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# Explainable Machine Learning Prediction of Dropout Risk Using Psychosocial and Cognitive Variables

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| Editor | Reviewers |
|---|---|
| Sergii Boltivets<br>Chief Researcher of the Department of Scientific Support of Social Formation of Youth. Mykhailo Drahomanov University, Ukraine<br>sboltivets@ukr.net | **Reviewer 1:** Shahrokh Makvand Hoseini<br>Associate Professor, Department of Psychology, Semnan University, Iran.<br>Email: shmakvand@semnan.ac.ir<br>**Reviewer 2:** Davood Taghvaei<br>Department of Psychology, Arak Branch, Islamic Azad University, Arak, Iran.<br>Email: d-taghvaeii@iau-arak.ac.ir |

## 1. Round 1

### *1.1. Reviewer 1*

Reviewer:

The study is described as a “cross-sectional predictive design.” However, throughout the manuscript, the authors refer to identifying “risk pathways” and “incremental predictive validity.” Given the absence of longitudinal data, causal or developmental language should be carefully revised. Please explicitly acknowledge that prediction does not imply temporal causation.

You state that SMOTE was applied due to 18.6% minority class representation. Since this imbalance is moderate rather than severe, please justify the decision statistically. Did you compare model performance with and without SMOTE? Oversampling may inflate performance metrics if not carefully validated.

The manuscript reports that gradient boosting achieved the “lowest Brier score,” but calibration curves are not shown and no statistical comparison of Brier differences is provided. Please include calibration plots and potentially report Expected Calibration Error (ECE).

Authors uploaded the revised manuscript.

### *1.2. Reviewer 2*

Reviewer:

You report Cronbach's alpha ranging from .78 to .91. Please provide alphas for each scale separately in a supplementary table. Aggregated ranges do not allow readers to evaluate measurement reliability for specific predictors, especially those ranking highly in SHAP importance.

While psychometric reliability is reported, the manuscript does not report reliability indices (e.g., split-half, test–retest) for cognitive tasks (n-back, digit-symbol, Raven short form). Please provide psychometric justification for these task selections and reliability estimates.

There is a duplication of "Table 3" (SHAP importance and comparative predictor domain performance). This must be corrected for clarity and indexing consistency.

In Table 3, depressive symptoms show 17.6% relative importance. Please clarify how "relative importance" was computed (normalized SHAP mean absolute values?). Also specify whether percentages sum to 100% and whether collinearity among predictors affects attribution.

Authors uploaded the revised manuscript.

## 2. Revised

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



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