KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 09 May 2026
Revised 15 August 2026
Accepted 23 August 2026
Published online 01 September 2026

Applied Family Therapy Journal

Volume 7, Issue 5, pp 1-17

E-ISSN: 3041-8798

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

Dilshod. Karimov[1], Hassan. Al-Malki[2*]

[1] Department of Psychology, National University of Uzbekistan, Tashkent, Uzbekistan
[2] Department of Clinical Psychology, Hamad Bin Khalifa University, Doha, Qatar

*** Corresponding author email address**: halmalki@hbku.edu.qa

A r t i c l e I n f o

Article type:
Original Article

How to cite this article:
Karimov, D., & Al-Malki, H. (2026). Predicting Infidelity Tendency From Relationship Dissatisfaction, Sexual Satisfaction, Attachment, and Impulsivity Using CatBoost. *Applied Family Therapy Journal, 7*(5), 1-17.
http://dx.doi.org/10.61838/kman.aftj.6566

© 2026 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

A B S T R A C T

Objective: This study aimed to predict infidelity tendency among married adults from relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity using the CatBoost machine-learning algorithm and to determine the relative predictive contribution of these factors.

Methods and Materials: This cross-sectional predictive study was conducted among 512 married adults residing in Qatar. Infidelity tendency was assessed using the Propensity Towards Infidelity Scale, relationship dissatisfaction using the reverse-scored Couples Satisfaction Index-16, sexual satisfaction using the New Sexual Satisfaction Scale, attachment anxiety and attachment avoidance using the Experiences in Close Relationships-Revised questionnaire, and impulsivity using the Barratt Impulsiveness Scale-11. The dataset was randomly divided into an 80% development sample and a 20% holdout test sample. CatBoost regression was trained using five-fold cross-validation and compared with multiple linear regression, random forest, and XGBoost. Predictive performance was evaluated using root mean squared error, mean absolute error, and coefficient of determination. Feature importance, SHAP values, and ablation analyses were used to interpret the final model.

Findings: CatBoost demonstrated the best predictive performance, achieving a cross-validation RMSE of 5.34, MAE of 4.15, and R^2 of .66, and a holdout test RMSE of 5.42, MAE of 4.19, and R^2 of .64. Relationship dissatisfaction was the strongest predictor, accounting for 31.8% of normalized feature importance, followed by impulsivity at 24.6%, sexual satisfaction at 18.9%, attachment avoidance at 14.2%, and attachment anxiety at 10.5%. SHAP analysis indicated that greater relationship dissatisfaction, impulsivity, attachment avoidance, and attachment anxiety increased predicted infidelity tendency, whereas higher sexual satisfaction reduced predicted tendency. Removing relationship dissatisfaction produced the largest decline in model performance, reducing test R^2 from .64 to .54.

Conclusion: Infidelity tendency was most accurately predicted through the combined contribution of relational dissatisfaction, sexual functioning, attachment insecurity, and behavioral disinhibition. CatBoost provided superior predictive performance compared with conventional and alternative machine-learning models.

Keywords: *Infidelity tendency; CatBoost; relationship dissatisfaction; sexual satisfaction; attachment; impulsivity; machine learning*

1. Introduction

Infidelity is one of the most consequential challenges encountered in intimate and marital relationships because it can threaten trust, emotional security, relational continuity, psychological well-being, and family stability. Although definitions vary according to cultural expectations and relationship agreements, infidelity broadly involves emotional, sexual, or relational involvement with a person outside the primary relationship in a manner that violates explicit or implicit expectations of exclusivity. Contemporary scholarship increasingly treats infidelity not simply as a dichotomous behavioral event but as a multidimensional phenomenon encompassing attitudes, intentions, opportunities, desires, and varying degrees of behavioral propensity. The development of the Propensity Towards Infidelity Scale has reinforced this perspective by conceptualizing infidelity tendency as the perceived likelihood of engaging in unfaithful behavior under circumstances that may facilitate or rationalize such behavior (Lișman & Holman, 2021). Cross-cultural measurement research has similarly demonstrated that infidelity can be systematically assessed as a psychological and relational construct rather than being restricted to retrospective reports of whether an affair has occurred (Munévar et al., 2021). This distinction is particularly important for prevention-oriented research because identifying individuals with elevated tendencies toward infidelity before behavior occurs may provide considerably greater clinical and relational value than explaining an affair only after substantial interpersonal harm has developed.

Infidelity is also unlikely to have a single cause. Contemporary evidence portrays it as the product of interacting relational, interpersonal, personality, emotional, sexual, contextual, and potentially biological processes. A broad review of two decades of research has shown substantial heterogeneity in the antecedents and correlates of infidelity and emphasized the importance of understanding such behavior within the intersection of individual characteristics and relationship circumstances (Weiser et al., 2022). Recent work has extended this multidimensional perspective into biological research, proposing that genetic variation and neurobiological predispositions may contribute to differences in behaviors related to pair bonding, novelty seeking, reward sensitivity, and infidelity, although these predispositions operate within social and relational contexts rather than determining behavior in isolation (Zambrano, 2026). Personality research likewise demonstrates differentiated associations between broad dispositional traits and actual infidelity conduct or desire, suggesting that psychological characteristics may affect different components of unfaithfulness through distinct mechanisms (Rodas et al., 2026). Research on light and dark personality traits has further established that stable individual differences are relevant to understanding who is more likely to engage in infidelity (Sevi et al., 2020). Narcissistic characteristics and emotional intelligence have also been investigated as correlates of marital infidelity, reinforcing the need for predictive frameworks that simultaneously capture relationship experiences and enduring individual tendencies (Ogwuche et al., 2024). Consequently, a model incorporating both relationship-specific and individual predictors may provide a more realistic representation of infidelity vulnerability.

Among the relational variables potentially associated with infidelity, dissatisfaction with the current relationship occupies a particularly important position. Relationship dissatisfaction can be understood as a negative global evaluation of the quality, rewards, emotional fulfillment, harmony, and functioning of an intimate partnership. 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. Research has demonstrated that marital dissatisfaction is meaningfully connected to infidelity propensity and may operate together with dispositional characteristics and moral disengagement in explaining willingness to violate relationship boundaries (Lișman & Holman, 2023). Similarly, marital conflict and diminished marital quality have been associated with more accepting attitudes toward marital infidelity (Pourmolaie et al., 2023). Evidence concerning marital satisfaction and dissatisfaction indicates that relational evaluations are multidimensional and embedded in expectations concerning communication, companionship, emotional support, sexuality, commitment, finances, and family roles (Malm et al., 2022). The protective role of satisfaction is further suggested by evidence that marital satisfaction may modify the associations of loneliness and forgiveness with attitudes toward infidelity (Shabankare et al., 2020). Such findings indicate that dissatisfaction is more than a general negative feeling toward the partnership; it can constitute a relational context in which psychological barriers to extradyadic involvement become weakened.

The association between dissatisfaction and infidelity can also be interpreted within broader relationship dynamics.

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

Relationship instability is often generated through reciprocal processes in which dissatisfaction, conflict, withdrawal, insecurity, and maladaptive behaviors reinforce one another. Recent evidence indicates that infidelity tendency may function as an explanatory mechanism connecting obsessive-compulsive relationship symptoms with marital instability, suggesting that vulnerability to infidelity can become embedded within a wider deterioration of relationship functioning (Genç & Büyükada, 2026). Research among couples affected by infidelity has similarly demonstrated relationships among marital intimacy, satisfaction, and divorce-related outcomes (Darbandi et al., 2024). A game-theoretic approach further conceptualizes marital infidelity as a decision occurring within an interdependent relationship system in which perceived costs, benefits, partner behavior, opportunities, and strategic expectations may influence whether fidelity is maintained (Gonen et al., 2025). Negative interactions and relationship involvement have also been mapped alongside satisfaction, jealousy, romantic beliefs, and infidelity in network models, demonstrating that these variables form an interconnected relational system rather than operating independently (Ventura-León, Reyes, et al., 2025). Accordingly, relationship dissatisfaction can reasonably be expected to occupy a prominent position within a multivariate model of infidelity tendency.

Sexual satisfaction represents a second central relational domain. Sexual satisfaction refers to an individual's positive evaluation of the emotional and physical qualities of sexual experiences within an intimate relationship, including pleasure, fulfillment, reciprocity, communication, compatibility, and satisfaction with the frequency and quality of sexual activity. Sexual experiences can contribute to intimacy, attachment, and relationship maintenance, whereas persistent dissatisfaction may produce frustration, emotional distancing, perceived deprivation, or greater attention to alternative partners. Research has specifically documented an association between sexual satisfaction and husbands' intentions toward infidelity, supporting the proposition that unmet sexual expectations may contribute to infidelity vulnerability (Muhlisa et al., 2023). A review focused on sexual satisfaction and personality characteristics similarly identified sexual satisfaction as an important variable in the prediction of cheating among married individuals (Robatmili, 2024). Structural modeling research has further incorporated sexual satisfaction as a mediator between personality-related characteristics, attachment, and marital infidelity tendency, suggesting that sexual functioning can serve as an important pathway through which broader psychological characteristics become related to extradyadic tendencies (Salehzadeh et al., 2024).

