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Predicting Work–Family Conflict and Marital Satisfaction Using Machine Learning: The Role of Job Stress, Emotional Exhaustion, Dyadic Coping, and Partner Support

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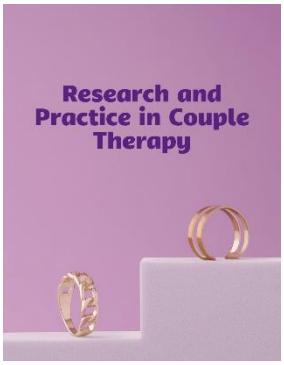

ABSTRACT

The present study aimed to investigate the effectiveness of Solution-Focused Couple Therapy (SFCT) on hope, dyadic coping, and relationship resilience among couples experiencing economic stress. This study employed a quasi-experimental design with pretest, posttest, and two-month follow-up assessments using a control group. The statistical population consisted of married couples experiencing significant economic stress in Toronto, Canada. Forty couples (80 individuals) meeting the inclusion criteria were selected through purposive sampling and randomly assigned to an experimental group (20 couples) and a control group (20 couples). The experimental group participated in eight weekly 90-minute sessions of Solution-Focused Couple Therapy, while the control group received no intervention during the study period. Data were collected using the Adult Hope Scale, the Dyadic Coping Inventory, and the Relationship Resilience Assessment Scale. Data analysis was conducted using repeated-measures analysis of variance and Bonferroni post hoc tests in SPSS version 29. The results of repeated-measures analysis of variance revealed significant effects of time, group, and Time × Group interaction for all dependent variables. For hope, significant effects were observed for time ($F = 51.84$, $p < .001$), group ($F = 42.27$, $p < .001$), and Time × Group interaction ($F = 64.18$, $p < .001$, $\eta^2 = .451$). Dyadic coping also demonstrated significant time ($F = 58.73$, $p < .001$), group ($F = 47.91$, $p < .001$), and interaction effects ($F = 71.26$, $p < .001$, $\eta^2 = .477$). Similarly, relationship resilience showed significant effects for time ($F = 62.54$, $p < .001$), group ($F = 50.16$, $p < .001$), and Time × Group interaction ($F = 75.83$, $p < .001$, $\eta^2 = .493$). Bonferroni comparisons indicated significant improvements from pretest to posttest and from pretest to follow-up for all variables ($p < .001$), while no significant differences were found between posttest and follow-up assessments ($p > .05$), indicating maintenance of treatment gains over time. The findings demonstrate that Solution-Focused Couple Therapy is an effective intervention for enhancing hope, dyadic coping, and relationship resilience among couples facing economic stress. By emphasizing strengths, future-oriented goals, and collaborative problem-solving, the intervention enabled couples to develop adaptive psychological and relational resources that persisted beyond the treatment period. These results support the application of solution-focused approaches as an evidence-based strategy for promoting relational well-being and resilience among couples confronted with financial adversity.

Keywords: Solution-Focused Couple Therapy, Hope, Dyadic Coping, Relationship Resilience, Economic Stress, Couples, Marital Relationships, Family Therapy, Strengths-Based Intervention, Psychological Adaptation.

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Introduction

The intersection of work and family life has become one of the most important areas of inquiry in contemporary family psychology, occupational health psychology, and relationship science. Rapid technological developments, increasing occupational demands, economic uncertainty, changing family structures, and evolving gender roles have intensified the

challenges individuals face in balancing professional responsibilities with family obligations. For married individuals, the successful integration of work and family roles is closely associated with psychological well-being, relationship quality, family functioning, and overall life satisfaction. Conversely, difficulties in balancing these domains often result in work–family conflict, a phenomenon characterized by incompatible pressures arising from occupational and family roles that make participation in one domain more difficult because of participation in the other. Work–family conflict has been linked to numerous adverse outcomes, including psychological distress, burnout, reduced productivity, diminished relationship quality, and lower marital satisfaction. Consequently, understanding the factors that contribute to work–family conflict and marital satisfaction has become a major priority for researchers and practitioners seeking to promote both occupational and family well-being (Sentieiro et al., 2025; Turliuc & Candel, 2021).

Marital satisfaction represents one of the most widely studied indicators of relationship quality and is commonly defined as an individual's subjective evaluation of the overall quality, happiness, and stability of a marital relationship. High levels of marital satisfaction are associated with better physical health, psychological adjustment, relationship longevity, and family functioning, whereas marital dissatisfaction is linked to emotional distress, conflict, separation, and divorce. Research has consistently demonstrated that marital satisfaction is a multidimensional construct influenced by interpersonal, psychological, social, and contextual factors. Contemporary models emphasize that relationship quality emerges from the interaction of individual characteristics, dyadic processes, and external stressors operating within the broader social environment (Abreu-Afonso et al., 2021; Chiș, 2022; Pereira et al., 2025). Accordingly, marital satisfaction cannot be understood solely through intrapersonal characteristics but must also be examined within the context of ongoing relational interactions and external pressures that couples encounter in daily life.

