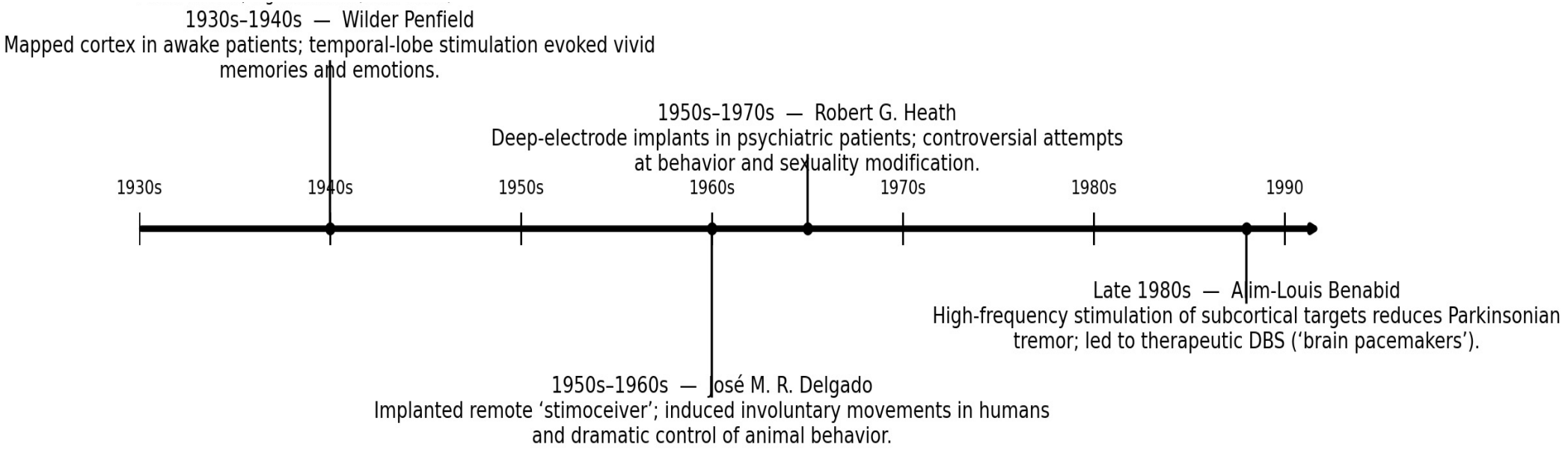
The psychological impacts of implantable brain-computer interfaces on human agency and autonomy

Fred Gilbert

EthicsLAB

research-led ethics and advocacy

A brief history of neural implant psychiatric effects



A brief history of neuropsychiatric effects

Although still alert, the patient leaned to the right, started to cry, and verbally communicated feelings of sadness, guilt, uselessness, and hopelessness, such as "I'm falling down in my head, **I no longer wish to live, to see anything, hear anything, feel anything. . . .**" When asked why she was crying and if she felt pain, she responded: "**No, I'm fed up with life, I've had enough. . . . I don't want to live any more, I'm disgusted with life. . . . Everything is useless, always feeling worthless, I'm scared in this world**." When asked why she was sad, she replied: "I'm tired. I want to hide in a corner. . . . I'm crying over myself, of course. . . . I'm hopeless, why am I bothering you. . . ." She had no hallucinations, nor were there any changes in her motor or cognitive symptoms of Parkinson's disease. **The depression** disappeared less than **90 seconds** after stimulation was stopped. **For the next five minutes the patient was in a slightly hypomanic state, and she laughed and joked with the examiner, playfully pulling his tie**. **She recalled the entire episode**. Stimulation, performed at least twice, through the other contacts of each electrode did not elicit this psychiatric response.

The NEW ENGLAND JOURNAL of MEDICINE

Bejjani B et al. N Engl J Med 1999;340:1476-1480.

A brief history of neuropsychiatric effects

2020's.. ?

Neurotechnologies have substantially evolved from bidirectional modalities to features extraction and categorisation of neural data by AI.

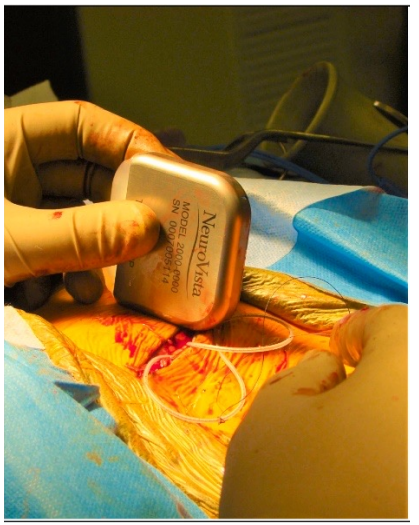
Passive – Active –Reactive Neurotech

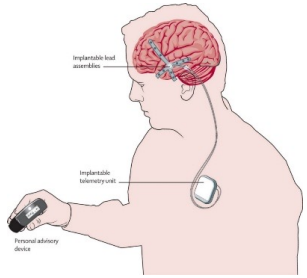
Common denominator:

Phenomenology still uncharted

Drastic embodiment of the BCI

P6: “[The BCI] was like an alien at first, […] you grow gradually into it and get used to it, so it then becomes a part of everyday, […] **it becomes part of you**. Because that’s what it did, **it was me**, **it became me**, […] **with this device I found myself.** […] It changed **who** that person was then and **I found myself changing**… growing I suppose and it changed my **confidence**, it changed my **abilities**. […] With the device I felt like I could do anything I wanted to do […] nothing could stop me.”





