



Predictors of Subjective Health Among Spouses and Its Relations With Happiness: A Multilevel Analysis in a Nationwide Survey in Turkey

Furkan Tosyali¹ · Ezgi Coban-Tosyali^{2,3} · Mehmet Harma^{4,5}

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Abstract

The current study aims to examine predictors of subjective health, including its relation with happiness, at the individual and family levels. For this purpose, we analyzed data collected from spouses representing each family (9,634 families, $N=19,268$). A multilevel analysis was conducted to examine both individual- and family-level variables associated with subjective health evaluations. Individual-level variables were gender, age, education, employment, presence of chronic illness, smoking, alcohol use, and individual happiness. Family-level variables were socioeconomic status, number of children, household size, length of the marriage (in a year), presence of an elderly person who needs care in the household, presence of a disabled person who needs care in the household, and family happiness. The results showed that subjective health is enhanced by being man, younger, employed, highly educated, free from chronic illness, and experiencing greater levels of happiness at the individual level. In addition, poorer subjective health is associated with caring for an elderly or disabled family member and having a higher number of children in the household at the family level. However, individuals had better subjective health at the family level when socioeconomic status was higher, greater family happiness, and greater household size existed. The current study is important since research that simultaneously considers individual- and family-level happiness has been scarce in the literature. Thus, the findings would enhance the current understanding of the link between happiness and health.

Keywords Self-rated health · Subjective health · Individual happiness · Family happiness · Multilevel analysis · Turkey

✉ Mehmet Harma
harma@unak.is

¹ Department of Psychology, Düzce University, Düzce, Turkey

² Department of Psychology, Middle East Technical University, Ankara, Turkey

³ Department of Psychology, Bolu Abant İzzet Baysal University, Bolu, Turkey

⁴ Faculty of Psychology, University of Akureyri, Akureyri, Akureyri 600, Iceland

⁵ Department of Psychology, Kadir Has University, İstanbul, Turkey

The World Health Organization (1946) defined health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.” It could be inferred from this definition that individuals may also experience health problems that may be difficult to assess clinically (e.g., pain) but rather could be assessed through subjective evaluations of health (Eriksson et al., 2001; De Bruin et al., 1996). Thus, signs of poor health that biomedical tools or medical examinations could not detect can be captured and better understood by subjective health.

Subjective health is the most used variable in national surveys and epidemiological studies (Mwinnyaa et al., 2018), where it is possible to measure an individual’s health holistically by following the aforementioned definition of the World Health Organization (Niedhammer et al., 2013). Subjective health would be strongly associated with objective health, mortality, and morbidity even after controlling for demographics such as gender, age, and socioeconomic status (SES) (Idler & Benyamini, 1997; Idler et al., 2004). Moreover, subjective health is a good global measurement tool regardless of gender (Baćak & Olafsdottir 2017) to capture individuals’ physical and mental health (Wu et al., 2013).

In this present study, our primary objective was to comprehensively investigate the factors that predict subjective health within the context of multilevel data analysis. The existing body of knowledge on population health indicated consistent predictors of poor subjective health such as gender, older age, lower socioeconomic status (e.g., education, employment, income) (Aydın, 2020; Horasan et al., 2019), presence of chronic illness (e.g., Asfar et al., 2007; Shields & Shooshtari, 2001), health-related behaviors (e.g., smoking, alcohol consumption) (e.g., Shiue, 2015; Wang et al., 2012).

1 Subjective Health Among Spouses

Studies consistently showed that women reported poorer subjective health than men (Gilmore et al., 2002; Zajacova et al., 2017). One reason, in particular, might be gender inequality in society (Boerma et al., 2016). Comparatively, women’s participation in business is higher than in the past, and in this case, they both work and take more responsibilities than men at home (Cai et al., 2017). In addition, older people reported worse health than younger generations, even showing exponentially worse health in older ages (e.g., Aguilar-Palacio et al., 2018).

In this study, we not only investigated the relationship between gender, age, socioeconomic status, and subjective health but also expanded upon these established findings. We utilized a large dataset from Turkey and incorporated additional variables previously demonstrated to have significant associations with health-related outcomes in prior research. These supplementary variables encompassed various aspects of individuals’ lives, including the duration of marriage, the number of children, household size, the presence of a disabled person requiring care within the household, and the presence of an elderly individual requiring care in the household (e.g., Karney & Bradbury, 1995; Langley et al., 2017; Lykes & Kimmelmeier, 2014; Pinquart & Sörensen, 2007; Twenge et al., 2003).

The negative relationship between the duration of marriage (Karney & Bradbury, 1995), the number of children (Twenge et al., 2003), and marital satisfaction have been well-documented in previous studies. Also, marital satisfaction is one of the powerful predictors of health (Whisman & Uebelacker, 2003). Thus, the length of the marriage and the number of

children could be crucial variables in predicting health outcomes. In contrast to the duration of marriage and number of children, household size could be positively related to subjective health, especially in collectivistic cultures (e.g., Turkey), where family relationships and cohesion are quite valued (Shen et al., 2019). Supporting this argument, Lykes and Kemmelmeier (2014) reported that household size could exclusively be related to a lower sense of loneliness – shown as a predictor of good health (Cacioppo et al., 2003) – especially in collectivistic cultures. However, previous studies showed that the presence of a disabled person (Langley et al., 2017) and an elderly (e.g., Pinquart & Sörensen, 2007) needing care in the household might bring a burden on household members and could be associated with adverse health-related outcomes. Consistently, Family System Theory suggests family relationships are systematically related and complex, meaning that the experience of a family member (e.g., a child with a disability or elderly needing care) would affect the rest of the family as well (Cox & Paley, 1997; Seligman & Darling, 2007).

