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The Relationship among Dysfunctional Attitudes and Automatic Thoughts, General (Mental) Health Status and Health Promotion Behaviors of Women: A Structural Equation Modelling Approach

Kadınların İşlevsel Olmayan Tutumları ve Otomatik Düşünceleri ile Genel (Mental) Sağlık Durumları ve Sağlığı Geliştirme Davranışları Arasındaki İlişki: Yapısal Eşitlik Modeli

Nuriye Yıldırım Şişman

ABSTRACT

***Aim**: The aim of researcher was to investigate the relationships of dysfunctional attitudes, automatic thoughts of women with their mental health states and health-promoting behaviors.*
***Methods**: Study used a cross-sectional to test the relationships between variables. Studied variables were investigated by a multivariate analysis using a structural equation modeling approach.*
***Results**: Women's mental health states were indirectly affected by dysfunctional attitudes and directly affected by automatic thoughts. This interaction affected health-promoting behaviors. While the direct effect of dysfunctional attitudes on mental health was not significant, a significant positive correlation was found among dysfunctional attitudes, automatic thoughts. As the mental health state improved, healthy lifestyle behaviors were positively affected.*
***Conclusion**: The major finding with this study the demonstration that healthy lifestyle might be generated indirectly by changes in dysfunctional attitudes and automatic thoughts.*

***Keywords:** Woman, health promotion, mental health*

ÖZ

***Amaç**: Bu çalışmanın amacı, kadınların işlevsel olmayan tutumları, otomatik düşünceleri, genel (mental) sağlık durumları ile sağlığı geliştirme davranışları arasındaki ilişkileri incelemektir.*
***Yöntem**: Araştırmanın tipi kesitsel ve tanımlayıcı ilişkisel araştırma desenidir. Araştırılan ilişkiler, yapısal eşitlik modeli yaklaşımıyla çok değişkenli olarak incelenmiştir.*
***Bulgular**: Kadınların genel sağlık durumlarını indirekt olarak işlevsel olmayan tutumları ve direkt olarak otomatik düşüncelerinin etkilediği belirlenmiştir. Bu etkileşiminde sağlığı geliştirme davranışlarını etkilediği görülmektedir. İşlevsel olmayan tutumların genel sağlık üzerindeki direkt etkisi anlamlı bulunmamışken, işlevsel olmayan tutumlar ve otomatik düşünceler arasında anlamlı ve pozitif ilişki bulunmuştur. Mental sağlık durumu iyileştikçe sağlıklı yaşam biçimi davranışları da olumlu olarak etkilenmektedir.*
***Sonuç**: Bu çalışmanın en temel sonucu, indirekt olarak işlevsel olmayan tutumlar, otomatik düşünceler üzerinde yapılacak değişimlerle, sağlıklı yaşam biçimi davranışlarının oluşturulabileceğinin gösterilmesidir.*

***Anahtar kelimeler:** Kadın, sağlığın geliştirilmesi, mental sağlık*

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Nuriye Yıldırım Şişman
Duzce University, Faculty of Health Sciences, Department of Nursing, Duzce, Turkey
✉ nuriyeyildirim@duzce.edu.tr
ORCID: 0000-0003-3745-3751

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INTRODUCTION

Women generally become overweight due to pregnancy, incorrect eating habits and sedentary lifestyles [1]. Women use herbal treatments for diseases more often than men and more frequently believe in magic [2]. Women have lower education levels, participate in the work-force less and earn smaller incomes [3]. Mental disease are common in female [4]. A study by Kelleci, Asti, and Kucuk[5], found that 58.3% of women who were admitted to healthcare institutions with physical complaints also presented mental symptoms. Women implement health-promoting behaviors at low or moderate levels [6,7]. Morbidity and mortality in chronic diseases can be decreased by lifestyle changes[8] and women can improve their health by changing their own lifestyle and behaviors [9].

