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Neurofeedback: The power of psychosocial therapeutics

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MAIN TEXT

In response to our Comment¹, a recent Correspondence piece argued that more time and research may confirm the clinical promise of electroencephalography neurofeedback (EEG-nf).² This common stance, however, seems to stem more from an allegiance to a technique —EEG-nf— than from measured scientific reasoning. In a way, the science is clear: power analyses tell us how big a sample we need to detect an expected effect; experimental design dictates how we must control for psychosocial influence; and nearly 60 years of research have yielded surprisingly little evidence to support claims of regulatory brain-based mechanisms, which supposedly drive EEG-nf outcomes. How much longer should one wait before coming to a conclusion? How many more experiments do we need?

Proponents of EEG-nf reason that many experiments cannot possibly support their view because of inadequate designs; moreover, they often cherry-pick positive results – reminiscent of pseudoscientific domains – to justify their claims. After 58 years of research and over 3,000 relevant publications [e.g., query “(neurofeedback or biofeedback) and (EEG or electroencephalogr*)” in Scopus], the Correspondence cites only one study³ wherein neural changes occurred in the direction of training. But even in this study, as in the rest of the literature, little evidence supports a correlation between the neural signal trained and behavioral outcomes – the purported foundation on which the pillar of neurofeedback has been erected since its inception in 1958.

The Correspondence states that even arguably the best double-blind EEG-nf study⁴ uses ineffective methods. And yet, this experiment omits reporting changes in neural activity while documenting large behavioral improvements for both veritable and sham feedback. Thus, neurofeedback was actually effective: as effective as mock neurofeedback. Psychosocial factors

– perceived success, for example – correlate directly with behavioral improvements regardless of feedback contingency.⁵

EEG-nf works; we are just trying to determine how. Given the well-documented behavioral benefits of EEG-nf alongside the overarching equivalence between genuine and fake feedback, placebo explanations seem plausible. Exponents of EEG-nf claim that this technique yields its effects by self-regulating brain function; however, the burden of proof continues to linger in their court. Science requires that proponents of unsupported claims provide compelling evidence and that everyone should be sufficiently critical to reject claims that already have been dismissed as specious. While many of us have probably waited long enough to conclude, for example, that the Tooth Fairy seems unlikely, others may ask for more time to look for her.

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