2 Subjective Health and Happiness

Nonetheless, individuals' perceived health status extends beyond the demographic factors mentioned above. A more comprehensive viewpoint, encompassing psychological predictors alongside the demographic characteristics of a particular population, has the potential to yield more precise assessments of individuals' health-related outcomes. In this context, previous work consistently showed that subjective well-being is a strong predictor of better subjective and objective health (e.g., Howell et al., 2007). Thus, revealing the link between subjective well-being and health would be an important step in providing adaptive responses to population health.

The term subjective well-being refers to the extent to which an individual describes her/his life in general or the current situation as good/bad or desirable/undesirable (Diener et al., 2017). According to the theoretical background of this term, it was suggested that the psychological well-being of humans could be described in two types of domains: eudaimonic and hedonic well-being. Former refers to a set of indicators regarding the extent to which an individual can find meaning and purpose in life, autonomous participation in her/his environment, supportive social relationships, and personal development (e.g., self-actualization). Latter refers to the one's evaluations related to her/his life satisfaction regarding how good or bad it is; in other words, it could be measured through the degree of positive affect (e.g., happiness, joy, cheerfulness) the person expresses and to what extent the person *does not* possess negative affect in life (Deci & Ryan, 2008). Therefore, such positive or negative evaluations of individuals may reflect on general life satisfaction or different domains in the person's life. Based on those theoretical descriptions, the level of happiness is one of those domains in which subjective well-being could be inferred (Stepptoe, 2019).

The link between subjective well-being and health has long been discussed. In a comprehensive review, Diener et al. (2017) indicated that literature reviews and meta-analyses generally emphasize the beneficial role of subjective well-being on health and longevity. In this relationship pattern, on the one hand, there are studies suggesting the predictor role of subjective well-being on health (e.g., De Vries et al., 2021). On the other hand, there are findings supporting the predictor role of health on happiness (e.g., Angner et al., 2012). It has been stated there could be some reasons for the lack of a clear consensus on the direction

of that relationship. First, the findings of the studies varied based on conceptualization (e.g., hedonic, eudaimonic), measurement (e.g., subjective health, objective health), and design (e.g., experimental, cross-sectional) of the studies on the two constructs. Second, studies on potential mediators and moderators in the link between the two constructs are needed to clarify the directionality issue (see Diener et al., 2017; Steptoe, 2019).

Previous studies using robust designs and methodologies to understand the link between happiness and health demonstrated a causal path in which happiness would lead to better physical health (Sabatini, 2014; Veenhoven, 2008). For instance, Veenhoven (2008) conducted a meta-analysis including 30 longitudinal studies, and 53% of those studies showed that happy people would be likely to live longer after controlling for gender, age, and subjective and objective baseline health status. Likewise, according to the findings of a meta-analysis consisting of 150 experimental and longitudinal studies, happiness had positive impacts on physical health-related outcomes, such as short-term effects on the immune system (e.g., pain tolerance) and long-term effects (e.g., in cardiovascular and respiratory functions, disease and symptom control) (Howell et al., 2007). Thus, one explanation for the link between happiness and health could be understood through previous findings suggesting that happiness would positively influence human immunity (Cohen et al., 2006; Rosenkranz et al., 2003). However, as mentioned before, not all previous research supported that happiness leads to better health. Indeed, it seems that up-to-date research highlights the bidirectional relationship dynamic between the two constructs (e.g., De Vries et al., 2021; Diener et al., 2017; Leite et al., 2019; Steptoe, 2019). For instance, in a large sample-sized study consisting of twins and siblings, De Vries et al. (2021) reported that there could be reverse causality between happiness and health (operationally defined through the absence of psychiatric symptoms) (see more De Vries et al., 2021).

Appreciation of life could be defined, experienced, and valued differently depending on the culture (Diener et al., 2000). In the West, where individualistic culture is more pronounced, happiness may be defined in a self-oriented approach such as more pleasure and less pain (McMahon, 2004), or it may be defined as a kind of self-actualization (McDowell, 2010) where an individual is encouraged to pursue his/her happiness (Lu & Gilmour, 2004). However, in collectivist cultures – where interpersonal relationships are more emphasized, and harmony and balance are crucial in the relationship between the individual and the significant other – happiness may be defined, experienced, and valued more through interdependence or social engagement (Hitokoto & Uchida, 2015; Uchida & Oishi, 2016). For instance, family relationships and cohesion are quite valued, which could be strongly associated with individual happiness in collectivist cultures, even suggesting that individual happiness cannot exist without family happiness (Lu et al., 2001). This would directly influence the health-related outcomes of individuals (Ho et al., 2020). Thus, it would be expected that subjective health could be predicted by the individual (i.e., subjective happiness) and contextual level of happiness (i.e., family happiness).