Among the external factors affecting marital functioning, occupational stress has received substantial attention. Job stress refers to the psychological and physiological strain that arises when workplace demands exceed an individual's resources and coping capacities. Increasing workloads, role ambiguity, job insecurity, long working hours, and organizational pressures contribute significantly to elevated stress levels among employees. Numerous studies have shown that occupational stress frequently spills over into family life, disrupting communication patterns, increasing irritability, reducing emotional availability, and undermining relationship quality. When individuals experience persistent job-related strain, their capacity to invest emotional resources in their marital relationship may become compromised, increasing the likelihood of work–family conflict and marital dissatisfaction. Socioeconomic challenges and occupational stressors have been identified as significant determinants of marital stress and relationship outcomes across diverse cultural contexts (Li et al., 2023; Novianti et al., 2024; Turliuc & Candel, 2021). Furthermore, research suggests that the impact of occupational stress on marital outcomes is often indirect and operates through psychological and relational mechanisms that influence how partners interact and support one another.

A closely related construct is emotional exhaustion, which represents the core dimension of burnout and refers to feelings of emotional depletion, fatigue, and reduced psychological energy resulting from prolonged exposure to stress. Emotional exhaustion has profound implications for interpersonal functioning because emotionally exhausted individuals often struggle to regulate emotions effectively, engage in constructive communication, and provide support to their partners. As emotional resources become depleted, relationship interactions may become increasingly characterized by withdrawal, irritability, and reduced intimacy. Evidence from family and relationship research indicates that chronic stress and emotional strain can negatively influence relationship satisfaction and marital adjustment, particularly when couples lack effective coping strategies to manage ongoing stressors (Carrese-Chacra et al., 2023; Mangialavori et al., 2021; Song et al., 2024). These findings highlight the importance of examining emotional exhaustion as a critical predictor of both work–family conflict and marital satisfaction.

Despite the detrimental effects of external stressors, not all couples experience similar levels of relational deterioration when confronted with adversity. The Systemic Transactional Model of stress and coping proposes that couples jointly manage stress through dyadic coping processes, whereby partners support one another and coordinate efforts to address challenges affecting the relationship. Dyadic coping encompasses a range of behaviors, including emotional support, problem-solving, delegated assistance, and collaborative coping efforts. Effective dyadic coping allows couples to transform individual stress into a shared challenge, thereby strengthening relationship resilience and promoting marital satisfaction. Over the past decade, dyadic coping has emerged as one of the most influential relational processes associated with relationship functioning and psychological adjustment (Ijaz et al., 2022; Indumathy & Kanth, 2021; Zhao et al., 2021).

A growing body of empirical evidence demonstrates that dyadic coping serves as a protective factor against the negative effects of stress on relationship outcomes. Studies conducted in diverse populations have shown that supportive, delegated, and common dyadic coping contribute significantly to relationship satisfaction, emotional adjustment, and family functioning. For example, dyadic coping has been found to mediate associations between attachment representations and relationship satisfaction, suggesting that couples who effectively cope together experience stronger and more satisfying relationships (Wendołowska et al., 2022). Similarly, dyadic coping has been shown to mediate relationships between communication patterns and dyadic adjustment, emphasizing its role as a central mechanism through which couples maintain relationship quality (Indumathy & Kanth, 2021). Research has also demonstrated that dyadic coping predicts marital satisfaction among older couples, couples facing fertility-related stress, and partners confronting significant life challenges (Junyan et al., 2023; Simon-Zámbori et al., 2025; Song et al., 2024).

The protective role of dyadic coping becomes particularly evident during periods of heightened stress and uncertainty. During the COVID-19 pandemic, numerous studies documented the importance of collaborative coping processes in maintaining relationship stability and satisfaction. Couples who engaged in effective dyadic coping reported lower levels of stress, better emotional adjustment, and greater relationship satisfaction despite facing unprecedented external challenges (Carrese-Chacra et al., 2023; Kurt & Sanberk, 2022; Relvas et al., 2023; Sentieiro et al., 2025). Systematic reviews have further confirmed that positive dyadic coping is consistently associated with better marital outcomes across a wide range of stressful circumstances, including health-related challenges, infertility treatments, parenting demands, and socioeconomic adversity (Jiménez-Picón et al., 2021; Santamaría-Gutiez et al., 2025). These findings suggest that dyadic coping may function as a crucial buffer that protects couples from the adverse effects of occupational stress and emotional exhaustion.

