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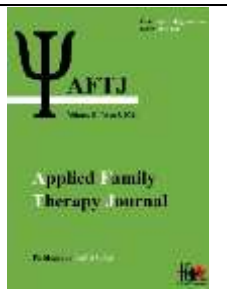

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Algorithmic Modeling of Caregiver Systemic Burden in Chronic Illness by Intersecting Partner Neuroticism and Dyadic Coping Mechanisms

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1. Round 1

1.1. Reviewer 1

Reviewer:

The argument for employing algorithmic/machine-learning approaches over traditional linear models is conceptually well-motivated, but methodologically under-specified: the Data Analysis section should clearly detail the specific algorithms used, preprocessing steps (handling missing data, scaling, encoding), model validation strategy (e.g., k-fold cross-validation, train–test split), hyperparameter tuning procedure, and overfitting control, and should explicitly justify why these particular choices are appropriate for the sample size and research questions.

The manuscript rightly emphasizes dyadic coping as a systemic process, but the analytic treatment of dyadic data could be strengthened: it is not fully clear whether the models incorporate both partners' reports (e.g., patient- vs. caregiver-reported dyadic coping), how interdependence between partners' responses is handled, and whether any dyadic indices (e.g., congruence/discrepancy scores, couple-level aggregates) were considered; clarifying this would greatly enhance the methodological rigor in line with the systemic framing.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The description of the sample and recruitment process is generally clear, yet the use of purposive sampling in a single urban Armenian context raises questions about external validity; the authors should more explicitly discuss how cultural factors, health-system characteristics, and the heterogeneity of chronic conditions may constrain generalizability, and possibly provide comparative demographic/clinical benchmarks to help readers gauge how representative these dyads are relative to the broader population of partner caregivers.

The measurement strategy is a strength, relying on well-validated instruments (ZBI, BFI-2 neuroticism, Dyadic Coping Inventory), but the manuscript would benefit from more detailed psychometric reporting within this specific sample (e.g., Cronbach's alpha or other reliability coefficients for each scale/subscale, factor structure checks if applicable, and any adaptation/translation validity evidence) to reassure readers that the constructs are being measured reliably and comparably in the Armenian context.

The conceptualization of "caregiver systemic burden" as a multidimensional construct is compelling, but the operationalization via the ZBI is not fully integrated into the theoretical framing: the authors should more clearly map which ZBI dimensions correspond to the systemic aspects highlighted in the Introduction, and consider whether a unidimensional total score is sufficient or whether subscale-level analyses could provide a more nuanced picture consistent with their systemic, non-monolithic view of burden.

While the emphasis on non-linear and interaction effects is theoretically justified, the Results (as inferred) need to show convincingly that the algorithmic models actually capture patterns that conventional regression would miss; I strongly encourage the authors to include a direct comparison with at least one linear benchmark model (e.g., multiple regression with interaction terms), reporting comparable performance metrics (R^2, RMSE/MAE) and, if possible, visualization of partial dependence or interaction plots that concretely demonstrate the added value of the machine-learning approach.

The discussion of neuroticism as a "profound disruptor" of dyadic functioning is intriguing but at times slightly overgeneralized; the Discussion should be more tightly anchored to the empirical findings by, for example, clarifying whether the observed effects reflect threshold dynamics, amplification via negative dyadic coping, or more uniform increases in burden, and should also acknowledge that neuroticism is partly malleable via emotion-regulation and interpersonal interventions, which could be more explicitly linked to the proposed clinical implications.

Response: Revised and uploaded the manuscript.

2. Revised

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

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