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ORIGINAL PAPER

A Model into Relations Between Spousal Support, Financial Satisfaction, and Marital Satisfaction

H. Deniz Günaydın[1] · **Ihsan Erdem Kayral**[2]

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Abstract
We developed a novel model combining the partial least squares structural equation modeling (PLS-SEM) and Artificial Neural Network (ANN) to examine the relationships between demographic variables, spousal support, financial satisfaction, and marital satisfaction. The sample comprised 948 Turkish participants who completed the Spousal Support Scale, Financial Satisfaction Scale, and Kansas Marital Satisfaction Index. In the dimension of PLS-SEM, spousal support positively influenced financial satisfaction. In the below- and above-starvation-line groups, marital satisfaction was positively influenced by financial satisfaction and spousal support. The PLS-SEM and the ANN models were integrated, and the present PLS-SEM model was validated. SS and FS were two crucial aspects of a marriage that significantly determine overall marital satisfaction in the below- and above-starvation-line groups. The MLP analysis demonstrated the validity of the relationship model between marital satisfaction and demographics. Age in the group above the starvation line and the number of children in the group below the starvation line were significant variables for MS.

Keywords ANN · PLS-SEM · Spousal support · Financial satisfaction · Marital satisfaction

Introduction

Marital satisfaction (MS) is a comprehensive evaluation of a person's attitude towards their marriage, used to measure marital contentment and stability in all facets of the relationship (Tavakol et al., 2017). MS is a subjective evaluation of how partners perceive marriage (Keizer, 2014). According to Keizer, relationship satisfaction is a subjective experience and opinion rather than a measure of a relationship's quality. Extensive research in this field indicates that MS is associated with a variety of factors, including the duration of marriage, number of children, gender, age, religion, education, socioeconomic status, culture, spousal support (SS), depression, stress, and uncertainty (Rashidi Fakari et al., 2022; Sorokowski et al., 2017). According to research, age, gender, duration of marriage, number of children, and dual-income status are significantly correlated with MS (Jackson et al., 2014; Wendorf et al., 2011). Furthermore, it may be stated that MS is an important variable associated with notions such as SS (Yedirir & Hamarta, 2015), FS (Boyle, 2012), marriage length (Bulgan et al., 2018), number of children (Sorokowski et al., 2017), gender (Jackson et al., 2017), age (Sorokowski et al., 2017), the presence of dual earners (Minnotte et al., 2013) as well as to fields such as couple relations, interpersonal relationships, and health. It is crucial to research MS using a variety of variables, such as spousal support (SS) and financial satisfaction (FS), as few studies have focused on the factors impacting marital pleasure in different circumstances. The current study aims to identify factors that may influence marital satisfaction in various contexts, considering the participants' starvation status.

Poverty is defined by the United Nations (UN) as the inability to meet basic requirements such as sanitation, education, nutrition, and clean water (UN, 2022). In Turkey, however, the starvation line is determined by the ability of people to meet their basic food and beverage requirements. It is stated that a family with two children must reach a certain minimum income level to meet their basic food

✉ H. Deniz Günaydın
dgunaydin@gmail.com

Ihsan Erdem Kayral
ihsanerdem.kayral@ostimteknik.edu.tr;
erdemkayral@yahoo.com

[1] Department of Psychology, Konya Food and Agriculture University, Konya, Turkey

[2] Department of International Trade and Finance, Ostim Technical University, Ankara, Turkey

requirements. Disk-Ar (The Research Centre of Confederation of Progressive Trade Unions of Turkey) and Türk-iş (Confederation of Turkish Trade Unions) reported in April 2022 that the family starvation line was set at 4750 TL and 5323.64 TL, respectively (Disk-Ar, 2022; Türk-İş, 2022). To prevent bias, we use the average of these household predictions (5036.50 TL). In our sample, there are a variety of families. They range from families with no children to those with six, meaning that our study's households range from two to eight people. Therefore, we calculated the family's income per person. In comparative cross-national research statements, it is widely acknowledged that the concept of the poverty line is more prevalent than the starvation line. Given Turkey's unique context, however, the starvation line concept would more effectively elucidate the relationship between the MS and SS, FS, and demographics. In Turkey, the minimum wage is determined by several significant parameters, the starvation line being one of the most significant. The so-called "minimum wage" appears to be intended to reflect the cost of subsistence and is widespread among salaried employees across the nation. However, it is essential to note that the "poverty line" refers to a distinct and separate concept. As an illustration, it is noteworthy that a threshold value of 4000 TL may define the starvation line. In contrast, the poverty threshold may exceed 10,000 Turkish Lira.

The report assembled by the Consumer Rights Association has revealed that a distressing segment of the Turkish population, estimated to exceed 25.5 million individuals, comprising approximately 30% of the entire populace, was presently situated below the starvation line, as manifested by their incapacity to fulfill the fundamental requirements of sustenance (THD, 2022). Therefore, it has been evaluated that addressing individuals who exhibit this characteristic separately in our sample can provide significant contributions in practice.

This study will constitute the first study to investigate the relationship between spousal support, financial satisfaction, various demographic variables, and marital satisfaction by dividing the participants' data into two groups: those above and below the starvation line. According to studies, the ability to satisfy basic needs significantly impacts marital satisfaction. Maslow (Arlow, 1955) suggests everyone seeks to satisfy various requirements. Food comes first on the list of basic requirements, then other psychological requirements. According to Maslow's theories, people should fulfill their basic needs (Levinger, 1966). Therefore, to experience marital satisfaction, individuals must satisfy their fundamental needs, including their hunger. We hypothesize that spousal support, financial satisfaction, and other demographical characteristics will affect marital satisfaction, varying depending on whether a couple lives above or below the starvation line.

The level of support provided by one's spouse is a crucial factor in marital fulfillment; the larger the level of support provided by one's spouse, the greater the level of harmony and happiness there is in the marital relationship. There is a favourable correlation between being content with one's financial situation and having a healthy marriage (Broman, 1993). There is a correlation between contentment with the family's financial status and an enhanced level of marital well-being. It is reasonable to draw the conclusion that spousal support and financial contentment have an impact on the satisfaction level of marriage. Increased spousal support and contentment with how the family finance contribute to increased marital well-being (Broman, 1993).

Objectives

This study examines factors contributing to MS by focusing on the SS, FS, and demographic variables of married individuals in Turkey via online surveys. Specifically, the study aims to (i) examine the association between SS, FS, and MS in the below- and above-starvation line groups (ii) investigate how demographic information (age, gender, dual-earner, education, marriage length, and the number of children) is related to MS, (iii) examine the link between demographic information and MS in the groups below and above the starvation line. In response to current study limitations, this study examines the relationship between various forms of spousal support, FS, and MS. In this study, SS is expected to have a statistically significant impact on MS with the mediation of FS, and SS has a positive effect on FS (Fig. 1). We expect SS to be the most significant predictor of MS. The second stage of our analysis indicates the significance of independent variables concerning MS (Fig. 2).

The impact of several demographic factors, such as age, gender, the presence of two income earners in a household, level of education, the length of a marriage, and the number of children, might shift depending on other variables. On the other hand, it is generally accepted that these factors do have some influence on MS (Fig. 3). The third phase of our analysis demonstrates the significance of each demographic variable concerning MS. Based on the literature and our research objectives, the following hypotheses can be formulated:

(1) SS will affect MS positively in the above-starvation-line group.
(2) SS will affect MS positively in the below-starvation-line group.
(3) SS will affect FS positively in the above-starvation-line group.
(4) SS will affect FS positively in the below-starvation-line group.