Another relational resource that has attracted considerable scholarly attention is partner support. Perceived partner support refers to an individual's belief that their spouse is available, responsive, and willing to provide emotional, informational, and practical assistance when needed. Supportive relationships promote emotional security, facilitate stress regulation, and strengthen relationship satisfaction. Research consistently indicates that perceived support from one's partner contributes significantly to marital quality, relationship stability, and psychological well-being. In families facing chronic stressors, such as raising children with developmental disorders or managing health-related challenges, partner support has been identified as a key predictor of marital satisfaction and family adjustment (He et al., 2022; Wiener et al., 2023; Xie et al., 2025). Longitudinal evidence further suggests that perceived spousal support and marital stability influence one another over time, creating reciprocal processes that reinforce relationship quality and resilience (Li et al., 2023).

Relationship scholars have increasingly recognized that positive interpersonal processes such as support, intimacy, communication, and shared emotional experiences contribute substantially to marital satisfaction. Studies examining positivity resonance, communication quality, and emotional connection have demonstrated that couples who engage in supportive and responsive interactions experience greater relationship satisfaction and improved long-term health outcomes (Ouellet-Courtois

et al., 2022; Tan et al., 2023; Wells et al., 2022). Likewise, investigations into relationship resilience have shown that supportive relational environments facilitate adaptive responses to stress and contribute to sustained marital satisfaction over time (Surijah et al., 2025; Surijah et al., 2023). These findings underscore the importance of examining partner support alongside dyadic coping as critical relational resources influencing both work–family conflict and marital satisfaction.

Recent research has also highlighted the importance of contextual and individual differences in shaping marital outcomes. Factors such as personality characteristics, attachment representations, childhood experiences, perfectionism, financial strain, health conditions, and parenting demands have all been associated with relationship quality and marital satisfaction (Chiș, 2022; Hamedani et al., 2024; Novianti et al., 2024; Zamir, 2021). Couples coping with disability, chronic illness, infertility, adoption-related experiences, or caregiving responsibilities often encounter unique stressors that influence relationship functioning through complex psychological and relational pathways (Despax et al., 2022; Pavon et al., 2024; Pereira et al., 2025; Simon-Zámbori et al., 2025). Consequently, contemporary relationship science increasingly emphasizes the need for integrative models capable of capturing multiple interacting predictors of marital outcomes.

Although traditional statistical approaches have substantially advanced understanding of marital processes, they may be limited in their ability to model complex, nonlinear interactions among numerous psychological, occupational, and relational variables. Machine learning methods offer a powerful alternative by enabling the identification of intricate patterns and predictive relationships that may not be adequately captured through conventional regression techniques. Machine learning algorithms can simultaneously process large numbers of predictors, detect nonlinear associations, evaluate variable importance, and generate highly accurate predictive models. These capabilities make machine learning particularly suitable for investigating multifaceted phenomena such as work–family conflict and marital satisfaction, which emerge from the dynamic interaction of occupational demands, psychological processes, and relational resources. Despite growing interest in applying machine learning to psychological and behavioral research, relatively few studies have employed these techniques to examine marital functioning and work–family dynamics, creating an important gap in the literature.

Given the established importance of job stress, emotional exhaustion, dyadic coping, and partner support for relationship functioning, as well as the potential advantages of machine learning methodologies, further investigation is warranted to identify the relative contributions of these factors in predicting work–family conflict and marital satisfaction among married employees. Therefore, the aim of the present study was to predict work–family conflict and marital satisfaction using machine learning algorithms based on job stress, emotional exhaustion, dyadic coping, and partner support among married employees in Tehran.

Methods and Materials

Study Design and Participants

This study employed a cross-sectional, correlational design with a predictive analytics approach grounded in machine learning methodologies. The primary objective was to develop and evaluate predictive models of work–family conflict and marital satisfaction based on occupational and relational variables, including job stress, emotional exhaustion, dyadic coping, and perceived partner support. The study was conducted among married employees working in public and private organizations across Tehran, Iran. Participants were recruited using a multistage cluster sampling procedure. Initially, several governmental institutions, educational centers, healthcare organizations, financial institutions, and private companies located in different districts of Tehran were selected. Subsequently, eligible employees were invited to participate voluntarily in the study.

The inclusion criteria consisted of being legally married, having at least one year of marital experience, being employed full-time for a minimum of one year, and being between 22 and 60 years of age. Individuals who reported severe psychiatric disorders, current participation in marital therapy, or incomplete questionnaire responses exceeding 10% of the items were excluded from the analysis. A total of 612 married employees were initially approached. After data screening and removal of incomplete responses, 584 participants met the eligibility criteria and were included in the final analysis. The sample consisted of both men and women representing a wide range of occupational sectors, educational backgrounds, and socioeconomic statuses, thereby enhancing the generalizability of the predictive models.

Measures

Work–family conflict was assessed using the Work–Family Conflict Scale developed by Carlson, Kacmar, and Williams (2000). This instrument is one of the most widely used measures of inter-role conflict between work and family domains. The scale consists of 18 items distributed across six dimensions reflecting time-based, strain-based, and behavior-based conflict in both work-to-family and family-to-work directions. Participants rate each statement on a five-point Likert scale ranging from strongly disagree to strongly agree. Higher scores indicate greater levels of perceived work–family conflict. Previous studies have demonstrated satisfactory psychometric properties for the instrument, with Cronbach's alpha coefficients generally exceeding 0.80 and evidence supporting its construct and criterion validity across diverse occupational populations.

