University of Minnesota Press, 2012), 21.

Another class of lucid dreaming headset goes even further than the original NovaDreamer by using EEG stimulation rather than audiovisual cues to induce lucidity. For example, the LucidCatcher is a band worn around the forehead and is connected to two dangling electrodes that have to be positioned adhesively behind each ear. Unlike the iBand's streamlined design, the electrodes of the LucidCatcher are relatively obtrusive. Like the iBand, this device uses EEG sensors to monitor REM phases but additionally delivers transcranial Alternating Current Stimulation (tACS) through the attached electrodes. At another Consciousness Hacking event in San Francisco, a developer of LucidCatcher described how their device can use tACS to encourage brain activity commonly associated with lucid dreaming. The developer advertised that with enough data, the company will be able to program brain waveforms for specific kinds of content.⁶⁶

tACS is a form of neuro-stimulation that delivers a small, pulsed, alternating current using electrodes placed on the head. According to LucidCatcher's developers, this alternating waveform primes the brain for electrical activity similar to those associated with lucid dreaming. LucidCatcher joins a category of wearables that use neuro-stimulation to induce desired brain states conducive to relaxation, meditation, or alertness. For example, Thync is a headband that uses a constant, low direct current called transcranial Direct Current Stimulation (tDCS) to prime the brain for mental calmness or focused productivity. These forms of transcranial electrical stimulation have been used therapeutically under the supervision of mental health professionals to manage mood disorders. However, in the United States, many of these neuro-stimulative wearables are not categorized as medical devices and do not require Food and Drug Administration (FDA) clearance for consumer use.⁶⁷

In the 1960s, neurophysiologist William Grey Walter treated the brain as a black box that could be understood and manipulated by modulating incoming against outgoing signals. This basic premise of biofeedback and stimulation that inspired Gysin's Dreamachine remains consistent in contemporary dream devices. The idea of the mind's black box as a kind of screen for multi-sensory media "content" runs from Gysin's Dream Cinema to Consciousness Hacking's comparison of lucid dreaming technology to virtual reality. According to this logic, if we can systematically modulate the signals to and from the brain, we will hold the master code to

⁶⁶ The video on Consciousness Hacking project night event featured the LucidCatcher and is available on the Consciousness Hacking YouTube channel at <https://youtu.be/dowcHwqcbdE>.

⁶⁷ Although it is outside the scope of this essay, health and safety regulations of neuro-stimulative wearables is a critical area for further investigation.

circumvent our sensory organs. This will allow us to directly program the source of all human perception, sensation, and experience — the mind. This master code is being sought by companies and sleep labs through the analysis of massive amounts of data about dreamers aggregated from consumer wearables such as the iBand and LucidCatcher.

The connection between the cultural imagination of the mind as a medium, dreams as content, and brain activity as data will be discussed in the following sections. This ideological configuration shifts Western dream culture away from communal practices of dreamwork that reach out towards the numinous. Instead, this triad of dream content, neural data, and the mind as a medium contain dream culture within feedback loops that link dreamers to algorithms but not to each other. Like virtual reality, lucid dreaming's holy grail is to cultivate communal experiences. However, the trajectory of Consciousness Hacking suggests a dream culture of atomization rather than collectivization.

The Ultimate Medium

The framing of lucid dreaming through the lens of virtual reality (VR) can be traced to the understanding of both as forms of media content that are imagined as more immersive than other screen-based media such as cinema or television. In Native American or ancient Greek dream culture, lucidity offered access to a sacred alternate reality of spirits, elders, and gods. In contrast, Euro-American culture cast dreams not as portals but as content that can be chosen and controlled. For example, in their handbook, LaBerge and Rheingold propose that “unlike a book or a movie, your lucid dream adventure can continue indefinitely, with a new episode each night or each REM period.”⁶⁸ In a similar vein, New Museum Curator Laura Hoptman informs that Gysin patented his Dreamachine because he believed that with its help the mind could replace television as a representational medium richer and more inspirational than still and moving images.⁶⁹

The notion of dreams and VR as media content can be understood according to what James Carey calls the “transmission view of communication,” which dominates industrialized cultures. This view underlies ways of talking about communication such as “imparting,” “sending,” “transmitting,” or “giving information

⁶⁸ LaBerge and Rheingold, *Exploring the World of Lucid Dreaming*, 112.

