




Random Forest Prediction of Family Functioning Based on Emotional Availability, Family Communication, Psychological Well-Being, and Coping Self-Efficacy

Justas. Rimkus¹, Sophie. Langlois^{2*}, Lina. Khoury³


¹ Department of Health Psychology, Lithuanian University of Health Sciences, Kaunas, Lithuania

² Department of Developmental Psychology, Université de Montréal, Montreal, Canada


³ Department of Counseling Psychology, University of Jordan, Amman, Jordan


* Corresponding author email address: sophie.langlois@umontreal.ca

Editor

Sefa Bulut¹
Associate Professor, Head of
Counseling Psychology and
Guidance Department, Ibn Haldun
University, Turkey
sefa.bulut@ihu.edu.tr

Reviewers

Reviewer 1: Seyed Ali Darbani¹
Assistant Professor, Department of Psychology and Counseling, South Tehran
Branch, Islamic Azad University, Tehran, Iran.

Email: Ali.darbani@iau.ac.ir
Reviewer 2: Roodabeh Hooshmandi¹
Department of Psychology and Counseling, KMAN Research Institute, Richmond
Hill, Ontario, Canada. Email: roodhooshmandi@kmanresce.ca

1. Round 1

1.1. Reviewer 1

Reviewer:

In the paragraph beginning “Recent social and economic changes have intensified the challenges faced by modern families,” the authors make broad claims regarding work demands, technological transformations, and societal uncertainties. However, no Canadian-specific evidence is provided despite the study being conducted in Canada. The manuscript would be strengthened by incorporating recent Canadian demographic or family-health statistics to justify the contextual relevance of the investigation.

The paragraph defining emotional availability states that it “refers to the capacity of family members to be emotionally responsive, accessible, supportive, and attuned to one another's needs.” This construct overlaps conceptually with several dimensions of the Family Assessment Device, particularly affective responsiveness and affective involvement. The authors should discuss the potential conceptual redundancy between predictor and outcome measures and explain how construct distinctiveness was established.

The paragraph discussing family communication notes that “family communication has consistently been identified as one of the strongest predictors of family adaptation.” Given that communication is also a core dimension within the Family

Assessment Device, the authors should address whether the strong predictive performance may partially reflect criterion contamination. A more detailed discussion of measurement overlap is warranted.

Table 1 reports strong correlations among predictors, including a correlation of .69 between emotional availability and family communication. While these values do not exceed conventional multicollinearity thresholds, they suggest substantial conceptual overlap. The authors should discuss how these interrelationships may influence feature importance rankings within the Random Forest model.

In Table 2, the reported testing-set R^2 of .847 is exceptionally high for family psychology research involving self-report variables. The authors should provide additional evidence that the model did not capitalize on shared-method variance, such as reporting out-of-bag error estimates, calibration plots, or external validation procedures.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The statement “psychological well-being constitutes another important determinant of family functioning” requires stronger justification regarding directionality. Since the study is cross-sectional, psychological well-being could plausibly function as either a predictor or an outcome of family functioning. The authors should acknowledge this bidirectional relationship and discuss alternative causal interpretations.

The paragraph introducing coping self-efficacy relies heavily on self-efficacy theory but does not sufficiently explain why coping self-efficacy was selected over broader self-efficacy constructs. The manuscript would benefit from a rationale distinguishing coping self-efficacy from general self-efficacy and explaining its specific relevance to family-system functioning.

In the paragraph stating that “emotional availability, communication quality, psychological well-being, and coping self-efficacy may therefore function synergistically,” the authors suggest interactive effects among variables. However, no interaction analyses or SHAP interaction values are reported. The authors should either empirically test these interactions or moderate the language suggesting synergistic relationships.

The claim that “machine learning approaches have been successfully applied to predict various psychological outcomes” requires a more comprehensive methodological justification. Specifically, the manuscript should explain why Random Forest was selected over alternative algorithms such as XGBoost, LightGBM, Elastic Net, or Support Vector Machines, particularly given the relatively small number of predictor variables.

In the Study Design and Participants section, the sentence “participants were recruited using a combination of online advertisements, community outreach programs, social media platforms, and family-oriented community organizations” lacks sufficient methodological detail. The authors should specify recruitment channels, advertisement content, response rates, and procedures used to minimize selection bias.

The paragraph describing the final sample reports that participants ranged from 18 to 72 years. However, no information is provided regarding ethnicity, household composition, income level, immigration status, or province-specific representation. Given the multicultural nature of Canada, these demographic characteristics are important for assessing external validity and should be reported.

The description of the Family Assessment Device indicates that “higher scores indicate poorer family functioning.” However, the manuscript does not specify whether the General Functioning subscale or total FAD score was used as the outcome variable. Because different scoring approaches may yield different psychometric properties, this issue should be clarified.

The paragraph describing the Brief Emotional Availability Scale reports that the instrument contains 24 items and measures emotional sensitivity, responsiveness, support, and closeness. However, no reliability coefficients (e.g., Cronbach’s alpha or McDonald’s omega) for the current sample are presented. Internal consistency estimates for all measures should be reported.

In the Data Analysis section, the authors state that “all predictor variables were inspected for multicollinearity.” However, only correlation coefficients are reported in Table 1. The manuscript should provide variance inflation factor (VIF), tolerance values, or alternative multicollinearity diagnostics to substantiate this claim.

The sentence “hyperparameter optimization was conducted using five-fold cross-validation and grid search procedures” lacks essential methodological transparency. The exact hyperparameter search space, final optimal parameters, random seed settings, and tuning criteria should be reported to ensure reproducibility.

Response: Revised and uploaded the manuscript.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.