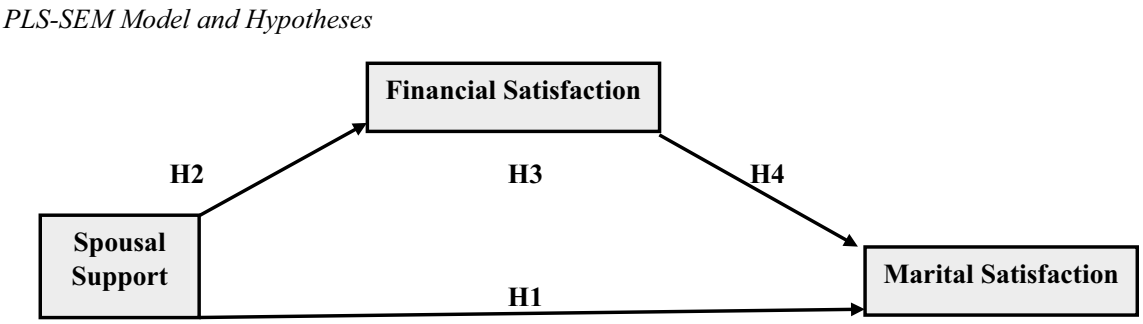

Fig. 1 PLS-SEM model and hypotheses

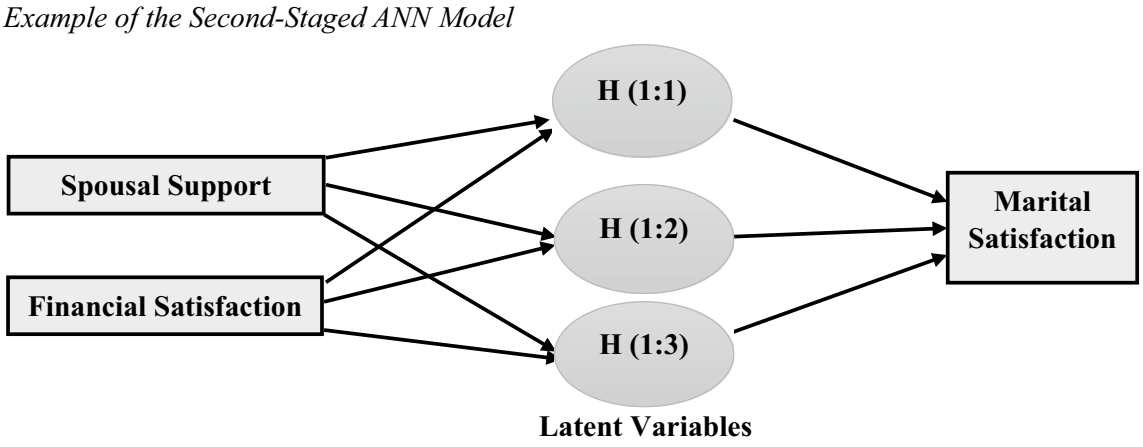

Fig. 2 Example of the second-staged ANN model

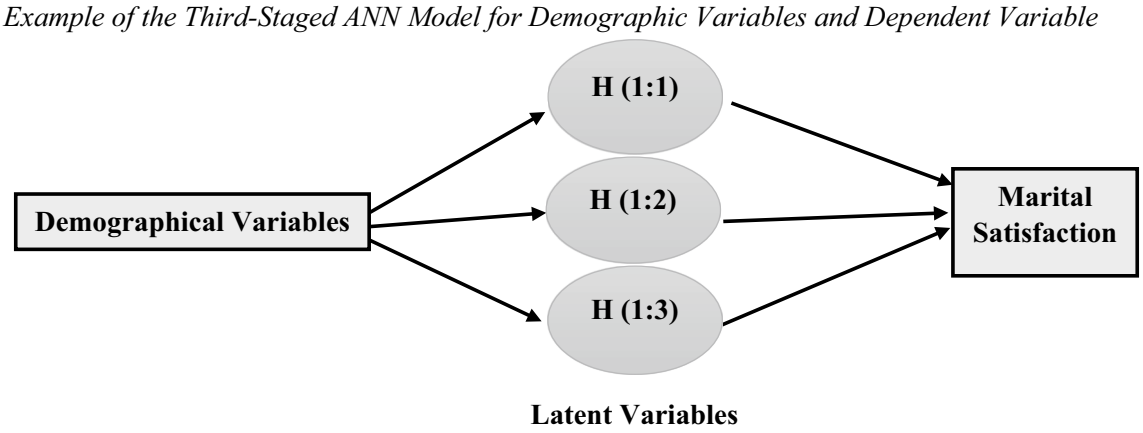

Fig. 3 Example of the third-staged ANN Model for demographic variables and dependent variable

(5) FS will affect MS positively in the above-starvation-line group.
(6) FS will affect MS positively in the below-starvation-line group.
(7) FS will determine SS and MS in the above-starvation-line group.
(8) FS will determine SS and MS in the below-starvation-line group.

(9) Demographics (age, gender, dual earner, education, marriage length, and the number of children) will predict MS.
(10) Demographics (age, gender, dual earner, education, marriage length, and the number of children) will predict MS in the above-starvation-line group.
(11) Demographics (age, gender, dual earner, education, marriage length, and the number of children) will predict MS in the below-starvation-line group.

Spousal Support (SS) and Marital Satisfaction (MS)

It is commonly held that SS affects the marital relationship. So far, studies have found a significant and positive relationship between SS and MS. Spousal support is one of the most significant aspects of intimate relationships, and it is thought to play a major role in marital relationships (Cunningham & Barbee, 2000). According to recent findings, spouse emotional support is the most significant predictor of MS. It was found that SS affected MS in a significantly positive way (Işık & Kaya, 2022). Other research found that SS was a significant predictor of marital satisfaction and closeness (Çağ & Yıldırım, 2018). Receiving spousal support has been shown to enhance the marriage and potentially improve the partners' psychological, emotional, and physical health (Sarason et al., 1997). Despite the academic focus on SS, only a few studies have explicitly studied the relationship between SS and marital happiness. As a result, this research aims to investigate whether SS is significantly connected with marital happiness. It would, thus, be interesting to see if this finding can be replicated in Turkish culture concerning FS. We believe SS will predict FS and MS positively in the groups above and below the starvation line.

Financial Satisfaction (FS)

Financial activities and how effectively family income is managed are shown to be strongly linked with marital happiness in general (Archuleta et al., 2011). While FS is positively associated with marriage satisfaction, financial stresses are adversely related to MS (Archuleta et al., 2011). Furthermore, Britt et al. (2008) discovered a positive association between financial contentment and relationship satisfaction, whereas Grable et al. (2007) discovered a correlation between FS and marital dissatisfaction. In other words, when couples had higher levels of financial happiness and less financial pressure, they were more content with their marriage (Boyle, 2012). The research presents evidence concentrating on family finance, implying that satisfaction with one's financial status boosts marital satisfaction (Copur & Eker, 2014). Therefore, financial habits, such as budgeting, saving, and investing, are strongly associated with financial satisfaction, and these good financial behaviors contribute to a couple's relationship satisfaction (Skogrand et al., 2011). However, very little empirical research has been conducted on the effect of FS in determining MS. New studies are needed to elucidate the association between these variables. Consequently, we assumed that FS would be a significant positive predictor of MS. We believe FS will affect SS and MS in above and below the starvation line groups.

Demographics

Age was identified as a common factor in MS literature and the most significant predictor of MS. The findings indicate a strong relationship between age and marriage satisfaction (Amirnovin & Ghaffarian, 2018). Other findings revealed no statistically significant link between MS and age (Alder, 2010; Moghadam et al., 2015). Numerous factors, such as education, length of the marriage, and economic status, significantly associated with MS are also correlated with age (Dabone, 2014). Nevertheless, there is an inconsistent relationship between age and MS. The research provides no unambiguous predictions regarding age-related patterns. Consequently, it is impossible to draw definitive conclusions about age-related tendencies of outcomes from the current corpus of research. More research has to be done on age as a possible indicator of MS. Thus, we hypothesize that age will significantly predict MS in both groups above and below the starvation line.

The findings demonstrated statistically significant gender differences between wives and husbands regarding marital satisfaction. They indicated that wives were slightly less satisfied than husbands (Jackson et al., 2017), which seems to provide evidence consistent with the gender theory, that males have a larger effect than females on the marriage relationship (Wilkie et al., 1998). Others, however, observed no differences in MS levels between male and female partners (Broman, 2005). These results indicate that research on gender differences in marital satisfaction is inconsistent. We suggest that gender will be a crucial predictor of MS in groups above and below the starvation line.

Dual earners are more likely to be stressed at work and dissatisfied in their relationships. According to empirical research (Majhi & Panda, 2015), families with dual incomes are more likely to experience role excess and increased work and family-related stresses, negatively impacting the way families function. When there are two earners, males frequently show more job stress and worse MS symptoms than wives. Therefore, it is important to take into account the challenges faced by couples with two incomes due to factors such as job stress and marital discontent (Putri & Kinanthi, 2017). It is widely acknowledged that husbands and wives who contribute financially to the household report lower levels of marital satisfaction, possibly because dual-income couples are more likely to experience marital conflicts (Putri

& Kinanthi, 2017). Jacobs and Gerson (2001) also found that two-income couples were concerned with maintaining a healthy work-family balance. Other studies (Mohsin, 2014) show that two incomes assist the couple in satisfying their fundamental needs, affording a higher level of living, and enjoying a variety of satisfaction and necessity. Therefore, it can be argued that having two incomes will likely make any married couple happier (Majhi & Panda, 2015). This study also aims to determine how MS is viewed in dual-earner marriages. Therefore, the fact that a couple has two incomes might affect how satisfied they are in their marriage. We suggest that being a dual-earner couple will be an important indicator of MS in both groups above and below the starvation line.

An individual's level of education has the potential to influence their lives positively and helpfully. Due to their education and academic understanding, those with a higher level of education may have more significant comprehension and awareness than others, preventing them from engaging in inappropriate behavior. Additionally, a person's educational background may affect their position and role in the community. Consequently, Hosseini et al. (2017) suggest that degree of education may significantly influence marital satisfaction. The results of the studies indicate that those with higher levels of education reported increased marital satisfaction. For example, Madanian and Mansor (2013) indicated that education significantly predicted MS. Other research (Ahangar et al., 2016) revealed that individuals with a lower level of education reported decreased marital satisfaction. There appears to be a correlation between education level and marital satisfaction, which suggests that education is a significant factor in MS. In contrast, other researchers (Alder, 2010; Hosseini et al., 2017) examined the relationship between educational level and marital satisfaction and found no significant correlation between the two variables. As a result, it is hard to conclude the current research on the relationship between marital satisfaction and educational level because it is frequently founded solely on data from countries other than Turkey. This raises the topic of whether or not a comparable relationship exists in Turkish culture. It was determined that a new study was required to clarify the relationship between these two variables. Our findings suggest that education will play a significant role in predicting MS in both groups above and below the starvation line.

The length of a marriage is crucial to determining relationship satisfaction. It is anticipated that couples who have been married for extended periods will experience greater satisfaction and support in their relationships than those who have been married for a shorter period (Umeaku et al., 2022). According to Orathinkal and Vansteenwegen (2006), elderly couples and those who have been married for more than ten years typically endure an adaptation period that results in fewer psychological problems. However, Shakir et al. (2021) found no statistically significant relationship between marriage length and relationship satisfaction, while Naderi and Nory (2017) found a negative relationship. Consequently, new research is required to elucidate the associations between these variables in light of these contradictory findings. The relationship between the duration of a marriage and marital satisfaction has yet to be adequately studied in Turkish samples, similar to the other variables in this study. Consequently, the current research will also investigate how the length of marriage influences marital satisfaction. Consequently, the duration of the marriage will be an important factor for predicting MS in both groups above and below the starvation line.

MS research supports the idea that the relationship between spouses will be hardened as the number of children rises (Kowal et al., 2021). According to the social exchange theory, which is based on the interdependence theory of Thibaut and Kelly, individuals join a relationship when the cost-to-benefit ratio is favorable (Nakonezny & Denton, 2008). With age, parents devote more time and resources to their children. As children age, their parents often dedicate more time and resources to them. Although this effect was not noticeable among Turkish women, having children predicted lower marital happiness across cultures (Wendorf, 2011). A new study is needed to determine the association between the number of children and MS in Turkish culture. Given this information, we assume the number of children will be important in predicting MS across income levels. Within this framework, the following research questions will be investigated as part of this study:

1. What are the associations between SS, FS, and MS?
2. How is demographic information related to MS?
3. How do the associations between demographic information, SS, FS, and MS differ between those above and below the starvation line?

