

# WHAT ARE THE ETHICS OF BRAIN-COMPUTER INTERFACES? A REVIEW OF THE LITERATURE

[Brain-computer interfaces \(BCIs\)](#) are a new technology that connects brain tissue to computer hardware. In this study, we reviewed the academic ethics literature and discovered that experts are very concerned about how BCIs will be used in society, for better or worse.

**Reference:** Burwell, S., Sample, M., Racine, E. (2017) [Ethical Aspects of Brain-Computer Interfaces: A Scoping Review](#). *BMC Medical Ethics*. 18(60), 1-11.

## WHO SHOULD READ THIS?

These results are relevant for biomedical engineers, clinicians, policy makers, people with neurological conditions related to paralysis, and anyone interested in new and emerging technologies.



## WHAT IS IT ABOUT?

Researchers around the world are currently exploring ways to use BCIs to improve health and quality of life. Some BCIs are wearable, like a hat, and can facilitate communication for people who need it. Other BCIs require surgery, and might reconnect paralyzed limbs.

## WHAT DID THE RESEARCHERS DO?

We used literature searches to find 42 academic articles that describe the ethical challenges of new BCI technology. After carefully reading each article, we made a list of the main ethical themes and double checked this list with several experts in the field.



## WHAT DID THE RESEARCHERS FIND?

BCIs are ethically challenging. The academic literature presents worries associated with safety, humanity and personhood, stigma and normality, autonomy, responsibility, research ethics, privacy and security, and justice.

## WHAT NOW?

It is a good first step to ask philosophers and clinicians about the ethics of BCI. But now we need to ask potential BCI users what they think, since their concerns may be different. Future studies should interview and survey stakeholders, which provide insights that could make BCIs more ethical and more effective.

