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Modeling Personality–Emotion–Somatic Symptom Pathways with Explainable Machine Learning

Mariana. Torres[1*], Fabricio. Peixoto[2], Jaime. Martínez Pacheco[3]

[1] Department of Electrical and Computer Engineering, Monterrey Institute of Technology and Higher Education (ITESM), Monterrey, Mexico
[2] Center for Population Health Research, National Institute of Public Health, Cuernavaca, Mexico
[3] Department of Psychiatry and Behavioral Sciences, Johns Hopkins School of Medicine, 733 N. Broadway, Baltimore, MD 21205, USA

*** Corresponding author email address**: mariana.torres@tec.mx

Editor	Reviewers
Mehdi Rostami Department of Psychology and Counseling, KMAN Research Institute, Richmond Hill, Ontario, Canada mehdirostami@kmanresce.ca	**Reviewer 1:** Azizreza Ghasemzadeh Armada Medical Centre, Dubai, UAE. Email: aghasemzadeh@irimed.org **Reviewer 2:** Roodabeh Hooshbamandi Department of Psychology and Counseling, KMAN Research Institute, Richmond Hill, Ontario, Canada. Email: rhooshmandi@kmanresce.ca

1. Round 1

1.1. Reviewer 1

Reviewer:

The use of a large community sample of over 1,000 adults in Mexico and validated Spanish versions of the BFI-44, DASS-21, and PHQ-15 is a major strength, but the sampling strategy (convenience plus stratified recruitment) raises concerns about representativeness; the authors should provide more detail on how strata were defined and reached, and include a more explicit discussion of selection bias and limits to generalizability beyond urban and internet-connected populations.

The Results section, as far as visible, provides basic descriptive statistics and sample characteristics, which are clear and informative; however, the paper would be strengthened by adding more nuanced distributional information (e.g., skewness, kurtosis, prevalence of clinically significant somatic symptom burden and emotional distress categories) and by situating these levels relative to prior epidemiological data to contextualize how “typical” or “elevated” this sample is.

While the conceptual model implies directional pathways from personality traits to emotional states to somatic symptoms, the cross-sectional design fundamentally limits causal inference, and the manuscript should be more cautious in its language

(e.g., avoid “pathways” and “effects” in favor of “associations” or “patterns”), explicitly acknowledge the possibility of reverse or bidirectional relationships, and avoid implying temporal sequencing that is not empirically established.

The article promises pathway modeling using SHAP, but based on the current description, it is unclear how the authors translated individual-level SHAP values into interpretable “pathways” rather than simple importance rankings; more methodological detail and illustrative figures (e.g., combined SHAP dependence plots that demonstrate interaction patterns or conditional effects for high versus low neuroticism) would greatly improve interpretability and theoretical contribution.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

The integration of multiple machine learning algorithms (Random Forest, Gradient Boosting, XGBoost) with SHAP-based explainability is innovative, yet the Methods section under-specifies several critical modeling choices, including hyperparameter tuning procedures, handling of multicollinearity among predictors, and the exact cross-validation scheme (e.g., number of folds, repeats, and whether nested cross-validation was used), which are necessary for assessing the robustness and reproducibility of the findings.

Although the rationale for using explainable AI (to move beyond “black box” models) is compelling and clearly stated, the authors should more sharply distinguish what added value SHAP provides over conventional regression or structural equation modeling in this specific context, perhaps by specifying a priori which kinds of nonlinear or interaction effects they expect and how SHAP outputs concretely advance psychosomatic theory rather than merely ranking predictors.

The description of psychometric properties is incomplete: internal consistency is mentioned, but the actual Cronbach’s alpha values for each scale/subscale in this sample are not reported in the excerpt; these coefficients, along with any evidence of factor structure or scale modifications, should be presented either in the Methods or Results to reassure readers about measurement reliability and the appropriateness of using scale scores as predictors in ML models.

Authors revised the manuscript and uploaded the document.

2. Revised

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

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