Method

Research Framework

This study aims to construct a three-staged model that combines the PLS-SEM and ANN models to investigate the relationships between FS, SS, and MS and to compare the significance of independent and demographic variables with the dependent variable. Figure 4 shows the research framework of these three stages.

Sampling and Data

Survey Monkey was used as the instrument for carrying out the process of data collection. The online survey was

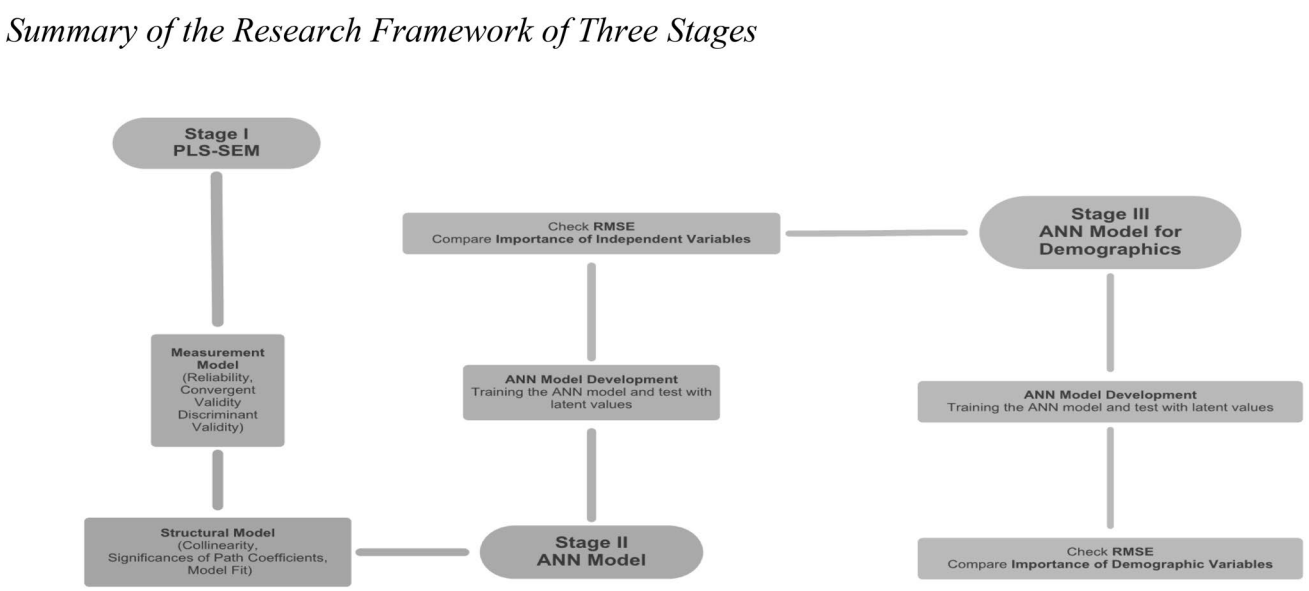

Fig. 4 Summary of the research framework of three stages

administered in a randomized manner over the course of two months, from March until May of 2022. At the outset of the survey, respondents were asked about their marital status, and those who were unmarried were excluded. The study received responses from 951 married people, 948 of which were deemed to be valid, which represented a response rate of 99.68%. It was revealed that 844 respondents (89.03%) lived above the starvation line, whereas 108 respondents (10.97%) lived below it.

Table 1 shows the descriptives of the demographic variables. According to Table 1, the proportion of females (66.6% of the above-starvation-line group, 86.5% of the below-starvation-line group) is larger than that of males for the two income groups.

The age group of 30 to 39 is the biggest across both income groups (37.2% for those above the starvation line, 48.1% for those below the starvation line). This age group was followed by the 40- to 49-year-olds in both income groups. However, the most prominent third age group changed according to the income groups. The 50 to 59 ranked third with a share of 19.3% above the starvation line, while groups 20 to 29 ranked third with almost the same share (19.2%) below the starvation line. University graduation proportion (the sum of an associate degree, undergraduate school, and graduate school) was 83.2% in the higher-income group, in line with our expectations. However, the lower income group's share of high school and lower education levels reached 86.5%. For both income groups, a marriage length between 1 and 29 years constituted more than 85% of respondents. Dual-earner couples had 62.7% above the starvation line. This diminished to 7.7% below the starvation line group. The families with two children ranked first for both income groups. The second was one child for those above the starvation line and three children for those below the starvation line. Table 2 shows the descriptives of dependent and independent variables.

According to Table 2, SS, FS, and MS have a higher average in the group above the starvation line than the lower-income group. Also a lower standard deviation for all variables in the group above the starvation line was observed. The skewness results indicate that all variables (except FS in the below-starvation line) are right-skewed. It further indicates that variables' distributions do not have excessive kurtosis.

Variables

SS was the independent variable for PLS-SEM and the second-staged ANN analysis. FS was the PLS-SEM analysis's mediator variable and the second-staged ANN's independent variable. In contrast, demographic variables (age, gender, dual earners, education, marriage length, and the number of children) were independent variables for the third-staged ANN. MS was the dependent variable in all stages of our analysis.

Measures

Survey for Variables

Spousal Support Yıldırım (2004) created the Spousal Support Scale (SSS) to measure the amount of perceived SS. The SSS is made up of 27 items that are rated on a 3-point Likert scale ("1 = Does not describe me at all" to

Table 1 Descriptive analysis for demographic variables

		Above Starvation Line		Below Starvation Line	
		n	%	n	%
Gender	Female	562	66.6	90	86.5
	Male	282	33.4	14	16.5
Age	20 to 29	88	10.4	20	19.2
	30 to 39	314	37.2	50	48.1
	40 to 49	236	28.0	23	22.1
	50 to 59	163	19.3	8	7.7
	60+	43	5.1	3	2.9
Education	Literate	-	-	1	1.0
	Primary School	26	3.1	31	29.8
	Middle School	20	2.4	35	33.7
	High School Ass	96	11.4	23	22.1
	Associate Degree	98	11.6	7	6.7
	Undergraduate School	405	48.0	6	5.8
	Graduate School	199	23.6	1	1.0
Dual-Earner Couples	Dual-Earner	529	62.7	8	7.7
	Only Man	293	34.7	88	84.6
	Only Woman	22	2.6	8	7.7
Marriage Length	< 1 year	11	1.3	-	-
	1 to 9	263	31.2	22	21.2
	10 to 19	280	33.2	57	54.8
	20 to 29	187	22.2	13	12.5
	30 to 39	88	10.4	8	7.7
	40+	15	1.8	4	3.8
Number of Children	0	99	11.7	-	-
	1	221	26.2	5	4.8
	2	370	43.8	41	39.4
	3	123	14.6	40	38.5
	4+	31	3.7	18	17.3

"3 = Describes me well"). The SSS is divided into four subscales: emotional support, instrumental and informational support, appraisal support, and social support. The score spans 27 to 81, with higher values indicating greater perceived SS. The SSS had a Cronbach's Alpha of 0.95 in the original study.

Financial Satisfaction Financial satisfaction was measured using a 10-point scale that Prawitz et al. (2006) employed. The question asks respondents to circle the number that best indicates how pleased they are with their current financial condition on a scale of 1–10, with scores of 1 being extremely unsatisfied and ten being extremely satisfied.

The Kansas Marital Satisfaction Index (KMSS; Nichols et al., 1983). The KMSS is a three-item scale. It assesses the conceptual distinctions suggested by Spainer and Cole between SS, MS, and marital relationship satisfaction (1976). In the KMSS, each item is assigned a value ranging from 1 (extremely unsatisfied) to 7 (extremely satisfied). The overall score ranges between 3 and 21, with higher values indicating greater perceived MS. Işık and Akün conducted reliability and validity studies on the Turkish version of the scale (2021). The internal consistency coefficient of the Turkish version of the KMSS was discovered to be = 99 because of the investigations conducted.

First-Stage Analysis: PLS-SEM This study uses a quantitative methodology based on confirmatory factor analysis in the first stage and uses a cross-sectional research design. This methodology is called Partial Least Squares Structural Equation Modelling (PLS-SEM). Partial Least Squares (PLS) is a component-based structural equation modeling approach to examine the relationships among dependent, independent, and mediator variables. This technique is commonly used in social sciences research (Hair et al., 2014; Iqbal et al.,

Table 2 Descriptive statistics for dependent/independent variables

Variables	Descriptives	Above Starvation Line	Below Starvation Line
MS	Mean	16.9	16.3
	Maximum	21	21
	Minimum	3	3
	Std. Dev	4.5	4.9
	Skewness	− 1.42	− 1.26
	Kurtosis	1.34	0.91
SS	Mean	67.0	62.4
	Maximum	81	81
	Minimum	29	32
	Std. Dev	13.2	13.9
	Skewness	− 1.05	− 0.46
	Kurtosis	0.12	− 0.81
FS	Mean	6.9	4.7
	Maximum	10	10
	Minimum	1	1
	Std. Dev	2.6	3.1
	Skewness	− 0.59	0.48
	Kurtosis	− 0.40	− 0.96

SS: Spousal Support; FS: Financial Satisfaction; MS: Marital Satisfaction

2018). PLS-SEM has two dimensions. These are measurement model (reliability and validity analyses) and structural model (path) analysis, respectively (Ringle et al., 2018). In the context of the measurement model, we check composite reliability and convergent and discriminant validities using different indices in the literature.

