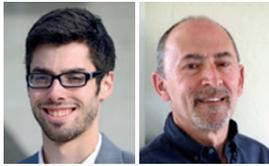


## PERSPECTIVE



# Time to expand the mind

Thoughtful use of ubiquitous technology can improve mental ability more than drugs and devices, say **Nicholas S. Fitz** and **Peter B. Reiner**.

Few objectives are more desirable than improving mental performance. Whether it is to enhance attention and memory or to stave off the normal decline of ageing, the drive for cognitive enhancement has caught the imagination of scientists and the public. The media, in particular, regularly report strategies that offer ‘limitless’ abilities. Despite the hype, drugs and devices produce, at best, only modest gains<sup>1</sup>. Indeed, the current evidence indicates that the best ways to improve mental ability are the familiar approaches of proper sleep, good nutrition and exercise.

One reason may be that our brains are already working at near-optimal capacity; attempts to modify them bump up against the hard limits of neurobiology. If this is the case, then we need to find a new strategy for boosting cognitive power. The best path, we believe, will be to improve the way in which we blend our mental capabilities with the powerful algorithms in our computers and smartphones.

## PERSPECTIVE SHIFT

It is hard to overstate the degree to which information technology has permeated today’s world. For many, reliance on technology begins when they awaken, continues throughout the day and ends only when they drift off to sleep. Nearly half of the adult population worldwide owns a smartphone. But to call these devices phones is a misnomer; the functions they carry out are incredibly diverse, including storing information, sending and receiving messages, and videoconferencing. Sometimes it feels as if technology is supplanting thinking, but this worry is somewhat misdirected. Rather, these devices are extending the reach of our cognitive abilities, so much so that a statement that once seemed radical is increasingly realistic: we have become proto-cyborgs<sup>2</sup>.

We are still a long way from the transhumanist fantasy of upgrading our brains with implantable computer chips. But we have entered a transitional era in which we are commingling our cognitive space with technology. In doing so, we have enlisted the assistance of what might be termed technologies of the extended mind<sup>3</sup>.

Consider the ways in which these tools already enhance cognition. Never before have humans had the ability to find answers in the blink of an eye, and to store vast amounts of data with greater fidelity than biological memory. As the Internet of Things gains momentum, we will find ourselves interacting with ‘intelligent’ objects that predict our preferences and make decisions on our behalf. Ideally, delegation of these tasks to our devices would allow us to expend more energy pursuing challenging activities such as improving willpower and analytical thinking.

But that is not how the human–technology connection is playing out. Instead, the same devices that extend some cognitive abilities degrade others. People grappling with information overload often bemoan the difficulty they have in concentrating for long periods

of time<sup>4</sup>. Although we seem to be constantly connected to others, some overuse technology at the expense of face-to-face social engagement. And it is the rare individual who does not succumb to the addictive appeal of devices that provide instant rewards. Turning them off is impractical because it can leave us disconnected from information that is truly valuable. Our gnawing anxiety about overusing our technology is only partly soothed by the current crop of apps, such as Freedom or Moment, that attempt to quiet the noise of digital life by blocking distracting websites for a limited period. A better strategy, however, is to embed solutions in the design of both the devices and the environments in which we use them.

## THE ATTENTION ECONOMY

One approach that merits further consideration is the idea of calm technology<sup>5</sup> — interfaces that inform without distracting.

For example, your phone might automatically go silent when it knows that you are in a meeting, unless the message is urgent. Behavioural nudges that help people to more closely align their technology use with their intentions could reinforce embedded design principles. Such alterations of the digital and physical environments can foster a healthier relationship with our devices. We endorse fledgling movements such as Time Well Spent that call for a broad coalition to work towards real-world solutions. We encourage the scientific community to investigate the implications — both beneficial and deleterious — of technology adoption. We call on policymakers and behavioural scientists to consider crea-

tive means of encouraging best practices by the public. And we challenge technology designers to improve the user experience so that cognitive health is no longer sacrificed on the altar of profit margins.

Our growing reliance on ubiquitous computing technologies defines the modern age. Melding these technologies with thoughtful design and effective nudges that reinforce healthy social norms will ensure that they genuinely improve the human condition. ■

**Nicholas S. Fitz** is a graduate student at the National Core for Neuroethics at the University of British Columbia. **Peter B. Reiner** is a professor at the National Core for Neuroethics at the University of British Columbia.  
e-mail: peter.reiner@ubc.ca

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