⁶⁹ Cashdan, “The Idea Machine.”

to others.⁷⁰ George Lakoff calls this the conduit metaphor. This metaphor structures how language is seen as a container for ideas, meanings, information, images, or sounds that are sent over a conduit to another entity which extracts ideas from words.⁷¹

The basic idea that images, thoughts, or dreams can be extracted from experiential contexts and can exist independently of people – in mediums such as words, paper, film, records, and hard drives – is a legacy of the conduit metaphor. At the center of these ideas about communication is the transmission of signals or messages over distance for the purpose of control. This transmission view reinforces cold-war era discourses about form as distinct from matter and about the laws of physics as discrete from the biology of bodies.⁷² Literary scholar Katherine Hayles calls these discourses “information narratives,” which systematically value abstract patterns over the physicality and materiality of bodies and entities. Information narratives dominate cyberpunk literature and can be traced back to the transmission view of communication and its conduit metaphor.⁷³

The idea of dreams as content and the mind as its medium has a long legacy, which carries forward to EEG dream headsets. For example, the developer at the Dream Tech panel in Palo Alto described the vividness and freedom of lucid dreaming as VR from 50 years into the future. Similarly, a developer of the LucidCatcher suggested at a Consciousness Hacking event that the entertainment possibilities for technologically augmented lucid dreaming would rival the fantastical scenes from the television series *Game of Thrones*.⁷⁴ This developer described dreams as content for wish-fulfillment such as riding on flying dragons or talking to dead relatives, which in the near future could be programmed into the device by analyzing and stimulating

⁷⁰ James Carey, *Communication as Culture, Revised Edition: Essays on Media and Society* (New York: Routledge, 2008). The transmission view contrasts with a ritual view of communication that is directed not toward the extension of shared over space but toward the maintenance of society and beliefs over time.

⁷¹ George Lakoff, “Body, Brain, and Communication (Interview by Ian A. Boal)” In J. Brook and I. A. Boal Eds. *Resisting the Virtual Life: The Culture and Politics of Information* (San Francisco: City Lights, 1995)

⁷² Sarah Kember, *Cyberfeminism and Artificial Life* (London: Routledge, 2003).

⁷³ Katherine Hayles, “Virtual bodies and flickering signifiers.” *October* 66 (Fall 1993).

⁷⁴ The Consciousness Hacking project night event featured wearable creators share their products and take questions from audience members. Marina Shellest from the company Luciding discussed the lucid dreaming EEG wearable LucidCatcher.

the brainwave patterns of specific dream narratives or environments.⁷⁵ She emphasized that unlike the dreamwork of keeping diaries, affirmations, and visualizations, the LucidCatcher would do the work for the dreamer, who could just set it and forget it. This automaticity of dream entertainment and its negation of dreamwork sets the latest generation of incubation devices apart from its precursors.

Computer graphics pioneer Ivan E. Sutherland famously described VR as “the ultimate display,” so immersive as to fool the mind about the environment’s virtuality: “A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal.”⁷⁶ Communication scholar Kevin Healy maintains that VR is often promoted through techno-romantic discourses about its potential to actualize previously-unknown dimensions of human imagination. Both lucid dreaming and VR are imagined as techniques enabling such high-fidelity representations of outer and inner worlds of humans, that they should be stewarded for their ability to manipulate. Healy suggests that because of resonances with each other, lucid dreaming can be thought of as an analog precursor to VR.⁷⁷

Communication researchers Biocca, Kim, and Levy contextualize that this desire for the ultimate display is common to the development of almost every iconic communication medium ever invented. Like visual media such as photography, film, and television, VR is driven by a desire for the essential copy: a rendition of the original so perfect as to fool the senses.⁷⁸ If VR is envisioned as the ultimate display, then I propose that its analog precursor lucid dreaming imagines the mind as the ultimate medium for multi-sensory content.

This desire can be related to what media theorists Bolter and Grusin call the logic of remediation, where every new medium justifies itself by purporting to make up for the inadequacies of an older medium, which in most cases relates to a lack of immediacy. Immediacy is a style of visual representation that tries to make the viewer

⁷⁵ Tadas Stumbrys, Daniel Erlacher, Miriam Johnson, and Michael Schredl. “The Phenomenology of Lucid Dreaming: An Online Survey.” *The American Journal of Psychology* 127, no. 2 (2014). According to this survey of lucid dreamers, most wanted to fly (231 respondents), speak with dream characters (123), and have sex (80). Only 4 wanted to meet God.

⁷⁶ Ivan Sutherland, “The Ultimate Display,” in *Multimedia: From Wagner to Virtual Reality*, eds. Randall Packer and Ken Jordan (New York: WW Norton & Company, 1965), 508.

