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Modeling Cultural Influences on Risk-Taking Using Machine Learning: Sensation Seeking, Norm Deviance, and Peer Influence

Eleni Christou[1], Eleni Kouris[2*], Daniel Farrugia[3]

[1] Department of Psychology, University of Cyprus, Nicosia, Cyprus
[2] Department of Educational Psychology, University of Crete, Heraklion, Greece
[3] Department of Psychology, University of Malta, Msida, Malta

*** Corresponding author email address**: eleni.kouris@uoc.gr

Editor	Reviewers
Sergii Boltivets Chief Researcher of the Department of Scientific Support of Social Formation of Youth. Mykhailo Drahomanov University, Ukraine sboltivets@ukr.net	**Reviewer 1:** Manijeh Daneshpour Department of Couple and Family therapy, Alliant International University, California, United States of America. mdaneshpour@alliant.edu **Reviewer 2:** Mansour Abdi Associate Professor, Department of Psychology, Arak University, Iran. m.abdi@arak.ac.ir

1. Round 1

1.1. Reviewer 1

Reviewer:

In the Methods paragraph stating “This study employed a cross-sectional, predictive-correlational design…,” the authors should more rigorously justify the compatibility of a cross-sectional design with machine learning prediction claims, as temporal ordering and causality remain unaddressed, which may lead to overinterpretation of predictive relationships .

The sentence “Data were collected using standardized self-report instruments…” requires elaboration regarding the cultural adaptation and linguistic validation of these instruments in the Greek context, as failure to report translation/back-translation procedures or measurement invariance testing raises concerns about cross-cultural validity .

In the Introduction paragraph beginning “Risk-taking behavior represents a central construct…,” the authors provide a broad conceptual overview but do not sufficiently differentiate between domain-general and domain-specific risk-taking, which is critical given that different domains (e.g., health vs. financial) may follow distinct predictive patterns .

The Results statement “intercorrelations among predictors were moderate but not indicative of multicollinearity” should be supported with formal diagnostics such as Variance Inflation Factor (VIF) values rather than qualitative interpretation alone .

In Table 2 interpretation, the authors state that Gradient Boosting achieved "excellent discriminative ability," but they do not report confidence intervals or statistical comparisons between models, which limits the robustness of model comparison claims .

The SHAP analysis sentence "indicating that increases in sensation seeking significantly elevate the likelihood…" may be misleading, as SHAP values reflect contribution to prediction rather than causal or statistical significance; this distinction should be explicitly clarified .

In the Findings section, the reported correlations (e.g., r = 0.54) are interpreted as "strong," yet according to conventional benchmarks these may be considered moderate, and the authors should justify their interpretation scale or revise wording for precision .

Response: Revised and uploaded the new document.

1.2. Reviewer 2

Reviewer:

The statement "Empirical evidence across domains… has consistently supported the role of sensation seeking…" would benefit from a more critical synthesis rather than a confirmatory tone, including discussion of boundary conditions or inconsistent findings in the literature to avoid confirmation bias .

In the paragraph "Peer influence operates through multiple mechanisms…," the authors should explicitly operationalize these mechanisms (e.g., mediation vs. moderation effects), as the current wording remains theoretically descriptive without specifying how these processes are tested within the present model .

The sentence "Norm deviance is deeply embedded in cultural contexts…" requires stronger theoretical anchoring by referencing specific cultural theories (e.g., Hofstede dimensions or cultural tightness–looseness), rather than remaining at a general level of abstraction .

In the paragraph discussing "the interaction between sensation seeking, peer influence, and norm deviance," the authors assert a "synergistic" relationship but do not empirically test interaction terms or nonlinear interaction effects explicitly in the reported models, which creates a discrepancy between theoretical claims and analytical implementation .

The claim "Cross-cultural studies have shown significant variation in risk-taking behaviors…" should be supported with a more systematic comparison or meta-analytic perspective, rather than selective citation, to strengthen the argument regarding cultural variability .

In the Methods section, the phrase "The sample size was determined based on power analysis for machine learning classification models…" is insufficiently detailed; the authors must report the specific assumptions, effect sizes, and criteria used for this power analysis, as ML-based power estimation is non-trivial and context-dependent .

The description "missing values through multiple imputation" lacks methodological transparency, as the authors do not specify the imputation method (e.g., MICE), number of imputations, or assumptions about missingness (MCAR, MAR), which directly affects reproducibility .

In the sentence "Hyperparameter tuning was conducted using grid search methods…," the authors should provide explicit parameter ranges and optimization criteria, as well as whether nested cross-validation was used to avoid data leakage and optimistic bias in performance estimation .

Response: Revised and uploaded the new document.

2. Revised

Editor's decision: Accepted.

Editor in Chief's decision: Accepted.

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