Marital satisfaction was measured using the Revised Dyadic Adjustment Scale (RDAS) developed by Busby, Christensen, Crane, and Larson (1995). The RDAS contains 14 items that evaluate overall marital quality through dimensions of consensus, satisfaction, and cohesion. Responses are scored on Likert-type scales with varying response formats depending on the item content. Higher scores indicate greater marital satisfaction and relationship adjustment. Numerous studies have reported acceptable reliability and validity for the scale in both clinical and non-clinical populations, and it has been widely employed in marital and family research.

Job stress was assessed using the Job Stress Scale developed by Parker and DeCotiis (1983). The instrument consists of 13 items designed to measure perceived occupational stress arising from workload pressures, role ambiguity, organizational demands, and work-related tension. Participants respond to each item using a five-point Likert scale ranging from strongly disagree to strongly agree. Higher scores reflect elevated levels of perceived job stress. Previous investigations have confirmed the scale's internal consistency, factor structure, and predictive validity in organizational settings.

Emotional exhaustion was evaluated using the Emotional Exhaustion subscale of the Maslach Burnout Inventory–Human Services Survey developed by Maslach and Jackson (1981). This subscale contains nine items assessing feelings of emotional depletion, fatigue, and psychological exhaustion resulting from prolonged occupational demands. Participants indicate the frequency with which they experience each feeling using a seven-point scale ranging from never to every day. Higher scores represent greater emotional exhaustion. Extensive empirical evidence has supported the reliability and validity of this measure across different occupational groups and cultural contexts.

Dyadic coping was measured using the Dyadic Coping Inventory developed by Bodenmann (2008). The inventory comprises 37 items assessing how couples jointly manage stress and cope with challenges affecting their relationship. The scale evaluates several dimensions, including supportive dyadic coping, delegated dyadic coping, common dyadic coping, and negative dyadic coping. Responses are recorded on a five-point Likert scale ranging from very rarely to very often. Higher scores on adaptive coping dimensions indicate more effective stress management within the couple relationship. Previous research has demonstrated strong psychometric properties, including high internal consistency and convergent validity with measures of relationship quality and psychological well-being.

Perceived partner support was assessed using the Spousal Support Scale developed by Cutrona (1996). The instrument measures the extent to which individuals perceive emotional, informational, instrumental, and appraisal support from their spouse. The scale contains 24 items rated on a five-point Likert continuum from strongly disagree to strongly agree. Higher scores indicate greater levels of perceived partner support. Previous validation studies have reported satisfactory reliability coefficients and evidence of construct validity in marital and family research contexts.

Data Analysis

Data analysis was conducted using Python programming language and several machine learning libraries, including Scikit-learn, Pandas, NumPy, and XGBoost. Prior to model development, data were screened for missing values, outliers, and distributional anomalies. Missing values representing less than 5% of the dataset were imputed using median substitution for continuous variables and mode substitution for categorical variables. Continuous variables were standardized using z-score normalization to improve model performance and comparability across predictors.

The dataset was randomly divided into training and testing subsets, with 80% of observations allocated to model training and 20% reserved for model evaluation. To enhance robustness and reduce overfitting, five-fold cross-validation was performed during model training. Several machine learning algorithms were implemented and compared, including Multiple Linear Regression, Random Forest Regression, Gradient Boosting Regression, Extreme Gradient Boosting (XGBoost), Support Vector Regression, and Artificial Neural Networks. Separate predictive models were developed for work–family conflict and marital satisfaction as dependent variables.

Model performance was evaluated using multiple metrics, including the coefficient of determination (R^2), Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and Mean Absolute Percentage Error (MAPE). Hyperparameter optimization was conducted using grid search procedures to identify the most effective parameter combinations for each algorithm. Feature importance analyses were subsequently performed using permutation importance and SHAP (Shapley Additive Explanations) values to determine the relative contribution of job stress, emotional exhaustion, dyadic coping, partner support, and demographic variables in predicting work–family conflict and marital satisfaction outcomes.

Finally, the predictive accuracy of competing algorithms was compared, and the best-performing model was selected based on cross-validated performance indicators. The findings provided both predictive insights and an interpretable understanding of the occupational and relational factors contributing to work–family conflict and marital satisfaction among married employees in Tehran.

