PUBLISHING INSTITUTE
Journal Website
Article history:
Received 14 March 2026
Revised 05 October 2026
Accepted 10 October 2026
Published online 01 December 2025

Psychological Research in Individuals with Exceptional Needs

OPEN PEER-REVIEW REPORT

E-ISSN: 3060-6713

A LightGBM-Based Prediction Model of Emotional Dysregulation in Children with ADHD: The Roles of Parent–Child Conflict, Cognitive Control, and Sleep Quality

Chinedu. Okonkwo[1], Laura. Evans[2*], Verónica. Escalante

[1] Department of Clinical Psychology, University of Nigeria, Nsukka, Nigeria
[2] Department of Cognitive Psychology, Memorial University of Newfoundland, St. John's, Canada
[3] Department of Educational Psychology, José Simeón Cañas Central American University, San Salvador, El Salvador

*** Corresponding author email address**: levans@mun.ca

Editor	Reviewers
Abolghasem Yaghoobi Professor of Psychology, Department of Psychology, Faculty of Economics and Social Sciences, Bu-Ali Sina University, Hamedan, Iran yaghoobi@basu.ac.ir	**Reviewer 1:** Hooman Namvar Assisstant Professor, Department of Psychology, Saveh Branch, Islamic Azad University, Saveh, Iran. Email: hnamvar@iau-saveh.ac.ir **Reviewer 2:** Elham Azarakhsh Department of Psychology, Islamic Azad University, Qom Branch, Qom, Iran. Email: elhamazarakhsh@qom.iau.ac.ir

1. Round 1

1.1. Reviewer 1

Reviewer:

The paragraph beginning with “Among the various difficulties experienced by children with ADHD, emotional dysregulation has emerged as one of the most clinically significant yet historically underappreciated features” provides a strong conceptual overview; however, the manuscript lacks a clear operational distinction between emotional dysregulation and related constructs such as emotional impulsivity, irritability, affective lability, and emotional reactivity. A more rigorous theoretical delineation is necessary to clarify the conceptual boundaries of the outcome variable.

In the paragraph discussing family dynamics, the authors write that “Repeated cycles of negative interactions may contribute to escalating emotional reactivity and reduced opportunities for the development of adaptive emotion regulation skills.” While theoretically plausible, this claim would be strengthened by incorporating a more explicit explanatory model (e.g., coercion theory, attachment theory, transactional developmental models) that links parent–child conflict to emotional dysregulation in ADHD populations.

The paragraph beginning “In addition to environmental influences, cognitive processes play a fundamental role in emotional regulation” reviews executive function literature effectively; however, the rationale for selecting cognitive control as the sole cognitive predictor remains insufficiently justified. The authors should explain why cognitive control was prioritized over other executive domains such as processing speed, planning, working memory, or inhibitory control, particularly given their documented associations with ADHD-related emotional functioning.

In the Findings section, the statement “No substantial multicollinearity was observed among predictor variables, as variance inflation factor (VIF) values ranged from 1.21 to 2.08” is appreciated; however, the manuscript would benefit from reporting tolerance values and presenting a complete multicollinearity diagnostics table. This would provide a more transparent assessment of predictor independence.

Table 1 reports strong correlations between emotional dysregulation and the predictors, particularly r = .68 for parent–child conflict. Given the magnitude of these associations, the authors should discuss whether nonlinear relationships or interaction effects were observed. Since machine-learning models are specifically designed to capture such complexities, reporting these patterns would substantially enrich interpretation.

Regarding Table 2, the reported difference between training R^2 (.842) and testing R^2 (.781) is relatively modest; nevertheless, the manuscript should provide additional evidence supporting model generalizability. For example, learning curves, calibration plots, residual analyses, or external validation procedures would offer stronger evidence that the model is not overfitted to the study sample.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

In the sleep-related section, the sentence “Sleep disturbances are highly prevalent among children with ADHD and have been documented across a wide range of populations and developmental stages” introduces a broad literature base, yet the manuscript does not adequately discuss whether specific sleep dimensions (e.g., sleep duration, sleep latency, sleep fragmentation, circadian misalignment) may exert differential effects on emotional dysregulation. A more nuanced discussion would improve theoretical precision.

The final paragraph of the Introduction states that “Most studies have examined parent–child conflict, cognitive control, or sleep quality independently.” This claim should be supported through a more systematic synthesis of previous studies demonstrating the lack of integrative models. The authors should explicitly identify gaps in prior multivariate or machine-learning investigations to better establish the novelty of the present study.

In the Study Design and Participants section, the authors report that participants were recruited through “a stratified convenience sampling method.” Additional information regarding the stratification criteria is necessary. Specifically, the manuscript should indicate whether stratification was based on age, sex, ADHD presentation subtype, geographic region, clinic type, or other demographic characteristics. This information is essential for evaluating sample representativeness.

The participant description notes that ADHD diagnoses were confirmed according to DSM-5-TR criteria; however, the manuscript does not specify the diagnostic procedures employed. The authors should clarify whether diagnoses were based on structured clinical interviews, clinician judgment, rating scales, medical records, or multimethod assessment protocols. This omission limits evaluation of diagnostic validity.

In the Measures section, the description of the Emotion Regulation Checklist states that “Higher scores on the emotional lability component indicate greater emotional dysregulation.” The authors should clarify whether the total score, emotional lability subscale score, or a composite score was used as the target variable in the LightGBM model. This distinction is important because different scoring approaches may alter predictive relationships and model interpretation.

The description of the BRIEF-2 reports that “Parents rated 63 items using a three-point response format.” Given that both the outcome variable and several predictors rely on parent-report measures, the manuscript should explicitly discuss the risk of

E-ISSN: 3060-6713

common-method variance. Additional analyses estimating the influence of shared informant bias would substantially strengthen the methodological rigor of the study.

In the Data Analysis section, the authors state that "Missing values representing less than 5% of the dataset were imputed using k-nearest neighbor imputation procedures." However, no justification is provided for selecting KNN imputation over alternative approaches such as multiple imputation, expectation-maximization, or model-based imputation. A methodological rationale and sensitivity analysis comparing imputation methods would improve confidence in the findings.

The paragraph beginning "The primary analytical approach involved the development of a Light Gradient Boosting Machine (LightGBM) prediction model" lacks sufficient information regarding model tuning procedures. The authors should provide a comprehensive hyperparameter search space, optimization criteria, convergence thresholds, and computational settings to facilitate reproducibility and enable readers to evaluate potential overfitting risks.

Authors revised the manuscript and uploaded the document.

2. Revised

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

E-ISSN: 3060-6713