⁷⁷ Kevin Healey, “Dreaming the Virtual: How Lucid Dream Practice Can Inform VR Development” *Journal of Virtual Worlds Research*, Volume 11 Number 2 (30 July 2018).

⁷⁸ Frank Biocca, Taeyong Kim, and Mark Levy, “The Vision of Virtual Reality,” in *Communication in the Age of Virtual Reality*, eds. Frank Biocca and Mark R. Levy (New York: Routledge, 1995).

forget the presence of the medium, by erasing the gap between the signifier and the signified. The desire for immediacy is the desire to get past the representation, beyond the medium, and closer to what is imagined as the real thing.⁷⁹ Photography was supposedly more immediate than painting, film than photography, television than film, and virtual reality than television. And I propose that now, dream technologies are imagined to erase all layers of technological and sensory mediation to deliver the most vivid and lucid experience directly through the ultimate medium of the mind. This imagined apotheosis of immediacy reinforces a fundamental way of thinking about communication as content that is encapsulated by the conduit or transmission metaphor and its information narratives.

The neuro-technology of the dreaming mind may absolutize the immediacy of medium transparency conceptualized by Bolter and Grusin, however, it dismantles another kind of immediacy - the communion between minds. Tracing the genealogy of discourses about communication, media historian John Durham Peters suggests that European philosophies and technologies of communication have been motivated by a desire for psychic immediacy, for the mutual communion of souls. This utopian desire to transcend the painful divisions of self and other, private and public, and inner thought and outer world is underscored by a nineteenth-century spiritualist view that saw the body as a container of the soul, and communication as both bridge and chasm between souls.⁸⁰ Biocca, Kim, and Levy offer that the dream of the ultimate display manifested in VR is also driven by the enduring desire for a kind of transcendence from the confines of the physical world. This transcendence is imagined to free the mind from the prison of the body. In this sense, both kinds of immediacy are underscored by a Cartesian fantasy of corporeal transcendence and psychic communion. However, in the case of dream hacking, steeped as it is in New Age spirituality, the immediacy of the internal cosmos takes precedence over that of the social universe.

Self-Spirituality

The Consciousness Hacking network is a San Francisco-based events and branding agency that organizes regular consumer-facing conferences, demonstrations, and

⁷⁹ David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge: MIT Press, 2000).

⁸⁰ John Durham Peters, *Speaking into the Air: A History of the Idea of Communication*, (Chicago: University of Chicago Press, 2012).

social gatherings around the mission of “exploring, upgrading, adjusting the mind’s interior operating system.”⁸¹ Since 2013, Consciousness Hackers have grown their membership to thousands in the Bay Area and hundreds in European cities such as Vienna and Stockholm. Consciousness Hacking does more than promote consumer products to makers and practitioners; it galvanizes a worldview that unites a larger network of scientists, technologists, and venture capitalists. This is based on an approach to technology and consumer electronics that draws from hacker culture.⁸²

Hacker culture is both a technical activity and a vehicle for self-fashioning and self-expression. Anthropologists Coleman and Golub offer that making and using technologies such as computer hardware and software under collaborative settings is not a means to an end but central to a liberal expressive self. This self is fashioned from the moral disposition that technical knowledge is sacred and that personal control of this knowledge creation and circulation is essential.⁸³ Communication scholar Fred Turner emphasizes that the development of hacker culture depended on technical activities of inventors, designers, and tinkerers, as well as non-technical roles of cultural entrepreneurs and journalists. The Consciousness Hacking network performs this non-technical role of event organization, branding, and creating publicity around the products and practices of lucid dream incubation.

A core feature of the network’s discourse is the legitimation of spiritual aspects with academic research, engineering, and financial investment. For example, the network’s founder insisted in a *Wired* magazine interview that “this is not woo-woo stuff... I saw spiritual attainment and I thought, “That does not need to be religious. That can be scientific.”⁸⁴ The network’s website is littered with slogans hybridizing spiritual and technological themes, such as “Awakening through Innovation” and “Transformative Technology.” This new hybridity between science and spirituality is consistently promoted as what distinguishes Consciousness Hacking from the old New Ageisms.

Contrary to Consciousness Hacking’s claims, the New Age movement has been entwined with technological tools since its inception. Analyzing over one

⁸¹ This is a quotation from the introductory video “What is Consciousness Hacking,” on the Consciousness Hacking website and available at https://youtu.be/sc_nlW2367Q.

⁸² The nuanced connections between Consciousness Hackers and hacker culture needs to be empirically investigated. This is a critical area for future research.

⁸³ Gabriella Coleman and Alex Golub, “Hacker practice: Moral genres and the cultural articulation of liberalism,” *Anthropological Theory* 8, no. 3 (2008).