Findings and Results

A total of 584 married employees participated in the study. Of these, 312 participants (53.4%) were men and 272 (46.6%) were women. The mean age of the participants was 38.47 years (SD = 7.92), with ages ranging from 23 to 59 years. The average duration of marriage was 11.26 years (SD = 6.84). Regarding educational attainment, 121 participants (20.7%) held a diploma or associate degree, 311 (53.3%) possessed a bachelor's degree, and 152 (26.0%) had completed postgraduate education. Concerning occupational sector, 41.4% were employed in governmental organizations, 34.8% worked in private companies, and 23.8% were employed in healthcare, educational, or financial institutions. The mean weekly working time was 46.82 hours (SD = 8.11). Preliminary screening indicated no substantial missing data, and all variables met the assumptions necessary for machine learning analyses following data preprocessing and normalization procedures.

Table 1. Descriptive Statistics and Correlations Among Study Variables

Variable	Mean	SD	1	2	3	4	5	6
1. Work–Family Conflict	53.84	11.72	1.00					
2. Marital Satisfaction	44.17	8.95	-0.62	1.00				
3. Job Stress	41.53	9.14	0.68	-0.54	1.00			
4. Emotional Exhaustion	27.46	7.82	0.64	-0.51	0.71	1.00		
5. Dyadic Coping	122.81	19.67	-0.49	0.73	-0.42	-0.39	1.00	
6. Partner Support	81.64	13.58	-0.56	0.76	-0.47	-0.44	0.69	1.00

All correlation coefficients were significant at $p < .001$.

Table 1 presents the means, standard deviations, and Pearson correlation coefficients among the study variables. Work–family conflict demonstrated strong positive correlations with job stress ($r = 0.68$, $p < .001$) and emotional exhaustion ($r = 0.64$, $p < .001$), indicating that higher occupational strain was associated with greater interference between work and family domains. Conversely, work–family conflict showed moderate to strong negative relationships with dyadic coping ($r = -0.49$, $p < .001$), partner support ($r = -0.56$, $p < .001$), and marital satisfaction ($r = -0.62$, $p < .001$). Marital satisfaction was positively associated with dyadic coping ($r = 0.73$, $p < .001$) and partner support ($r = 0.76$, $p < .001$), while exhibiting negative associations with job stress ($r = -0.54$, $p < .001$) and emotional exhaustion ($r = -0.51$, $p < .001$). These findings provide preliminary evidence that occupational stressors and relational resources are substantially related to both work–family conflict and marital satisfaction and support their inclusion as predictors in subsequent machine learning analyses.

Table 2. Performance Comparison of Machine Learning Models for Predicting Work–Family Conflict

Model	R^2	RMSE	MAE	MAPE (%)
Multiple Linear Regression	0.56	7.98	6.23	12.48
Support Vector Regression	0.64	7.11	5.48	10.93
Random Forest Regression	0.72	6.21	4.69	9.21
Gradient Boosting Regression	0.75	5.88	4.42	8.73
Artificial Neural Network	0.77	5.63	4.28	8.34
XGBoost Regression	0.81	5.14	3.89	7.68

The comparative evaluation of predictive algorithms revealed substantial differences in model performance when predicting work–family conflict. Among the six tested algorithms, the XGBoost model demonstrated the highest predictive accuracy, accounting for 81% of the variance in work–family conflict scores ($R^2 = 0.81$). This model also produced the lowest prediction errors, as reflected by RMSE = 5.14, MAE = 3.89, and MAPE = 7.68%. The Artificial Neural Network model exhibited the second-best performance ($R^2 = 0.77$), followed by Gradient Boosting Regression ($R^2 = 0.75$) and Random Forest Regression ($R^2 = 0.72$). Traditional Multiple Linear Regression displayed the weakest predictive capability ($R^2 = 0.56$). The results indicate that nonlinear ensemble learning methods significantly outperformed conventional statistical approaches, suggesting that the relationships between occupational stress variables, relational resources, and work–family conflict are characterized by complex and potentially nonlinear patterns. Feature importance analyses within the optimal XGBoost model revealed that job stress emerged as the most influential predictor, followed by emotional exhaustion, partner support, and dyadic coping.