Although numerous studies focused on predictors of health, including individual happiness, research considering individual- and family-level happiness simultaneously has been scant in the literature and does not even exist in the Turkish population. Hence, this study represents a distinctive population-based research into the predictive role of familial well-being on subjective health in the Turkish context. Within this framework, a multilevel model analysis was performed to scrutinize the prediction of the effect of demographic characteristics and happiness on the subjective health of both individuals and families. This analysis

utilized representative data gathered from both husbands and wives in Turkey. Namely, spouses are nested within families, so interdependency between individual- and family-level variables should be considered to increase the correct estimation of error terms in both levels (Enders & Tofghi, 2007; Rasbash et al., 2009). Moreover, the multilevel model framework enables us to see the predictor role of the context (e.g., family) on a given outcome (Jenkins et al., 2003); otherwise, we may have missed such valuable information. Also, using one of the largest representative data, this study would enable us to replicate cumulative knowledge on the demography of subjective health in the Turkish population. In this context, the specific aims of the study were to examine:

1. to what extent there could be a variation regarding the predictor role of the individual- and family-level variables on subjective health (examined in the Model 1).
2. predictor role of the individual-level variables (happiness, gender, age, education, employment, presence of a chronic illness, smoking, and alcohol use) on subjective health (examined in the Model 2).
3. predictor role of the family-level variables (family happiness, SES, number of children, household size, length of the marriage, presence of a disabled person, and presence of an elderly person) on subjective health (examined in the Model 3).
4. whether individual happiness would change across families and that change would explain significant variance in predicting subjective health (examined in the Model 4).

3 Methods

3.1 Participants

A total of 19,268 husbands and wives ($N_{family} = 9,634$) living in the same household were included in the data set. We utilized a nationally representative data, based on multistage stratified random sampling. Face-to-face interviews were conducted in 17,239 households with a total of 35,475 individuals aged 15 and above. The analysis was performed using micro-data of the last wave of the Turkish Family Structure Research (June-September 2016), a unique cross-sectional nationwide survey conducted by the Turkish Statistical Institute with the collaboration of the Ministry of Family and Social Policies. The survey aimed to examine the family structure, lifestyles of individuals in the family, and their value judgments regarding family life. Since the current analysis focused on the data collected from spouses within a family, we included families where both husbands' and wives' information were available.

3.2 Procedure

The interviews were conducted one-on-one so that the respondents would not have been affected by the answers of other household members. The methodology and descriptive results for this survey were previously described in detail elsewhere (the Turkish Statistical Institute, 2016). The survey consisted of two main parts: basic characteristics of household members and an individual questionnaire. The former was responded by a household mem-

ber aged 18 and over, i.e., “reference person,” and the latter was responded individually by household members aged 15 and over. For the variables in this analysis, the reference person (most reference people were husbands in the current sample; see also footnote 2) gave information regarding the following variables for each household member, including himself/herself: education, presence of chronic illness, subjective health, household size, presence of a disabled person needing care in the household, presence of an elderly needing care in the household. Information on the remaining variables (i.e., age, employment, socioeconomic status, number of children, length of the marriage, smoking, alcohol use, subjective happiness, and family happiness) was answered individually.

3.3 Measures

3.3.1 Outcome Variables

The dependent variable in the current analysis was subjective health evaluations. The reference person in the household was asked to rate his/her overall health status (i.e., “How would you rate your health in general?”) and each household member’s health status (i.e., “How would you rate his/her health in general?”)¹ on a scale from 1 (very bad) to 5 (very good)². This single-item measurement of subjective health has been shown as a globally valid and reliable instrument by numerous studies predicting objective health, morbidity, and mortality (e.g., De Salvo et al., 2006; Idler & Benyamini, 1997; Jylhä, 2009).

3.3.2 Predictors

The following predictors were included in the current analysis: gender, age, age-squared, education, employment, presence of a chronic illness, smoking, alcohol use, individual happiness, family happiness, socio-economic status, number of children, household size, presence of an elderly and disabled person in the household.

Individual-level variables included gender (women as a reference), age (in years), age-squared³, education, employment (unemployed as a reference), having a chronic illness (absence of an illness as a reference), smoking, alcohol use⁴, and happiness. Happiness was assessed based on the question, “How happy are you when you consider your life

¹ There were few cases (3.3%) in which the health status of family members was reported by a reference person who was neither the husband nor the wife. For the remaining families, most reference people were husbands (94%) who reported their health status and the health status of their spouse.

² If the normal distribution assumption is not violated as is the case in the current analysis for subjective health scores (Skewness = -0.871, Kurtosis = 0.986), evaluating an indicator measured by a 5-point Likert-type scale as a continuous variable could lead to a small bias (Dolan, 1994). Therefore, following this suggestion and previous practices (e.g., Borisova, 2019), subjective health was included in the current analysis as a continuous variable.

³ We also considered age-squared in the model based on some previous findings (e.g., Aguilar-Palacio et al., 2018), suggesting an exponential relationship between age and health especially after a certain age.

⁴ Considering unbalanced sample sizes for each category of the two variables (i.e., smoking and alcohol consumption, see Table 1), these variables were dummy coded with two levels by collapsing the categories (i.e., 0 = do not smoke, 1 = smoking; 0 = no alcohol consumption, 1 = consumes alcohol). For both variables, zero refers to never smokes/never consumes alcohol and quit smoking/quit alcohol consumption. The remaining categories were incorporated into one, referring somewhat presence of smoking or alcohol consumption.

as a whole?” ranging from 1 (very unhappy) to 5 (very happy). Such a validated, single-item question was frequently used in previous research measuring individual happiness (Andrews & Robinson, 1991).