Two indices are commonly used for reliability analysis. These are Cronbach's Alpha coefficient and Composite Reliability (CR). They should be greater than 0.7 (Hair et al., 2019). We used Average Variance Extracted (AVE) and Heteroit-Monoroit Ratio (HTMT) to constitute convergent and discriminant validities. AVE has to exceed 0.5, whereas HTMT should be less than 0.85 (Hair et al., 2019). After checking the reliability and validity, the structural model analysis can be applied. The structural model is implemented to obtain path coefficients and test the significance of these coefficients through the use of the bootstrapping technique. We apply the PLS-SEM model to determine the relationships between SS, FS, and MS for the above- and below-starvation-line groups and the indirect relationship (proxy FS) between SS and MS for the same groups by using the SmartPLS 3.0 software package. We use the mediation analysis (Preacher & Hayes, 2008) to check the indirect relationship between SS and MS.

Second and Third Stages Analysis: ANN Model

We use the Artificial Neural Network (ANN) model in the second and third stages. The ANN model is a vigorous method utilizing artificial intelligence (AI) and imitating the brain's functions. This model has several advantages compared to traditional statistical models like multivariate regression, which only evaluates linear relationships between variables. However, the ANN model examines linear and non-linear interactions using deep learning facilities without restrictions and econometric assumptions (Liébana–Cabanillas et al., 2017a, 2017b). ANN can be counted as a machine learning methodology to diminish prediction errors using a feed-forward-back-propagation (FFBP) algorithm. The ANN model has three layers: input, hidden, and output. It usually uses activation functions to connect different layers. The activation function generally uses a sigmoid or hyperbolic tangent function (Leong et al., 2020). The ANN model uses the unknown inner workings—a black box. It investigates the latent relationships in the data through training and shows the learning outcome through testing (Liébana-Cabanillas et al., 2017a, 2017b; Sharma et al., 2021).

In our research, we used the non-linear ANN model (Multilayer Perception, MLP) for the second and third stages using IBM SPSS-25 software. In the second stage, we tried to determine the significance of SS and FS in MS for the groups above and below the starvation line. We combine the PLS-SEM and the ANN model to determine the relationships between independent variables (SS and FS) and dependent variables (MS). We examined the robustness of PLS-SEM model results for each income group. In the third stage, we deployed the ANN model to reveal the significance of demographic variables in MS for different income groups. This hybrid model is usually used in business models and the engineering field. However, this is an innovative application for the multidiscipline study of psychology and finance.

Results

First-Stage Results

The measurement models check the reliability and validity in the first dimension of PLS-SEM. Cronbach's Alpha values of each construct were above 0.7 (0.96 for the above-starvation-line model, 0.95 for the below-starvation-line model), and construct reliability (CR) was above 0.7 (0.96 for the above-starvation-line model, 0.95 for the below-starvation-line model), indicating high internal consistency. AVE was above 0.5 (0.88 for the above-starvation-line model, 0.87 for the below-starvation-line model), displaying that all factors perform the convergence value. The reliability analysis results show that all factors provide reliability when measuring the

observed variables, which can be retained. The study estimates that the HTMT values proposed by Henseler et al. (2015) to procure the discriminant validity are accurate. The results show that the HTMT was calculated as lower than 0.85 (from 0.17 to 0.85 for the above-starvation-line model and from 0.33 to 0.84 for the below-starvation-line model), which shows that they measure different things. Consequently, the current investigation ensured that all measurement model requirements were satisfied and validated the measures' reliability, convergent validity, and discriminant validity.

In the second dimension of PLS-SEM, the structural models were applied above and below the starvation line when the conditions of the measurement models were met. PLS bootstrapping with 5000 samples was applied to evaluate the statistical significance of the models. Table 3 shows the results of the PLS-SEM analysis. These results also support the proposed research objectives and hypotheses.

H1 examines whether SS positively affects MS for each income (above and below the starvation line) group. H1a and H1b were significant at 1% with 0.84 and 0.81 beta coefficients, respectively. H2 investigates that SS has a positive impact on FS. Our results showed that two hypotheses (H2a and H2b) were significant at 1%, as well. Regarding H3, FS positively affects MS for each income group. Two hypotheses were also significant at 5%, with $\beta = 0.06$ above the starvation line and $\beta = 0.11$ below the starvation line. It was found that SS was a more critical variable than FS in explaining MS, as per our expectations. Finally, H4 stated that FS separately mediated SS and MS for two income groups. H4a was statistically significant at 5% with a 0.01 beta coefficient, and H4b at 10% with a 0.04 beta coefficient.

SRMR is a criterion to evaluate the model fit. The model fits well if SRMR does not exceed 0.08 (Leong et al., 2019). Both models had a lower value than 0.08 (0.01 for above the starvation line, 0.02 for below the starvation line).

Therefore, our analysis concludes that all coefficients are positive and significant for all income groups and relevant, as presented in Fig. 5, for intuitively testing research hypotheses 1–4. This shows that spousal support has a significant positive impact on FS and MS in both groups, directly and indirectly, through FS on MS.

Table 3 PLS-SEM results (Structural Model Path Coefficient)

Above starvation line		β	*S.E*
H1a	SS → MS	.84***	.02
H2a	SS → FS	.17***	.04
H3a	FS → MS	.06**	.02
H4aa (Mediation Effect)	SS → FS → MS	.01**	.01
		Saturated model	Estimated model
	SRMR	.01	.01
Below Starvation Line			
H1b	SS → MS	.81***	.04
H2b	SS → FS	.33***	.08
H3b	FS → MS	.12**	.05
H4ba (Mediation Effect)	SS → FS → MS	.04*	.02
		Saturated model	Estimated model
	SRMR	.02	.02

VIF scores change between 1 and 6. VIF score < 10 means no multicollinearity problem for variables (O'Brien, 2007)

S.E. Standard error; *SRMR* Standardized Root Mean Square Residual

a: Bootstrapping (n = 5000)

*,**,*** significance at 10%, 5%, and 1% respectively (two-tailed *t*-test)

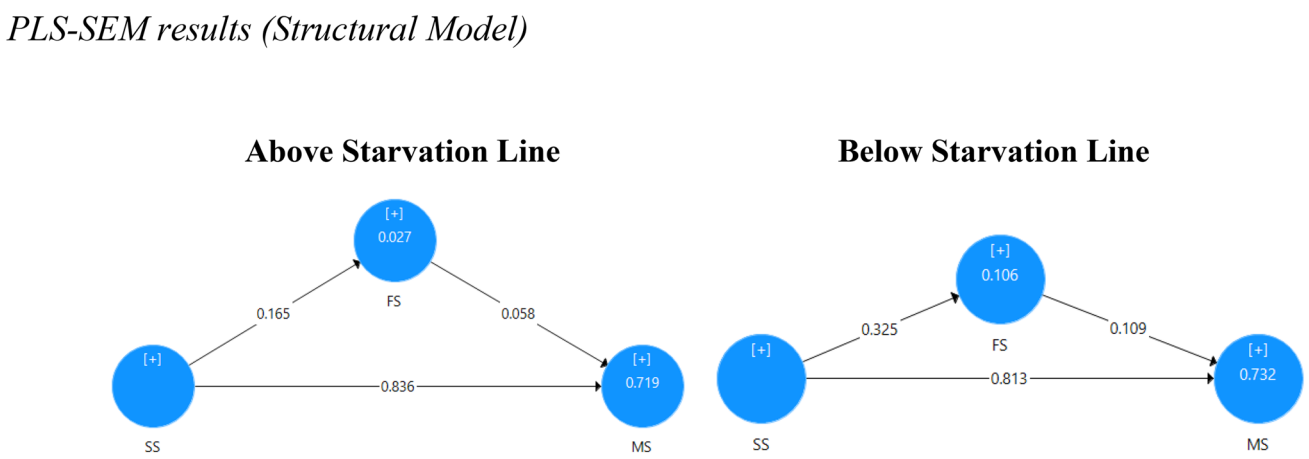

Fig. 5 PLS-SEM results (Structural Model)

However, regarding the above-starvation group, SS had a more significant and positive impact on MS than the below-starvation group. FS had a significant and positive impact on MS in both groups, but in the below-starvation group, the impact of FS on MS was bigger.

Second-Stage Results

The two-step PLS-SEM and Multilayer Perception (MLP) ANN (a non-linear ANN method) procured more in-depth results regarding the relative significance of the input factors (Sohaib et al., 2019). In the second stage, the (MLP) ANN model was applied to check the significance of SS and FS in MS for the two income groups. Thus, PLS-SEM and the ANN model were combined, and we examined the robustness of the PLS-SEM model.

This research used a commonly applied FFBP algorithm to train the ANN model with a sigmoid or hyperbolic hidden layer activation function. Figure 6 shows an example of this application.

A ten-fold cross-validation technique was implemented to avoid overfitting neural network models (Liébana–Cabanillas et al., 2017a, 2017b). Cross-validation was used in training and testing data in the 70% to 30% ratio. The root means square of error (RMSE) was also used to improve ANN model accuracy (Sharma & Sharma, 2019). According to the data set interval, RMSE values can change between 0 and ∞. However, lower RMSE shows a better fit for any model.

The MLP models reported 2.64 and 2.77 average RMSE for training and 2.28 and 1.92 mean RMSE for testing in both income groups, from higher to lower, respectively. MS scores ranged from 3 to 21. Thus, the standard deviation of 0.02 and 0.08 for training and 0.04 and 0.14 for testing data under RMSE values showed that the models had high precision with non-linear ANN models. (See Appendix A. It shows the results for each income group.)

The main findings of the MLP models can be obtained from a sensitivity analysis (Liebana-Cabanillas et al., 2017). This model determines the variations in the dependent variable by changes in the associated independent variables. Table 4 shows the sensitivity analysis results for those above and below the starvation line.

According to Table 4, SS is the most influential independent variable with an average normalized importance ratio of 93.53% and 91.72% on MS for above and below the starvation line, respectively. However, FS follows SS for both income groups with an average normalized importance ratio of 6.47% and 8.28% on MS. FS is a more effective variable for the lower-income group than the higher one. Table 5 summarizes a robustness check and comparison between PLS-SEM and MLP model results for both income groups.