Changes in health behaviors include various social, emotional and cognitive factors [10]. In humans, thoughts, emotions and behaviors are related to each other. Any change occurring in any one of these factors also leads to changes in the other factors [11]. To change behaviors, thoughts should be first changed. Emotional problems may emerge when thoughts become negative and unrealistic [12]. Automatic thoughts are those that automatically occur in the mind of the individual. Dysfunctional attitudes that are included in an individual's cognitive structure shape their thoughts and result in cognitive errors, which lead to negative automatic thoughts. These thought errors can be observed among all humans [13]. Dysfunctional attitudes cause disturbing emotions such as depression, extreme anxiety, extreme embarrassment and anger as well as negative behaviors such as aggressiveness and shyness [14]. Negative automatic thoughts must be decreased to impact long-term anxiety [15]. It is difficult to change health-related risky behaviors such as physical immobility and malnutrition [10]. A previous study found that physical activity was strongly affected by weight-related internal factors [16]. Many studies have emphasized that, theoretically, dysfunctional attitudes and automatic thoughts are associated with the mental health of the individual[11,17] and many structural equation models evaluating this relationship exist in the literature [18-20]. No studies were found in the literature that both included structural equation modeling and evaluated the relationships of dysfunctional attitudes, automatic thoughts and mental health factors with health promotion. The factors that affect the health-promoting behaviors of women should be assessed when providing healthcare services [6]. Negative lifestyle behaviors should be changed to establish a healthy lifestyle. Being aware of automatic thoughts, nonfunctional attitudes is necessary for change. In this study, the relationships of nonfunctional attitudes, automatic thoughts with healthy lifestyle behaviors and mental health were assessed. Demonstration of these relationships will guide the implementation of preventive health practices.

Aims and Hypothesis: The aim was to examine the relationships of nonfunctional attitudes and automatic thoughts in women with their mental health states and health-promoting behaviors. Hypothetically, women's mental health states and health-promoting behaviors should be increased if their nonfunctional attitudes and automatic thoughts are decreased.

METHODS

Study Type

Study used a cross-sectional, correlational design to test the relationships between variables. Studied variables were investigated by a multivariate analysis using a structural equation modeling.

Study Sample

A total of 72,547 women older than 18 years of age live in the city center of Duzce. The study population included 664 women over 18 years old who were living in the city center of Düzce. The sample was within a 99% confidence interval with p=0.5 and d=0.05 [21]. Data were collected between May and September 2016. Ultimately, 629 women were included in the study. The women ratio was 95%, and the percentage of nonparticipants was 5%.

Data Collection Instruments

A perivate data form, the Health promotion scale II, General health questionnaire, an Automatic thoughts scale, and a Nonfunctional attitudes scale were used as data collection instruments.

The perivate data data included questions prepared by the researchers, including the sociodemographic characteristics of women.

Health promotion scale II (HPS)
Scale, which was developed in 1987 by Walker, was revised in 1996 and renamed the Health Promotion Scale II [22]. The scale is composed of 52 items. A Turkish adaptation of the scale was performed by Bahar, Beşer, Gördes, Ersin, And Kıssal [23]. The overall score of the scale provides a score of health-promoting behaviors. An increase in the score obtained from the scale indicates that the individual frequently performs the specified health behaviors. The Cronbach Alpha was 0.94 [23].

General health questionnaire (GHQ)
The GHQ was developed by Goldberg [24]. A Turkish adaptation of the scale was performed by Kilic in [25]. Individuals who score a 4 or less on the scale are considered to have normal mental health. Individuals who score 5 and more on the scale are considered to be a "risky group for mental problems" The Cronbach Alpha, as, was 0.84 for the total scale [25].

Automatic thoughts questionnaire (ATQ)
This questionnaire was developed by Hollon and Kendall [26]. It aims to measure the frequency of an individual's negative thoughts regarding themselves as well as their cognitive ruminations. It is composed of 30 items. Higher total scores indicate frequent automatic thoughts in an individual. A Turkish adaptation of the scale was conducted by Sahin and Sahin. The Cronbach Alpha, was 0.96 [27].

Dysfunctional attitudes scale-revised Turkish form (DASRTR)
This form was developed by Weissman and Beck [28]. A Turkish adaptation of the scale was performed by Batmaz and Ozdel [29]. The scale is that aims to measure depression-associated dysfunctional attitudes. Raw scores are used to calculate scale scores, which consist of two subscales. No cut-off point was determined for the scale. The Cronbach alpha 0.84 [29].

Statistical Analysis
Descriptive statistics were calculated for all study variables. A theoretical model showing the direct and indirect effects of the ATQ and DASRTR on the HPS using the GHQ as mediator variable was constructed using a structural equation modeling (SEM). Compliance of the dataset with multivariate normality and multicollinearity assumptions were controlled for using Mardia's kurtosis test for multivariate normality and the variance inflation factor (VIF), respectively. The Cronbach's alpha internal consistency coefficient was calculated for the reliability analysis of each scale included in the model. The SEM approach was used to calculate parameter assumptions of the recommended structural model using the maximum likelihood estimation (MLE).