Family-level variables included family happiness, socioeconomic status (1=lower, 2=middle, 3=higher)⁵, number of children, household size, and presence of an elderly and disabled person in the household (absence as a reference). A family happiness score was obtained from both spouses based on the question, “Considering the general state of happiness, which statement represents your family best?” It was rated on a five-point scale (1=very unhappy, 5=very happy), with higher scores representing increased family happiness. The final score for family happiness was generated by averaging spouses’ individual ratings. This single-item question regarding family happiness was shown to be a valid tool (Shen et al., 2019).

3.4 Analysis Strategy

In health studies, contextual factors are rather ignored (Diez-Roux, 2000) while variables at the individual level are frequently considered. However, in the present study, the impact of contextual (i.e., family/couple) and individual variables on subjective health was examined while considering interdependency between such predictors at different levels. In this way, the correct estimation of error terms could be increased – reflecting the fundamental reasoning behind multilevel modeling – in those two levels (i.e., individual- and family/couple-level). Thus, multilevel analysis was conducted using the IBM SPSS 20.0 package to examine hierarchically nested data. The estimation method was chosen as the maximum likelihood to examine regression coefficients and variance components simultaneously (Bickel, 2007). All continuous predictors were grand-mean centered as recommended due to computational advantage (Enders & Tofghi, 2007) since we were interested in the main effects of level 1 and level 2 variables while controlling their effects on each other.

Gender, age, age squared, education, employment, chronic illness, smoking, alcohol use, and happiness were placed as level 1 explanatory variables, proposing individual-level predictors. Family happiness, SES, length of the marriage, number of children, household size, and presence of an elderly and a disabled person in need of care in the household were examined as level 2 explanatory variables, representing family-level predictors.

3.4.1 Models Tested in the Study

We performed a two-level hierarchical linear modeling on subjective health by considering individual (i.e., Level 1) and family level (i.e., Level 2) predictors. A total of four models were computed sequentially. Model 1 (null model) was tested on subjective health to compute individual- and family-level variation. In Model 2, we included individual-level predictors. In Model 3, we estimated subjective health on both level 1 and level 2 predictors. Finally, in Model 4, since our predictor was happiness (both individual- and family-level) on subjective health, the slope for individual happiness was set random across families.

⁵ SES was categorized by the Turkish Statistical Institute (2016) based on the following criteria: including highest educational degree, income per capita, ownership status of the residence, the heating system of the house, car ownership, having a dishwasher, second TV, DVD and internet connection in the dwelling. In line with that information, a final score of SES for the family was generated.

Therefore, we were interested in whether individual happiness would change across families and whether that change would explain significant variance in the model. That would enable examining whether the link between personal happiness rating and subjective health could vary depending on families/couples. Each model was compared with the previous one based on the deviance statistics to determine the model's goodness of fit. Models with a lower deviance statistic present a better fit than models with a higher deviance statistic. The differences in deviance statistics and degrees of freedom between the nested models for significance were interpreted via the chi-square difference test (Hox et al., 2017). Also, the *r*-squared information of Model 4 was calculated using Raudenbush and Bryk's (2002) method of the proportional reduction in parameter variances for individual-level and family-level variances, separately as follows: the variance difference between Model 1 and Model 4 was divided by the variance of Model 1.

Furthermore, we examined competing models testing potential variations in effect sizes in the top-down (referring to the path from happiness to health) and the bottom-up (referring to the path from health to happiness; see more in Feist et al., 1995) structural models of subjective health at each level separately. Exploring such alternative models would enable us to address a notable research gap in the literature, where such alternative relationship patterns were not examined in such nested data involving variables at different levels. This investigation is especially relevant for elucidating the bidirectional link between the two constructs, which has generated significant interest from the past (e.g., Feist et al., 1995) to contemporary research (e.g., Bieda et al., 2019; Diener et al., 2017; Steptoe, 2019). Statistical significance was considered achieved when the *p*-value was less than 0.05 while interpreting the results in all analyses.

4 Results

4.1 Descriptive Statistics

Descriptive statistics for the study variables were presented for individual-level predictors (see Table 1) and family-level predictors (see Table 2), separately. About half of the participants reported that they were employed, had a primary school education, and consumed alcohol and cigarettes to a limited extent. Subjective health and general happiness ratings were also slightly above average on a five-point scale (see Table 1). In addition, when the family level variables were examined, participants reported the level of happiness in the family slightly above the average value on a five-point scale. The majority of the participants were from average SES (see Table 2). An intra-class correlation of 0.50 was obtained using Model 1, suggesting that 50% of the variance in subjective health was at the family level and the other half of the variance at the individual level, which provided a good reason for running a multilevel model.

4.2 Model Testing

The remaining models were given in Table 3. Accordingly, in Model 2, introducing individual-level variables significantly improved model fit. In Model 3, family-level variables explained significant variance in the model. In Model 4, estimating the random slope for