⁸⁴ Kevin Gray, “Inside Silicon Valley’s New Non-Religion: Consciousness Hacking,” *Wired*, November 2017, <http://www.wired.co.uk/article/consciousness-hacking-silicon-valley-enlightenment-brain>.

hundred books of New Age writings, religious scholar Wouter Hanegraaff identifies consistent themes such as channeling, healing, personal growth, and an attempted synthesis between esoteric religion and science.⁸⁵ This hybridity is also true for Christianity: rationality and religious myth, science and the desire for supernatural redemption, instrumental rationality and the yearning for transcendence have flourished hand in hand, not just metaphorically, but literally and historically.⁸⁶ Contemporary examples of techno-mysticism are a continuation of a thousand-year-old Western tradition in which the advance of what was then known as the “useful arts,” was inspired by and grounded in religious expectation. However, unlike the personal God of Christianity, New Age religions postulate that the sacred cannot be found out there, but must be discovered by exploring one’s inner psychic space.⁸⁷

Scholars of religion Schulman and Stroumsa offer that the modern assumption that dreaming is a private and revelatory mode of self-knowledge is not shared by many cultures.⁸⁸ For example, dreams in many non-Western cultures are less about psychological proclivities or self-identity and more about supernatural contact or divine revelation.⁸⁹ Practices of recounting, sharing, and interpreting dreams through stories or statistics, through communal rituals or proprietary algorithms are culturally specific and have political and psychic ramifications.

At the crossroads between the science of sleep and the mysticism of dreams lies the principle of “self-spirituality,” which religious scholars agree is the anchor of diverse sets of New Age beliefs and practices. For example, in their cult manual, LaBerge and Rheingold offer that lucid dreaming is a tool for problem-solving, self-healing, and personal growth, which combines the teachings of ancient traditions and research from modern psychologists to help you find your deepest identity:

... lucid dreaming can give you a taste of the infinite, an intimation of a far wider world beyond the limits of ordinary reality. Whatever your views on spirituality and the nature of the self, you can use your lucid

⁸⁵ Wouter Hanegraaff, *New Age Religion and Western Culture: Esotericism in the Mirror of Secular Thought* (Albany: State University of New York Press, 1996).

⁸⁶ David F. Noble, *The Religion of Technology: The Spirit of Invention and the Divinity of Man* (New York: Alfred A. Knopf, 1997).

⁸⁷ Dick Houtman and Stef Aupers, “Religions of Modernity: Relocating the Sacred to the Self and the Digital,” In *Religions of Modernity: Relocating the Sacred to the Self and the Digital*, Dick Houtman and Stef Aupers eds. (Leiden: Brill, 2010).

⁸⁸ Shulman and Stroumsa, *Dream Cultures*.

⁸⁹ Gordon Ingram, “Dreaming,” *Oxford Bibliographies*, DOI: 10.1093/OBO/9780199766567-0120.

dreams to plumb the depths of your identity and explore the frontiers of your inner world.⁹⁰

Sociologist Paul Heelas explains that self-spirituality is the assumption that the Self is sacred and that spirituality lies within the person. New Age teachings posit that mainstream society represses our authentic selves, and provide a wide range of spiritual disciplines to help individuals gain spiritual insight by recovering the perfect sacred essence within them.⁹¹ The introductory video on the Consciousness Hacking website faithfully replicates the playbook of self-spirituality by promising prospective members transcendence by “exploring the mind’s interior” for an “internal experience of truth, faith, sense of the sacred, and divinity.”

The New Age focus on the self at the expense of the social world is consistent with the countercultural undercurrent of Silicon Valley startups,⁹² which informs and inspires Consciousness Hackers. For example, self-spirituality is evident at Burning Man, a festival held annually in the Nevada desert that is attended by many in the tech industry. Consumer culture ethnographer Robert Kozinets reports that Burning Man is not about major social change, but minor changes in identity, taking place collectively and simultaneously. Kozinets refers to Burning Man’s practices as creating a liminal “youtopia” for personal exploration and enrichment as opposed to a utopia of grand visions for society.⁹³

The final section will suggest how Consciousness Hacking’s self-spirituality cultivates a youtopia of automatized dream entertainment and atomized searches for personal truth. This draws Western dream culture further away from connections to the numinous and from shared contexts of dreamwork. Consciousness Hacking also detracts dream culture from notions of communicative immediacy towards what can be considered biopolitical immediacy, based on truth claims about the aggregation of dreams at the level of populations.

