



'A mass experiment': How the internet may be changing your brain

From- 'Hack' on <https://www.abc.net.au/>. Wednesday 5 June 2019 5:52pm.

You're switching between Facebook and Instagram while responding to texts, with Netflix on the laptop and music playing in the next room. When you stop and try to focus on a single problem, your brain refuses to cooperate, and, before you realise what's happening, you're back on your phone. The internet isn't just changing how we live and work - it's actually altering our brains.

An international team of researchers, including psychiatry and mental health experts from Oxford and Harvard, have published the first major review of the way the internet can influence the way we think, including how intensive use may even be changing the structures of our brains.

Their report, [published in the the journal of World Psychiatry](#), broadly concludes that using the internet can produce "acute and sustained alterations" in our capacity to focus on tasks, recall information, and interact with others. This may be reflected in changes in the brain.

"For better or worse, we are already conducting a mass-scale experiment of extensive internet usage across the global population," the report concludes.

The research was led by Dr Joseph Firth, a senior research fellow with the NICM Health Research Institute at Western Sydney University.

He told *Hack* internet use should be considered an emerging important factor in brain function, alongside other inputs such as sleep and nutrition.

"We're conducting an experiment without actually checking the results," he said. "We're just observing the effects of the introduction across many aspects of our society, but not really assessing the results of the experiment."

How it affects the brain

Dr Firth said attention and memory were the most affected brain functions. A limitless stream of different forms of digital media encourage us to adopt a behaviour pattern known as 'media multi-tasking' - interacting with lots of things at once, but on a shallow level. Your brain turning to mush after flitting between information streams - that's media multi-tasking.

"People who engage in a lot of those types of activity are less able to pay sole attention and give their entire focus to a single task," Dr Firth said. "It makes you worse at ignoring distractions."

Even a short time online can temporarily reduce your attentional capacity for the time afterwards. Is this actually changing the structure of your brain? Maybe, Dr Firth says.

"It takes quite a long time to change the structure of the brain, but when we look at it through functional MRI imaging we can see changes in brain activity between those who engage in lots of media multi-tasking and those who do not."

[A recent randomised controlled trial](#) found that six weeks of engaging in an online role playing game caused significant reductions in grey matter with the orbitofrontal cortex - a brain region implicated in impulse control and decision making. [A separate study](#) also found frequent multi-tasking behaviours predict the development of attentional deficits in early adolescents (but not teenagers). "Just by hacking our weaknesses it can take control."

Internet usage also affects parts of the brain associated with memory functions. [Studies have found](#) that people instructed to find information online completed the task faster than those using printed encyclopedias, but were less able to recall the information accurately. This is not necessarily bad: Other studies show 'cognitive offloading' - i.e. not having to remember everything - allows people to focus better on other tasks. [But it's also associated](#) with a change in brain structure in regions of the brain associated with long-term memory formation.

"It reduces our ability to store information long-term," Dr Firth said. He said brains are most vulnerable to being shaped when they're new and developing; when we're children and in our early teenage years. "High levels of concentration are not something given to us from birth - we acquire that through our lives. "Are we reducing our brains ability to ever gain these skills? "That is quite terrifying."

Tech companies unlikely to consider psychological harm

Despite the concerns raised, Dr Firth said it was important to keep perspective. He said there was "no reason to believe internet usage is going to have any major detrimental effects" provided it does not entirely replace sleep and physical activity. "It's more of a concern in those people who are missing out on sleep due to it, social interactions, physical activity, things like this," he said. "That could be really detrimental to people over the long-term."

But he said the lack of research was concerning - particularly given the internet was the most widespread and rapidly adopted technology in the history of humanity. Added to this, we're losing the ability to ever understand how a brain functions without extensive online media usage. As an increasing proportion of the world goes online, soon there will be no control group against which to compare an internet user's brain.

He said tech companies have a responsibility to share user data so that researchers can better understand what exactly the internet is doing to our brains and cognition. Companies are not yet doing this, he said.

"They should, by necessity, gather and share data when producing a product," he said.

"If you're running a multi-billion dollar tech company and your tech turns out to be psychologically harmful to people, do you think that message will definitely be translated to the general population? We can't expect them to do that."