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BRAIN GAIN: THE EMERGING SECURITY AND ETHICAL CHALLENGES OF COGNITIVE ENHANCEMENT

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The radically accelerating development of emerging strategic technologies (ESTs) poses important questions for the future of human societies.

On the one hand, ESTs promise great benefits. For example, newly developed forms of biotechnology, synthetic biology, and nanopharmaceuticals will begin to aid medical interventions, including those associated with psychological disorders. Drugs and nano-scaled

mechanical delivery systems that enhance our memory and mental capacity will one day assist us in performing functions outside of our natural capabilities. On the other hand, cognitive enhancement presents us with numerous ethical dilemmas and raises fundamental questions about how we understand ourselves. Such ideas have until recently been consigned to the realm of the imagination, but the likelihood of having a roomful of superior beings with hyper-memory—or an army of them—is fast becoming technologically possible. These developments complicate longstanding debates in both philosophy and cognitive science. Cognitive enhancement questions our notions of self-understanding, as well as those aspects of our nature with which we tend to feel most familiar.

In many ways, the emerging reality of cognitive enhancement is one that has snuck up on us. Although it has an intellectual history of only around 60 years, cognitive science has progressed at a tremendous pace. Interdisciplinary contributions to the field have offered significant insight into human nature. In particular, contemporary neuroscientific research, which has benefited from advanced brain imaging and a deepening investigation into neurochemistry, has offered more precise and invaluable insights into human behavior. As I have argued elsewhere, emotions play a central role in determining human behavior, influencing our actions to a much greater extent than philosophical accounts based around rationality have acknowledged. Emotions, in turn, are demonstrably mediated by

neurochemicals. Ongoing neurochemical research has demonstrated that emotions have corresponding physical neurochemical reactions in the brain. A full diagram interrelating neural activity and mental representations is still incomplete, but it is increasingly realistic that such a mapping is, in principle, possible.

As we have learned that neurochemistry is both a substantial determinant and a consequence of human behavior, we have been presented with the increasingly likely possibility that, with the right tools, we might be able to manipulate that neurochemistry, our emotions, and our cognitive abilities. This would mean we could then alter and orchestrate our emotions, thus determining what we will become both as individuals and as a species. The possibility that humans may seek to artificially enhance positive emotions and reduce negative ones is not difficult to foresee. This is because our neurochemistry is underpinned by a set of motivators I call the Neuro-P5: power, profit, pleasure, pride, and permanency. These will, at most times, push us to perpetuate those actions that ensure our gratification and enable one or more of these motivators.

But among the many emergent technologies with potential ethical and security implications, why does cognitive enhancement matter? The power to alter aspects of human nature raises the question of how we should employ such power, and to what end. One way of framing these challenges is to consider them in the context of human rights. Human rights are, of course, part of larger metaphysical debates, but we can narrow the discussion by considering human rights in the way that they were articulated by the Universal Declaration of Human Rights in 1948, as rights one has simply by virtue of being human. This shared understanding of what it means to be human, as well as the sorts of physical and psychological needs common to us all, have established a common framework for understanding human rights, contrasted against other legal or political rights.

Cognitive enhancement might radically complicate this understanding by multiplying and diversifying the categories by which we could apply human rights. Cognitive enhancement, if applied unequally throughout the population, would categorize humans as either enhanced or unenhanced. Such re-categorizations could render human rights unhelpful as a framework for defining ethical behavior and norms in international relations. At the very least, such a framework could become incomplete if what counts as “human” is called into question. Even more fundamentally, the introduction of cognitive enhancement complicates our understanding of personhood. Advances in neuroscience continue to heap up evidence for something like the mind-brain identity thesis, implying that a physicalist account of human beings is accurate and that our brain chemistry substantially defines what and who we are. Such possibilities might well have social and political implications, such as difficulties raised by increased inequality resulting from cognitive enhancement. Moreover, a general undermining of our conceptions of society and self in meritocratic terms will likely suffer a radical revision.

The prospect of altering brain chemistry will also cast many of our basic understandings of relationships and our expectations of one another in a new and uncertain light. Many of our ideas about what people deserve, how they are to be rewarded or punished, and the sort of employment they are prepared for or may reasonably aspire to presuppose a kind of agentic responsibility. In philosophical tradition, *arête*—the Ancient Greek notion of excellence or “virtue”—presupposes a kind of identification with the activity in which one engages and the quality of one’s performance. Such notions must now be reassessed. Are we to be identified with our performance, for instance, if that performance is largely a consequence of cognitive enhancement? Conversely, if *arête* is thought of as a relative notion, is our unenhanced performance devalued because of the cognitively enhanced performances of others?

In addition to these issues, the prospect of cognitive enhancement is also likely to reinforce persistent inequalities on a global—rather than an individual—scale. As such, it has potentially profound implications for international relations and global security. Nations with

greater resources are more likely to find themselves in a position to take advantage of enhancement technologies, providing them with an even greater competitive edge over other, less fortunate states. Harnessing cognitive enhancement could help states engineer more productive, competent, focused, and skilled individuals in the workplace, thus increasing the overall output of their economies and projecting global power further afield. The increased radical inequality that could result is a powerful catalyst for social instability, and raises a number of threats to human dignity. In these globalized circumstances, those at the bottom of the resource distribution curve may come to constitute a pool of agitated and alienated individuals ripe for radicalization.

Cognitive enhancement may also result in critical asymmetric capabilities in wars, with two immediate possible implications. First, cognitive enhancement could widen the capabilities gap between countries; second, it could lead to further competition among states, or to a race to develop ever more sophisticated enhancement technologies. At the same time, cognitive enhancement will inevitably lead to sharp contrasts between enhanced and non-enhanced soldiers in the army, even those fighting on the same side. This will invariably bring about problems of troop cohesion, as well as challenges to the application of international law. Pills or brain stimulation to keep soldiers alert for days without sleep will not only improve the quality of their performance during operations, but also raise numerous ethical questions and concerns about the long-term health implications of such tactics for the soldiers themselves. At the same time, an easily imagined cognitive enhancement pill could help erase soldiers' traumatic memories, and in so doing, act as a possible solution for post-traumatic stress disorder. However, further ethical questions would surely be raised in the process of commercializing such a drug.

These and many related questions must be contended with in the near future. As is the case with most technologies, cognitive enhancement presents both risks and opportunities. In order to manage its implications, regulatory mechanisms will be critical. If left entirely unregulated, cognitive enhancement is bound to exacerbate societal inequality and introduce new sources of tension into international relations. As with other ESTs currently under development, cognitive enhancement requires an understanding of the world and conceptions of human beings and our nature that are in many ways new. Coming to terms with these new realities will be only the first step in ensuring that both the development of ESTs is sustainable and our human dignity remains intact.

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