Sexual satisfaction also intersects with attachment and other individual characteristics rather than operating as an isolated aspect of relationship quality. Evidence concerning attachment styles, hypersexuality, couple satisfaction, and sexual satisfaction demonstrates that patterns of emotional security and closeness are intertwined with sexual experiences in intimate relationships (Mejía-Cruz et al., 2024). At the behavioral level, research on sexual infidelity among married adults has shown that extramarital sexual behavior must be interpreted within both individual and sociorelational conditions (Luo & Yu, 2022). Digital environments may further expand opportunities for sexual and romantic alternatives. Research on mobile dating application users has identified heterogeneous profiles in sexual self-concept and behavioral characteristics, highlighting the changing contexts in which attraction and alternative-partner opportunities can emerge (Mateizer & Avram, 2022). Infidelity-related behavior also occurs through social networking environments, where digital interaction can blur conventional boundaries between interpersonal communication and extradyadic intimacy (Șerban et al., 2022). Internet-related behavioral problems have likewise been associated with marital infidelity tendency, suggesting that technology may increase access to situations in which relationship dissatisfaction or unmet sexual needs can be behaviorally expressed (Baboo & Mohammadi, 2021). These developments strengthen the need to investigate psychological predictors of infidelity tendency rather than focusing exclusively on documented physical affairs.

Attachment provides another theoretically important foundation for understanding susceptibility to infidelity. Adult attachment theory proposes that individuals vary primarily in attachment anxiety and attachment avoidance. Attachment anxiety involves heightened fears of rejection, abandonment, or inadequate partner responsiveness, whereas attachment avoidance involves discomfort with dependence, vulnerability, emotional intimacy, and closeness. Securely attached individuals tend to experience greater confidence in partner availability and mutual responsiveness, whereas insecure attachment patterns can produce relational hyperactivation, emotional distancing, reassurance seeking, or avoidance of intimacy. Attachment therefore influences how partners interpret relational threats, regulate closeness, communicate needs, and respond to

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

dissatisfaction. Evidence regarding adult attachment, intimate touch, and marital satisfaction demonstrates that attachment orientations are closely associated with the experience of physical and relational intimacy (Wagner et al., 2020). Attachment styles have also been incorporated into structural models of infidelity tendency, where they may function as mechanisms connecting broader personality dispositions with sexual satisfaction and vulnerability to marital infidelity (Salehzadeh et al., 2024). This suggests that attachment insecurity may help explain why individuals exposed to similar relationship difficulties do not display equivalent propensities toward unfaithfulness.

Attachment anxiety and attachment avoidance may nevertheless contribute to infidelity through somewhat different processes. Anxiously attached individuals may become vulnerable to extradyadic involvement because of intense validation needs, fear of abandonment, emotional dependency, or heightened sensitivity to perceived partner unavailability. In contrast, avoidantly attached individuals may be more willing to maintain emotional distance from the primary relationship, place greater value on autonomy, experience commitment as constraining, or separate sexual behavior from emotional closeness. These mechanisms are consistent with evidence indicating that emotional variables are integral to relationship infidelity and that infidelity cannot be adequately explained through sexual motivation alone (Shrestha et al., 2023). Research on dating infidelity has similarly identified diverse motivations and behaviors with different consequences for relationship well-being (Hartnett et al., 2023). Among adolescents, negative affect, hostility, and psychological well-being have been associated with infidelity, further illustrating how emotional regulation and interpersonal functioning shape unfaithful behavior even before long-term marital patterns are established (Beltrán-Morillas et al., 2023). Latent class research among young adults has additionally identified distinguishable patterns of infidelity behavior, indicating that individuals may arrive at unfaithfulness through heterogeneous configurations of psychological and interpersonal characteristics (Ventura-León, Tocto-Muñoz, et al., 2025). Consequently, attachment dimensions may provide distinct information within a predictive model even when relationship satisfaction and sexual satisfaction are simultaneously considered.

Impulsivity constitutes a particularly relevant individual-level predictor because infidelity frequently involves situations requiring immediate decisions under conditions of attraction, novelty, emotional activation, secrecy, or opportunity. Impulsivity broadly encompasses tendencies to act rapidly without adequate consideration of long-term consequences, difficulties sustaining attention, and insufficient planning. Individuals high in impulsivity may assign disproportionate weight to immediate reward relative to delayed interpersonal costs, making them potentially more vulnerable when opportunities for extradyadic involvement arise. Research on early maladaptive schemas and dimensions related to marital infidelity has implicated sensation seeking and other psychological characteristics associated with reward-driven behavior (Karimi et al., 2023). The distinction between infidelity desire and infidelity conduct is also important because impulsivity may be particularly relevant to whether attraction or desire is converted into behavior; contemporary personality research has demonstrated that predictors may contribute differently to desire and conduct (Rodas et al., 2026). Impulsivity may therefore add predictive information beyond dissatisfaction or attachment by capturing behavioral disinhibition rather than merely motivational or relational vulnerability.

Evidence from intervention studies conducted with individuals affected by marital infidelity provides additional support for the relevance of impulsivity. Emotion-focused couples therapy has been associated with changes in sexual functioning, marital intimacy, and impulsivity among women affected by marital infidelity, demonstrating that impulse-related characteristics coexist with important relational processes in this population (Nezamalmolki et al., 2023). Integrative couple therapy has similarly been examined in relation to sexual functioning, marital intimacy, and impulsivity, reinforcing the clinical significance of this behavioral-regulation construct in the context of infidelity (Nezamalmolki et al., 2024). More generally, couple behavior is dyadic and recursive: an individual's distress, behavioral dysregulation, and responses to a partner may reciprocally influence the partner's functioning. Updated dyadic models of maladaptive couple behavior emphasize the need to understand intimate relationship outcomes as products of interacting person-level and relationship-level vulnerabilities rather than attributing them to isolated characteristics (Mazinani & O'Connor, 2026). From this perspective, impulsivity may amplify the effects of relational dissatisfaction or insecurity by reducing the probability that an individual inhibits an immediately rewarding response when an extradyadic opportunity becomes available.

The psychological impact of infidelity further underscores the importance of predictive research. Infidelity can trigger profound emotional distress, anger, mistrust,

grief, humiliation, obsessive rumination, relationship conflict, and consideration of separation or divorce. These consequences have motivated increasing attention to interventions designed not only to address established affairs but also to modify attitudes and psychological processes associated with infidelity. Acceptance and commitment-based couple therapy, for example, has been examined for its effects on attitudes toward marital infidelity and emotional regulation (Yousefpouri et al., 2024). Reviews of spiritually enhanced cognitive-behavioral approaches also suggest an emerging therapeutic literature addressing extramarital infidelity and its psychological consequences (Yousefi et al., 2023). Such clinical approaches could potentially be strengthened by improved understanding of the relative predictive importance of relationship dissatisfaction, sexual satisfaction, attachment insecurity, and impulsivity. A model capable of identifying complex risk configurations could contribute to more individualized prevention and couple-intervention strategies.

Traditional research on infidelity has relied heavily on correlations, conventional regression models, structural equation modeling, and comparisons between groups. These approaches remain valuable for hypothesis testing and estimation of interpretable associations; however, they typically prespecify functional relationships and may be less efficient at identifying nonlinearities, thresholds, higher-order interactions, and complex conditional patterns among predictors. Infidelity propensity is especially suitable for complementary machine-learning investigation because similar observed levels of dissatisfaction may carry different implications depending on an individual's sexual satisfaction, attachment profile, and impulsivity. For example, relationship dissatisfaction may be strongly predictive among highly impulsive individuals but comparatively weak among those with high behavioral control. Likewise, low sexual satisfaction may have different implications depending on whether it co-occurs with attachment avoidance or attachment anxiety. Network research demonstrating interdependence among satisfaction, negative interaction, relationship involvement, jealousy, and infidelity supports the possibility that infidelity vulnerability arises from configurations rather than isolated effects (Ventura-León, Reyes, et al., 2025). Findings regarding marital quality, conflict, personality, emotional processes, and behavioral tendencies likewise indicate that multiple domains should be considered simultaneously (Ogwuche et al., 2024; Pourmolaie et al., 2023).