⁹⁰ LaBerge and Rheingold, *Exploring the World of Lucid Dreaming*, 284.

⁹¹ Paul Heelas, *The New Age Movement: The Celebration of the Self and the Sacralization of Modernity* (Oxford: Blackwell, 1996).

⁹² Fred Turner, “Burning Man at Google: A Cultural Infrastructure for New Media Production.” *New Media & Society* 11, no. 1-2 (2009): 73-94.

⁹³ Robert Kozinets, “Can Consumers Escape the Market? Emancipatory Illuminations from Burning Man,” *Journal of Consumer Research* 29, no. 1 (2002): 36.

Data-Driven Dreaming

The quest for immediacy in our media artifacts is often accompanied by new opportunities for hypermediacy - the multiplication of screens and interfaces.⁹⁴ Referring to e-governance structures, anthropologist William Mazzarella observes that “one of the great structuring ironies of our age is the tendency for increasingly elaborate systems of mediation to be deployed in the pursuit of immediation.”⁹⁵ The twinned drives of immediacy and hypermediacy converge in self-tracking wearables, where aerodynamic biosensors are paired with a cascade of smartphone interfaces to monitor, analyze, and nudge users to optimize their performance.⁹⁶ Dream hacking wearables are no exception. Like health and fitness trackers, technologized dream optimization is contingent on what legal scholar Julie Cohen calls a biopolitical public domain, where statistical comparison is made possible by amassing data points across populations of tracked bodies.⁹⁷ This section outlines how dream content and sleep data are part of biopolitical public domains and discusses their ascendant form of immediacy, which is based on the truth-claims of biodata analyzed on the scale of populations.

Another panelist at the Consciousness Hacking Dream Tech event was Kelly Bulkeley, a psychologist of religion. When asked about the relevance of familiar practices of dream interpretation to dream technologies, Bulkeley replied that instead of random dream dictionaries, people need transparent, testable, statistical correlations between measurable patterns in dream content (such as word count frequencies) and inferences to waking life. Citing his involvement in the Sleep and Dream Database,⁹⁸ he stated that “dream content is a very accurate reflection of social relationships, emotional temperament, sexual desires and activity, daily routines, spiritual and religious beliefs, cultural interests, and political ideologies.”⁹⁹ Another notable database of dream content is maintained by psychologist Antonio Zadra. Like Bulkeley, Zadra emphasizes that because dream symbolism is culturally specific,

⁹⁴ Bolter and Grusin, *Remediation*.

⁹⁵ William Mazzarella, “Internet X-ray: E-governance, Transparency, and the Politics of Immediation in India,” *Public Culture* 18, no. 3 (2006): 500.

⁹⁶ Kate Crawford, Jessa Lingel, and Tero Karppi, “Our Metrics, Ourselves: A Hundred Years of Self-Tracking from the Weight Scale to the Wrist Wearable Device,” *European Journal of Cultural Studies* 18, no. 4-5 (2015).

⁹⁷ Julie Cohen, “The Biopolitical Public Domain: The Legal Construction of the Surveillance Economy,” *Philosophy & Technology* (2017).

⁹⁸ Sleep and Dream Database. Accessed September 13, 2018. <http://sleepanddreamdatabase.org>.

⁹⁹ Consciousness Hacking, “Dream Tech Panel.”

reliable inferences to waking life can be more accurately drawn from the analysis of a single person's dreams over time, rather than the analyses of dreams at the level of populations.¹⁰⁰

Despite this qualification by dream researchers, many dream technologists emphasize the potential of big data analytics of dreams to reveal profound insights about populations, society, and human nature. One example is Shadow, a successfully crowdfunded app that has since been abandoned by its development team. Shadow's developers promised an app that would translate self-recorded dream recollections into a global database for insights into the dreams of every demographic from women in Moscow to children in Sao Paulo. By analyzing data points collated from dream content keywords, the campaign promised an app that would "create a space for dreams to self-organize and give us real information about our consciousness."¹⁰¹

Falling in step with popular rhetoric about big data,¹⁰² Shadow's app developers stated that "true comprehension comes when the dots are revealed and we see the big picture." Regardless of the scale of available data, such analyses can never impartially reveal the truth of populations because they are based on algorithms that are sedimented assemblages of countless human assumptions, exceptions, and changes in decision making.¹⁰³ Nevertheless, these truth-claims around the big data of dreams echo claims about EEG's graphical recording of sleep, which during its midcentury deployment across sleep science, was imagined to frame a natural history of consciousness.¹⁰⁴

Just as EEG dream incubation can be traced back to mechanical devices such as Gysin's Dreamachine, discourses around big data have neglected analog roots. Historian Rebecca Lemov describes a failed scientific undertaking in the 1950s to build a "database of dreams" by capturing people's dreams in large amounts and storing them in an experimental data bank. Like Shadow's developers, a team of psychologists and anthropologists led by Bert Kaplan believed that datasets collected by hundreds of researchers, when collated and miniaturized on microcard machines

¹⁰⁰ *Horizon*. "Why Do We Dream?" season 14, episode 1. Directed by Charles Colville. BBC, February 10, 2009.