Example of the Non-linear ANN Model (Second Stage)

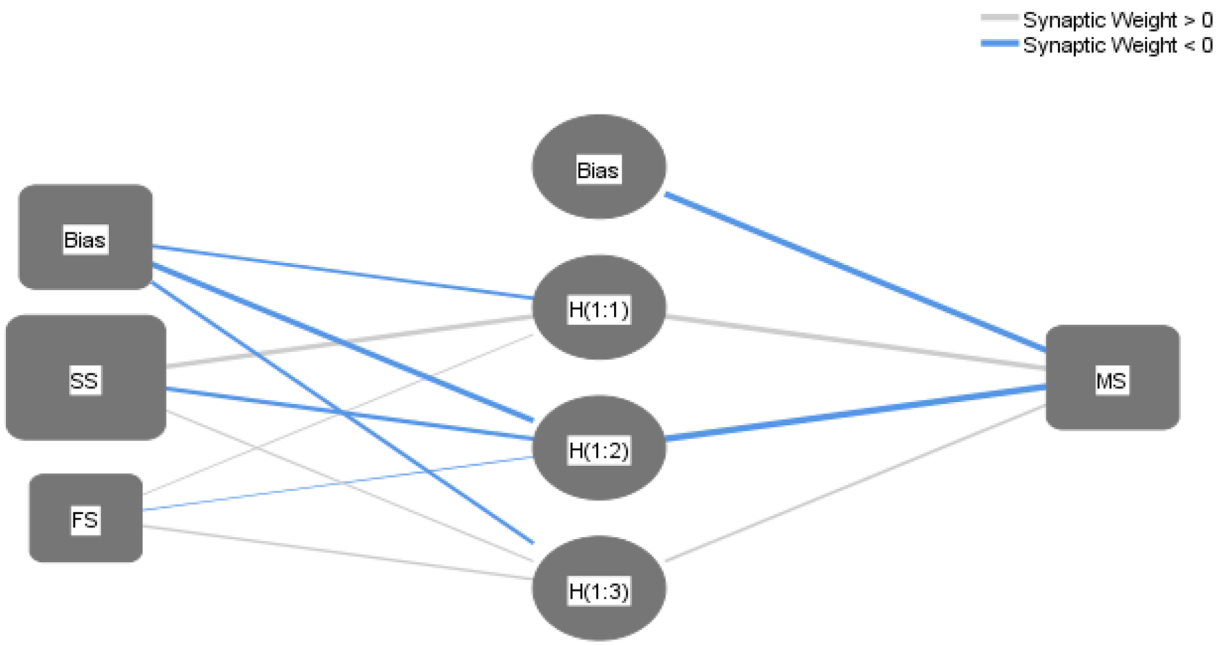

Fig. 6 Example of the non-linear ANN Model (Second Stage)

Table 4 A second-stage sensitivity analysis: importance of independent variables in MS at MLP models

Above Starvation Line			Below Starvation Line	
ANN	SS	FS	SS	FS
ANN (1)	.93	.07	.95	.05
ANN (2)	.95	.05	.92	.08
ANN (3)	.96	.04	.90	.10
ANN (4)	.94	.06	.93	.07
ANN (5)	.94	.06	.92	.08
ANN (6)	.92	.09	.90	.10
ANN (7)	.95	.05	.89	.11
ANN (8)	.94	.06	.93	.07
ANN (9)	.94	.06	.89	.11
ANN (10)	.90	.10	.94	.06
Average Importance	.94	.07	.92	.08
Normalized Importance	93.53%	6.47%	91.72%	8.28%

Dependent Variable (output) = MS; Independent Variables (inputs) = SS and FS

Table 5 compares the results of MLP models (for all income groups) and the PLS-SEM based on the strength of path coefficients (PLS-SEM) and normalized importance ranking. SS ranks first, and FS follows it for both models and income groups. These findings show that PLS-SEM and MLP can be applied together, and the second stage enhances the robustness of our models.

Third-Stage Results

In the third stage, we applied the MLP models to reveal the relative importance of demographics on MS for both income groups. The third stage also used the FFBP algorithm with a sigmoid or hyperbolic hidden layer activation function to train the ANN model. Figure 7 shows an example of this application.

It also used a ten-fold cross-validation technique with RMSE to abstain from overfitting all neural network models, such as the second stage (Liebana-Cabanillas et al., 2017). According to MLP models for MS models with demographics, RMSE ranges from 4.62 and 4.82 for training and 3.36 and 3.83 for testing the two income groups (see Appendix B). Hence, the models were reliable for analyzing the relationships between demographics (predictors), and the ANN models demonstrate a good model fit.

Table 6 shows the results of the sensitivity analysis findings for MS in each income group. According to Table 6, the age category is the most influential independent variable, with an average normalized importance ratio of 17.64% for predicting MS above the starvation line. Dual-earner couples, the number of children, marriage length, education, gender, and income group follow this. These variables' importance ratios range from 12.64% to 16.54% (less than a 4% interval).

However, the normalized importance ratios from the highest to the lowest are ranked as the number of children (27.17%), marriage length (18.94%), dual-earner couples (13.52%), education (12.52%), age category (12.33%), and gender (4.18%) for those below the starvation line.

Discussion

The current study aimed to discover variables influencing marital satisfaction in various contexts, considering whether their income is above or below starvation. This study investigated the associations between MS and the SS, FS, and demographic characteristics of married people in Turkey. The overall goal of this work was to create a unique three-staged model that combines the PLS-SEM and ANN models to evaluate the correlations between FS, SS, and MS and compare the weights of independent and demographic factors at the dependent variable.

In the dimension of PLS-SEM, structural models were applied above and below the starvation line after satisfying the requirements of measurement models, which assessed whether SS and FS positively affected MS for participants above and below the starvation line. SS, FS, and MS had a greater average for the group above the starvation line than the group below the starvation line. For each group, SS had

Table 5 Comparison between PLS-SEM and MLP (ANN) Analysis

Predictor	PLS-SEM Path	PLS-SEM Ranking	ANN Importance	ANN Ranking
Above Starvation Line				
SS	.84	1	93.53%	1
FS	.06	2	6.47%	2
Below Starvation Line				
SS	.81	1	91.72%	1
FS	.11	2	8.28%	2

Note. Dependent Variable = MS

Example Figure of the Non-linear ANN Model (Third Stage)

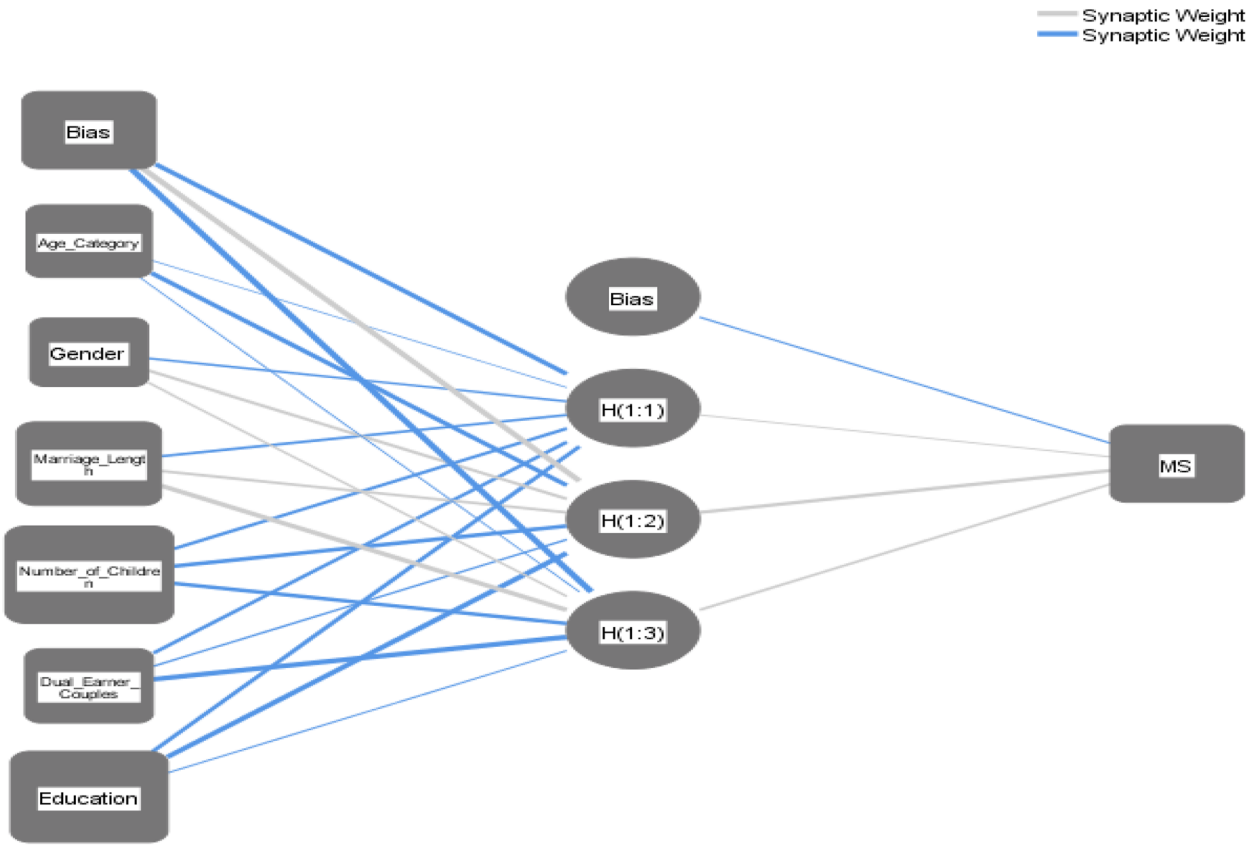

Fig. 7 Example figure of the non-linear ANN model (Third Stage)