ELSEVIER
Brain Stimulation
Volume 16, Issue 3, May–June 2023, Pages 783-789

How I became myself after merging with a computer: Does human-machine symbiosis raise human rights issues?

Frederic Gilbert [a], Marcello Ienca [b c], Mark Cook [d e]

Science and Engineering Ethics
pp 1–14 | Cite as

Embodiment and Estrangement: Results from a First-in-Human “Intelligent BCI” Trial

Authors
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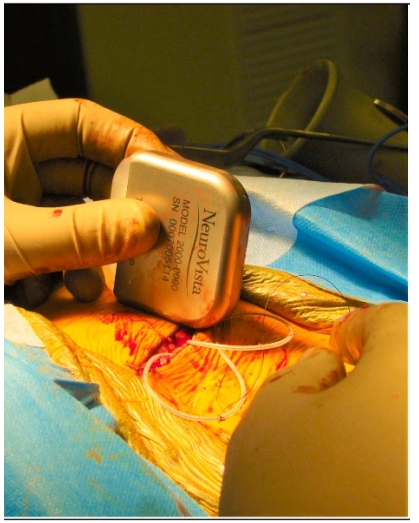
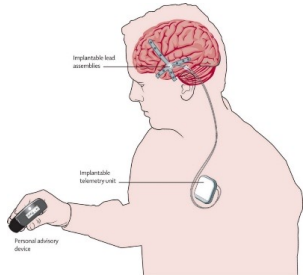
F. Gilbert, M. Cook, T. O’Brien, J. Illes

Radical Rupture: Self-Estranged effects

P3: "[The BCI] made me feel like I was just sick all the time. […] **It made me feel like I was different to everyone else. [… I felt so *weird all the time***; before it, **I only felt strange having the seizure**."

"It made me feel like ***I had no control. So I didn't have control over what I was going to do.***[…] **I got really depressed**. […] I had been depressed before, **I'd been very depressed, and I knew what depression was**, …I knew what depression felt [like]: "**I know I'm getting depression**", I remember how depression felt, and I could feel very much exactly the same. "





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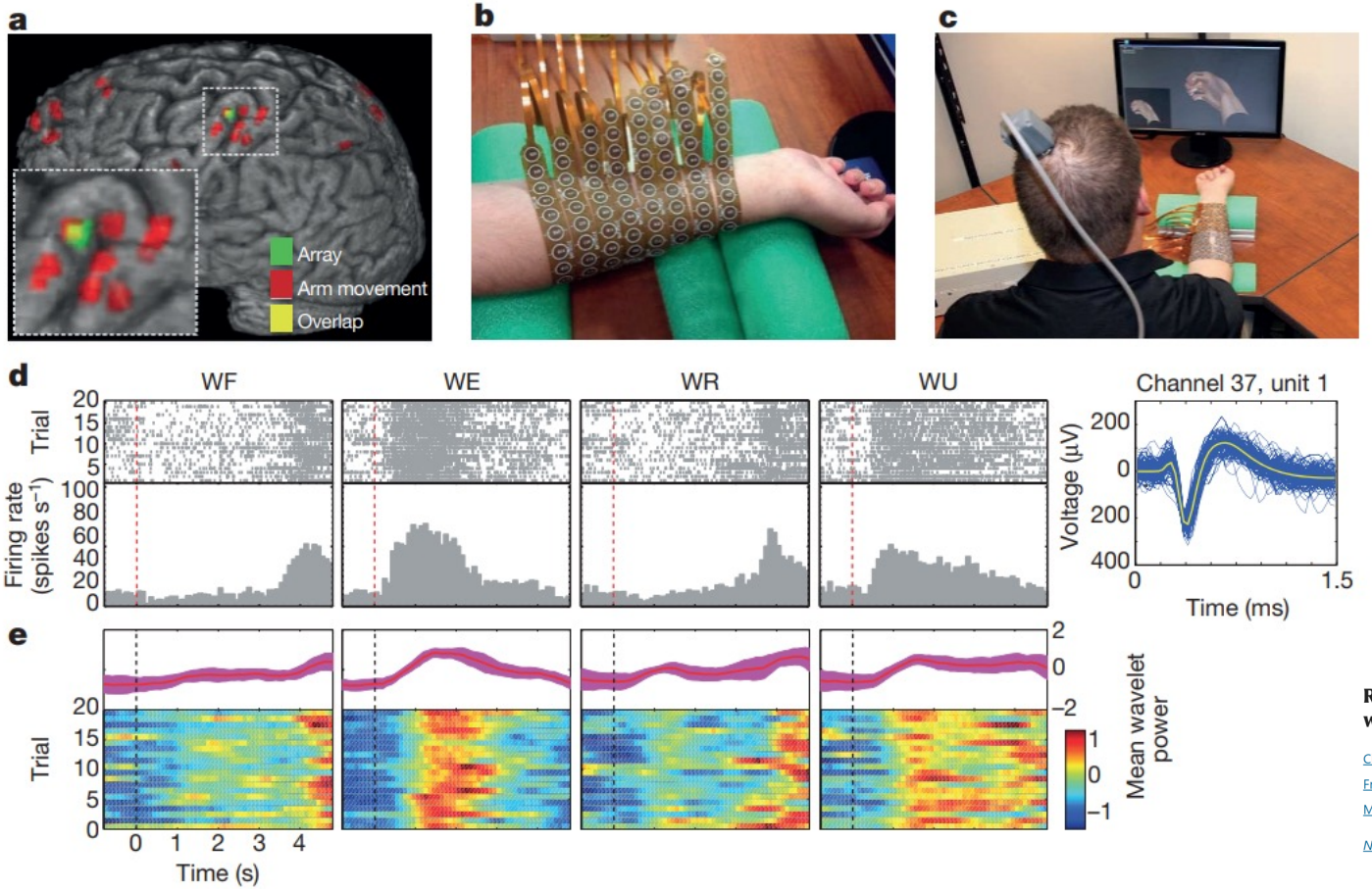