The following model fit indices were used to assess the model: (χ^2/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), goodness of fit index (GFI), standardized root mean square residual (SRMR) and non-normed fit index (NNFI). The significance of the mediator variable in the suggested model was assessed using a Sobel test.

SPSS v.22 and LISREL 8.54 were used for statistical assessments. A value of $p<0.05$ was considered statistically significant.

Ethical Aspects Permission was obtained from the Duzce Governorship to conduct the study. Ethics permission was obtained (2016-38). Women were informed about the study both orally and in writing, participants were informed that participation was voluntary.

RESULTS

The mean age of the 629 women in this study was 37.22±14.15 years old, 29.7% of the women were employed, and 37.2% were university graduates. The sociodemographic characteristics of the participants are shown in detail in Table 1.

The theoretical model, which was generated to assess the direct and indirect effects of the ATQ and DASRTR on the HPS using the GHQ as mediator variable, is shown in Figure 1.

Mardia's kurtosis test for multivariate normality indicated that the data met the multivariate normality assumption ($p>0.05$). The multicollinearity assumption was controlled for by the VIF approach. The descriptive values and reliability coefficients of the scales included in the suggested structural model are provided in Table 2.

Data regarding the structural equation model that was obtained using the MLE estimation technique

Table 1. Sociodemographic Characteristics of the Participants

		N	%
Age (Mean±SD)	37.22±14.15		
Height	162.26±6.32		
Weight	67.26±13.97		
BMI	25.62±5.47		
Education level	Illiterate	18	2.9
	Literate	15	2.4
	Elementary school	131	20.8
	Secondary school	54	8.6
	High school	177	28.1
	University	234	37.2
Employment	Housewife	318	50.6
	Employed	187	29.7
	Retired	29	4.6
	Student	95	15.1
Family type	Core	513	81.6
	Large	100	15.9
	Broken	16	2.5
Children	Yes	426	67.7
	None	203	32.3
Family income	Income is less than expenses	127	20.2
	Income is equal to expenses	411	65.3
	Income is greater than expenses	91	14.5
Social assurance	Yes	559	88.9
	No	70	11.1
Location	City center	490	77.9
	County	85	13.5
	Village	54	8.6
Disease	Yes	194	30.8
	None	435	69.2
Medication	Yes	166	26.4
	None	463	73.6
Health state	Poor	17	2.7
	Moderate	256	40.7
	Well	356	56.6
Smoking	Yes	160	25.4
	No	469	74.6
Alcohol	Yes	25	4.0
	No	604	96.0
Physical activity	Yes	210	33.4
	No	419	66.6

SD: Standard Deviation

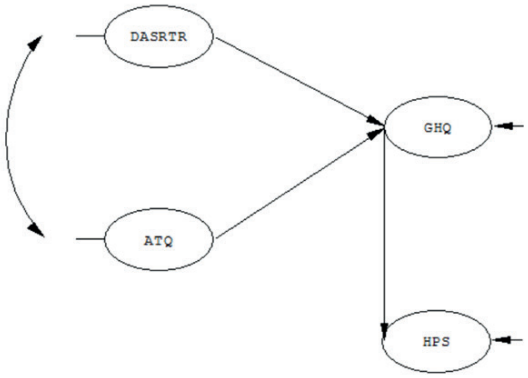
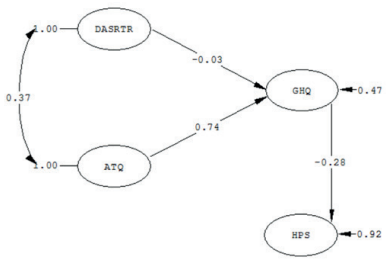
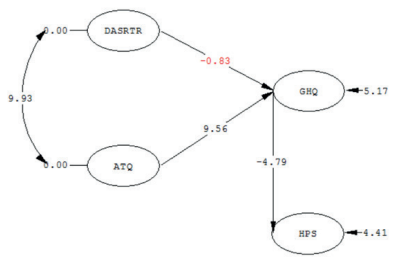


Figure 1. Conceptual structural equation model



Chi-Square=16787.25, df=7336, P-value=0.00000, RMSEA=0.045

Figure 2. Standardized solution of the structural equation model



Chi-Square=16787.25, df=7336, P-value=0.00000, RMSEA=0.045

Figure 3. Standardized solution (t value) of the structural model

and the model fit indices are reported in Table 3. Although the model was not found to be significant using a chi-square test, the suggested model was "acceptable" or "well fit" according to the fit indices. Path diagrams of the models are shown in Figures 2 and 3.