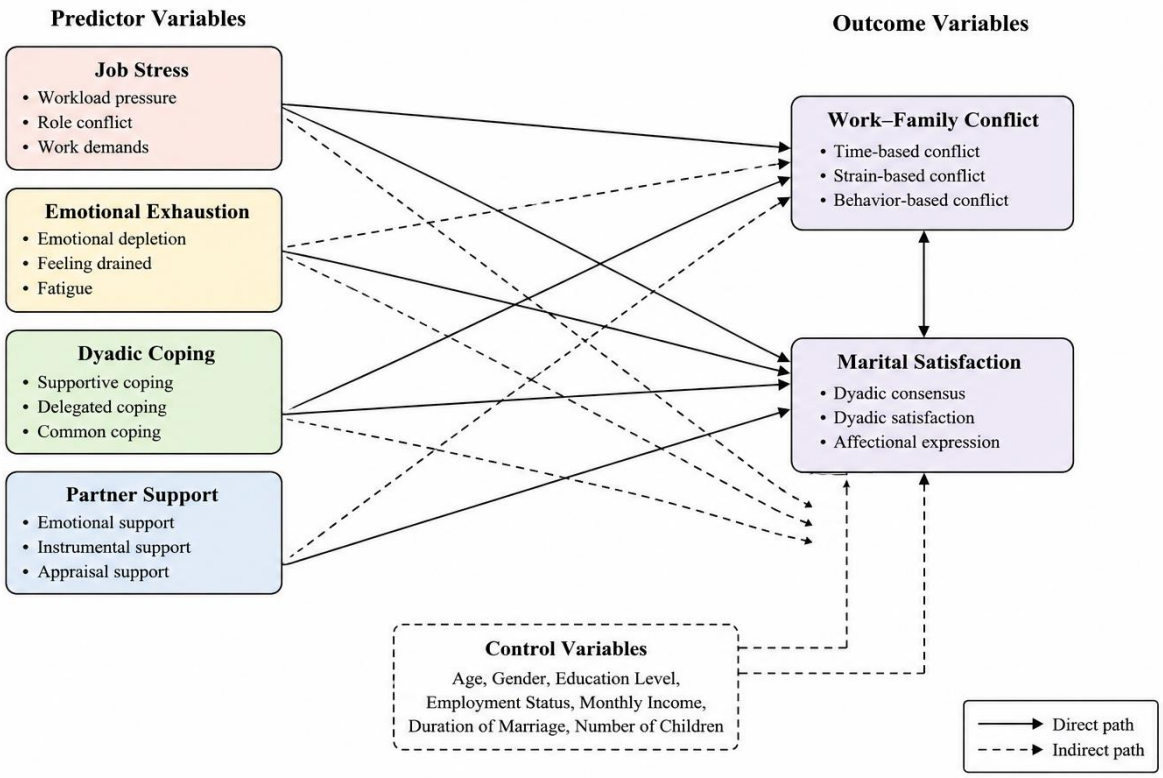

Figure 1. Conceptual model of the relationships among job stress, emotional exhaustion, dyadic coping, partner support, work–family conflict, and marital satisfaction.

Figure 1. Conceptual Machine Learning Framework for Predicting Work–Family Conflict and Marital Satisfaction from Job Stress, Emotional Exhaustion, Dyadic Coping, and Partner Support

Table 3. Feature Importance and Machine Learning Performance for Predicting Marital Satisfaction Using the Optimal XGBoost Model

Predictor	Importance Score	Relative Importance (%)
Partner Support	0.327	32.7
Dyadic Coping	0.281	28.1
Job Stress	0.178	17.8
Emotional Exhaustion	0.143	14.3
Duration of Marriage	0.041	4.1
Weekly Working Hours	0.030	3.0

Model Performance Indicators: $R^2 = 0.84$, RMSE = 4.37, MAE = 3.18, MAPE = 6.82%

The machine learning model predicting marital satisfaction achieved exceptionally high accuracy. The optimal XGBoost model explained 84% of the variance in marital satisfaction scores, demonstrating excellent predictive capability. Examination of feature importance values showed that partner support was the strongest predictor, contributing 32.7% of the total predictive power. Dyadic coping represented the second most influential predictor, accounting for 28.1% of the model's explanatory capacity. Together, these two relational variables contributed more than 60% of the overall predictive performance, highlighting the critical role of interpersonal resources in marital functioning. Job stress and emotional exhaustion also contributed meaningfully to prediction, accounting for 17.8% and 14.3% of model importance, respectively. Demographic variables such as duration of marriage and weekly working hours demonstrated comparatively smaller contributions. The model performance statistics indicated excellent predictive precision, with an R^2 value of 0.84 and low prediction error indices. These findings

suggest that marital satisfaction among employed married individuals can be predicted with considerable accuracy using a combination of occupational and relational variables, with supportive relationship processes exerting the strongest influence on marital outcomes.

Discussion and Conclusion

The present study sought to predict work–family conflict and marital satisfaction among married employees using machine learning algorithms based on job stress, emotional exhaustion, dyadic coping, and partner support. The findings demonstrated that all study variables were significantly associated with both work–family conflict and marital satisfaction. Specifically, job stress and emotional exhaustion exhibited strong positive relationships with work–family conflict and negative relationships with marital satisfaction, whereas dyadic coping and partner support were negatively associated with work–family conflict and positively associated with marital satisfaction. Furthermore, the machine learning analyses revealed that nonlinear ensemble models, particularly XGBoost, achieved superior predictive performance compared to conventional statistical approaches. The optimal model explained 81% of the variance in work–family conflict and 84% of the variance in marital satisfaction, indicating that occupational and relational variables collectively provide substantial predictive information regarding marital functioning among employed individuals.

