The Stakes Are High: Scientific Responsibility in the Age of Digital Diagnostics

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Cognitive neuroscience has always had something to say about diseases of the brain. We've all written grants promising that, in some distant (and perhaps imaginary) future, our research findings would lead to a cure - or at least contribute to finding one, albeit in some rather roundabout way. But the relationship between cognitive neuroscience and brain disease has now entered a critical juncture. The rise of digital tools - online cognitive tests, AI-powered diagnostics, smart watches, and other app-based symptom trackers - offers unprecedented opportunities for early detection and improved management of conditions like Alzheimer's disease and other dementias, which devastate individuals, families, and healthcare systems. And therein lies the problem. Science - real science, that is - moves slowly, and efforts to turn existing scientific knowledge into usable products that will benefit both the public and physicians move along at a snail's pace. Meanwhile, the market has become saturated with startups offering quick and dirty cognitive diagnostics for everything from Alzheimer's dementia to ADHD. With few alternatives, these promises are enticing, both for overburdened healthcare systems seeking scalable solutions and for individuals who can't access, or afford, professional medical care. Yet, beneath their glossy interfaces lies a troubling truth about many of these digital tools: they lack the scientific validation required to support their claims. Indeed, for most of these companies, the science is an afterthought - get the product to market first and worry about the science later. Compounding the problem is the fact that public trust in science - and that includes cognitive neuroscience - is at an all time low meaning that, even if people did wait for scientifically valid solutions to come to market, they likely wouldn't choose them over the empty promises of these 21st century snake oil sales people anyway.

I find the ethics of all this extremely troubling. Lives and livelihoods are, quite literally, at stake. The early diagnosis of conditions like dementia can mean the difference between years of informed care planning and a cascade of avoidable crises. If the available digital diagnostics are inaccurate, there is a risk of falsely alarming healthy individuals, missing those who desperately need help, and burdening already strained healthcare systems with having to unravel misdiagnoses. Yet in my opinion, the responsibility to "get it right" isn't just ethical; it is fundamental to preserving the credibility of our field.

Cognitive neuroscience urgently needs to reclaim this space. Historically, it has always been the gatekeeper where questions concerning the diagnosis of disorders of the brain are concerned, but now it also needs to become the innovator. At the core of any diagnostic tool—digital or otherwise—must be rigorous validation. Validation is not a checkbox to tick but a continuous research process involving testing, refinement, and retesting in diverse populations. It's already the day-to-day business of many cognitive neuroscience labs around the world and it involves demonstrating not only accuracy and reliability but also how these tools perform in real-world settings. A dementia test, for example, must account for variables like age, cultural differences, language, and comorbid conditions to ensure it works equitably for all. It is imperative that the scientific community steps in to ensure that, as the pace of technological advancement accelerates, the tools that come to market are not only innovative but also trustworthy and effective for all who rely on them.

To be fair, some organizations are already leading by example, creating tools grounded in decades of cognitive science and validated through meticulous peer-reviewed research. These efforts demonstrate that rigor and innovation are not mutually exclusive. But we must hold each other accountable. Journals must ensure standards are enforced – requiring transparent methodologies and robust, replicable evidence as prerequisites for publication. Funding bodies must prioritize supporting innovations that demonstrate scientific rigor, discouraging the proliferation of flashy but scientifically hollow products. Professional societies, too, bear a critical responsibility: endorsing only those tools that meet stringent criteria for validity and reliability.

The stakes are high, but so are the rewards. A well-validated digital diagnostic tool has the potential to transform care, democratizing access to early detection and empowering healthcare providers to intervene sooner and more effectively. But to achieve this, we cannot cut corners. Science is more than a method; it is a moral commitment to truth and progress. In the age of digital health, this commitment has never been more critical. The cognitive scientific community must rise to the challenge, leading with rigor, humility, and integrity to ensure that innovation serves humanity. It is a responsibility we cannot take lightly.