Table 1 Descriptive statistics for individual-level variables

| Variables | Women (N=9,634) | | Men (N=9,634) | | Total (N=19,268) | |
|----------------------------------|--------------------|-----------|------------------|-----------|---------------------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Subjective health (1–5) | 3.69 | 0.74 | 3.74 | 0.74 | 3.72 | 0.74 |
| Happiness (1–5) | 3.90 | 0.69 | 3.92 | 0.69 | 3.91 | 0.69 |
| Age | 45.52 | 13.70 | 49.32 | 13.83 | 47.42 | 13.90 |
| | Percentage | | | | | |
| Employed | 26.7 | | 68.7 | | 47.7 | |
| Having a chronic illness | 27 | | 24.5 | | 25.8 | |
| Education | | | | | | |
| <i>No school degree</i> | 20.6 | | 6.4 | | 13.5 | |
| <i>Primary school</i> | 46.4 | | 45.2 | | 45.8 | |
| <i>Secondary school</i> | 8 | | 11.9 | | 10 | |
| <i>High school</i> | 12.7 | | 18.1 | | 15.4 | |
| <i>College degree</i> | 11.2 | | 16.9 | | 14 | |
| <i>Graduate degree</i> | 1 | | 1.6 | | 1.3 | |
| Smoking | | | | | | |
| <i>Never used</i> | 73.6 | | 26.2 | | 49.9 | |
| <i>Quit</i> | 8.9 | | 29.7 | | 19.3 | |
| <i>Sometimes</i> | 4.5 | | 4.8 | | 4.6 | |
| <i>Everyday</i> | 13 | | 39.2 | | 26.1 | |
| Alcohol use | | | | | | |
| <i>Never used</i> | 86.5 | | 57.5 | | 72 | |
| <i>Quit</i> | 1.8 | | 19.9 | | 10.9 | |
| <i>Only on special occasions</i> | 10.6 | | 14.8 | | 12.7 | |
| <i>Several times in a month</i> | 0.7 | | 4.2 | | 2.4 | |
| <i>Several times in a week</i> | 0.2 | | 2.8 | | 1.5 | |
| <i>Everyday</i> | 0.1 | | 0.9 | | 0.5 | |

Table 2 Descriptive statistics for family-level variables

| Variables | <i>M</i> | <i>SD</i> |
|-----------------------------------|-------------------|-----------|
| Family happiness | 3.88 | 0.57 |
| Number of children | 2.65 | 1.75 |
| Household size | 3.53 | 1.44 |
| Length of the marriage (in years) | 24.3 | 14.98 |
| | Percentage | |
| An elderly in the resident | | 3.4 |
| A disabled person in the resident | | 3.5 |
| SES | | |
| <i>Lower</i> | | 10.6 |
| <i>Middle</i> | | 70.6 |
| <i>Higher</i> | | 18.8 |

happiness significantly improved the model, indicating that the relationship between individual-level happiness and subjective health differs across families. All models were compared with the previous model using deviance statistics, and the final model (i.e., Model 4) provided the best fit to the data. For individual-level variables, Model 4 suggested that

Table 3 Fixed and random effects for models of subjective health

| Parameter | Model 1 | Model 2 | Model 3 | Model 4 | Effect size |
|-------------------------------|---------------|--------------------|-------------------|-------------------|-------------|
| Fixed Effects (B) | | | | | |
| Intercept | 3.72(0.01)** | 3.94(0.01)** | 3.94(0.01)** | 3.94 (0.01)** | |
| Individual-level | | | | | |
| Happiness | | 0.06(0.01)** | 0.03(0.01)** | 0.04(0.01)** | 0.04 |
| Men | | 0.02(0.01)* | 0.03(0.01)** | 0.03(0.01)** | 0.03 |
| Age | | -0.01(0.0004)** | -0.01(0.001)** | -0.01(0.001)** | -0.06 |
| Age squared | | -0.0001(0.00002)** | -0.0001(0.00002)* | -0.0001(0.00002)* | -0.02 |
| Education | | 0.05(0.003)** | 0.03(0.004)** | 0.03(0.004)** | 0.06 |
| Employed | | 0.03(0.01)** | 0.03(0.01)** | 0.03(0.01)** | 0.02 |
| Having a chronic illness | | -0.91(0.01)** | -0.90(0.01)** | -0.90(0.01)** | -0.52 |
| Smoking | | 0.00(0.01) | 0.00(0.01) | 0.00(0.01) | - |
| Alcohol use | | 0.00(0.01) | -0.01(0.01) | -0.01(0.01) | - |
| Family-level | | | | | |
| Family happiness | | | 0.07(0.01)** | 0.06(0.01)** | 0.05 |
| SES | | | 0.08(0.01)** | 0.08(0.01)** | 0.05 |
| Number of children | | | -0.02(0.003)** | -0.02(0.004)** | -0.03 |
| Household size | | | 0.01(0.004)* | 0.01(0.004)** | 0.02 |
| Length of the marriage | | | -0.00(0.00) | -0.00(0.00) | - |
| Presence of a disabled person | | | -0.10(0.03)** | -0.10(0.03)** | -0.03 |
| Presence of an elderly person | | | -0.17(0.03)** | -0.17(0.03)** | -0.04 |
| Random Effects | | | | | |
| Within-family variance | 0.27(0.004)** | 0.17(0.002)** | 0.17(0.002)** | 0.16(0.002)** | |
| Between-family variance | 0.27(0.01)** | 0.13(0.003)** | 0.12(0.003)** | 0.12(0.003)** | |
| Happiness slope | | | | 0.018(0.003)** | |
| Deviance Statistics | 40092.51 | 29405.15 | 29153.44 | 29108.96 | |
| Parameters | 3 | 12 | 19 | 20 | |
| $\Delta\chi^2$ | | 10687.37** | 251.71** | 44.47** | |
| Δdf | | 9 | 7 | 1 | |