One of the most important findings of the study was the strong predictive role of job stress in explaining work–family conflict. Feature importance analyses indicated that job stress emerged as the most influential predictor of work–family conflict, supporting theoretical perspectives that conceptualize work and family as interdependent domains in which strain experienced in one context spills over into another. Occupational stress depletes psychological resources, increases emotional strain, and reduces individuals' capacity to fulfill family obligations effectively. Consequently, employees experiencing elevated job stress may encounter greater difficulty balancing competing role demands, resulting in increased conflict between work and family responsibilities. This finding is consistent with previous studies demonstrating that external stressors and socioeconomic pressures significantly contribute to relationship strain and family dysfunction (Li et al., 2023; Turliuc & Candel, 2021). Similarly, financial strain and occupational burdens have been shown to undermine marital satisfaction and overall quality of life, particularly when stress accumulates over time without adequate coping resources (Novianti et al., 2024; Pereira et al., 2025). The present findings extend this literature by demonstrating that job stress not only correlates with work–family conflict but also serves as one of its strongest predictive determinants when analyzed within advanced machine learning frameworks.

The findings further revealed that emotional exhaustion represented another highly influential predictor of work–family conflict and marital satisfaction. Emotional exhaustion reflects a state of depleted emotional and psychological resources resulting from chronic stress exposure. Individuals experiencing emotional exhaustion often exhibit reduced emotional availability, diminished patience, and impaired capacity for constructive interpersonal interactions. These characteristics can contribute directly to relationship difficulties and increase vulnerability to work–family interference. The observed results align with previous evidence demonstrating that chronic stress adversely affects relationship functioning through emotional and psychological pathways (Carrese-Chacra et al., 2023; Mangialavori et al., 2021). Research conducted during the COVID-19 pandemic further illustrated how elevated stress levels can impair relational functioning and increase dissatisfaction unless couples possess effective coping mechanisms (Kurt & Sanberk, 2022; Sentieiro et al., 2025). Emotional exhaustion may therefore be conceptualized as a critical mechanism through which occupational demands influence family relationships, helping explain why employees facing persistent workplace pressures frequently report difficulties maintaining satisfying marital relationships.

Another noteworthy finding concerns the significant protective role of dyadic coping. The results demonstrated that dyadic coping was negatively associated with work–family conflict and positively associated with marital satisfaction. Moreover, dyadic coping emerged as one of the strongest predictors within the machine learning models, particularly for marital satisfaction. This finding supports the Systemic Transactional Model, which proposes that stress is not merely an individual phenomenon but a relational experience that can be managed collaboratively by couples. When partners engage in supportive communication, joint problem-solving, emotional responsiveness, and collaborative stress management, the negative effects of external stressors are substantially reduced. The present results are highly consistent with previous research showing that dyadic coping promotes relationship quality, marital adjustment, and psychological well-being across diverse populations and contexts (Ijaz et al., 2022; Indumathy & Kanth, 2021; Zhao et al., 2021). Dyadic coping has also been identified as a mediator linking communication patterns, attachment representations, and relationship satisfaction, suggesting that couples benefit when stress becomes a shared rather than individualized challenge (Relvas et al., 2023; Wendołowska et al., 2022).

The importance of dyadic coping observed in the current study is also consistent with findings from specialized populations facing significant life challenges. Previous investigations have demonstrated that dyadic coping enhances marital quality among couples confronting fertility-related stress, parenting challenges, chronic illness, and developmental disabilities (Pavon et al., 2024; Simon-Zámbori et al., 2025; Song et al., 2024). Positive dyadic coping has similarly been associated with relationship satisfaction among couples undergoing assisted reproductive treatments and those navigating major life transitions (Santamaría-Gutiez et al., 2025). Furthermore, studies examining religious coping, parenting practices, and family health have repeatedly identified dyadic coping as a central process through which couples maintain relational stability despite adversity (He et al., 2022; Junyan et al., 2023; Skinner et al., 2021). The current findings reinforce these conclusions and suggest that dyadic coping serves as a robust predictor of marital functioning even when considered alongside occupational stress and emotional exhaustion.

Perhaps the most striking result of the study was the dominant role of partner support in predicting marital satisfaction. According to the feature importance analysis, perceived partner support was the strongest predictor within the marital satisfaction model. This finding is theoretically meaningful because support from a spouse constitutes one of the most important relational resources available to married individuals. Perceived support contributes to feelings of security, belongingness, validation, and emotional connectedness, all of which strengthen relationship quality. When individuals perceive that their partner understands, values, and supports them during times of stress, they are more likely to experience satisfaction with the relationship and greater resilience in the face of challenges. These findings align closely with previous research demonstrating that partner support predicts marital satisfaction, relationship stability, and family well-being (He et al., 2022; Li et al., 2023; Xie et al., 2025). Longitudinal evidence suggests that supportive marital interactions create reciprocal cycles in which support strengthens satisfaction, which in turn promotes further supportive behavior (Li et al., 2023).

