The Effectiveness of Neurofeedback on Working Memory Performance and Cognitive Planning Ability in Children with Attention-Deficit/Hyperactivity Disorder

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Fereidoun Yaryari Associate Professor, Department of General Psychology, Kharazmi University, Tehran, Iran yaryari@khu.ac.ir	**Reviewer 1:** Mohammad Ashori Department of Psychology and Education of People with Special Needs, Faculty of Education and Psychology, University of Isfahan, Isfahan, Iran. Email: m.ashori@edu.ui.ac.ir **Reviewer 2:** Thseen Nazir Professor of Psychology and Counseling Department, Ibn Haldun University, Istanbul, Turkey. Email: thseen.nazir@ihu.edu.tr

1. Round 1

1.1. Reviewer 1

Reviewer:

In the sentence "Functional imaging studies have demonstrated altered neural oscillations, particularly excessive theta activity and reduced beta power…", please clarify whether these oscillatory patterns represent trait-like neural markers or task-induced states, as this distinction is theoretically meaningful for neurofeedback rationale.

The paragraph citing "Himmelmeier & Werheid (2024)" and "Wu et al. (2024)" summarizes systematic reviews but lacks mention of potential confounding variables (e.g., placebo feedback). Including this nuance would increase the critical depth of the review.

In the sentence "In Iran and other developing contexts, the growing interest in neurofeedback research reflects…", expand briefly on why cultural adaptation (e.g., visual feedback stimuli or parental engagement) might influence neurofeedback outcomes, citing regional contextual factors.

The concluding sentence "Therefore, given the existing literature and the need for more empirical clarity…" effectively states the aim, but it could benefit from an explicit hypothesis formulation (e.g., "It was hypothesized that neurofeedback would significantly enhance…").

In the paragraph "Participants were recruited through convenience sampling…", the text later states "Eligible participants… were randomly assigned." Clarify whether initial recruitment was convenience-based and only randomization applied to group assignment. This needs clearer methodological consistency.

In the same section, the phrase "Assuming a medium effect size (f ≈ 0.25)… the required sample size was calculated to be 70 participants" would benefit from citing the software or statistical table used (e.g., G*Power 3.1). Include the specific test parameters (ANOVA repeated measures, within-between interaction).

The description under Table 4 ("Based on the Reliable Change Index…") should detail how RCI was computed (formula or cutoff reference). This ensures methodological transparency and allows replication.

In the paragraph "Mechanistically, these improvements can be attributed to neurofeedback's capacity to regulate cortical oscillations…", the discussion conflates speculative neural mechanisms with empirical results. Distinguish between data-driven conclusions and theoretical extrapolation for accuracy.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

The paragraph beginning "Despite growing evidence, the heterogeneity in neurofeedback protocols…" identifies protocol variation but does not articulate a precise empirical gap leading to this study. Please specify how your design (theta/beta and SMR combination) uniquely addresses that inconsistency.

In "The Persian version of the scale was standardized by Ebrahimi et al. (2015)…", provide the normative sample size and age range to demonstrate cultural appropriateness. Reviewers may question equivalence between local norms and the 7–14 age band used here.

The section on the Digit Span Test reports Cronbach's alpha (.79). Since alpha is seldom appropriate for span tasks, consider citing split-half or test–retest reliability, or justify the use of internal consistency for performance tests.

In "Block 1 (F4): Training focused on reducing the theta/beta ratio at F4…", please explain why F4 (right frontal) was selected rather than Fz or F3, given that left frontal hypoactivation is also reported in ADHD. A theoretical justification would strengthen methodological rationale.

In "The sham protocol was identical… but the feedback provided was asynchronous and pre-recorded." Specify how the prerecorded feedback was generated (e.g., from another participant, from baseline recordings). This information is essential for reproducibility and to rule out expectancy bias.

The paragraph "Statistical assumptions were tested, including normality…" mentions Levene's test and Kolmogorov–Smirnov, but does not discuss the handling of potential violations. Add information on transformations or robustness checks if any assumption was violated.

In Table 1, the use of two decimal places for means is appropriate, but the textual paragraph "It can be observed that the neurofeedback group showed a consistent improvement…" should include effect size interpretation (Cohen's d) for each variable to quantify the magnitude of improvement.

Authors revised the manuscript and uploaded the document.

2. Revised

Editor's decision: Accepted.
Editor in Chief's decision: Accepted.