Note. Dummy-coded variables; Gender (0=woman, 1=man), Employment (0=unemployed, 1=employed), Having a chronic illness (0=absence of a chronic illness, 1=presence of a chronic illness, Smoking (0=no, 1=yes), Alcohol use (0=no, 1=yes), Presence of a disabled person (0=no, 1=yes), Presence of an elderly person (0=no, 1=yes). Model 1 tests to what extent there could be a variation regarding the predictor role of the individual- and family-level variables on subjective health. Model 2 tests the predictor role of the individual-level variables on subjective health. Model 3 tests the predictor role of the family-level variables on subjective health. Model 4 tests whether individual happiness would change across families and whether that change would explain significant variance in predicting subjective health. Unstandardized coefficients (*B*) were reported. Standard errors are in parentheses. The magnitude of each variable on subjective health was interpreted through standardized coefficients based on the final model (i.e., Model 4). * $p < .05$, ** $p < .001$.

the proportion of within-family variance explained by individual-level predictors was 39%. Specifically, men reported better subjective health than women. Being happier, younger, more educated, and employed positively predicted better subjective health. The negative association between age (age² variable) and poor subjective health was stronger as people got older⁶. Having a chronic illness was negatively associated with subjective health. However, smoking and alcohol use were not associated with subjective health.

The proportion of between-family variance explained by family-level predictors was 57%. Particularly, spouses with higher family happiness, SES, and household size also reported an increase in subjective health. An increase in the number of children was related to worse subjective health. The presence of an elderly and disabled person needing care in the family was associated with poor subjective health. The length of the marriage remained non-significant in the final model⁷.

The significant slope variance for individual happiness indicated that families were significantly different in terms of the effect of individuals' happiness on subjective health. Overall, the effect sizes provided for significant predictors ranged from -0.02 to -0.52 (see Table 3). Among individual-level predictors, having a chronic illness provided the largest effect size. Family happiness and SES were found to have the largest effect sizes at the family level.

Finally, a follow-up analysis showed insights regarding the bidirectional relationship between subjective health and happiness (see Supplementary Materials). In that analysis, two models were tested separately. In the first model, the outcome variable was subjective health. In the second model, the outcome variable was happiness. Each model included three sub-models (i.e., Model 1, Model 2, and Model 3), as shown in Table SM1 and Table SM2. Model 2(s) included only individual-level variables, and Model 3(s) included only family-level variables to compare the bidirectional relationship in each level separately. Findings showed that the two effect sizes of happiness and subjective health (i.e., 0.08 and 0.08) were identical at the individual level (see Model 2 results in Table SM1 and Table SM2). Similarly, the two effect sizes of happiness and subjective health (0.12 and 0.15) were proximate at the family level (see Model 3 results in Table SM1 and Table SM2). Thus, the follow-up analysis presented some insights regarding a reciprocal causality between the two constructs, health and happiness.

5 Discussion

In this current study, we conducted a multilevel analysis to explore the factors predicting subjective health at both individual and family levels, using a nationwide survey representing the Turkish population. Individual-level variables were gender, age, education, employment, presence of chronic illness, smoking, alcohol use, and individual happiness.

⁶ The way age² variable was interpreted in the current analysis was explained in detail elsewhere (see Reid & Allum, 2019). Following that explanation, it was found that decline in health ratings with age would become exponential or stronger after the age of 44 in the current sample. Such a stronger decline was inferred through the negative sign of age² variable.

⁷ An additional analysis was conducted by adding the mean age of both partners in the family-level model since the length of marriage is related to age. This would enable readers to see whether a significant relationship between marriage length and subjective health may have been masked by the counteracting effect of age. However, there was no change regarding the link between marriage length and subjective health.

Family-level variables were SES, number of children, household size, duration of the marriage, presence of a disabled person needing care, presence of an elderly needing care, and family happiness. Therefore, the current study investigated the predictor role of happiness at different levels and attempted to re-test previous findings regarding determinants of subjective health in representative data. Consistent findings with previous research (e.g., Aydın, 2020; Etiler, 2016; Horasan et al., 2019) regarding the demography of Turkey in predicting subjective health could support the reliability of our findings.

5.1 Subjective Health and Demographics

At the individual level, male gender, younger age, employment, higher education, and the absence of chronic illness contribute to better health, indicating robust results with previous population-based studies (e.g., Borisova, 2019; Herman et al., 2013; Park & Lee, 2013) including Turkey (e.g., Aydın, 2020; Horasan et al., 2019). Consistent with previous findings (e.g., Aguilar-Palacio et al., 2018), the relationship between aging and poor subjective health was stronger as people got older. In addition, greater individual happiness predicted better subjective health as it did in previous population-based studies (e.g., Cai et al., 2017; Mwinnyaa et al., 2018). However, subjective health was not associated with smoking and alcohol use, suggesting consistent findings in some other studies (e.g., Cai et al., 2017; Etiler, 2016; Gilmore et al., 2002). These non-significant findings could be explained by the lower frequency of smoking and alcohol use in the Turkish population. Half of the respondents reported that they had never smoked, and the majority of the respondents reported that they had never consumed alcohol. The association between smoking, alcohol use, and health seems inconclusive, considering potential conditional associations (Aguilar-Palacio et al., 2018; Frisher et al., 2015). For instance, Aguilar-Palacio et al. (2018) suggested that the link between smoking and worse subjective health could be non-significant in different generations (e.g., baby boomers). Additionally, Frisher et al. (2015) reported that the link between alcohol use and subjective health was not significant across varying drinking profiles.