The central importance of partner support is further supported by studies examining communication quality, emotional intimacy, and positive relational experiences. Research has shown that constructive communication patterns, self-disclosure, positivity resonance, and shared emotional experiences contribute substantially to relationship satisfaction and long-term relational success (Ouellet-Courtois et al., 2022; Tan et al., 2023; Wells et al., 2022). The current findings suggest that partner support may function as a foundational relational resource that enhances these positive processes while simultaneously buffering the detrimental effects of stress. Consequently, couples characterized by strong supportive interactions appear better equipped to maintain relationship satisfaction despite occupational and family pressures.

An additional contribution of the present study lies in its application of machine learning methodologies to relationship research. Traditional regression-based approaches have generated valuable insights into marital functioning; however, they

often assume linear relationships among variables and may not adequately capture the complex interactions underlying relationship outcomes. The superior performance of XGBoost, Random Forest, and Artificial Neural Network models indicates that the relationships among job stress, emotional exhaustion, dyadic coping, partner support, work–family conflict, and marital satisfaction are likely nonlinear and multifaceted. These findings support the growing use of machine learning approaches in behavioral science, particularly when researchers seek to identify complex predictive patterns involving numerous interacting variables. By explaining over four-fifths of the variance in both outcome variables, the machine learning models demonstrated remarkable predictive accuracy and highlighted the practical value of integrating computational methods into family and relationship research.

The findings also provide support for resilience-oriented perspectives on marital functioning. Recent research has emphasized that successful relationships are characterized not by the absence of stress but by the capacity to adapt effectively when stress occurs (Surijah et al., 2025; Surijah et al., 2023). The current results indicate that dyadic coping and partner support serve as key resilience factors that help couples withstand occupational pressures and emotional strain. Similar conclusions have been reported in studies examining relationship quality during public health crises, chronic illness, socioeconomic hardship, and caregiving responsibilities (Carrese-Chacra et al., 2023; Sentieiro et al., 2025; Wiener et al., 2023). Thus, relationship resilience appears to emerge from the interaction of individual resources, relational strengths, and effective coping processes that enable couples to navigate adversity together.

The results should also be interpreted within the broader context of contemporary relationship science. Previous reviews have identified numerous determinants of marital satisfaction, including personality traits, attachment representations, childhood experiences, perfectionism, and relational adjustment processes (Chiș, 2022; Hamedani et al., 2024; Zamir, 2021). Although these variables were not directly examined in the present study, the strong predictive performance achieved by occupational and relational variables suggests that stress-related and interpersonal processes may represent particularly important determinants of marital outcomes among employed adults. Likewise, studies focusing on family health, dyadic adjustment, and relationship representations have emphasized the central role of interpersonal functioning in maintaining relationship quality (Despax et al., 2022; Jiménez-Picón et al., 2021). The present findings contribute to this growing body of literature by demonstrating that relational resources can substantially offset the negative effects of occupational stressors on marital functioning.

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design prevents causal inferences regarding the relationships among job stress, emotional exhaustion, dyadic coping, partner support, work–family conflict, and marital satisfaction. Second, all data were collected using self-report questionnaires, which may be influenced by social desirability, response bias, and common method variance. Third, the sample consisted exclusively of married employees residing in Tehran, which may limit the generalizability of the findings to other cultural, occupational, or geographical contexts. Fourth, although the machine learning models demonstrated high predictive accuracy, additional variables such as personality traits, attachment styles, mental health indicators, and organizational characteristics were not included in the analyses. Finally, the absence of longitudinal data prevented examination of how predictive relationships evolve over time.

Future studies should employ longitudinal and prospective designs to investigate causal pathways linking occupational stressors, relational processes, and marital outcomes. Researchers may also incorporate dyadic data from both partners to better capture reciprocal influences within relationships. Expanding predictive models to include psychological variables such as attachment, emotional regulation, resilience, personality traits, and mental health indicators may improve explanatory power and provide a more comprehensive understanding of marital functioning. Future investigations could additionally compare

different machine learning algorithms, utilize larger and more diverse samples, and examine cross-cultural differences in the predictors of work–family conflict and marital satisfaction. Exploring intervention-based applications of predictive analytics may further advance the practical utility of machine learning within relationship science.

The findings suggest that interventions designed to reduce work–family conflict and enhance marital satisfaction should focus simultaneously on occupational and relational domains. Organizations can contribute by implementing stress-management programs, promoting work–life balance initiatives, reducing excessive workloads, and providing employee support services. Couple-based interventions should emphasize the development of effective dyadic coping skills, collaborative problem-solving, emotional communication, and mutual support behaviors. Counselors and family therapists may benefit from incorporating stress-management and relationship-strengthening techniques into treatment programs for couples experiencing work-related pressures. Additionally, educational programs aimed at improving partner responsiveness, emotional support, and constructive communication may help couples build resilience and maintain marital satisfaction despite occupational challenges. By strengthening both individual and relational resources, practitioners can support healthier marriages and more effective adaptation to the demands of contemporary work and family life.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

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Authors' Contributions

All authors equally contributed to this study.

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.

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