




Article history:
Received 24 October 2025
Revised 17 January 2026
Accepted 23 January 2026
Published online 01 June 2026

CatBoost Modeling of Parenting Effectiveness Based on Mindfulness, Emotional Intelligence, Psychological Flexibility, and Reflective Functioning

Selin. Aydemir¹, Nattaporn. Chaisiri^{2*}, Andrej Kováčik³


¹ Department of Clinical Psychology, Middle East Technical University, Ankara, Turkey

² Department of Counseling Psychology, Chulalongkorn University, Bangkok, Thailand



³ Department of Cognitive Psychology, Comenius University, Bratislava, Slovakia

* Corresponding author email address: nattaporn.c@chula.ac.th

Editor

Manijeh Daneshpour
Department of Couple and Family
therapy, Alliant International
University, California, United States
of America
mdaneshpour@alliant.edu

Reviewers

Reviewer 1: Abolghasem Khoshkanesh
Assistant Professor, Counseling Department, Shahid Beheshti University, Tehran,
Iran.
Email: akhoshkonesh@sbu.ac.ir
Reviewer 2: Meysam Sadeghi
Assistant Professor of Department of Cognitive Psychology, Higher Education
Institute of Cognitive Sciences, Tehran, Iran. Email: m.sadeghi@icss.ac.ir

1. Round 1

1.1. Reviewer 1

Reviewer:

In the paragraph beginning with “Importantly, emerging evidence indicates substantial conceptual and empirical overlap among mindfulness, emotional intelligence, psychological flexibility, and reflective functioning,” the authors acknowledge overlap among predictors but do not adequately discuss the implications for discriminant validity. Given the moderate-to-strong intercorrelations reported later in Table 1, additional discussion is needed regarding whether these constructs represent distinct latent dimensions or manifestations of a broader psychological functioning factor.

The statement “Machine learning approaches offer a promising alternative because they can model complex relationships, identify subtle patterns, and generate highly accurate predictions without imposing restrictive statistical assumptions” would benefit from a more balanced discussion. The authors should acknowledge potential limitations of machine learning approaches, including interpretability challenges, risk of overfitting, and the distinction between predictive accuracy and explanatory inference. This addition would provide a more nuanced methodological justification for selecting CatBoost.

In the Study Design and Participants section, the sentence “A stratified convenience sampling strategy was used to ensure adequate representation of parents from diverse socioeconomic backgrounds and educational levels” requires substantially greater methodological detail. The authors should specify the strata used, the proportional allocation procedures, recruitment rates within each region, and the extent to which the final sample reflects national demographic characteristics of Thai parents.

In the paragraph beginning with “Hyperparameter optimization was performed using five-fold cross-validation combined with grid-search procedures...” the manuscript lacks critical reproducibility information. The final optimized hyperparameter values (e.g., depth, learning rate, iterations, regularization coefficient) should be reported in a dedicated table to facilitate replication and evaluation by other researchers.

Table 1 reports correlations ranging from .55 to .72 among the study variables. While the authors conclude that “multicollinearity was unlikely to compromise subsequent machine learning analyses,” no formal diagnostic statistics (e.g., variance inflation factors, tolerance values, condition indices) are presented. Reporting these indices would provide stronger evidence supporting this conclusion.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The paragraph beginning with “Eligibility criteria included being a biological or adoptive parent...” lacks information regarding sample size determination. The manuscript should report whether an a priori power analysis, machine-learning sample size estimation procedure, or heuristic guideline was employed to justify the inclusion of 742 participants and to support the adequacy of the dataset for predictive modeling.

In the Measures section, the description “Parenting effectiveness was assessed using the Parenting Sense of Competence Scale (PSOC) developed by Johnston and Mash (1989)” should be expanded to include psychometric properties obtained within the present sample. Specifically, Cronbach’s alpha, McDonald’s omega, or other reliability indices should be reported for each instrument rather than relying exclusively on evidence from previous studies.

The paragraph describing the Five Facet Mindfulness Questionnaire states that “The FFMQ has demonstrated strong reliability and validity across diverse populations”; however, the manuscript does not indicate whether validated Thai-language versions of the measures were used. The authors should provide details regarding translation procedures, cultural adaptation, back-translation methods, and psychometric validation within the Thai context.

In the description of the Acceptance and Action Questionnaire-II, the sentence “Following recommended scoring procedures, higher scores after reverse interpretation indicate greater psychological flexibility” requires clarification. The authors should specify precisely how reverse scoring was implemented and whether higher scores reflect flexibility or reduced experiential avoidance, as interpretation of AAQ-II scores varies across studies.

The Data Analysis section reports that “Missing data were examined and handled using multiple imputation procedures when the proportion of missing values was less than 5%.” The manuscript should specify the imputation method used (e.g., MICE, predictive mean matching), the number of imputations generated, convergence diagnostics, and whether imputation was performed before or after train-test splitting to avoid information leakage.

The sentence “Outliers were identified through interquartile range analysis and Mahalanobis distance diagnostics and were evaluated prior to model development” is insufficiently detailed. The authors should clarify how many observations were identified as outliers, whether any were removed, winsorized, or retained, and how these decisions influenced model performance and generalizability.

Response: Revised and uploaded the manuscript.

2. Revised

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.