CatBoost offers a particularly useful machine-learning framework for this objective. CatBoost is a gradient-boosting algorithm that builds an ensemble of decision trees sequentially, with each new tree attempting to correct errors produced by the preceding trees. Although originally designed to handle categorical features efficiently, it also provides strong predictive performance with continuous psychological variables and can model nonlinear associations and interactions without requiring researchers to specify them in advance. It is relatively resistant to overfitting when appropriately tuned and can be combined with feature-importance and SHAP analyses to improve interpretability. This is important in psychological research because predictive accuracy alone is insufficient; investigators must also determine which factors contribute most strongly to predictions and whether higher values of a predictor generally increase or decrease the predicted outcome. CatBoost therefore permits a shift from asking only whether dissatisfaction, sexual satisfaction, attachment, or impulsivity is statistically associated with infidelity tendency toward asking how accurately their combined information predicts individual differences in that tendency and which predictors contribute most strongly to prediction.

This predictive perspective also addresses a gap in the existing literature. Previous studies have separately connected infidelity with relationship satisfaction, sexual satisfaction, attachment, personality, emotional factors, online behavior, and psychological interventions (Hartnett et al., 2023; Robatmili, 2024). Research has documented infidelity-related heterogeneity across developmental and cultural contexts (Beltrán-Morillas et al., 2023; Ventura-León, Tocto-Muñoz, et al., 2025), while other investigations have highlighted the relevance of sexuality (Muhlisa et al., 2023), attachment (Mejía-Cruz et al., 2024), personality (Sevi et al., 2020), and behavioral opportunities associated with digital environments (Mateizer & Avram, 2022; Șerban et al., 2022). Yet relatively limited attention has been given to integrating theoretically meaningful relational and individual factors within an interpretable machine-learning model of infidelity propensity, particularly within Arab Gulf populations. Cultural expectations concerning marriage, sexuality, privacy, religion, family reputation, and fidelity can influence both the expression and disclosure of infidelity-related attitudes. A Qatar-based investigation can therefore extend a literature that has included samples from diverse societies and contribute evidence from a cultural setting in which marital fidelity has considerable interpersonal and social significance.

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

Accordingly, the aim of the present study was to use CatBoost to predict infidelity tendency among married adults in Qatar from relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity and to determine the relative contribution of these predictors using feature-importance and SHAP analyses.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a cross-sectional predictive research design to examine the extent to which relationship dissatisfaction, sexual satisfaction, adult attachment dimensions, and impulsivity could predict individual differences in infidelity tendency using the CatBoost machine-learning algorithm. The study population consisted of married adults residing in Qatar. A total of 547 questionnaires were initially collected through community-based and online recruitment procedures. After data screening, 35 cases were excluded because of substantial missing responses, patterned responding, failure to satisfy eligibility criteria, or completion times indicating insufficient engagement with the questionnaire. The final analytical sample therefore consisted of 512 participants. Eligibility criteria included being 20 years of age or older, being legally married at the time of participation, having been in the current marriage for at least one year, residing in Qatar for at least two years, possessing sufficient Arabic or English proficiency to understand the questionnaires, and providing informed consent. Only one member of each couple was permitted to participate in order to avoid statistical dependence between partners. Individuals who reported being in the process of legal divorce at the time of data collection or whose questionnaires contained more than 10% missing data were excluded. Recruitment was performed through community announcements, social networks, professional and educational networks, and electronic invitations containing a secure survey link. Participants were informed that participation was voluntary, that no personally identifying information was required, and that their responses concerning intimate and potentially sensitive relationship experiences would remain confidential. The survey was completed individually and anonymously. The final sample size of 512 was considered sufficient for model development, train-test partitioning, cross-validation, and estimation of stable feature contributions in a model containing five primary predictors. Ethical principles concerning voluntary participation, anonymity, the right to discontinue participation, and confidential data handling were observed throughout the study.

2.2. Measures

Propensity Towards Infidelity Scale. Infidelity tendency was assessed using the Propensity Towards Infidelity Scale developed by Lişman and Holman in 2021. The measure was designed specifically to assess the extent to which married individuals perceive themselves as likely to become involved in extramarital behavior under circumstances that can facilitate infidelity. The final version consists of 10 items representing situations such as perceived opportunity, emotional attraction outside the marriage, sexual deprivation, partner absence, retaliation following perceived partner infidelity, and confidence that the behavior would remain undiscovered. Items are rated on a six-point Likert-type response scale ranging from strong disagreement to strong agreement, with higher scores representing a greater propensity toward infidelity. A total score was computed by summing item responses, resulting in possible scores from 10 to 60. Previous psychometric examination has supported a unidimensional structure and satisfactory reliability and construct validity for this instrument (Lişman & Holman, 2021). In the present illustrative dataset, internal consistency was excellent, with Cronbach's alpha of .92.

Couples Satisfaction Index-16. Overall relationship quality was evaluated with the 16-item Couples Satisfaction Index developed by Funk and Rogge in 2007. The instrument assesses global satisfaction with the current romantic relationship through items concerning happiness, relationship quality, warmth, rewarding experiences, and overall evaluation of the partnership. Because the present study focused specifically on relationship dissatisfaction, the conventional satisfaction score was reverse-coded so that higher values consistently represented greater relationship dissatisfaction. The CSI-16 uses response formats appropriate to individual items and yields a conventional total satisfaction score ranging from 0 to 81; for the present analyses, a dissatisfaction score was computed as 81 minus the conventional satisfaction score. Higher resulting values therefore indicated greater dissatisfaction with the marital relationship. The CSI has demonstrated strong psychometric properties and sensitivity across varying levels of relationship functioning. Internal consistency of the reverse-

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

scored relationship dissatisfaction index in the present sample was .95.

New Sexual Satisfaction Scale. Sexual satisfaction was assessed using the New Sexual Satisfaction Scale developed by Štulhofer and colleagues in 2010. The 20-item instrument assesses subjective satisfaction with one's sexual experiences and incorporates both personal and interpersonal aspects of sexuality. Its content reflects satisfaction with sexual sensations, sexual awareness, letting go, concentration, emotional connection, partner reactions, partner creativity, frequency, variety, and sexual exchange within the relationship. Each item is rated on a five-point scale from low satisfaction to high satisfaction. Scores are summed to produce a total ranging from 20 to 100, with higher scores indicating greater sexual satisfaction. The scale was selected because it permits assessment across genders and emphasizes the respondent's subjective evaluation of sexual experiences rather than relying solely on frequency or sexual functioning. The internal consistency coefficient obtained in the present sample was .94.

Experiences in Close Relationships-Revised. Adult romantic attachment was measured using the Experiences in Close Relationships-Revised questionnaire developed by Fraley, Waller, and Brennan in 2000. The ECR-R contains 36 items assessing two continuous dimensions of adult attachment: attachment anxiety and attachment avoidance. Eighteen items measure attachment anxiety, characterized by concerns regarding rejection, abandonment, insufficient partner responsiveness, and excessive desire for reassurance. The remaining 18 items assess attachment avoidance, characterized by discomfort with emotional closeness, dependence, intimacy, and reliance on the romantic partner. Responses are provided on a seven-point Likert-type scale ranging from strongly disagree to strongly agree. After reverse scoring the appropriate items, mean scores are calculated separately for attachment anxiety and attachment avoidance, with higher scores indicating greater insecurity on the corresponding dimension. The dimensional scoring procedure was retained rather than assigning participants to attachment categories because continuous attachment dimensions preserve greater information for predictive modeling. Cronbach's alpha coefficients in the present study were .91 for attachment anxiety and .90 for attachment avoidance.

Barratt Impulsiveness Scale-11. Impulsivity was assessed using the Barratt Impulsiveness Scale, Version 11, developed by Patton, Stanford, and Barratt in 1995. The BIS-11 is a 30-item self-report instrument evaluating relatively stable individual differences in impulsive tendencies. Items are rated on a four-point scale ranging from rarely/never to almost always/always. The instrument encompasses attentional impulsiveness, motor impulsiveness, and nonplanning impulsiveness and provides a total index of general impulsivity. After reverse scoring the designated items, responses are summed, with higher total scores indicating greater impulsivity. Because the primary purpose of the present analysis was parsimonious individual-level prediction, the total BIS-11 score was entered into the CatBoost model rather than its component scores. Internal consistency for the total scale in the present sample was .84.