a positive influence on FS and SS (Işık & Kaya, 2022; Yedirir & Hamarta, 2015), and FS (Archuleta et al., 2011; Britt et al., 2008; Kerkman, 1998; Kerkman et al., 2000) had a positive influence on MS. According to the findings of these studies, in line with the present outcomes, SS and FS were two crucial aspects of a marriage that played a significant role in determining overall marital satisfaction. Numerous studies indicate that those who receive support from their spouses report higher marital satisfaction than people who don't. The findings further indicate that financially content participants will likely have more stable marriages. Those who report high levels of SS and FS also report high levels of MS because of the positive relationship between SS, FS, and MS. They also show that SS and FS elements are recognized as sources of marital satisfaction and factors that affect the quality of relationships. SS had a more significant and positive effect on FS in the above-starvation-line group than in the below-starvation-line group. However, the effect of FS on MS was greater in the below-starvation-line group than in the above-starvation-line group. The group above the starvation line may support their spouses in other areas as they have more economic income and thus can meet their basic financial needs. On the other hand, the group below the starvation line may support their spouses more financially because they have a lower economic income and, therefore, cannot meet their basic financial needs. Maslow's hierarchy of needs can help us understand the associations between SS, FS, and MS in groups below and above the starvation lines. According to Maslow (Arlow, 1955), humans attempt to satisfy various needs. Biological requirements, such as the need to eat, are the initial and most basic, followed by other psychological needs. Maslow's ideas state that most people focus on the first level (Levinger, 1966). Hence, individuals must satisfy their fundamental and financial needs to be satisfied in their marriage.

A further finding from the examination of the data was that FS served as a significant and positive mediator between SS and MS. In sum, the mediation effect of the variable of FS explained the significant association between SS and MS. In light of these findings, spousal support was revealed to favor the quality of marriage via the indirect influence of financial satisfaction, as it can decrease financial stress between

Table 6 A Third-stage sensitivity analysis: importance of demographic variables in MS at MLP models

ANN	Age Category	Gender	Dual-Earner Couples	Education	Marriage Length	Number of Children
Above Starvation Line						
ANN (1)	.28	.15	.14	.12	.08	.09
ANN (2)	.12	.06	.27	.12	.12	.11
ANN (3)	.18	.16	.12	.15	.13	.20
ANN (4)	.19	.18	.12	.18	.12	.09
ANN (5)	.19	.09	.23	.12	.09	.16
ANN (6)	.19	.16	.10	.10	.21	.13
ANN (7)	.19	.14	.18	.13	.10	.17
ANN (8)	.22	.07	.20	.13	.11	.17
ANN (9)	.13	.12	.16	.14	.14	.16
ANN (10)	.08	.14	.13	.16	.25	.13
Average importance	.18	.13	.17	.13	.14	.14
Normalized importance	17.64%	12.64%	16.54%	13.35%	13.48%	14.03%
Below starvation line						
ANN (1)	.08	.01	.18	.05	.26	.29
ANN (2)	.11	.10	.14	.16	.21	.21
ANN (3)	.12	.01	.21	.12	.18	.30
ANN (4)	.11	.06	.09	.23	.20	.09
ANN (5)	.17	.07	.05	.20	.20	.19
ANN (6)	.13	.03	.15	.13	.22	.26
ANN (7)	.19	.10	.05	.14	.06	.31
ANN (8)	.15	.01	.23	.07	.07	.38
ANN (9)	.08	.01	.13	.08	.28	.36
ANN (10)	.10	.04	.13	.07	.22	.34
Average Importance	0.12	.04	.14	.13	.19	.27
Normalized Importance	12.33%	4.18%	13.52%	12.52%	18.94%	27.17%

Dependent variable (output) = MS

partners. Spousal support, according to this, explains marital satisfaction via the mediator effect of financial satisfaction. The direct influence of the variable of spousal support on marital satisfaction might be explained by reference to the variable of financial satisfaction, according to the results of a synthesis of the present study and the findings of the literature (Kerkman et al., 2000), because it was supposed that FS would enhance supportive partner behaviors to improve overall marital quality. It is thought that lower FS would lower spousal support behaviors and decrease MS (Kerkman et al., 2000). It's possible that new research may shed light on the relationship between FS and MS.

In the second phase, the (MLP) ANN model was used to evaluate the significance of SS and FS in MS for the two income groups. The PLS-SEM model and the ANN model were integrated, and the robustness of the PLS-SEM model was investigated. FS was more significant for the lower-income group than for the higher-income group. For all models and income groups, SS ranked first, and FS ranked second. These results indicate that PLS-SEM and MLP can be used in conjunction with one another, and the addition of the second stage improves the robustness of our models. The PLS-SEM analysis was validated with the help of the deep ANN during the second phase because the ANN model had a greater prediction ability than PLS-SEM models and was used to elucidate the relationships between variables further (Almarzouqi et al., 2022). Due to its deep architecture, which enables it to identify non-linear correlations between variables, ANN has a high prediction potential (Almarzouqi et al., 2022). Because this is the first study to apply ML algorithms to predict the relationship between SS, FS, and MS, the hybrid method used in this study will contribute to the field of MS research. According to Huang and Stokes (2016), the analysis often uses a basic type ANN with just one hidden layer. To enhance the precision of non-linear models, deeper ANN or multi-layer ANN has been suggested in the literature (Wang, 2017). This study uses deep ANN, a hybrid SEM-ANN approach to analyze the data based on the recommendations. To analyze the data

based on the suggestions made in this research, we used deep ANN, a method that combines SEM and ANN.

In the third phase, we utilized MLP models to determine the relative impact of demographics on MS for two income groups. For MS, the ANN models had a strong model fit and were reliable for analyzing the associations between demographics (predictors) and dependent variables. Age (Amirnovin & Ghaffarian, 2018; Lee, 1977) was the most influential independent predictor for predicting MS above the starvation line, followed by dual-earner couples (Putri & Kinanthi, 2017) and the number of children (Kowal et al., 2021; Orithinkal & Vansteenwegen, 2007) according to the findings of a sensitivity analysis. This may be related to the fact that as individuals become older, they become more financially stable and have more marital satisfaction. However, below the starvation line, the most influential independent predictor was the number of children, followed by the length of marriage (Bulgan et al., 2018; Umeaku et al., 2022) and dual-earner couples. Similarly, research in Turkey (Kavak, 2018) found that having more children increased the couple's obligations and financial challenges, made it harder for the spouses to spend quality time together, and lowered marital happiness for various other reasons. Other studies failed to reveal a significant association or revealed a significant negative association between age (Alder, 2010; Moghadam et al., 2015), dual-earner couples (Mohsin, 2014), number of children (Wendorf et al., 2011), length of marriage (Shakir et al., 2021) and MS. Age was a significant predictor of MS because judgment-based criteria had the potential to change with time and education level usually increases with age. This indicates that marital satisfaction grew in line with the average age at which a couple tied the knot (Dabone, 2014; Lee, 1977). The research on dual-earner couples reveals that involvement in the spouse's gendered position at work fosters more substantial knowledge of the partner's obligations than performing in separate roles (Schwartz, 1994). The dual-income couple can augment their lifestyle and mental health with dual incomes (Gallimore et al., 2006). According to other researchers, the number of children in a household diminishes marital satisfaction. As the number of children increases, parents devote more time and energy to caring for them. By doing so, the existing resources for their partner's care may become limited. Therefore, raising more children may be perceived as a bonding element and an obstacle to leaving the marriage, but not necessarily a satisfying marriage (Kowal et al., 2021; Orithinkal & Vansteenwegen, 2007). These findings imply that marital satisfaction declines as the number of children increases, although it may vary according to different studies (Kowal et al., 2021); for example, the research has not revealed a similar outcome in the Turkish context (Wendorf et al., 2011). This indicates that culture-specific variables may impact the relationship between marital happiness and the number of children (Sorokowski et al., 2017). Participants who had been married for longer indicated higher satisfaction levels with their marriage (Bulgan et al., 2018).

Implications and Limitations

This hybrid model is typically utilized in the field of engineering in addition to its business models. Nonetheless, this is an original application for the interdisciplinary study of psychology and finance. These results demonstrate that PLS-SEM and MLP are compatible, improving our models' robustness. The mediation study also suggests that the participants' financial happiness significantly mediates the relationship between spousal support and marital satisfaction. In addition, FS is indeed a significant precursor to MS, together with SS. The ANN model reveals the significance of demographic factors on MS for various income groups. According to the results of this study, factors such as spousal support, financial satisfaction, age, dual-earning, the number of children in the marriage, and the length of the marriage are all related to marital satisfaction. Those in the low-income group can improve their financial situation by receiving a better education. This information will aid in identifying the variables that may affect marital happiness.

However, there are a few shortcomings in this research. The current study is limited to present dataset and certain regions in Turkey. Another limitation is that this study is cross-sectional. The demographics and research characteristics of age, gender, education, income, dual-earning, number of children, length of the marriage, SS, and FS were one of the study's major limitations. In Turkey, the percentage of households living on minimum wage and the proportion of families living below the starvation line is higher than in our study (THD, 2022).

Implications for Future Research

Considering the limitations of the present study, analyses can be made with more generalizable data. It is suggested that further research be carried out with a bigger sample size and participants from more varied backgrounds. Studies can be conducted in which demographics are used as moderator variables. This research adopted a quantitative approach, which limited its ability to generalize and demonstrate the concepts under investigation.

Therefore, it is proposed that future studies use qualitative and mixed methods to comprehend marital satisfaction. Using a qualitative method, potential participants from both groups below and above the starvation line can be interviewed about SS, FS, and MS to get broader responses and support the quantitative data, focusing on gender roles. This research focuses on how general SS affects marital satisfaction. Future research, however, may use other forms of spousal support, such as emotional and physical assistance, since the other forms of support may be more significant than support in terms of relationship happiness. Meanwhile, longitudinal studies should be conducted to conclude the nature of the causal relationship between the above factors and marital satisfaction. It may be advantageous to do research that follows couples over time and examine their relationships during various life stages.