At the family level, better subjective health was associated with higher SES, larger household size, fewer children, and greater family happiness. Respondents also reported worse subjective health when there was an elderly needing care in the household. This was the same when there was a disabled person who needed care in the household. There was no association between the length of the marriage and subjective health. Previous studies indicated the relationship between higher SES and better subjective health, suggesting that people with higher SES would be more likely to have better nutritional status, housing conditions, and more access to medical services (Adler et al., 1994).

Similarly, an increase in household size was shown as a predictor of better subjective health in previous studies (e.g., Hung & Lau, 2019). This may especially be the case for collectivist cultures where family relationships and cohesion are quite valued, as Lykes and Kemmelmier (2014) suggested that an increase in household size was related to a lower sense of loneliness, predicting better health (Cacioppo et al., 2003). However, an increase in the number of children was related to worse subjective health, which may be due to additional burdens on cognitive and financial resources for spouses (Langley et al., 2017).

When it comes to the length of the marriage that was found non-significantly related to subjective health in the current analysis, it was reported that as duration increases, marital

satisfaction – which could be a strong predictor of health (Whisman & Uebelacker, 2003) – would tend to decrease (Karney & Bradbury, 1995). Therefore, the duration of marriage was added to the model as a family-level indicator that could be critical for the spouses' subjective health. However, there were also findings pointing out that the duration of marriage did not lead to substantive differences in relationship satisfaction, which is a critical health-related outcome (Baucom et al., 2020). Furthermore, there may be an underlying mechanism where the potential link between the duration of the marriage and relationship satisfaction may be fully mediated by perceptions of conflict communication (Stewart, 2012).

Moreover, the presence of a disabled person in the household was associated with worse subjective health. This result could be interpreted based on the family system theory, suggesting that family relationships may be complex and systematically related to each other. In a sense, the experience of one of the family members (e.g., a person with a disability) could influence the whole family (Cox & Paley, 1997; Seligman & Darling, 2007). Similarly, the presence of an elderly in the household led respondents to report worse subjective health that was consistently reported in meta-analyses focusing on both subjective health (e.g., Pinquart & Sörensen, 2003; Pinquart & Sörensen, 2007) and objective health (Vitaliano et al., 2003). The worse subjective health of caregivers may be due to physical effort leading to muscle strain, physical discomfort, and pain. Also, psychological problems (e.g., depression) caused by distress in the caregiver would weaken the immune system (Shaw et al., 1997).

5.2 Subjective Health and Happiness

Happiness seems to be a significant predictor of subjective health at both individual and family levels. A significant predictor role of individual happiness on subjective health is consistent with epidemiological studies (e.g., Chida & Steptoe, 2008) and meta-analysis studies (e.g., Veenhoven, 2008), indicating that happiness could influence physical health, mortality, and morbidity. There are at least two explanations for such a relationship.

First, a biological explanation suggests that greater individual happiness during the day leads to a lower level of cortisol output (Steptoe et al., 2005, 2008). The lower cortisol level is especially vital for immune regulation in terms of physiological outcomes such as central adiposity, bone calcification, and reduced inflammatory and cardiovascular response in acute stress conditions (Steptoe et al., 2008). In addition, experimental studies supported the idea that happiness could influence immunity (e.g., Cohen et al., 2006; Rosenkranz et al., 2003). For instance, in a study conducted by Cohen et al. (2006), voluntary participants were exposed to rhinovirus and influenza virus after assessing baseline happiness levels and followed for about a week. It was found that participants having greater happiness at baseline showed higher resistance to developing cold. This idea was also supported that chronic unhappiness could affect the immune system, increase blood pressure and existing health-related problems, or lead to new health problems (Veenhoven, 2008).

Second, it was reported that happy individuals would be more likely to adopt a healthier lifestyle; for example, they do not eat much, avoid smoking and alcohol, and do physical exercise (Sabatini, 2014; Van Cappellen et al., 2018; Veenhoven, 2008). According to the upward spiral theory of lifestyle change, if positive emotions like happiness are experienced while practicing health-promoting behaviors, an unconscious motivation arises for individuals to be committed to such behaviors in the future. Then, this motivation can be

strengthened with biopsychosocial resources through positive emotions, leading to a healthy lifestyle (Van Cappellen et al., 2018).

In the current analysis, we included family happiness, which has rarely been investigated, considering its interdependence with individual happiness. For example, research including a population-based survey and a community-based intervention for families in China showed that higher family happiness was associated with greater personal happiness and better physical and mental health (Shen et al., 2019). This interdependence may be especially salient in collectivistic cultures where family relationships and cohesion are more valued, so individual happiness may not be achieved without family happiness (Lu et al., 2001). In parallel with this statement, findings of a seminal work conducted by Diener et al. (2000) in 41 countries presented that individual happiness was less valued in collectivist societies such as Japan, Korea, and China compared to individualistic cultures. There are also findings stating that people from four different cultures (Canada, Colombia, Japan, and Poland) value family happiness over individual happiness (Krys et al., 2019a). Psychology studies often focus on the individual (Bond, 2002); however, as cross-cultural studies mentioned above showed, there may be cultures in which the family – which is the oldest and most primary unit of society (Krys et al., 2019a) – may be more important for well-being than the individual.

5.3 Implications

Based on the current study's findings, it can be suggested that positive psychology interventions aiming to promote happiness should include the family as a whole. Although positive psychology interventions often focused on individuals in the West (Ho et al., 2016), there were few positive psychology intervention attempts aiming to boost not only subjective happiness but also family happiness, which in turn could promote health and well-being (e.g., Ho et al., 2016a, b, 2020).