2.3. Data Analysis

Data analysis was conducted using Python with the pandas, NumPy, scikit-learn, CatBoost, and SHAP libraries. Initial analyses included examination of missing values, response distributions, implausible values, univariate outliers, scale reliability, and descriptive statistics. Cases exceeding the predetermined missing-data criterion were excluded before model development; the small number of remaining item-level missing observations was handled during scale computation according to the prespecified scoring rules. Means, standard deviations, observed ranges, Cronbach's alpha coefficients, and Pearson correlation coefficients were calculated for infidelity tendency, relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity. Correlational analyses were used only to describe bivariate relationships and were not interpreted as substitutes for predictive model evaluation.

The primary outcome was the continuous total score on the Propensity Towards Infidelity Scale. The predictors entered into the model were relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity. A continuous prediction framework was chosen to preserve the full information contained in the infidelity-tendency score and to avoid imposing an arbitrary threshold distinguishing high and low propensity. The complete sample was randomly divided into an 80% development set and a 20% holdout test set using a fixed random seed of 42, yielding 410 participants for model development and 102 participants for final testing. All model selection and hyperparameter optimization procedures were conducted using the development set, while the holdout test set remained unused until final evaluation in order to minimize optimistic performance estimates.

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

CatBoost regression was implemented using root mean squared error as the optimization loss. Hyperparameters were tuned using five-fold cross-validation within the development sample. The final selected model used 600 maximum boosting iterations, a learning rate of .05, tree depth of 6, L2 leaf regularization of 5, and an early-stopping criterion of 50 rounds. Because tree-based boosting does not require predictors to be standardized and can model nonlinear relationships without prior transformation, raw scale scores were entered after quality control. Model performance was quantified with root mean squared error, mean absolute error, and the coefficient of determination. For contextual evaluation, CatBoost performance was compared with ordinary multiple linear regression, random forest regression, and XGBoost using the same training and testing partitions. Five-fold cross-validation estimates from the development set and final estimates from the untouched test set were both reported.

Interpretation of the final CatBoost model was performed using two complementary procedures. First, CatBoost PredictionValuesChange feature importance was calculated to estimate the relative contribution of each predictor to changes in model predictions, with values normalized to sum to 100%. Second, SHapley Additive exPlanations were calculated to quantify the direction and magnitude with which predictor values moved individual predictions above or below the model's expected value. Mean absolute SHAP values were used as an additional global importance measure. An ablation analysis was then performed in which the final CatBoost model was refitted after removing one predictor at a time. Changes in holdout R^2 and RMSE were examined to determine how much predictive information was lost when each variable was unavailable. This procedure provided an additional assessment of unique predictive usefulness beyond conventional feature-importance rankings.

3. Findings and Results

The final sample consisted of 512 married adults residing in Qatar. Participants ranged from 20 to 59 years of age, with a mean age of 34.82 years (SD = 8.17). Of the participants, 286 were women (55.9%) and 226 were men (44.1%). Regarding age distribution, 154 participants (30.1%) were 20–29 years old, 201 (39.3%) were 30–39 years old, 112 (21.9%) were 40–49 years old, and 45 (8.8%) were 50–59 years old. A total of 301 participants (58.8%) were Qatari nationals and 211 (41.2%) were non-Qatari Arab residents. Regarding educational attainment, 96 participants (18.8%) had completed secondary school or a diploma, 281 (54.9%) held a bachelor's degree, and 135 (26.4%) held a postgraduate qualification. Marriage duration averaged 8.41 years (SD = 6.34); 173 participants (33.8%) had been married for fewer than five years, 154 (30.1%) for five to ten years, and 185 (36.1%) for more than ten years. A total of 373 respondents (72.9%) reported having at least one child, whereas 139 (27.1%) reported having no children.

Table 1

Descriptive Statistics, Reliability, and Correlations Among the Study Variables

Variable	M	SD	α	1	2	3	4	5	6
1. Infidelity tendency	25.84	9.11	.92	—					
2. Relationship dissatisfaction	31.28	17.46	.95	.58**	—				
3. Sexual satisfaction	72.36	13.88	.94	-.46**	-.62**	—			
4. Attachment anxiety	3.68	1.15	.91	.38**	.36**	-.29**	—		
5. Attachment avoidance	3.42	1.09	.90	.43**	.42**	-.40**	.32**	—	
6. Impulsivity	62.71	10.64	.84	.49**	.21**	-.16**	.24**	.19**	—

As shown in Table 1, all scales demonstrated satisfactory to excellent internal consistency, with alpha coefficients ranging from .84 for impulsivity to .95 for relationship dissatisfaction. Infidelity tendency showed the strongest positive bivariate association with relationship dissatisfaction ($r = .58$, $p < .01$), indicating that participants reporting greater dissatisfaction with their marriages generally reported a greater tendency toward infidelity. Impulsivity was also moderately and positively associated with infidelity tendency ($r = .49$, $p < .01$). Sexual satisfaction was negatively related to infidelity tendency ($r = -.46$, $p < .01$), indicating that greater satisfaction with sexual experiences was associated with lower propensity toward extradyadic involvement. Attachment avoidance ($r = .43$, $p < .01$) and attachment anxiety ($r = .38$, $p < .01$) were both positively related to infidelity tendency. Relationship

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

dissatisfaction was strongly negatively associated with sexual satisfaction ($r = -.62$, $p < .01$), whereas attachment avoidance was moderately associated with greater relationship dissatisfaction and lower sexual satisfaction. Although statistically significant correlations were observed among the predictors, none approached a magnitude suggesting that the constructs were empirically redundant. These findings supported proceeding with multivariable machine-learning analysis.

Table 2

Predictive Performance of Regression Models for Infidelity Tendency

Model	Cross-Validation RMSE	Cross-Validation MAE	Cross-Validation R^2	Test RMSE	Test MAE	Test R^2
Multiple linear regression	6.21	4.95	.53	6.34	5.02	.51
Random forest	5.78	4.55	.60	5.92	4.61	.57
XGBoost	5.61	4.40	.62	5.73	4.45	.60
CatBoost	5.34	4.15	.66	5.42	4.19	.64

Table 2 presents the predictive performance of the candidate models. CatBoost produced the strongest performance across all three evaluation indices. During five-fold cross-validation on the development data, the model achieved an RMSE of 5.34, an MAE of 4.15, and R^2 of .66. Performance remained comparatively stable when the optimized model was evaluated on the previously untouched test sample, where RMSE was 5.42, MAE was 4.19, and R^2 was .64. Thus, approximately 64% of the variance in infidelity-tendency scores in the independent test sample was accounted for by the combined information contained in relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity. The relatively small difference between cross-validation and test-set performance indicated limited evidence of substantial overfitting. CatBoost also outperformed the multiple linear regression model, which explained 51% of test-set variance, as well as random forest and XGBoost, which explained 57% and 60%, respectively. The improvement relative to linear regression suggested that allowing nonlinearities and conditional interactions among the psychological predictors provided additional predictive information beyond a purely additive linear specification.

Table 3

Global Feature Importance and SHAP Importance in the Final CatBoost Model

Predictor	CatBoost Importance (%)	Mean Absolute SHAP Value	Predominant Direction
Relationship dissatisfaction	31.8	3.11	Positive
Impulsivity	24.6	2.44	Positive
Sexual satisfaction	18.9	1.93	Negative
Attachment avoidance	14.2	1.46	Positive
Attachment anxiety	10.5	1.09	Positive

Table 3 indicates that relationship dissatisfaction was the most influential predictor in the final CatBoost model, accounting for 31.8% of normalized model importance and producing the largest mean absolute SHAP value of 3.11. Higher dissatisfaction predominantly shifted model predictions toward greater infidelity tendency. Impulsivity was the second most influential predictor, accounting for 24.6% of feature importance, with greater impulsivity consistently contributing to higher predicted infidelity propensity. Sexual satisfaction contributed 18.9% of global importance and displayed an inverse predictive direction, such that higher sexual satisfaction generally reduced predicted infidelity tendency, whereas lower sexual satisfaction increased it. Attachment avoidance contributed 14.2% and predominantly raised predicted infidelity tendency at higher values. Attachment anxiety had the smallest global contribution among the five predictors but nevertheless accounted for 10.5% of importance and generally increased predictions as anxiety became more pronounced. The convergence between the CatBoost feature-importance ranking and mean absolute SHAP values supported the stability of the overall ordering of predictors.