¹⁰¹ Over 80,000 US dollars was pledged by over 3,700 backers. The crowdfunding campaign received favorable coverage from news outlets such as The Atlantic, Wired, and the Huffington Post. <https://www.kickstarter.com/projects/hunterleesoik/shadow-community-of-dreamers>.

¹⁰² danah boyd and Kate Crawford, "Critical questions for Big Data: Provocations for a Cultural, Technological, and Scholarly Phenomenon," *Information, Communication & Society* 15, no. 5 (2012).

¹⁰³ Ed Finn, *What Algorithms Want* (Cambridge: MIT Press, 2017).

¹⁰⁴ Kroker, *The Sleep of Others and the Transformations of Sleep Research*, 7.

would make possible an encompassing vision of the whole universe of subjectivity.¹⁰⁵ For example, inspired by Freudian approaches, anthropologist Dorothy Eggan collected the manifest content of over 600 dreams of Native American tribal subjects and arranged them in elaborate charts to discern overarching patterns. This fantasy of total information and its quest for a grand theory of the human psyche has a long history. This fantasy is part of a distinct dream culture in Western societies that connects Kaplan's database to the app Shadow's truth-claims about big data.

Biopolitics of Dream Cultures

20th-century scientific visions of charting a universe of subjectivity on microcard and graphing a natural history of consciousness through EEG converge in dream hacking wearables. This desire to understand dreams on the level of populations both quantitatively and qualitatively owes a debt to 19th-century statistical innovations that made it possible to calculate averages and demarcate normalcy from pathology. Wolf-Meyer offers that such norms about wellbeing and productivity extended into the management of most aspects of life - including sleep and dreams - through medical, social, cultural, and economic institutions.¹⁰⁶

Foucault uses the term biopower to denote these technologies and techniques that govern human social and biological processes. He describes how biopower intervenes through the discipline of individual bodies by interiorizing the need for self-control, while also intervening at the level of the population. This latter intervention takes place through concepts of a social or biological corpus with its own measures of health, defined through population statistics about reproduction, nutrition, and sleep. This social corpus must be managed and controlled according to regimes of optimization and truth discourses about life.¹⁰⁷ The management of populations works hand in hand with the control of subjects through indirect governance techniques that guide individuals without being responsible for them.

¹⁰⁵ Rebecca Lemov, *Database of Dreams: The Lost Quest to Catalog Humanity* (New Haven: Yale University Press, 2015).

¹⁰⁶ Wolf-Meyer, *The Slumbering Masses*.

¹⁰⁷ Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979*. Ed. Michel Senellart, trans. Graham Burchell (New York: Palgrave Macmillan, 2004).

Such forms of neoliberal governance encourage people to give their lives a specific entrepreneurial form.¹⁰⁸

EEG dream incubation can be seen as a biopolitical regime where the analysis of aggregated brainwave data and dream content on the level of populations is being internalized as a form of personal empowerment and lifestyle optimization. For example, in their cult manual, LaBerge and Rheingold question whether sleeping through one's dreams is the best use of a limited lifespan, when lucidity could provide mental imagery of unsurpassed vividness, to rehearse skills and scenarios for the optimization of waking life. The authors cite studies suggesting that mental rehearsals of skills in lucid dreams could enhance performance in everyday life. According to art critic Jonathan Crary, capitalism is unable to fully eliminate sleep as a human necessity, but governs the sleeping body and mind in increasingly intrusive ways:

If something as private and seemingly interior as dreaming is now the object of advanced brain scanners and can be imagined in popular culture as downloadable media content, then there are few restraints on the objectification of those parts of individual life that can be more easily relocated to digital formats.¹⁰⁹

Sociologist Simon Williams adds that this regulation of cycles of regeneration between consciousness and unconsciousness is the final frontier of biomedicalization and pharmaceuticalization in biopolitical governance.¹¹⁰ Information ethicist Adam Moore cautions that the combination of brain imaging technologies such as EEG and predictive analysis foments tensions between neuroscience and privacy. For example, in the near future, brain scans could be part of standard personality tests that employers expect from job applicants.¹¹¹ Media scholar Tony Sampson uses the term neurocapitalism to describe the convergence of workplace and consumer cultures in a mode of capitalism that uses the brain sciences in conjunction with technologies to

¹⁰⁸ Thomas Lemke, "The Birth of Bio-Politics': Michel Foucault's Lecture at the Collège de France on Neo-Liberal Governmentality." *Economy and Society* 30, no. 2 (2001).

