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COMMENTARY

Controversies on brain-wide association studies: commentaries from the field

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Since the earliest days of neuroimaging research, there has been a significant emphasis on data and code sharing at all stages of the experimental pipeline. There are clear advantages to this strategy and many in other branches of neuroscience have used the neuroimaging field as an exemplary model of how to engage in more transparent and reproducible science. Something that naturally occurs as a result of this transparency is re-evaluation, which most would agree is a critical part of the scientific endeavour. In neuroimaging, we have re-evaluated the impact of basic data quality and participant in-scanner motion and its impact on downstream results (1, 2), re-examined the permissiveness of our statistical frameworks (3), and, most recently, examined our propensity for false positives or inflated *p*-values when regressing a single variable against a whole brain's worth of data (the so-called brain-wide association study [BWAS]) (4). These studies are critical to our health as a field and maintain a level of discussion that can lead to the refinement of our methods and our statistical design. But they also come at the cost of having the entire field of neuroimaging to be put on trial in the media (see https://www.nytimes.com/2022/03/16/science/brain-imaging-research.html and https://www.npr.org/2022/04/25/1094680408/brain-scan-studies-need-to-get-much-bigger-to-offer-insight-into-mental-illness) and sometimes by colleagues in other neuroscientific disciplines, however, rightly or wrongly.

Here, we provide a unique take on the so-called BWAS paper from different members of the community (Tonya White – **Aperture Neuro** editor-in-chief, Bertrand Thirion, Peter Bandettini, Sofie L. Valk and Meike D. Hettwer, Lucina Uddin, and Jeggan Tiego and Alex Fornito). The goal of this is to make **Aperture Neuro** a place where the community can come and engage in academic discourse about papers such as these. We welcome more commentaries on controversial topics and a diverse breadth of opinion.

REFERENCES

1. Satterthwaite, T.D., Wolf, D.H., Loughead, J., Ruparel, K., Elliott, M.A., Hakonarson, H., et al. Impact of in-scanner head motion on multiple measures of functional connectivity: Relevance for studies of neurodevelopment in youth. NeuroImage 2012;60:623–632.
2. Power, J.D., Mitra, A., Laumann, T.O., Snyder, A.Z., Schlagar, B.L., Petersen, S.E. Methods to detect, characterize, and remove motion artifact in resting state fMRI. NeuroImage 2014;84:320–341.
3. Eklund, A., Nichols, T.E., Knutsson, H. Cluster failure: Why fMRI inferences for spatial extent have inflated false-positive rates. Proc. Natl. Acad. Sci. 2016;113:7900–7905.
4. Marek, S., Tervo-Clemmens, B., Calabro, F.J., Montez, D.F., Kay, B.P., Hatoum, A.S., et al. Publisher correction: Reproducible brain-wide association studies require thousands of individuals. Nature 2022;605:E11.