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

Table 4

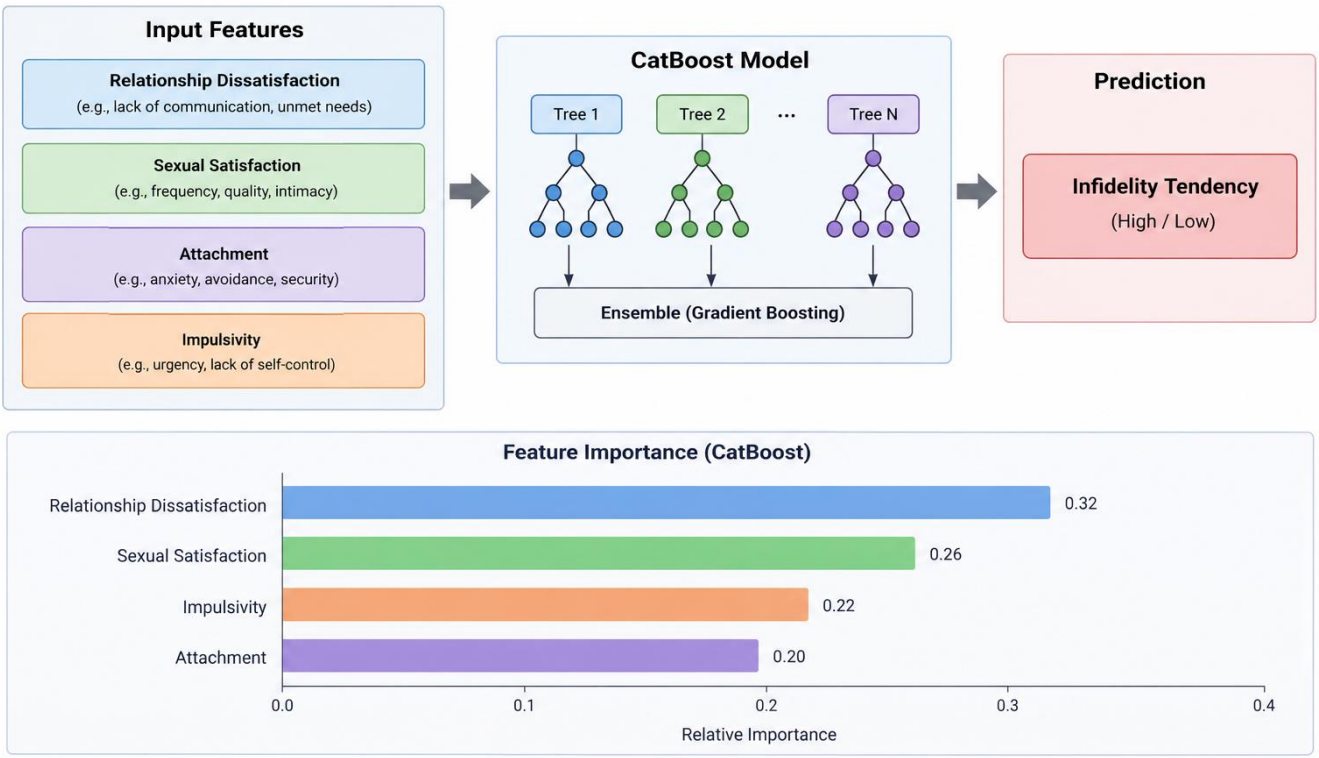
CatBoost Ablation Analysis for the Prediction of Infidelity Tendency

Model Specification	Test RMSE	Test MAE	Test R^2	Change in R^2 From Full Model
Full model	5.42	4.19	.64	—
Without relationship dissatisfaction	6.10	4.78	.54	-.10
Without impulsivity	5.91	4.57	.57	-.07
Without sexual satisfaction	5.76	4.46	.59	-.05
Without attachment avoidance	5.61	4.33	.61	-.03
Without attachment anxiety	5.52	4.27	.62	-.02

The ablation results presented in Table 4 confirmed the feature-importance findings. Removing relationship dissatisfaction produced the largest deterioration in predictive accuracy: test-set R^2 declined from .64 to .54 and RMSE increased from 5.42 to 6.10. Removing impulsivity reduced R^2 by .07, while removal of sexual satisfaction reduced it by .05. Excluding attachment avoidance and attachment anxiety produced smaller but still meaningful decreases of .03 and .02 in R^2, respectively. Importantly, no single predictor reproduced the performance of the complete model, indicating that the final prediction depended on complementary information from relational quality, sexuality, attachment insecurity, and behavioral self-regulation. The results therefore suggested that relationship dissatisfaction was the most information-rich individual predictor while the strongest predictive performance was achieved only when all five constructs were modeled jointly.

Figure 1

SHAP Summary Plot Showing the Direction and Magnitude of Predictor Contributions to CatBoost Predictions of Infidelity Tendency



The SHAP pattern indicated that high relationship dissatisfaction generated the largest positive shifts in predicted infidelity tendency, particularly at the upper end of the dissatisfaction distribution. High impulsivity also consistently increased model predictions, with the magnitude of its contribution becoming more pronounced at elevated scores. Sexual satisfaction demonstrated the opposite pattern: high values generally shifted predictions

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

downward, whereas low sexual satisfaction increased predicted propensity toward infidelity. Higher attachment avoidance contributed positively to predicted infidelity tendency across much of its distribution, while attachment anxiety showed a smaller and more variable positive effect. The dispersion of SHAP values within similar predictor levels suggested that predictor effects were not entirely additive and that the contribution of a given variable partly depended on the values of other characteristics. This pattern was consistent with the superior performance of CatBoost compared with the conventional linear model.

4. Discussion

The present study used CatBoost to predict infidelity tendency from relationship dissatisfaction, sexual satisfaction, attachment anxiety, attachment avoidance, and impulsivity among married adults in Qatar. The principal finding was that the combined predictor set demonstrated substantial predictive utility, with the final CatBoost model explaining 64% of variance in infidelity-tendency scores in the independent holdout sample. CatBoost also produced lower prediction errors and higher R^2 than multiple linear regression, random forest, and XGBoost. Feature-importance and SHAP analyses identified relationship dissatisfaction as the strongest predictor, followed by impulsivity, sexual satisfaction, attachment avoidance, and attachment anxiety. The ablation analysis supported the same ordering because model performance deteriorated most strongly when relationship dissatisfaction was removed, followed by impulsivity and sexual satisfaction. Taken together, these findings suggest that vulnerability to infidelity is neither exclusively a product of relationship dysfunction nor solely a manifestation of individual personality or self-regulation. Instead, the strongest prediction emerged from the simultaneous consideration of relational dissatisfaction, sexual experience, attachment insecurity, and behavioral disinhibition.

Relationship dissatisfaction emerged as the most influential predictor of infidelity tendency. Participants who evaluated their relationships more negatively tended to receive substantially higher predicted infidelity scores, and eliminating dissatisfaction from the CatBoost model produced the largest reduction in test-set performance. This result is consistent with previous evidence linking marital dissatisfaction with greater propensity toward marital infidelity. Lişman and Holman found that dissatisfaction forms an important relational component of infidelity propensity and may operate alongside personality and moral disengagement (Lişman & Holman, 2023). Similarly, marital conflict and poorer marital quality have been associated with more favorable attitudes toward marital infidelity (Pourmolaie et al., 2023). Research examining satisfaction and dissatisfaction as multidimensional experiences also shows that negative relationship evaluations reflect difficulties across communication, affection, expectations, and companionship rather than a single isolated complaint (Malm et al., 2022). The present findings extend these observations by demonstrating that dissatisfaction retained the largest predictive contribution when sexual satisfaction, both attachment dimensions, and impulsivity were simultaneously available to a nonlinear machine-learning model.

Several mechanisms may explain the importance of relationship dissatisfaction. Persistent dissatisfaction can weaken emotional investment in the primary relationship, reduce perceived rewards of exclusivity, increase attention to attractive alternatives, and make extradyadic involvement easier to justify psychologically. From an interdependence perspective, individuals continuously evaluate relationship rewards, costs, expectations, and alternatives; when perceived outcomes fall below expectations, commitment may become increasingly vulnerable. This interpretation is compatible with game-theoretic conceptualizations in which the decision to maintain fidelity or engage in infidelity is influenced by perceived relational benefits, costs, opportunities, partner behavior, and expected consequences (Gonen et al., 2025). It is also consistent with network evidence showing that relationship satisfaction, negative interactions, involvement, jealousy, and infidelity occupy interconnected positions within a wider relational system (Ventura-León, Reyes, et al., 2025). The predictive relevance of dissatisfaction therefore appears to reflect not merely negative mood but a broader reorganization of how the individual appraises the current relationship relative to possible alternatives.

The finding also corresponds with research linking infidelity to marital instability. Genç and Büyükada reported that infidelity tendency can contribute to pathways connecting problematic relationship symptoms with marital instability (Genç & Büyükada, 2026). Among couples already affected by infidelity, intimacy and satisfaction have likewise been connected to divorce-related outcomes (Darbandi et al., 2024). These observations support the possibility of reciprocal reinforcement: dissatisfaction may

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

heighten infidelity vulnerability, while infidelity-related thoughts or behavior may further undermine trust and satisfaction. Because the present study was cross-sectional, the prediction direction should not be interpreted as definitive causal sequencing. Nevertheless, the strong out-of-sample contribution of dissatisfaction indicates that clinicians assessing infidelity vulnerability should consider global relationship functioning rather than restricting assessment to sexual behavior or opportunity.