¹⁰⁹ Crary, 24/7, 104.

¹¹⁰ Simon Williams, *The Politics of Sleep: Governing (Un) Consciousness in the Late Modern Age* (London: Palgrave Macmillan, 2011).

¹¹¹ Adam Moore, "Privacy, Neuroscience, and Neuro-Surveillance." *Res Publica* 23, no. 2 (2017). Other brain imaging technologies include magnetoencephalography (MEG), magnetic resonance imaging (MRI), and functional magnetic resonance imaging (fMRI).

conform bodies and minds to the rationalities and regimes of efficiency management.¹¹²

On the one hand, this optimization of dreams for performance and amusement extends liberal-democratic regulative rationalities fostered by Quantified Self sensibilities. Anthropologist Natasha Dow Schüll describes how health and activity trackers imagine the self as a database to be rationalized and optimized through data-driven nudges to improve movement, diet, and sleep.¹¹³ On the other hand, neuro-feedback and stimulation represent a level of biopolitical rationalization that seems more invasive than other wearable technologies. This data-driven nudge that vibrates to remind the working body to stand and illuminates to remind the sleeping body to be lucid now analyzes aggregated brain activity to optimize personal gratification and productivity through transcranial electrical stimulation.

Biopolitical Immediacy

In our neuro-technological age, the human desire for immediacy pivots from the erasure of mediating frames at the level of the device to biopolitical truth claims about autonomic brain activity on the level of databases. The front and back end of EEG dream hacking promise both medium transparency as well as biopolitical veracity that trump all screen-based content and all phenomenologically-based data. This is because like William Walter's black box and Bert Kaplan's total archive, modern dream databases promise absolute knowledge of human subjectivity that is more immediate, intimate, and authentic than other forms of big data. Media scholar Sun-ha Hong explains that self-tracking practices perpetuate a technological fantasy of "data's intimacy": the idea that machines can know us more accurately and objectively than we know ourselves.¹¹⁴ Within this framing, the human mind can be understood as the ultimate medium for content with the highest level of sensorial immersion and statistical relevance.

Dreams have been collective portals to spirits and gods, as well as individual doorways to a sacred self. Today, dreams are not only secular instruments for personal

¹¹² Tony Sampson, *The Assemblage Brain: Sense Making in Neuroculture* (Minneapolis: University of Minnesota Press, 2016).

¹¹³ Natasha Dow Schüll, "Data for life: Wearable technology and the design of self-care," *BioSocieties* 11, no. 3 (2016).

¹¹⁴ Sun-ha Hong, "Data's Intimacy: Machinic Sensibility and the Quantified Self," *communication +1* 5, no. 1 (2016).

wish-fulfillment, they are two-way mirrors for a collective unconscious. This collective unconscious is distilled from neuro-data on the scale of populations, analyzed through proprietary algorithms, and relatively inaccessible to individuals from whom it is aggregated. Many scholars of surveillance have noted that access, analysis, and ownership of such databases of human bodies and subjectivity is often asymmetrically controlled by corporations and governments. According to sociologist David Lyon, these forms of soft surveillance differ from Orwellian totalitarianism. For example, the surveillant mechanisms of self-tracking wearables are packaged as consumer comforts and entrepreneurial subjectivities.¹¹⁵ Information technology researcher Shoshana Zuboff adds that current surveillant modes of capitalist accumulation target populations for data extraction. In this ascendant mode of capitalism, populations are subject to illegible mechanisms of commodification and control by firms in new markets of behavioral prediction and modification.¹¹⁶

Databases are at the crux of biopower's hold over human bodies through the generation of truth discourses about individual and collective life. The object of analysis in modern dream culture is not just our demographically modular digital shadows or biodata, but our very cognitive patterns. The more obvious concern about this neurological turn in data fetishism is its manifestation of the human desire for immediacy in its most invasive form. However, I would argue that depending on the technical and regulatory infrastructures it is embedded in, EEG patterns can be just as invasive as more pedestrian forms of biodata such as fingerprints or facial recognition.