Implications for Practice/Policy

The current findings may be applied to enhance family-based treatments in family therapy, psychology, policymaking, and education settings. In particular, the findings of this research will be helpful to professionals working in mental health, as well as marital psychotherapists, counselors, family trainers, and mental health supervisors in Turkey who work with married couples. When working with this population, therapists and counselors should be aware of the differences between groups below and above the starvation line in terms of the associations between demographics, SS, FS, and MS. These differences can be seen in terms of the relationship between the starvation line and SS, FS, and MS. Policymakers may use this information to create psycho-educational programs to assist couples in improving their marriages based on their finances. To better understand how sociocultural elements affect marital happiness, studies and policy should also focus on the financial state of marriage in varied demographic groups.

Conclusions

This study aimed to develop a novel three-staged model combining the PLS-SEM and ANN models to examine FS, SS, and MS relationships and compare the significance of independent and demographic variables with the dependent variable. This study is one of the first to examine the association between spousal support, financial satisfaction, various demographic variables, and marital satisfaction by dividing participants' data into two above- and below-starvation-line groups. SS, FS, and MS were more prevalent above the starvation line than in the lower-income group. Spousal support significantly impacts financial and marital satisfaction in both groups, where FS is directly and indirectly related to MS. These findings show that PLS-SEM and MLP can be applied together. The second stage enhances the robustness of our models. For MS models with demographics, the models are reliable in analyzing the relationships between demographics (predictors), and the ANN models possess a good model fit. Age was the most influential independent variable for predicting MS above the starvation line.

Appendix

See Tables 7 and 8

Table 7 The second stage: MLP (Non-linear ANN) model validation analysis

Above Starvation Line				Below Starvation Line			
Training		Testing		Training		Testing	
N	*RMSE*	*N*	*RMSE*	*N*	*RMSE*	*N*	*RMSE*
581	2.638	263	2.244	71	2.732	33	1.923
587	2.618	257	2.241	77	2.865	27	1.528
569	2.596	275	2.320	76	2.671	28	1.852
588	2.634	256	2.339	67	2.815	37	1.900
580	2.631	264	2.276	80	2.732	24	1.719
597	2.634	247	2.252	75	2.703	29	1.829
584	2.650	260	2.225	66	2.905	38	2.007
596	2.630	248	2.283	66	2.852	38	1.863
600	2.638	244	2.274	76	2.695	28	1.936
596	2.678	248	2.346	74	2.756	30	1.897
Mean	2.635	*Mean*	2.280	*Mean*	2.773	*Mean*	1.923
SD	0.021	*SD*	0.042	*SD*	0.081	*SD*	0.135

RMSE Root mean square errors; *N* sample size; *S.D.* Standard Deviation

Table 8 The third stage: MLP (Non-linear ANN) model validation analysis for MS

Above Starvation Line				Below Starvation Line			
Training		Testing		Training		Testing	
N	*RMSE*	*N*	*RMSE*	*N*	*RMSE*	*N*	*RMSE*
581	4.708	263	3.768	71	4.281	33	3.252
587	4.511	257	3.825	77	4.892	24	3.851
569	4.713	275	3.879	76	4.716	28	3.240
588	4.707	256	3.806	67	4.972	36	3.367
580	4.456	264	3.829	80	4.902	23	3.407
597	4.640	247	3.826	75	4.918	29	3.222
584	4.633	260	3.781	66	5.106	35	3.435
596	4.624	248	3.826	66	4.472	36	3.304
600	4.583	244	3.896	76	4.942	28	3.327
596	4.667	248	3.827	74	4.984	30	3.152
Mean	4.624	*Mean*	3.826	*Mean*	4.818	*Mean*	3.356
SD	0.086	*SD*	0.039	*SD*	0.256	*SD*	0.195

RMSE Root mean square errors, *N* sample size, *SD* Standard Deviation

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Data Availability The data that support the outcomes of the present study are available on demand from the corresponding author.

Declarations

Conflict of interest I here assert that there is not any conflict of interest among authors and other parties regarding the present research.

Ethical Approval I also declare that study measures were reviewed by the committee of ethics that is located in Konya Food and Agricultural University and results of inspections indicate that instruments and application of the study were in line with widely accepted ethical principles.

Informed Consent The author obtained consent from participants who took part in the research and the researcher followed the requirements of the Declaration of Helsinki. Accordingly, the researcher informed the participants about of the aim of study and guaranteed that the participants' responds would be kept anonymous and they would only be used for study purposes.

References

Ahangar, K., Juhari, R., Yaacob, S. N., & Talib, M. A. (2016). Demographic factors and marital satisfaction among Iranian married students in Malaysia. *Asian Journal of Social Sciences & Humanities, 5*(2), 153–163.

Almarzouqi, A., Aburayya, A., & Salloum, S. A. (2022). Prediction of user's intention to use metaverse system in medical education: A hybrid SEM-ML learning approach. *IEEE Access, 10*, 43421–43434. https://doi.org/10.1109/ACCESS.2022.3169285

Amirnovin, E., & Ghaffarian, A. (2018, November). *Assessment of Marital Satisfaction and Happiness in Men and Women who are Married at Early Age and Old Age.* In RAIS Conference Proceedings-The 11th International RAIS Conference on Social Sciences. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3303479

Archuleta, K. L., Britt, S. L., Tonn, T. J., & Grable, J. E. (2011). Financial satisfaction and financial stressors in marital satisfaction. *Psychological Reports, 108*(2), 563–576. https://doi.org/10.2466/07.21.PR0.108.2.563-576

Arlow, J. A. (1955). Motivation and Personality: By AH Maslow. New York: Harper & Brothers, 1954. 411 pp. *Psychoanalytic Quarterly, 24*, 447–448.

Boyle, J. (2012). *Shared money, less conflict, stronger marriages: The relationship between money ownership perceptions, negative communication, financial satisfaction, marital satisfaction and marital instability* [Unpublished doctorate dissertation]. College of Human Ecology and Kansas State University.

Britt, S. L., Grable, J. E., Nelson Goff, B. S., & White, M. (2008). The influence of perceived spending behaviors on relationship satisfaction. *Financial Counseling and Planning, 19*, 31–43.

Broman, C. L. (1993). Race differences in marital well-being. *Journal of Marriage and the Family*, 724–732.

Broman, C. L. (2005). Marital quality in Black and White marriages. *Journal of Family Issues, 26*(4), 431–441. https://doi.org/10.1177/0192513X042724

Bulgan, G., Kemer, G., & Çetinkaya Yıldız, E. (2018). Marital satisfaction of Turkish individuals: the role of marriage type, duration of the marriage, and personality traits. *International Journal of Humanities and Social Science, 8*(1), 88–97.

Copur, Z., & Eker, I. (2014). The relationship between financial issues and marital relationships. *International Journal of Arts & Sciences, 7*(5), 683.

Cunningham, M. R., & Barbee, A. P. (2000). Social support. In C. Hendrick & S. S. Hendrick (Eds.), *Close relationships: A sourcebook* (pp. 272–285). Sage.

Dabone, K. T. (2014). Effects of age on marital satisfaction of married people in Sunyani municipality. *International Journal of Research in Social Sciences, 3*(8). Retrieved http://hdl.handle.net/123456789/7889

Disk-Ar (2022). In April 2022, the starvation line is 4,750 TL, the poverty line is 16,431 TL. http://arastirma.disk.org.tr/?p=8718

Gallimore, S. A., Hughes, J. L., & Geldhauser, H. A. (2006). Marriage length, spousal support, and marital satisfaction in dual-income men and women. *Modern Psychological Studies, 12*(1), 8.

Grable, J. E., Britt, S. L., & Cantrell, J. (2007). An exploratory study of the role financial satisfaction has on the thought of subsequent divorce. *Family and Consumer Sciences Research Journal, 36*, 130–150. https://doi.org/10.1177/1077727X07309284

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hair, J. F., Jr., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review, 26*(2), 106–121. https://doi.org/10.1108/EBR-10-2013-0128

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*, 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hosseini, M. A., Hosseini, A., & Mehraki, B. (2017). Marital satisfaction of student marriage and its relationship with demographic characteristics among students at Shiraz University of Medical Sciences. *International Journal of Environmental & Science Education, 12*(2), 321–328.

Huang, W., & Stokes, J. W. (2016). MT Net: a multi-task neural network for dynamic malware classification. In *Detection of Intrusions and Malware and Vulnerability Assessment: 13th International Conference, DIMVA 2016, San Sebastián, Spain, July 7–8, 2016, Proceedings 13* (pp. 399–418). Springer International Publishing. https://www.microsoft.com/en-us/research/publication/mtnet-multi-task-neural-network-dynamic-malware-classification/

Iqbal, A., Latif, F., Marimon, F., Sahibzada, U. F., & Hussain, S. (2018). From knowledge management to organizational performance: Modelling the mediating role of innovation and intellectual capital in higher education. *Journal of Enterprise Information Management, 32*(1), 36–59. https://doi.org/10.1108/JEIM-04-2018-0083

Işık, E., & Akün, Ç. (2021). Turkish validation of the Kansas Marital Satisfaction Scale. *Journal of Family Therapy, 44*(12), 313–324. https://doi.org/10.1111/1467-6427.12359

Işık, R. A., & Kaya, Y. (2022). The relationships among perceived stress, conflict resolution styles, spousal support and marital satisfaction during the COVID-19 quarantine. *Current Psychology*. https://doi.org/10.1007/s12144-022-02737-4

Jackson, G. L., Krull, J. L., Bradbury, T. N., & Karney, B. R. (2017). Household income and trajectories of marital satisfaction in early marriage. *Journal of Marriage and Family, 79*(3), 690–704. https://doi.org/10.1111/jomf.12394

Jackson, J. B., Miller, R. B., Oka, M., & Henry, R. G. (2014). Gender differences in marital satisfaction: A meta-analysis. *Journal of Marriage and Family, 76*(1), 105–129. https://doi.org/10.1111/jomf.12077

