Journal Website

Article history:
Received 13 July 2025
Revised 23 October 2025
Accepted 31 October 2025
Published online 01 April 2026

Journal of Psychosociological Research in Family and Culture

Open Peer-Review Report

E-ISSN: 3041-8550

Machine Learning-Based Identification of Cultural Determinants of Decision-Making: The Role of Risk Perception, Uncertainty Avoidance, and Norm Compliance

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1. Round 1

1.1. Reviewer 1

Reviewer:

In the Introduction, the statement “Cultural determinants shape how individuals perceive risks, tolerate uncertainty, and adhere to social norms” is theoretically sound but insufficiently anchored in a specific theoretical framework (e.g., Hofstede, Schwartz, or GLOBE); I strongly recommend explicitly naming and operationalizing the cultural theory guiding the study to enhance conceptual rigor.

The paragraph beginning with “One of the most critical constructs in understanding culturally influenced decision-making is risk perception” does not adequately distinguish between cognitive and affective components of risk perception; incorporating dual-process or psychometric paradigm distinctions would significantly strengthen construct clarity and theoretical depth.

The Data Analysis section includes “handling of missing values, normalization, and feature scaling,” but does not specify the techniques used (e.g., mean imputation, multiple imputation, min-max scaling, z-score normalization), which is critical for reproducibility in machine learning workflows.

The sentence “k-fold cross-validation was used to ensure generalizability” should specify the value of k (e.g., 5-fold, 10-fold) and whether stratification was applied, as these choices materially affect model evaluation.

In the Findings section, the statement “These demographic characteristics suggest that the sample captured a diverse cross-section of Portuguese society” appears overstated; the absence of rural/urban breakdown and socioeconomic indicators limits the strength of this claim.

In Table 1 interpretation, the phrase “moderate to high mean scores across all constructs” lacks benchmarking; the authors should define what constitutes “moderate” or “high” relative to scale midpoints or normative data.

Response: Revised and uploaded the new document.

1.2. Reviewer 2

Reviewer:

In the sentence “Risk perception is not only a cognitive assessment but also a socially constructed phenomenon influenced by descriptive norms and behavioral visibility,” the manuscript would benefit from specifying the mechanism of social construction (e.g., social amplification of risk framework), as the current phrasing remains conceptually broad and under-specified.

The paragraph on uncertainty avoidance includes the sentence “High uncertainty avoidance cultures tend to favor structured environments, formal rules, and predictable outcomes,” yet it does not address intra-cultural variability; the assumption of homogeneity within national culture (Portugal) should be critically examined or justified.

In the Introduction, the claim “Norm compliance is deeply rooted in socialization processes and reinforced through mechanisms such as social proof, moral obligation, and legal enforcement” would benefit from clearer differentiation between injunctive and descriptive norms, as conflating these may obscure distinct behavioral pathways.

The paragraph beginning “The interplay between risk perception, uncertainty avoidance, and norm compliance becomes particularly salient” lacks an explicit conceptual model or diagram; I recommend including a hypothesized model illustrating directional relationships and potential interactions prior to empirical testing.

In the Methods section, the sentence “Data were collected using standardized instruments measuring risk perception, uncertainty avoidance, norm compliance, and decision-making quality” is insufficiently detailed; specific instrument names, item counts, scale anchors, and sample items should be provided to ensure psychometric transparency.

The description “a culturally adapted version of the Uncertainty Avoidance Scale derived from Hofstede’s cultural dimensions framework” requires clarification regarding the adaptation process (translation, back-translation, validation); otherwise, measurement equivalence cannot be assumed.

In the sentence “All instruments consisted of multiple items rated on five-point Likert scales, and prior studies have confirmed their construct validity,” the manuscript should report confirmatory factor analysis (CFA) results for the current sample rather than relying solely on prior validation.

Response: Revised and uploaded the new document.

2. Revised

Editor’s decision: Accepted.

Editor in Chief’s decision: Accepted.

JPRFC
E-ISSN: 3041-8550