

# The militarization of neuroscience

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We've seen this story before: The Pentagon takes an interest in a rapidly changing area of scientific knowledge, and the world is forever changed. And not for the better.

During World War II, the scientific field was atomic physics. Afraid that the Nazis were working on an atomic bomb, the U.S. government mounted its own crash project to get there first. The Manhattan Project was so secret that Congress did not know what it was funding and Vice President Harry S. Truman did not learn about it until FDR's death made him president. In this situation of extreme secrecy, there was almost no ethical or political debate about the Bomb before it was dropped on two cities by a bureaucratic apparatus on autopilot.

Despite J. Robert Oppenheimer's objections, a few Manhattan Project scientists organized a discussion on the implications of the "Gadget" for civilization shortly before the bomb was tested. Another handful issued the [Franck Report](#), advising against dropping the bomb on cities without a prior demonstration and warning of the dangers of an atomic arms race. Neither initiative had any discernible effect. We ended up in a world where the United States had two incinerated cities on its conscience, and its pursuit of nuclear dominance created a world of nuclear overkill and mutually assured destruction.

This time we have a chance to do better. The science in question now is not physics, but neuroscience, and the question is whether we can control its militarization.

According to Jonathan Moreno's fascinating and frightening new book, [Mind Wars: Brain Research and National Defense](#) (Dana Press 2006), the Defense Advanced Research Projects Agency has been funding research in the following areas:

- Mind-machine interfaces ("neural prosthetics") that will enable pilots and soldiers to control high-tech weapons by thought alone.
- "Living robots" whose movements could be controlled via brain implants. This technology has already been tested successfully on "roborats" and could lead to animals remotely directed for mine clearance, or even to remotely controlled soldiers.
- "Cognitive feedback helmets" that allow remote monitoring of soldiers' mental state.
- MRI technologies ("brain fingerprinting") for use in interrogation or airport screening for terrorists. Quite apart from questions about their error rate, such technologies would raise the issue of whether involuntary brain scans violate the Fifth Amendment right against self-incrimination.
- Pulse weapons or other neurodisruptors that play havoc with enemy soldiers' thought processes.

- “Neuroweapons” that use biological agents to excite the release of neurotoxins. (The Biological and Toxin Weapons Convention bans the stockpiling of such weapons for offensive purposes, but not “defensive” research into their mechanisms of action.)
- New drugs that would enable soldiers to go without sleep for days, to excise traumatic memories, to suppress fear, or to repress psychological inhibitions against killing.

Moreno’s book is important since there has been little discussion about the ethical implications of such research, and the science is at an early enough stage that it might yet be redirected in response to public discussion.

If left on autopilot, however, it’s not hard to see where all of this will lead. During the Cold War, misplaced fears of a missile gap and a mind control gap excited an overbuilding of nuclear weapons and unethical LSD experiments on involuntary human subjects. Similarly, we can anticipate future fears of a “neuroweapons” gap, and these fears will justify a headlong rush into research (quite likely to involve unethical human experiments) that will only stimulate our enemies to follow suit.

The military and scientific leaders chartering neuroweapons research will argue that the United States is a uniquely noble country that can be trusted with such technologies, while other countries (except for a few allies) cannot. They will also argue that these technologies will save lives and that U.S. ingenuity will enable the United States to dominate other countries in a neuroweapons race. When it is too late to turn back the clock, they will profess amazement that other countries caught up so quickly and that an initiative intended to ensure American dominance instead led to a world where everyone is threatened by chemicalized soldiers and robotterrorists straight out of *Blade Runner*.

Meanwhile, individual scientists will tell themselves that, if they don’t do the research, someone else will. Research funding will be sufficiently dominated by military grant makers that it will cause some scientists to choose between accepting military funding or giving up their chosen field of research. And the very real dual-use potential of these new technologies (the same brain implant can create a robosoldier or rehabilitate a Parkinson’s disease sufferer) will allow scientists to tell themselves that they are “really” working on health technologies to improve the human lot, and the funding just happens to come from the Pentagon.

Does it have to be this way? In spite of obvious problems controlling a field of research that is much less capital-intensive and susceptible to international verification regimes than nuclear weapons research, it is possible that a sustained international conversation between neuroscientists, ethicists, and security specialists could avert the dystopian future sketched out above.

Unfortunately, however, Moreno (p.163) quotes Michael Moodie, a former director of the Chemical and Biological Arms Control Institute, as saying, “The attitudes of those working in the life sciences contrast sharply with the nuclear community. Physicists since the beginning of the nuclear age, including Albert Einstein, understood the dangers of atomic power, and the need to participate actively in managing these risks. The life sciences sectors lag in this regard. Many neglect thinking about the potential risks of their work.”

Time to start talking!

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