The range of standardized path coefficients and the t-value range for each item in the available structural equation model and appropriate structural equations are summarized in Table 4. Since all of the items of the scales in the model (total of 123 items)

Table 2. Descriptive Values and Cronbach's Alpha Coefficients of Each Scale Included in the Model

	Number of items in the original scale	Number of items in the model	Cronbach's Alpha	Mean	SD
Health Promotion Scale-HPS	52	52	0.907	131.04	18.70
General Health Questionnaire-GHQ	28	28	0.929	61.87	13.28
Automatic Thoughts Questionnaire-ATQ	30	30	0.964	26.49	13.10
Dysfunctional Attitude Scale Revised-DASRTR	13	13	0.888	49.80	20.54

Table 3. Model Fit Indices of the Mediation Model

	χ^2	df	p	χ^2/df	RMSEA	90% CI§ for RMSEA	CFI	GFI	SRMR	NNFI
Mediation model	16787.247	7336	<0.001	2.288	0.045	0.044-0.046	0.959	0.697	0.060	0.958

df: degree of freedom, RMSEA: root mean square error of approximation, CI: confidence interval, CFI: comparative fit index, GFI: goodness of fit index, SRMR: standardized root mean square residual, NNFI: non-normed fit index.

were found to be statistically significant, all of the items were included in the model. When the path diagrams shown in Figures 2 and 3 were examined, a significant positive correlation was found between the ATQ- and DASRTR-independent latent variables in the suggested model (rDASRTR-ATQ=0.37, t-value=9.93). While a significant positive direct effect of the ATQ-independent latent variable on the GHQ factor was found (bGHQ-ATQ=0.74, t-value=9.56), no significant direct effect of the DASRTR factor on the GHQ factor was identified (bGHQ-DASRTR=-0.030, t-value=-0.83). Moreover, neither independent latent variable had a direct effect on the HPS factor. However, these two independent latent variables affected the HPS factor indirectly through the GHQ mediator variable. While the ATQ had a positive and significant indirect effect on the HPS-dependent latent variable (bHPS-ATQ=-0.21, t-value=-5.13), the DASRTR latent variable did not have a significant effect on the HPS factor (bHPS-DASRTR=0.01, t-value=0.82). In this structural model, the significance of the GHQ mediator variable was also assessed using a Sobel test (Sobel test statistic=-4.28, p<0.05). The GHQ mediator variable showed a significant and negative direct effect on the HPS-dependent latent variable (bHPS-GHQ=-0.28 t-value=-4.79). As the value of the GHQ factor decreased (individuals with low GHQ total scores are considered normal), the HPS value increased (individuals implemented frequent healthy life style behaviors).

Table 4. Range and T-Value Range of the Standardized Path Coefficients and Structural Equations for Each Factor in the Structural Equation Model

	Number of items in the model	Range of standardized path coefficients of items in the model	t-value range of standardized path coefficients of items in the model
Health Promotion Scale-HPS	52	0.086 - 0.531	2.329 - 8.274
General Health Questionnaire-GHQ	28	0.112 - 0.281	7.708 - 9.584
Automatic Thoughts Questionnaire-ATQ	30	0.474 - 0.850	13.745 - 20.843
Dysfunctional Attitude Scale Revised-DASRTR	13	0.693 - 1.116	15.662 - 17.634
Structural equations	GHQ=-0.030DASRTR + 0.739ATQ (-0.828) † (9.557)		R^2=0.531
	HPS=-0.277GHQ (-4.794)		R^2=0.077

†t-value>1.96 was considered significant; t-value in parenthesis

DISCUSSION

In this study, the relationships of dysfunctional attitudes (DASRTR) and automatic thoughts (ATQ) with the general (mental) health states (GHQ) and health-promotion behaviors (HPS) of Turkish women were evaluated. Although the model was not significant according to a chi-square test, fit indices found the model to be "acceptable" and "well fit". As a confirmation of the model, a significant and positive relationship was found between dysfunctional attitudes and automatic thoughts of the women, and the effect of automatic thoughts on their mental health state was positive and significant. Dysfunctional attitudes and automatic thoughts affected health-promoting behaviors indirectly through mental health effects, which was a mediator variable. While the direct effect of dysfunctional attitudes on mental health and health-promoting behaviors was not significant, automatic thoughts were determined to have a significant and positive indirect effect on health promotion. The mental health mediator variable had a significant negative effect on health-promoting behaviors. Based on this finding, as the total mean scale score of the mental health factor decreased (individuals with a low GHQ total score were considered as normal, i.e., the mental health state of the individuals improved), the total mean score of health promoting-behaviors increased (higher HPS total scores indicated that individuals were implementing frequent health-promoting behaviors). Based on the model, we predicted that automatic thoughts of women would increase as their dysfunctional attitudes increased; an increase in automatic thoughts might negatively affect health-promoting behaviors indirectly by impairing the mental health state, which was a mediator variable, and health-promoting behaviors would be positively affected as the mental health state improved.