Impulsivity was the second strongest predictor and contributed substantially beyond relationship dissatisfaction. Higher impulsivity was associated with higher infidelity tendency in the bivariate analysis, generated positive SHAP contributions, and reduced test R^2 by .07 when removed. This pattern is theoretically plausible because infidelity commonly involves conflicts between immediate and delayed outcomes. An extradyadic encounter can provide immediate rewards such as excitement, sexual gratification, emotional validation, novelty, or relief from relationship distress, whereas many of its costs—including loss of trust, family disruption, shame, conflict, or separation—are delayed and uncertain at the moment of decision. Individuals characterized by greater behavioral disinhibition, weaker planning, or stronger immediate-reward orientation may therefore be less likely to inhibit responses to extradyadic opportunities even when they recognize potential long-term consequences.

The relevance of impulsive and reward-sensitive characteristics is compatible with findings concerning sensation seeking and psychological tendencies associated with marital infidelity (Karimi et al., 2023). It is also consistent with recent evidence showing that predictors of infidelity desire are not necessarily identical to predictors of actual conduct (Rodas et al., 2026). An individual may experience attraction to someone outside the marriage without acting upon it; behavioral self-regulation becomes especially important in determining whether desire is converted into action or stronger behavioral intention. This distinction may explain why impulsivity remained strongly informative even after dissatisfaction and sexual satisfaction were incorporated into the model. Dissatisfaction can create motivation to seek alternatives, whereas impulsivity may influence whether the individual responds behaviorally when an opportunity becomes available.

Clinical research provides additional indirect support for this interpretation. Emotion-focused couples therapy has been investigated in relation to impulsivity as well as sexual functioning and marital intimacy among women affected by marital infidelity (Nezamalmolki et al., 2023), while integrative couple therapy has likewise been associated with these domains (Nezamalmolki et al., 2024). Although intervention studies among individuals affected by infidelity cannot establish impulsivity as an antecedent of affairs, they demonstrate that self-regulatory characteristics form a clinically meaningful component of the psychological profile surrounding infidelity. The current findings suggest that incorporating impulse control, delayed-consequence evaluation, and behavioral self-regulation into prevention-oriented interventions may be useful, especially when elevated impulsivity co-occurs with substantial relationship dissatisfaction.

Sexual satisfaction ranked third in global predictive importance and operated primarily as a protective predictor. Higher sexual satisfaction shifted CatBoost predictions toward lower infidelity tendency, whereas low sexual satisfaction increased predicted scores. This finding is directly aligned with evidence linking sexual satisfaction to intentions toward infidelity (Muhlisa et al., 2023) and with literature identifying sexual satisfaction as an important correlate of cheating among married individuals (Robatmili, 2024). Structural equation research has similarly positioned sexual satisfaction within pathways linking attachment and personality characteristics to infidelity tendency (Salehzadeh et al., 2024). Taken together, these findings support the view that sexuality constitutes a distinct component of relationship functioning rather than simply reflecting global relationship satisfaction.

Low sexual satisfaction may increase infidelity vulnerability through several mechanisms. Persistent discrepancies regarding frequency, desire, novelty, responsiveness, affection, or sexual communication may produce frustration and increase the perceived desirability of an alternative sexual partner. However, the current machine-learning findings suggest that sexual dissatisfaction should not be treated as sufficient on its own. Its feature importance was lower than that of global relationship dissatisfaction and impulsivity, and the full model substantially outperformed interpretations relying on any single factor. Moreover, sexuality is intertwined with attachment, emotional intimacy, and relationship evaluation. Research connecting attachment styles and hypersexuality with both couple and sexual satisfaction illustrates these intersections (Mejía-Cruz et al., 2024). Population-level research on sexual infidelity similarly demonstrates that sexual behavior occurs within broader marital and sociocultural circumstances (Luo & Yu, 2022). Thus, low sexual satisfaction may create

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

vulnerability, but whether this vulnerability translates into greater infidelity tendency appears likely to depend on additional psychological and relational characteristics.

Contemporary digital environments may strengthen this conditional process by increasing access to alternative partners. Mobile dating applications create opportunities for sexual and romantic interaction and are used by individuals with heterogeneous sexual profiles and motivations (Mateizer & Avram, 2022). Social networking platforms also permit behaviors that can fall within or near relationship-specific definitions of infidelity (Șerban et al., 2022). Internet-related behavioral difficulties have been associated with marital infidelity tendency as well (Baboo & Mohammadi, 2021). Consequently, a person experiencing low sexual satisfaction may now encounter substantially more accessible pathways toward extradyadic interaction than in earlier social environments. Nevertheless, opportunity remains distinct from motivation and behavioral regulation, again emphasizing the relevance of the multivariable model.

Both attachment dimensions contributed independently to prediction, although attachment avoidance was more influential than attachment anxiety. Higher avoidance generally increased predicted infidelity tendency, and removing avoidance produced a greater decline in test-set R^2 than removing anxiety. This pattern is compatible with attachment theory because avoidantly attached individuals tend to experience discomfort with emotional dependence and closeness and may use interpersonal distancing as a strategy for maintaining autonomy. Under conditions of dissatisfaction, such individuals may be comparatively less motivated to restore intimacy within the primary relationship and more willing to psychologically separate sexual or emotional involvement from commitment. Research linking attachment to intimate touch and marital satisfaction demonstrates that attachment orientation shapes how closeness and physical intimacy are experienced within long-term partnerships (Wagner et al., 2020). Structural evidence also supports the importance of attachment within models of infidelity tendency (Salehzadeh et al., 2024).

Attachment anxiety also predicted elevated infidelity tendency, although its contribution was smaller and showed greater heterogeneity in SHAP values. This finding may reflect competing processes. Attachment-anxious individuals strongly desire closeness and reassurance and may therefore be highly motivated to preserve relationships; at the same time, perceived rejection or insufficient responsiveness can produce intense validation seeking, jealousy, negative affect, and vulnerability to external reassurance. The positive association observed here suggests that under some combinations of dissatisfaction, low sexual satisfaction, and impulsivity, external attention may serve as a source of reassurance or emotional validation. Previous research emphasizes that emotional states are important components of infidelity (Shrestha et al., 2023), while evidence from adolescent populations connects negative affect and hostility with infidelity-related behavior (Beltrán-Morillas et al., 2023). Research on the behavioral and motivational dynamics of dating infidelity likewise suggests considerable heterogeneity in why individuals become involved outside their primary relationships (Hartnett et al., 2023). Such heterogeneity may explain why attachment anxiety had a less uniform contribution than dissatisfaction or impulsivity.

The finding that the full CatBoost model outperformed multiple linear regression is also theoretically informative. Linear regression still demonstrated substantial predictive ability, accounting for approximately half of the test-set variance, which indicates that important portions of the relationships among the constructs were approximately additive. However, CatBoost increased explained variance to .64, suggesting that nonlinear patterns and interactions contained additional information. This is compatible with the broader infidelity literature, which increasingly portrays unfaithfulness as heterogeneous rather than as the product of a single universal pathway. Latent class analysis has identified distinct patterns of infidelity behavior among young adults (Ventura-León, Tocto-Muñoz, et al., 2025), and multidimensional research demonstrates that relationship, personality, emotional, and contextual characteristics may combine differently across individuals (Weiser et al., 2022). The present analysis suggests that predictive methods capable of representing such conditional patterns may complement traditional explanatory statistical approaches.

The superiority of a configuration-based approach is also consistent with findings concerning personality. Light and dark personality traits have been found to predict infidelity to different degrees (Sevi et al., 2020), while emotional intelligence and narcissistic characteristics have been associated with marital infidelity (Ogwuche et al., 2024). Recent work differentiating infidelity conduct from desire further demonstrates that broad traits do not affect every infidelity-related outcome in the same way (Rodas et al., 2026). Biological perspectives similarly emphasize predisposition rather than deterministic causation,

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

recognizing that genetic and neurobiological tendencies interact with environmental opportunities and relationship conditions (Zambrano, 2026). Therefore, the predictive contribution of impulsivity in the present study should not be interpreted as implying that impulsive individuals inevitably become unfaithful. Instead, impulsivity appears to contribute information whose significance can vary according to the relational context represented by dissatisfaction, sexuality, and attachment.