A more pertinent implication of biopolitical immediacy to the analysis of dream tech is its algorithmic aggregation of a kind of collective unconscious. This is far from the Jungian enterprise, which essentializes a universally experienced world of images that dreamers and mythmakers share with each other to a divine realm of total and perfect meaning. The Jungian collective unconscious is the source of symbols and myths that recur independently across the world and manifest as the transcendent coincidence of all oppositions.¹¹⁷ The algorithmic collective unconscious is also far from the utopia of shared lucidity described by dream researchers and dreamwork practitioners in New Age circles. For example, Stephen LaBerge expressed that after

¹¹⁵ David Lyon, *The Culture of Surveillance: Watching as a Way of Life* (Cambridge: Polity, 2018).

¹¹⁶ Shoshana Zuboff, "Big Other: Surveillance Capitalism and the Prospects of an Information Civilization." *Journal of Information Technology* 30, no. 1 (2015).

¹¹⁷ William Doty, *Mythography: The Study of Myths and Rituals* (Tuscaloosa: University of Alabama Press, 2000).

a career studying the psychophysiology of dreams, he is still committed to its “inner spiritual value”, especially in the meaning of dreams and nightmares.¹¹⁸

The collective unconscious of biopolitical immediacy is closer to the maps for human desire assembled by the neuro-marketing industry.¹¹⁹ Such industrial logics apply predictive analytics to our dream biodata and online data shadow to more efficiently package us as audience commodities to advertisers in marketplaces of consumer products and political ideologies. Media has always been about communication. Much of this communication has been between humans. The neuro-stimulative model of the mind as a medium reroutes these communicative circuits into feedback loops for data between electrodes and analytics rather than for stories between dreamers.

We are a long way from Peters’s description of the utopian desire for psychic communion underscored by the idea of communication since Greek antiquity.¹²⁰ Dream hacking entails a different model of media, and a different paradigmatic metaphor for understanding the self and the world from the gramophone, film, and typewriter that Kittler considered in his theory of medium interiorization.¹²¹ Perhaps we should put our technological drive towards ever higher fidelity and immersion on hold, to consider not the mystical puzzle of collective lucidity, not the hard problem of consciousness, but the everyday concerns of communion over collation and connection.

Conclusion

This essay used media archaeological approaches to analyze dream incubation from stroboscopic artwork and electrooculographic devices to electroencephalographic wearables. This analysis suggests how Consciousness Hacking neuro-technologies strive to apotheosize a civilizational desire for immediacy that has endured throughout the history of communication media. This erasure of mediation to its imagined experiential essence within the mind is attempted through a miniaturization of biofeedback accompanied by a backend of databases and analytics. Three fantasies of immediacy inform this analysis. The first is the transparent immediacy of the mind as the ultimate medium that is invoked by lucid dreaming

¹¹⁸ Science and Nonduality, “Lucid Dreaming with Alan Wallace, Stephen LaBerge, Fariba Bogzaran.”

¹¹⁹ Sampson, *The Assemblage Brain*.

¹²⁰ Peters, *Speaking into the Air*.

¹²¹ Kittler, *Gramophone, Film, Typewriter*.

neuro-technologies. The second is the psychic immediacy of communion between minds that is circumvented by the New Age self-spirituality of Consciousness Hacking. The third is the biopolitical immediacy promised by neurological and phenomenological correlation of human subjectivity in dream databases. As brain-computer interfaces infiltrate consumer electronics, familiar promises of big data analytics to reveal hidden patterns in public behavior and sentiment are being extended to private cognition. These neuro-technologies of dream incubation reflect the fantasy of immediacy in its most invasive yet insidious form. While the applications of modern dream tech may seem esoteric, its logics and discourses are pervasive.

Media theory's key contribution is its questioning of a medium's paradigmatic logic. Walter Ong posited in his analysis of writing that inscriptive media restructure consciousness, providing an orienting frame for conceptions of self and reality.¹²² In a similar vein, Kittler states that "the communications technologies of the day exercise remote control over all understanding and evoke its illusion."¹²³ In other words, it is difficult to step outside of a dominant medium's paradigm to interpret its workings. We are perhaps at the cusp of neuro-stimulation's ascendance as a paradigmatic medium. Before this transition from a long age of inscription that laid the foundation of human civilization to a future of data-driven sensory solipsism, we have a chance to shape the mediating technics of our minds. How the self-spirituality of Consciousness Hackers conciliates the social and cultural demands of neuro-surveillant capitalism remains a challenge for this New Age of dreamers.

¹²² Walter Ong, *From Orality to Literacy* (London: Routledge, 2002).

¹²³ Kittler, *Optical Media*, 30.

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