

Brain health research is leaving the lab and coming to your smartphone

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Dr Claire Gillan, Principal Investigator, neureka. Credit: Trinity College Dublin

The COVID-19 pandemic has made many aspects of face-to-face research impossible for the foreseeable future, pushing scientists to explore remote ways of continuing their research and collecting data. But

even before the pandemic, a seismic shift in this direction was already taking place in the field of brain health.

Traditional methods in mental health and dementia research would normally see research participants visit a lab to perform tests leading to difficulties in enrolling large enough samples of people to yield compelling and reproducible datasets. Researchers who are trying to identify what predisposes the brain to develop depression or dementia and how and why the [brain changes](#) in these disorders, need thousands of participants to yield conclusive results.

Now scientists at the Global Brain Health Institute (GBHI) at Trinity College Dublin hope to tackle this problem using a new smartphone app to carry out a range of major research projects designed to tackle the brain basis of disorders of the mind—from the most widespread mental health disorders like depression and anxiety, to dementia, a problem of increasing global concern as our populations live longer.

The new app, called neureka is a collection of research studies delivered through brain games and self-reflection challenges that allows users to have fun and learn about themselves, while also playing a major part in cutting edge scientific research. Among several research studies delivered through the app, one will help the team at GBHI to identify modifiable risk factors for disorders of the mind—things that individuals and policy-makers can do to prevent people from developing these potentially devastating conditions. neureka is a nod to that indescribable "eureka!" moment that comes with new scientific discovery, but also the 86 billion neurons in our brains that inspired the creation of the app.

Dr. Claire Gillan, GBHI Faculty, assistant professor of psychology at Trinity and Principal Investigator said: "One of the really unique aspects of this project is that we are trying to make participating in science fun—we've hidden the things we are testing inside games that we hope

the public will want to play. If this works, there is huge potential for studying cognition on a whole new scale. Imagine if Pokemon Go or Candy Crush weren't just games? If at the same time, players were helping researchers to understand how the brain works and how we can develop new ways to prevent mental health conditions and dementia."

For example, if scientists want to understand whether having the odd glass of red wine protects us from getting dementia, we need to estimate the influence of wealth, culture, climate, and a myriad of other contributing factors before they can arrive at a conclusion. This means it takes thousands of people to come together so the scientists can answer some of the most important questions in brain health today!

Considering these limitations; this vital research simply cannot move as fast as we need it to. In the era of data science, the field is crying out for richer and more complex datasets that permit us to develop individualised understanding of brain health. This data can capture not just the complexity of the brain, but also its moment-by-moment interaction with the environment, and how these conspire to make someone feel acutely unwell.

Dr. Gillan continued: "We simply cannot have 20,000 people come into our lab to do an experiment—it's not feasible, let alone have them come in once a week for several months. This new technology allows us to track, for the first time, how cognition evolves over time and in concert with changes in life circumstances and one's mental health. It's these time courses that are going to allow us to ask the most important, but difficult to address, questions around cause and effect."

Now, merely by using their smartphone to complete challenges, users can play brain games and anonymously and confidentially share their personal experience of mental health with the GBHI research team. By using the app, they can play an enormous part in fighting disorders of the

brain.

The more people that engage with the app; the more scientists will learn about what causes dementia and mental health problems—and how we can intervene before people get sick.

Speaking on the potential reach of the neureka app, Professor Brian Lawlor, deputy executive director of GBHI and Conolly Norman Chair in Old Age Psychiatry at Trinity said: "Here at GBHI we are very excited about the release of neureka. By moving research in brain health from the lab to the smartphone, Dr. Gillan is addressing the important issue of inequity of access to research participation. neureka can potentially reach and benefit much larger numbers of people, including marginalised groups. GBHI believes very strongly that we need to include these vulnerable groups in research as they are particularly at risk from threats to [brain](#) health."

Dr. Claire Gillan concluded: "The goal here is to understand all the different ways people keep their brains healthy. The app is for everyone—those who personally struggle with their [mental health](#), have family risk, or have no problems whatsoever. Whoever you are, your data is a crucial part of the puzzle and will help us build the most detailed models possible of what we can and cannot control in the fight against disorders of the mind."

More information: neureka is available for free download on the App Store and Google Play Store.

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