The findings may also be understood within a dyadic framework. Even though the present model used individual-level data, relationship dissatisfaction, sexual satisfaction, and attachment processes inherently involve interactions between partners. Updated dyadic models of maladaptive intimate behavior emphasize reciprocal influences in which one partner's emotional and behavioral patterns alter the other partner's responses over time (Mazinani & O'Connor, 2026). Consequently, an individual's high predicted infidelity tendency cannot be reduced to a defect located entirely within that person. The prediction reflects the individual's reported relationship experience combined with their attachment characteristics and behavioral regulation. This distinction is particularly important clinically because prediction should not be used to assign blame or presume future infidelity. Instead, a risk-oriented model can identify domains that may warrant assessment and intervention.

The results also have implications for preventive couple interventions. Acceptance and commitment-based approaches have demonstrated relevance to attitudes toward marital infidelity and emotional regulation (Yousefpouri et al., 2024), while cognitive-behavioral and spiritually integrated approaches have been discussed within the treatment literature on extramarital infidelity (Yousefi et al., 2023). The present feature rankings suggest that intervention may be strengthened by moving beyond generic messages about fidelity. For couples characterized primarily by relationship dissatisfaction, treatment may need to prioritize communication, unresolved conflict, emotional responsiveness, and relationship rewards. When sexual dissatisfaction is prominent, structured sexual communication and attention to mutually satisfactory intimacy may be important. When impulsivity is elevated, interventions can incorporate response delay, identification of high-risk situations, consequence evaluation, and self-regulation skills. For individuals displaying attachment insecurity, treatment may focus on fears of abandonment, avoidance of vulnerability, reassurance cycles, and development of secure relational communication.

The cultural context of Qatar should also be considered when interpreting the findings. Infidelity is strongly shaped by social norms, privacy expectations, marital expectations, family structures, religious values, and perceived consequences. Consequently, self-reported propensity toward infidelity may reflect both private psychological inclination and willingness to disclose socially sensitive attitudes. Cross-national differences in the prevalence, meaning, and expression of infidelity make it inappropriate to assume that models developed in Western populations transfer unchanged to Gulf societies. The present analysis nevertheless demonstrated that theoretically established predictors retained substantial predictive information in this context. Future cross-cultural research could determine whether the ordering or nonlinear effects of these features differ across countries and whether additional culturally relevant variables improve model performance.

5. Conclusion

The present study demonstrated the potential utility of CatBoost for predicting infidelity tendency from a concise set of theoretically meaningful relational and individual characteristics. Relationship dissatisfaction was the strongest predictor, followed by impulsivity, sexual satisfaction, attachment avoidance, and attachment anxiety, while the complete model provided substantially better prediction than any interpretation based on a single variable. CatBoost achieved the strongest out-of-sample performance among the evaluated models and explained approximately 64% of variance in infidelity tendency, suggesting that nonlinear and conditional associations contribute meaningfully to prediction. The findings support a multidimensional conceptualization in which infidelity vulnerability reflects the combined influence of relationship evaluation, sexual fulfillment, attachment insecurity, and behavioral self-regulation rather than a single causal factor. Interpretable machine-learning approaches such as CatBoost combined with SHAP may therefore provide a useful complement to conventional explanatory analyses in relationship psychology.

6. Limitations & Suggestions

Several limitations should be considered. First, the cross-sectional design does not establish temporal or causal relationships among the predictors and infidelity tendency; elevated dissatisfaction may precede increased infidelity propensity, but infidelity-related thoughts or previous

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

experiences may also contribute to dissatisfaction. Second, all constructs were measured through self-report, making the results vulnerable to recall error, social-desirability effects, and deliberate underreporting, particularly because infidelity and sexuality are sensitive topics in the sociocultural context under study. Third, the outcome represented propensity toward infidelity rather than verified future infidelity behavior; therefore, predictive accuracy for questionnaire scores should not be interpreted as equivalent to prediction of actual extradyadic behavior. Fourth, although the sample was sufficiently large for the specified model, convenience and online recruitment may limit representativeness. Fifth, only five psychological predictors were modeled, whereas opportunity, religiosity, commitment, moral beliefs, partner behavior, personality, relationship duration, digital behavior, and previous infidelity may contribute additional predictive information. Finally, evaluation was based on an internal holdout sample rather than an independent external cohort, and transportability to other populations remains to be established.

Future research should employ prospective longitudinal designs in which relationship and individual characteristics are measured before subsequent infidelity-related outcomes, allowing examination of temporal prediction and changes in risk over time. Larger multicenter samples from Qatar and other Gulf and Arab populations would permit external validation and investigation of cultural heterogeneity in model performance. Future models could include relationship commitment, moral disengagement, religiosity, perceived alternatives, previous infidelity, partner infidelity, digital dating behavior, conflict, loneliness, sensation seeking, emotional regulation, personality traits, and opportunity variables. Dyadic studies collecting data from both partners would be especially valuable for determining whether partner characteristics and discrepancy scores improve prediction. Comparative evaluation of CatBoost, XGBoost, random forests, elastic net models, neural networks, and interpretable generalized additive models could establish whether improved complexity produces clinically meaningful gains in prediction. Researchers should also examine SHAP interaction values, partial dependence patterns, calibration, temporal stability, fairness across gender and demographic subgroups, and external validation before considering applied risk-screening uses.

The findings suggest that assessment of infidelity vulnerability in couple counseling should avoid relying on a single indicator and instead consider global relationship dissatisfaction, sexual satisfaction, attachment insecurity, and behavioral self-regulation together. Practitioners may benefit from identifying each couple's dominant risk configuration rather than assuming that all individuals vulnerable to infidelity require the same intervention. Interventions for pronounced relationship dissatisfaction can prioritize communication, emotional responsiveness, conflict resolution, and restoration of positive relationship experiences; sexual dissatisfaction may require sensitive assessment of sexual communication, expectations, desire discrepancies, and mutually satisfactory intimacy; attachment insecurity may warrant work on emotional safety, dependency concerns, abandonment fears, and avoidance of vulnerability; and elevated impulsivity may call for strategies addressing response inhibition, awareness of high-risk situations, delayed decision-making, and anticipation of long-term consequences. Machine-learning estimates, if eventually validated for clinical use, should function only as decision-support information and should never be treated as proof that an individual has been or will become unfaithful.

Acknowledgments

We would like to express our appreciation and gratitude to all those who cooperated in carrying out this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors have equally contributed to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

References

Baboo, N. S., & Mohammadi, N. (2021). Investigating the Effect of Internet Addiction on the Tendency to Marital Infidelity in Couples in Shiraz. *Propósitos y Representaciones*, *9*(SPE2). https://doi.org/10.20511/pyr2021.v9nspe2.1087

Beltrán-Morillas, A. M., Villanueva-Moya, L., Sánchez-Hernández, M. D., Alonso-Ferres, M., Garrido-Macías, M., & Expósito, F. (2023). Infidelity in the Adolescence Stage: The Roles of Negative Affect, Hostility, and Psychological Well-Being. *International journal of environmental research and public health*, *20*(5), 4114. https://doi.org/10.3390/ijerph20054114

Darbandi, B., Ahadi, H., & Khalatbari, J. (2024). Predicting the Tendency Towards Divorce in Couples Involved in Infidelity Based on Marital Intimacy and Satisfaction With the Mediation of Ethical Orientation Styles. *Aftj*, *5*(1), 115-127. https://doi.org/10.61838/kman.aftj.5.1.13

Genç, E., & Büyükada, E. (2026). The Impact of Obsessive-Compulsive Relationship Symptoms on Marital Instability: Mediating Role of Infidelity Tendency. *Journal of marital and family therapy*, *52*(2). https://doi.org/10.1111/jmft.70122

Gonen, L. D., Tavor, T., & Spiegel, U. (2025). Examining Marital Infidelity via Game Theory. *Mathematics*, *13*(14), 2235. https://doi.org/10.3390/math13142235

Hartnett, A. C., Croes, Z. L., Hertlein, B. R., & Lasslo, S. K. (2023). Understanding Dynamics Dating Infidelity: Behaviors, Motivations, and Implications for Relationship Well-Being. *Jurnal Sosial Sains Terapan Dan Riset (Sosateris)*, *11*(2), 120-137. https://doi.org/10.35335/ctkmr713

Karimi, S., Doostdari, F., Lotfabadi, N. B., Yosefi, R., Soleymani, M., & Kianimoghadam, A. S. (2023). The Role of Early Maladaptive Schemas in Predicting Legitimacy, Seduction, Normalization, Sexuality, Social Background, and Sensation Seeking in Marital Infidelity. *Practice in Clinical Psychology*, *11*(3), 249-258. https://doi.org/10.32598/jpcp.11.3.848.2

