

Predicting Marital Satisfaction Using Random Forest Based on Attachment, Communication, Intimacy, and Conflict Indicators

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1. Round 1

1.1. Reviewer 1

Reviewer:

The manuscript reports a final sample of 646 participants but does not provide an a priori or simulation-based justification for whether this sample was adequate for the planned machine-learning analysis. Although conventional power analysis is not directly transferable to Random Forest modeling, the authors should provide a rationale based on the number of candidate predictors, expected model complexity, training-test allocation, cross-validation design, and anticipated prediction error stability. With approximately 517 participants in the training set and only about 129 in the independent test set, the precision of the reported test-set $R^2 = .78$ should be quantified, preferably using bootstrap confidence intervals.

In the participant description, the manuscript specifies that respondents had to be “legally married,” “currently living with their spouse,” and married for at least one year. These criteria require stronger theoretical justification. Excluding cohabiting couples, recently married couples, and spouses living apart may systematically remove relationships at particular developmental or stress-related stages and therefore narrow the range of marital satisfaction. The authors should explain why

these criteria were necessary for the research question and explicitly delimit the target population to which the resulting predictive model is intended to generalize.

Table 1 reports Cronbach's alpha for every measure, but reliability estimation should not be limited to alpha. Given the multidimensional nature of several instruments and the known assumptions underlying coefficient alpha, the authors should consider reporting McDonald's omega where appropriate and clarify whether reliability coefficients were calculated for the present Canadian sample rather than copied from prior validation studies. In addition, the table should report observed ranges and, ideally, skewness and kurtosis for continuous variables to provide a more complete account of the predictor distributions before machine-learning analysis.

Table 1 presents correlations such as $r = .72$ between emotional intimacy and marital satisfaction, $r = .66$ for constructive communication, and $r = -.61$ for attachment anxiety, yet the manuscript does not report confidence intervals for these effects. Given the moderate sample size and the interpretive emphasis placed on relative association strength, 95% confidence intervals should be added. More importantly, the authors should avoid describing correlation magnitude as evidence of predictive contribution because bivariate association and out-of-sample predictive importance are analytically distinct. This distinction should be made explicit in the Findings section before transitioning from Table 1 to Random Forest results.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The Data Collection Tools section describes the Couples Satisfaction Index-16 as the dependent variable but does not report whether the specific version administered was validated for the linguistic and cultural composition of the Canadian sample. This is especially important because the manuscript reports participants from Quebec as well as other provinces but states that eligibility required the ability to read English. The authors should clarify whether the survey was administered exclusively in English, whether French-speaking Canadians were systematically excluded, and what implications this restriction has for the representativeness of a study described broadly as involving “married adults in Canada.”

The operationalization of marital conflict requires substantial clarification. The manuscript states that the Revised Conflict Tactics Scales were used “with emphasis on the dimensions relevant to the frequency and management of disagreements” and that negotiation and psychological aggression were retained. However, the CTS2 includes multiple domains with distinct conceptual and ethical implications. The authors should specify exactly which CTS2 subscales and items were administered, whether self-to-partner, partner-to-self, or combined scores were used, what scoring procedure was applied, and why other CTS2 domains were omitted. If only selected components were administered, the text should avoid implying that the complete CTS2 instrument was used.

The manuscript combines domain-specific scores from the PAIR scale, including emotional, social, sexual, intellectual, and recreational intimacy, as separate Random Forest predictors. Because these constructs are likely to be moderately or strongly intercorrelated, the authors should present the full predictor correlation matrix rather than only correlations between each predictor and marital satisfaction. The statement that “Random Forest does not depend on the same independence assumptions as ordinary least squares regression” is correct but incomplete: correlated predictors can substantially distort permutation-importance rankings by distributing predictive information across redundant features. The authors should therefore assess feature redundancy and consider conditional permutation importance or grouped importance analyses.

Response: Revised and uploaded the manuscript.

2. Revised

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.