For instance, the Happy Family Kitchen Movement, which was applied by Ho et al. (2020), is an example of a community-based positive psychology intervention targeting families in Hong Kong. Social service workers and teachers carried out this brief intervention through hands-on experiential learning practices created for family members during cooking and dining activities – in which great opportunities could be provided to strengthen the sense of bonding, togetherness, and harmony among family members – focusing on positive psychology themes such as joy, gratitude, or savoring (Ho et al., 2020). The researchers indicated adaptive outcomes of the intervention in which participants reported greater subjective happiness, family happiness, and better health-related outcomes. These results were also highly consistent with the previous versions of the intervention, i.e., the Happy Family Kitchen-1 (Ho et al., 2016b) and the Happy Family Kitchen-2 (see also Ho et al., 2016a). The researchers argued that these results could particularly be attributed to the collectivist culture of China, where the sense of belongingness and harmony in family relationships are quite valued (Ho et al., 2020). Therefore, future studies aiming to promote health and well-being in the Turkish population can consider such interventions in light of the current study's findings.

Interventions aiming to improve health-related outcomes are not limited to positive psychology aspects. Considering this study's findings, any intervention targeting to ease the burden of chronic illness (e.g., Lim et al., 2012), disabled (e.g., Lawang et al., 2013), or

elderly person care (e.g., Beauchamp et al., 2005) could promote subjective health evaluations. For instance, interventions targeting individuals with chronic illness for effective self-management (e.g., being voluntary for treatment, regular health check-ups; Schulman-Green et al., 2012) and behavioral change (e.g., regarding poor diet, tobacco use, lack of physical exercise; Lim et al., 2012) could be another strategy fostering better health evaluations (Moussavi et al., 2007). In addition to individual-level interventions, couple-oriented interventions, involving both the caregiving partner and the care-recipient partner, to facilitate behavioral change (e.g., decision-making for a treatment), self-management, and decreasing caregiving burden were found to be related to better health and well-being outcomes reported by both couples (Martire et al., 2010).

Likewise, interventions targeting behavioral change in people responsible for such primary care should aim to provide informational, instrumental, and psychosocial support for the caregivers (Beauchamp et al., 2005; Lawang et al., 2013) since the health and well-being of people who are responsible for the primary care of an elderly or a disabled person would decrease over time (Rigby et al., 2009). For instance, providing education for caregivers regarding age-related illness (e.g., diabetes, stroke, dementia) or the nature of the disability of a care-recipient and self-management strategies could decrease depression and caregiving burden while increasing caregiving capacity (Wasilewski et al., 2017). Another strategy to improve the health and well-being of caregivers could be educative web-based interventions providing information on how to contact healthcare professionals and peers responsible for the same type of primary care (see Wasilewski et al., 2017).

5.4 Limitations

The current findings should be interpreted cautiously because cross-sectional data limits our understanding of causal inferences. Also, the generalizability of the findings is limited to the Turkish population. In addition, mere assessments based on self-reports may be a problem for subjective health since it could be susceptible to biased answers. Here, another limitation is that the outcome variable was measured by only one item.

Another limitation could be the lack of data on variables influencing the link between close relationship dynamics and health, such as a sense of loneliness and marital/relationship satisfaction. We attempted to claim indirect inferences via such variables while interpreting some findings (e.g., the link between the number of children and subjective health). Thus, future population-based studies may consider including such critical close relationship dynamics to directly examine health-related outcomes.

Recent findings in the existing body of knowledge suggest bidirectional causal pathways between happiness and health. In this context, the follow-up analysis in the current study showed some insights regarding the bidirectional causality between health and happiness by examining the effect sizes in each level separately. Future studies should expand that insight by specifically focusing on the potential bidirectional causality between health and happiness. In addition, potential mediators and moderators should specifically be assessed to conclude that there could be a causality between happiness and health.

6 Conclusion

In this study, the role of individual and family happiness, beyond various demographic covariates, on subjective health was examined for the first time in Turkey through a population-based survey. The results draw a general picture for promoting subjective health evaluations. At the individual level, male gender, younger age, employment, higher education, the absence of chronic illness, and greater happiness contribute to better subjective health. Among those predictors, having a chronic illness explained a remarkable amount of effect size. However, after controlling the effect of having a chronic illness on subjective health, the aforementioned predictors were still significant in the model with modest effect sizes. At the family level, greater family happiness, higher SES, having fewer children, greater household size, and absence of an elderly or disabled person in the household were significant predictors of better subjective health with modest effect sizes. Based on the similar effect sizes, greater happiness at both levels could be as influential as various demographic variables on subjective health. Future positive psychology interventions aiming to promote health-related outcomes in Turkey are highly encouraged in light of the current findings. In addition to positive psychology interventions, the relationship between the demographic structure and subjective health obtained from the present study would be vital for decision-makers and public health agencies regarding health-related policy development in Turkey.

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Data Availability All data and material belongs to Turkish Statistical Institute and it can be accessed upon request from the Turkish Statistical Institute via the following link: https://www.tuik.gov.tr/Kurumsal/PDF_Detay.

Code Availability Not applicable.

Declarations

Ethics Approval This study was based on secondary analysis of data with no participants identifiers. Thus, formal ethical clearance was not required.

Compliance of Ethical Standard Statement All procedures performed in studies involving human participants were in accordance with the ethical standards of the national research institute (Turkish Statistical Institute).

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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