Lişman, C. G., & Holman, A. C. (2021). Cheating Under the Circumstances in Marital Relationships: The Development and Examination of the Propensity Towards Infidelity Scale. *Social Sciences*, *10*(10), 392. https://doi.org/10.3390/socsci10100392

Lişman, C. G., & Holman, A. C. (2023). Dark, Dissatisfied and Disengaged: Propensity Towards Marital Infidelity, the Dark Triad, Marital Satisfaction and the Mediating Role of Moral Disengagement. *Psihologija*, *56*(2), 163-177. https://doi.org/10.2298/psi2204100031

Luo, W., & Yu, J. (2022). Sexual Infidelity Among the Married in China. *Chinese Journal of Sociology*, *8*(3), 374-397. https://doi.org/10.1177/2057150x221108574

Malm, E. K., Oti-Boadi, M., Adom-Boakye, N. A., & Andah, A. (2022). Marital Satisfaction and Dissatisfaction Among Ghanaians. *Journal of Family Issues*, *44*(12), 3117-3141. https://doi.org/10.1177/0192513x221126752

Mateizer, A., & Avram, E. (2022). Mobile Dating Applications and the Sexual Self: A Cluster Analysis of Users' Characteristics. *International journal of environmental research and public health*, *19*(3), 1535. https://doi.org/10.3390/ijerph19031535

Mazinani, B., & O'Connor, B. P. (2026). An Updated and Revised Dyadic Model of Partner Violence. *Behavioral Sciences*, *16*(9), 1468. https://doi.org/10.3390/bs16091468

Mejía-Cruz, D., Ávila-Chauvet, L., & Villalobos-Gallegos, L. (2024). Attachment Styles and Hypersexuality in Mexican Emerging Adults: Assessing the Influence on Couple and Sexual Satisfaction. https://doi.org/10.20944/preprints202406.0462.v1

Muhlisa, N. A., Siswanti, D. N., & Khumas, A. (2023). The the Relationship Between Sexual Satisfaction and Husband's Infidelity Intentions. *Arrus Journal of Social Sciences and Humanities*, *3*(4), 452-458. https://doi.org/10.35877/soshum1885

Munévar, F. R., Patiño, L. E. P., Ortegón, L. M., Rodríguez, M. C., Zapata, C. D., & Niño, Y. R. (2021). Validación Del Inventario Multidimensional De Infidelidad (IMIN) en Población Colombiana. *International Journal of Psychological Research*, *14*(1), 33-47. https://doi.org/10.21500/20112084.4710

Nezamalmolki, M., Bahrainian, S. A., & Shahabizadeh, F. (2023). Effectiveness of Emotion-Focused Couples Therapy on Sexual Function, Marital Intimacy, and Impulsivity in Women Affected by Marital Infidelity. *PWJ*, *4*(4), 39-47. https://doi.org/10.61838/kman.pwj.4.4.5

Nezamalmolki, M., Bahrainian, S. A., & Shahabizadeh, F. (2024). Effectiveness of Integrative Couple Therapy on Sexual Function, Marital Intimacy, and Impulsivity in Women Affected by Marital Infidelity. *Jarac*, *6*(2), 19-26. https://doi.org/10.61838/kman.jarac.6.2.3

Ogwuche, C. H., Tyav-Tersoo, K. I., Onah, C., & Orafa, D. T. (2024). Marital Infidelity Among Married Couples: Roles of Emotional Intelligence and Narcissistic Personality Traits in Makurdi, Benue State. *Journal of Innovation in Psychology Education and Didactics*, *28*(1), 27-26. https://doi.org/10.29081/jiped.2024.28.1.03

Pourmolaie, S., Rahbarjou, S. S. S., & Shamsaldini, A. (2023). Predicting Attitudes Towards Marital Infidelity Based on Marital Conflict and Marital Quality Among Women. *PWJ*, *4*(3), 48-54. https://doi.org/10.61838/kman.pwj.4.3.6

Robatmili, S. (2024). Predicting Cheating Among Married Individuals Based on Sexual Satisfaction and Personality Traits: A Review. *Open Access Research Journal of Biology and Pharmacy*, *10*(1), 023-025. https://doi.org/10.53022/oarjbp.2024.10.1.0035

Rodas, J. A., Abad, M., Barandica, A., León-Rojas, J. E., Figueira, J. A. V., & Oleas, D. (2026). Infidelity Conduct and Desire: The Differentiated Contribution of Broad Personality Traits. *Frontiers in psychology*, *17*. https://doi.org/10.3389/fpsyg.2026.1939819

Salehzadeh, S., Bahram Ali Ghanbari Hashem, A., & Nejat, H. (2024). Structural Equation Modeling Modeling of the Tendency Toward Marital Infidelity Based on Significant Five Personality Factors Mediated by Attachment Styles and Sexual Satisfaction. *Journal of Health Reports and Technology*, *10*(1). https://doi.org/10.5812/jhrt-142998

Şerban, I., Salvati, M., & Enea, V. (2022). Sexual Orientation and Infidelity-Related Behaviors on Social Media Sites. *International journal of environmental research and public health*, *19*(23), 15659. https://doi.org/10.3390/ijerph192315659

Sevi, B., Urgancı, B., & Sakman, E. (2020). Who Cheats? An Examination of Light and Dark Personality Traits as

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

Predictors of Infidelity. *Personality and individual differences*, *164*, 110126. https://doi.org/10.1016/j.paid.2020.110126

Shabankare, M. G., Heidari, A., Makvandi, B., & Marashian, F. S. (2020). Relationship of Forgiveness and Feeling of Loneliness With Attitudes Toward Marital Infidelity Regarding the Moderating Role of Marital Satisfaction in Married Students. *Ajnpp*, 77-83. https://doi.org/10.32592/ajnpp.2021.8.2.103

Shrestha, P. S., Shaver, S. R., Perlman, T. T., & Walsham, W. (2023). Emotional Dimensions of Infidelity: An Analysis of Psychological and Emotional Factors Affecting Relationship Infidelity. *Jurnal Sosial Sains Terapan Dan Riset (Sosateris)*, *11*(2), 88-103. https://doi.org/10.35335/85rbw180

Ventura-León, J., Reyes, A., Valencia, P. H., Tocto-Muñoz, S., Gamboa-Melgar, G., Ruiz-Castro, J., & Lino-Cruz, C. (2025). Exploring Infidelity Behavior Patterns in a Sample of Peruvian Young Adults: A Latent Class Analysis. *Journal of marital and family therapy*, *51*(4). https://doi.org/10.1111/jmft.70066

Ventura-León, J., Tocto-Muñoz, S., Lino-Cruz, C., Sánchez-Villena, A. R., Martinez-Munive, R., Talledo-Sánchez, K., & Casiano-Valdivieso, K. (2025). Myths of Romantic Love, Negative Interactions, Relationship Involvement, Satisfaction, Infidelity, and Jealousy in Peruvian Individuals With Couples: Directed and Undirected Network Analysis. *Journal of marital and family therapy*, *51*(2). https://doi.org/10.1111/jmft.70014

Wagner, S. A., Mattson, R. E., Davila, J., Johnson, M. D., & Cameron, N. M. (2020). Touch Me Just Enough: The Intersection of Adult Attachment, Intimate Touch, and Marital Satisfaction. *Journal of Social and Personal Relationships*, *37*(6), 1945-1967. https://doi.org/10.1177/0265407520910791

Weiser, D. A., Shrout, M. R., Thomas, A. V., Edwards, A. L., & Cravens, J. D. (2022). "I've Been Cheated, Been Mistreated, When Will I Be Loved": Two Decades of Infidelity Research Through an Intersectional Lens. *Journal of Social and Personal Relationships*, *40*(3), 856-898. https://doi.org/10.1177/02654075221113032

Yousefi, S., Bafghi, Z. R., Ahmadi, A., Joulaei, H., Bolhari, J., & Mirzai, M. (2023). Spirituality Enhanced With Cognitive-Behavioral Techniques in Extramarital Infidelity: A Literature Review. *Zahedan Journal of Research in Medical Sciences*, *26*(2). https://doi.org/10.5812/zjrms-135837

Yousefpouri, M., Zomorodi, S., & Bazzāziān, S. (2024). Effectiveness of Acceptance and Commitment-Based Couples Therapy on Attitudes Towards Marital Infidelity and Emotional Regulation in Married Women. *Aftj*, *5*(2), 103-111. https://doi.org/10.61838/kman.aftj.5.2.12

Zambrano, A. K. (2026). Genetic Predisposition and Infidelity: From Molecular Variation to Relationship Behavior—A Narrative Review. *International Journal of Molecular Sciences*, *27*(19), 8510. https://doi.org/10.3390/ijms27198510

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798