The Relationship between Dysfunctional Attitudes and Automatic Thoughts

Based on the model, it was estimated that negative automatic thoughts would increase as dysfunctional attitudes of the women increased. Dysfunctional attitudes been associated with diabetes [30]. In another study, dysfunctional attitudes were associated with negative self-modeling through negative attachment experiences [31]. Scores of automatic thoughts and dysfunctional attitude scales were higher among obese women with obstructive eating disorder [32]. Negative automatic thoughts and dysfunctional attitudes are among the causes of depression [17]. A brooding thinking style mediates the relationship between dysfunctional attitudes and depressive symptoms [19]. Automatic thoughts are predictors of emotional distress including fear and sadness [33]. In a study by Fonseca and Canavarro[20], women with depressive symptoms exhibited negative thoughts about motherhood and more dysfunctional attitudes. A previous study found that automatic thoughts and dysfunctional attitudes were associated with distress, and automatic thoughts were a mediator variable [18]. In the present study, a significant and positive relationship was also found between dysfunctional attitudes and automatic thoughts of women, and mental health was determined to be a mediator variable.

The Relationship among Automatic Thoughts, Mental Health and Health-Promoting Behaviors

Another finding that was confirmed by the model in the present study was that women's mental health state would improve as their negative automatic thoughts decreased and that their health-promoting behaviors would increase as their mental health states improved. Negative automatic thoughts were demonstrated to have a mediating effect between antenatal depression and negative life events [34]. In a previous experimental study, as negative automatic thoughts decreased, life satisfaction was enhanced [35]. Poor mental health was associated with elevated health risks [36]. Mental health can be improved by interventions for health promotion [37]. Lifestyle changes should focus on nutrition, alcohol, physical activity, smoking and stress management. A healthy lifestyle is required for the prevention of mental and physical health problems [38]. Individual reinforcement and health-promoting lifestyles were found to be associated with each other [39]. Therefore, the mental health and health-promoting behaviors of women, which were reinforced by automatic thoughts and indirectly reinforced by dysfunctional attitudes, may be improved. Physical immobility has been associated with increases in health-related expenses among middle-aged women [40]. Accordingly, making women improve their health-promotion behaviors will decrease health-related expenses. In a study by Yılmazel and Duman[41], Turkish women exhibited a moderate level of healthy lifestyle behaviors. Health education and interventions are required to improve health among Turkish women. In this study, the effect of dysfunctional attitudes on mental health was not significant, whereas the effect of automatic thoughts on the mental health state was both positive and

significant. Additionally, mental health, which was a mediator variable, directly affected healthy lifestyle behaviors.

While the relationship of dysfunctional attitudes and automatic thoughts with depression has been examined in diabetic patients in the literature[30], no structural equation modeling study has been performed to evaluate dysfunctional attitudes, automatic thoughts and mental health factors among healthy women. Importantly, aside from mental health, healthy lifestyle behaviors were also indirectly affected by changes in dysfunctional attitudes and automatic thoughts in this constituted structural equation model. This finding will facilitate the design of randomized controlled studies in the future.

CONCLUSIONS

The main finding of this study was the demonstration that healthy lifestyle behaviors might be generated indirectly by changes in dysfunctional attitudes and automatic thoughts. According to social cognitive theory, which is based on the health promotion model, an individual's thoughts shape their behaviors [42]. Accordingly, nursing interventions for the changes in dysfunctional attitudes and automatic thoughts will contribute to the improvement of health. Based on this result, we recommend to conducting randomized controlled studies that focus on changes in dysfunctional attitudes and negative automatic thoughts to establish evidence-based practice.

Author contribution
Study conception and design: NYŞ; data collection: NYŞ; analysis and interpretation of results: NYŞ; draft manuscript preparation: NYŞ. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval
The study was approved by the Düzce University, Faculty of Medicine, Non-Invasive Clinical Research Ethics Committee (Protocol no. 2016-38/18.04.2016).

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Conflict of interest
The authors declare that there is no conflict of interest.

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