Jacobs, J. A., & Gerson, K. (2001). Overworked individuals or overworked families? Explaining trends in work, leisure, and family time. *Work and Occupations, 28*(1), 40–63. https://doi.org/10.1177/0730888401028001004

Kavak, A. (2018). Evli bireylerde çatışma yönetimi ve evlilik doyumu [Conflict management and marital satisfaction in married individuals] [Unpublished master thesis]. Institute of Educational Sciences and Hacettepe University. http://www.openaccess.hacettepe.edu.tr:8080/xmlui/handle/11655/5303

Keizer, R. (2014). Relationship Satisfaction. In A. C. Michalos (Ed.), *Encyclopedia of Quality of Life and Well-Being Research.* Springer. https://doi.org/10.1007/978-94-007-0753-5_2455

Kowal, M., Groyecka-Bernard, A., Kochan-Wójcik, M., & Sorokowski, P. (2021). When and how does the number of children affect marital satisfaction? An international survey. *PLoS ONE, 16*(4), e0249516. https://doi.org/10.1371/journal.pone.0249516

Lee, G. R. (1977). Age at marriage and marital satisfaction: A multivariate analysis with implications for marital stability. *Journal of Marriage and the Family, 39*(3), 493–504. https://doi.org/10.2307/350904

Leong, L. Y., Hew, T. S., Ooi, K. B., & Dwivedi, Y. K. (2020). Predicting trust in online advertising with an SEM-artificial neural network approach. *Expert Systems with Applications, 162*, 113849. https://doi.org/10.1016/j.eswa.2020.113849

Leong, L. Y., Hew, T. S., Ooi, K. B., & Hew, J. J. (2019). A hybrid SEM-neural network analysis of social media addiction. *Expert Systems with Applications, 133*, 296–316. https://doi.org/10.1016/j.eswa.2019.05.024

Levinger, G. (1966). Sources of marital dissatisfaction among applicants for divorce. *American Journal of Orthopsychiatry, 36*(5), 803–807. https://doi.org/10.1111/j.1939-0025.1966.tb02407.x

Liébana-Cabanillas, F., Marinković, V., & Kalinić, Z. (2017b). A SEM-neural network approach for predicting antecedents of m-commerce acceptance. *International Journal of Information Management, 37*(2), 14–24. https://doi.org/10.1016/j.ijinfomgt.2016.10.008

Liébana-Cabanillas, F., Ramos de Luna, I., & Montoro-Ríos, F. (2017a). Intention to use new mobile payment systems: A comparative analysis of SMS and NFC payments. *Economic Research, 30*(1), 892–910. https://doi.org/10.1080/1331677X.2017.1305784

Madanian, L., & Mansor, S. M. S. S. (2013). Marital satisfaction and demographic traits in an emigrant sample: Rasch analysis. *Procedia-Social and Behavioral Sciences, 107*, 96–103. https://doi.org/10.1016/j.sbspro.2013.12.404

Majhi, G., & Panda, B. (2015). Marital satisfaction in dual-earner family. *IOSR Journal of Humanities and Social Science, 20*(3), 1–4. https://doi.org/10.9790/0837-20310104

Minnotte, K. L., Minnotte, M. C., & Pedersen, D. E. (2013). Marital Satisfaction among dual-earner couples: Gender ideologies and family-to-work conflict. *Family Relations, 62*(4), 686–698. https://doi.org/10.1111/fare.12021

Moghadam, S. R. M., Chegeni, M. E., & Hafez, A. A. (2015). Explore the relationship among spiritual health, marital satisfaction, and demographic characteristics (age, duration of marriage, duration of employment) in Mafi hospital nurses of Susa city in 1994. *Journal of Religion and Health, 1*(4), 38–44.

Mohsin, F. Z. (2014). Marital satisfaction and job satisfaction: a study of dual and single-earner couples. *Pakistan Business Review (Special Issue).* https://www.pbr.iobm.edu.pk/wp-content/uploads/2016/01/PBR-SPECIAL-ISSUE-2014.pdf#page=95

Naderi, L., & Nory, A. (2017). The prediction of marital satisfaction of couples in Isfahan based on empathy and forgiveness. *Knowledge & Research in Applied Psychology, 16*(4), 69–75.

O' Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*, 673–690. https://doi.org/10.1007/s11135-006-9018-6

Orathinkal, J., & Vansteenwegen, A. (2007). Do demographics affect marital satisfaction? *Journal of Sex and Marital Therapy, 33*, 73–85. https://doi.org/10.1080/00926230600998573

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

Putri, S. L., & Kinanthi, M. R. (2017). Job Stress and Marital Satisfaction among Husbands in Dual-Earner Marriages. *UI Proceedings on Social Science and Humanities, 1*. https://www.researchgate.net/profile/Melok-Kinanthi/publication/326224114_Job_Stress_and_Marital_Satisfaction_among_Husbands_in_Dual-Earner_Marriages/links/5b3ef960a6fdcc8506ffcbda/Job-Stress-and-Marital-Satisfaction-among-Husbands-in-Dual-Earner-Marriages.pdf

Rashidi Fakari, F., Doulabi, M. A., & Mahmoodi, Z. (2022). Predict marital satisfaction based on the variables of socioeconomic status (SES) and social support, mediated by mental health, in women of reproductive age: Path analysis model. *Brain and Behavior, 12*(3), e2482. https://doi.org/10.1002/brb3.2482

Sarason, B. R., Sarason, I. G., & Gurung, R. A. R. (1997). Close personal relationships and health outcomes: A key to the role of social support. In S. Duck (Ed.), *Handbook of personal relationships* (2nd ed., pp. 547–573). Wiley.

Shakir, A. Y. M., Aziz, D. A., & Carmergam, S. (2021). Financial well-being, mindfulness, and marital duration as predictors of relationship satisfaction among married couples in Malaysia. *Polish Psychological Bulletin*. https://doi.org/10.24425/ppb.2021.139165

Sharma, A., Dwivedi, Y. K., Arya, V., & Siddiqui, M. Q. (2021). Does SMS advertising still have relevance to increase consumer purchase intention? A hybrid PLS-SEM-neural network modelling approach. *Computers in Human Behavior, 124*, 106919. https://doi.org/10.1016/j.chb.2021.106919

Sharma, S. K., & Sharma, M. (2019). Examining the role of trust and quality dimensions in the actual usage of mobile banking services: An empirical investigation. *International Journal of Information Management, 44*, 65–75. https://doi.org/10.1016/j.ijinfomgt.2018.09.013

Skogrand, L., Johnson, A., Horrocks, A., & DeFrain, J. (2011). Financial management practices of couples with great marriages. *Journal of Family and Economic Issues, 32*(1), 27–35. https://doi.org/10.1007/s10834-010-9195-2

Sohaib, O., Hussain, W., Asif, M., Ahmad, M., & Mazzara, M. (2019). A PLS-SEM neural network approach for understanding cryptocurrency adoption. *IEEE Access, 8*, 13138–13150. https://doi.org/10.1109/ACCESS.2019.2960083

Sorokowski, P., Randall, A. K., Groyecka, A., Frackowiak, T., Cantarero, K., Hilpert, P., & Sorokowska, A. (2017). Marital satisfaction, sex, age, marriage duration, religion, number of children, economic status, education, and collectivistic values: Data from 33 countries. *Frontiers in Psychology, 8*, 1199. https://doi.org/10.3389/fpsyg.2017.01199

Tavakol, Z., Nikbakht Nasrabadi, A., Behboodi Moghadam, Z., Salehiniya, H., & Rezaei, E. (2017). A review of the factors associated with marital satisfaction. *Galen Medical Journal, 6*(3), 197–207. https://doi.org/10.22086/gmj.v6i3.641

Tüketici Hakları Derneği. [Consumer Rights Association] (TKD) (2022). https://www.tuketicihaklari.org.tr/haberler/basinacikl amalari.2022.03.14.html

Türk-İş. (2022). Nisan Açlık Yoksulluk Sınırı [April Hunger Poverty Line]. https://www.turkis.org.tr/nisan-aclik-yoksulluk-siniri/

Umeaku, N. N., Iwuchukwu, E. M., Nweke, K. O., & Oradiegwu, S. U. (2022). The Influence of Educational Level and Duration of Marriage on Marital Satisfaction Among Nigerian Couples. *Interdisciplinary Journal of African & Asian Studies (IJAAS), 8*(1).

UN (2022). *Sustainable Development Goals.* https://www.un.org/sustainabledevelopment/poverty/

Wang, J. G., Cao, Z. D., Yang, B. H., Ma, S. W., Fei, M. R., Wang, H., ... & Wang, X. F. (2017, July). *A mothed of improving identification accuracy via deep learning algorithm under condition of deficient labeled data.* In 2017 36th Chinese Control Conference (CCC) (pp. 2281–2286). IEEE. http://www.cgl.org.cn/auto/db/detail.aspx?db=950003&rid=78358&agfi=0&cls=0&uni=True&cid=0&showgp=True&prec=False&md=93&pd=6&msd=93&psd=6&mdd=93&pdd=6&count=10&reds=yang%3Bjian

Wendorf, C. A., Lucas, T., Imamoğlu, E. O., Weisfeld, C. C., & Weisfeld, G. E. (2011). Marital satisfaction across three cultures: Does the number of children have an impact after accounting for other marital demographics? *Journal of Cross-Cultural Psychology, 42*(3), 340–354. https://doi.org/10.1177/0022022110362

Wilkie, J. R., Ferree, M. M., & Ratcliff, K. S. (1998). Gender and fairness: Marital satisfaction in two-earner couples. *Journal of Marriage and the Family*. https://doi.org/10.2307/353530

Yedirir, S., & Hamarta, E. (2015). Emotional expression and spousal support as predictors of marital satisfaction: The case of Turkey. *Educational Sciences: Theory and Practice, 15*(6), 1549–1558. https://doi.org/10.12738/estp.2015.6.2822