nature

Restoring cortical control of functional movement in a human with quadriplegia

Chad E. Bouton, Ammar Shaikhouni, Nicholas V. Annetta, Marcia A. Bockbrader, David A. Friedenberg, Dylan M. Nielson, Gaurav Sharma, Per B. Sederberg, Bradley C. Glenn, W. Jerry Mysiw, Austin G. Morgan, Milind Deogaonkar & Ali R. Rezai

Nature **533**, 247–250 (2016) | Cite this article

Embodiment Effects

Self-understanding:

"**I think the BCI is changing me** […] it is definitely changing what I can **identify as something that is my own movement.** […] As I get more use to the capabilities of the movement and it's become more natural, **it really become more a part of me, and that mean I am changing.** "

Embodiment Effects

***Naturalisation of BCI-induced free movement*:**

"The more and more I use the BCI, the more and **more it feels natural**, it feels the way it should; […] seeing the system works and responds help increase that **sense of it being a natural movement** […] I think the BCI gives me a **sense of freedom** because **I'm regaining abilities** that I thought I had lost".

Estrangement Effects

Losing control:

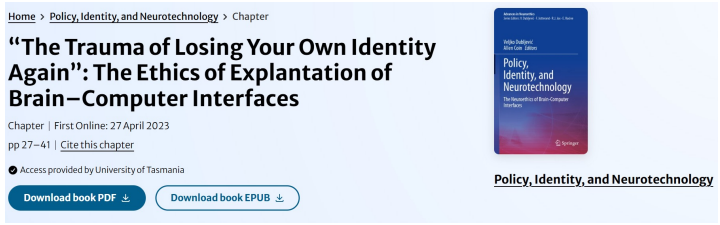
"There are time where there is **false positive** of the stimulation decoder […] **it will move without me giving explicit command**. **It is a little bit jarring in a sense**, because I question myself: "Did I think that ? did I mess something up? Did the computer mess something up? […]

There are certainty time where, I think I completely nail it, I would have **score 100%** for a test. But the feedback it not that."

Estrangement Effects

***Explantation*:**

“You are experiencing that trauma of losing your own identity again and try to figure out who you are; because, you know, **if you really do identify with the device it become a part of you**, and when that change, it is just… **it would be just very similar to the trauma and the adjustments I had to make after my initial spinal cord injury”**.



Discussion: BCIs introduce Vulnerabilities

Potential rupture in sense of control/agency

Varying **degrees of control** given to users introduce a **grey area between voluntary and involuntary action**.

What happens to a person's **sense of control/agency** when they voluntarily initiate an action, but a computer then steps in to complete the action?

Discussion: BCIs introduce Vulnerabilities

Discontinuity in transfer of responsibilities

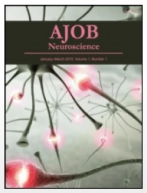
Issues with semi-automated systems where a human supervising the task is **held responsible** for task failures.

What about if a BCI **bypasses** an agent intention? Who/what should be responsible for BCI behaviours?

Discussion: BCIs introduce Vulnerabilities

BCIs can induce postoperative psychological side effects.

Common feelings of a (1) loss of control and a (2) distorted perceptions of one's capacities —the first (1) being mostly associated with a deteriorative sense of the self, the second (2) largely related to a restorative sense of the self.



AJOB Neuroscience

Target Article

I Miss Being Me: Phenomenological Effects of Deep Brain Stimulation

Frederic Gilbert, Eliza Goddard, John Noel M. Viaña, Adrian Carter & Malcolm Horne

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