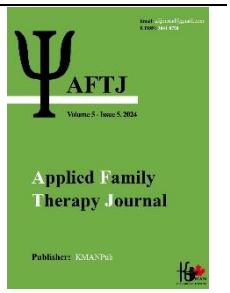
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Predicting Infidelity Tendency From Relationship Dissatisfaction, Sexual Satisfaction, Attachment, and Impulsivity Using CatBoost

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1. Round 1

1.1. Reviewer 1

Reviewer:

The paragraph discussing relationship dissatisfaction states that “when a relationship is experienced as chronically disappointing, conflictual, emotionally unrewarding, or inconsistent with personal expectations, alternatives to the current partnership may acquire greater subjective attractiveness.” This is theoretically plausible, but the manuscript should explicitly identify the theoretical framework supporting this mechanism, such as interdependence theory or investment-model principles. The Discussion later invokes interdependence-type mechanisms, but the Introduction would be stronger if the causal logic were established prospectively. Doing so would also help distinguish global relationship dissatisfaction from the more specific sexual dissatisfaction construct included in the same model.

The discussion of sexual satisfaction would benefit from sharper treatment of discriminant validity. The manuscript acknowledges that “sexual satisfaction also intersects with attachment and other individual characteristics,” and Table 1 later reports a relatively strong correlation of r = -.62 between sexual satisfaction and relationship dissatisfaction. The authors should therefore explain why sexual satisfaction was retained as a separate predictor conceptually and empirically. This distinction is especially important because general relationship dissatisfaction may already subsume dissatisfaction with sexual intimacy. The manuscript should discuss whether sexual satisfaction is expected to contribute incremental predictive information beyond global dissatisfaction and should connect that rationale directly to the later ablation analysis.

The eligibility criterion stating that participants had to be "residing in Qatar for at least two years" requires justification. It is unclear why two years was chosen rather than nationality, duration of marriage in Qatar, or another culturally relevant criterion. Moreover, the sample later includes both Qatari nationals and non-Qatari Arab residents, raising an important question about sociocultural heterogeneity. The authors should explain whether expatriate respondents were recruited from comparable Arabic cultural backgrounds and should consider nationality/residency status as a potential source of distributional heterogeneity. At minimum, descriptive or sensitivity analyses should establish whether the model performs similarly across Qatari and non-Qatari participants.

The statement that "the final sample size of 512 was considered sufficient for model development, train-test partitioning, cross-validation, and estimation of stable feature contributions" is currently asserted without quantitative support. Machine-learning sample adequacy cannot be established solely through conventional statistical power logic. The authors should justify sample size in relation to the number of predictors, expected prediction error, train-test split, hyperparameter tuning procedure, and stability of SHAP estimates. A learning-curve analysis would be particularly informative: if cross-validated error plateaus before the full training sample is reached, this would provide empirical evidence that model performance is reasonably stable at the available sample size.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The attachment section states that "attachment anxiety and attachment avoidance may nevertheless contribute to infidelity through somewhat different processes." This is an important distinction, but the manuscript should develop these mechanisms more rigorously and consistently. Attachment anxiety is described in terms of validation seeking and abandonment concerns, whereas avoidance is associated with emotional distancing and autonomy. The authors should explain whether these are hypothesized to produce additive, nonlinear, or interaction effects with relationship dissatisfaction and sexual satisfaction. Since CatBoost is specifically justified on its ability to detect nonlinear and interactive relationships, the theoretical section should identify plausible interactions in advance rather than mentioning them only generically.

The paragraph introducing impulsivity argues that "infidelity frequently involves situations requiring immediate decisions under conditions of attraction, novelty, emotional activation, secrecy, or opportunity." This rationale is persuasive; however, the manuscript uses the total BIS-11 score despite the scale's multidimensional structure. Because attentional, motor, and nonplanning impulsivity may have different relevance to extradyadic decision-making, the authors should justify their decision to collapse these dimensions into one global score. A sensitivity analysis comparing total impulsivity with its subdimensions would considerably strengthen the psychological interpretation of the machine-learning model and could reveal whether one form of impulsivity drives the observed predictive importance.

The manuscript states that "CatBoost offers a particularly useful machine-learning framework for this objective," but the rationale for choosing CatBoost over other boosting algorithms remains somewhat generic. Since the predictors in the present analysis are all continuous psychometric scores, one of CatBoost's principal advantages—specialized handling of categorical variables—is not materially exploited. The authors should therefore provide a more specific methodological justification for selecting CatBoost, such as robustness on moderate-sized tabular datasets, ordered boosting, regularization characteristics, or prior evidence of stable performance. This is particularly important because XGBoost and random forest are later included as comparators and CatBoost outperforms them only modestly.

In the Methods section, the sentence "A total of 547 questionnaires were initially collected… The final analytical sample therefore consisted of 512 participants" requires substantially greater transparency regarding recruitment. The manuscript should specify the recruitment period, recruitment channels, whether the survey was online only or also administered in person, the languages in which it was offered, how duplicate responses were prevented, and whether incentives were provided. Because

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infidelity and sexuality are highly sensitive topics in Qatar, these methodological details are especially important for evaluating selection bias and the likelihood that respondents differed systematically from the broader population of married adults.

Response: Revised and uploaded the manuscript.

2. Revised

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