



**Journal of Education in Science,
Environment and Health**

www.jeseh.net

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ISSN: 2149-214X

To cite this article:

Yilmaz, M. & Cakirlar-Altuntas, E. (2022). A study to develop a health self-efficacy scale. *Journal of Education in Science, Environment and Health (JESEH)*, 8(3), 242-252. <https://doi.org/10.55549/jeseh.1158503>

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A Study to Develop a Health Self-Efficacy Scale

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Article Info

Article History

Published:
01 July 2022

Received:
09 February 2022

Accepted:
02 June 2022

Keywords

Health
Health self-efficacy
Self-efficacy
Psycho-social scale
development

Abstract

Health self-efficacy (HS), defined as the belief of being able to take actions necessary to be healthy, is crucial for improving individuals' health-related behaviors. That is why there is a need for a valid and reliable scale to measure people's level of HS. This study aims to develop a scale that enables the measurement of HS of individuals. This is a study for developing a scale that uses the survey methodology. Data obtained from two different sample groups have been evaluated through exploratory and confirmatory factor analyses. Through the factor analysis carried out to put forward the framework of the scale, we determined that the HS comes under nine categories, and that 81.4% of HS is explored. We have examined the 9-factor framework of the "Health Self-Efficacy Scale" (HSS) that was developed through confirmatory factor analysis, observing that its fit indices are acceptable and the HS framework is confirmed. The Cronbach's alpha value of the scale is .93 and its sub-dimensions are between .85 - .96. The HSS, consisting of 36 items and providing data regarding the beliefs of individuals that they can manage to fulfill health-related practices, is a valid and reliable tool of measurement.

Introduction

At a time when the pandemic has impacted our world as never before, in order for societies to remain healthy, it is necessary, along with the reduction of social and environmental risks, to maximize the effort shown to protect individual health. That way it will be possible to more quickly ameliorate the health practices and increase the quality of life of individuals, and accordingly, of societies. Led by the World Health Organization (WHO), the Bangkok Charter was signed, which defines the notions of encouragement and improvement of health as the process of people increasing their control over their health and its determining factors, and providing an opportunity to ameliorate their health (Bangkok Charter, 2005). The individual's health-related actions, their beliefs, behaviors, and experiences contribute to the health and the perception of the individualistic aspects of health (Ağaçdiken Alkan, Özdelikara & Mumcu Boğa, 2017). In this context, in order to protect and ameliorate health, it is indispensable that the studies on health self-efficacy increase.

It is shown that self-efficacy is measured for a variety of health-related behaviors such as in traditional clinical fields, intellectual development, health-related activities, and performance in sports. Moreover, it is a prominent and reintegrative theoretical framework that can explain and forecast psychological changes obtained through different treatment methods (Elshatarat et al., 2016). To add, self-efficacy that is health-related is accepted as a significant component of programs and models for improving health due to its support for a healthy lifestyle (Gandoy-Creco et al., 2016). Health self-efficacy is also defined as a person believing in their abilities to organize and realize the actions needed to overcome health-related situations (Von Ah et al., 2004), or that a person has an optimistic self-faith concerning resistance to unhealthy temptations and embracement of a healthy lifestyle (Schwarzer & Renner, 2000). It is clear that a society consisting of individuals with a higher level or health self-efficacy will cope with diseases more successfully, stay away from risky actions, and be better at protecting their health.

The results obtained from previous scientific research show the importance of the examination of self-efficacy's effects on individuals' health-related behavior. According to these results, it is known that self-efficacy considerably predicts the patterns of smoking and drinking, and the increasing belief of self-efficacy is an important determinant of quitting smoking at ages 18-29 (Von Ah et al., 2004); that the relationship between the perceived self-efficacy and the capacity of exercise should be used in improving health conditions (Selzler, Moore et al., 2020); and that it was tackled in studies with regards to nutrition, obesity, and weight control (Bas & Donmez, 2009). Other studies show that a high level of self-efficacy could be a protective factor against sleep problems and is crucial against the prevention and treatment of sleeping disorders (Schlarb et al., 2012); that it

explains protective behaviors against breast cancer by 67% (Umeh & Chadwick, 2016); and that it is in correlation with the increase in self-efficacy of getting an HPV vaccination and protection from the disease through vaccination (Stout et al., 2020). It is also stated that a high level of self-efficacy could support an individual with low spiritual intelligence to display proper health behavior (Omar Dev et al., 2018); and that people with higher self-belief are more resilient to stress in their careers (Lu et al., 2005).

The goal should be first to use the scales developed for measuring health self-efficacy to determine the self-efficacy of the individuals constituting the society, regarding whether they fulfill the necessary health-related behavior, and later on to improve this behavior through the application of public health and health education. This could strengthen the beliefs and perceptions of being healthy among individuals who make up the society, supporting the creation of a healthier society. The purpose of this study is to develop a valid and reliable health self-efficacy tool that measures the individuals' health self-efficacy levels.

Methods

This is a study of scale development using the principal survey model.

Sample

This study has used two different groups. The first group from which the exploratory factor analysis (EFA) data was obtained consists of 170 people, and the second one from which the confirmatory data was obtained consists of 429 people. A total of 599 participants attended the study, and the data on gender and age is given below, in Table 1.

Table 1. Gender and age distribution of participants

Variable		Frequency (f)	Percent (%)
Gender	Male	141	23.5
	Female	458	76.5
	Total	599	100
Age	12-15	17	2.8
	16-19	11	1.8
	20-24	62	10.4
	25-40	316	52.8
	41-55	169	28.2
	56-65	22	3.7
	66 and above	2	0.3
	Total	599	100

As written on Table 1, among the participants 23.5% are male and 76.5% are female. There are 17 participants (2.8%) in 12-15 age group, 11 (1.8%) in 16-19 age group, 62 (10.4%) in 20-24 age group, 316 (52.8%) in 25-40 age group, 169 (28.2%) in 41-55 age group, 22 (3.7%) in 56-65 age group, and finally, 2 participants (0.3%) at the age of 66 and above.

Data Collection

The study for the validity and reliability of the Health Self-Efficacy Scale has been carried out from March to July in 2020, during the COVID-19 pandemic. During the first stage of research, data from 170 participants were used in exploratory factor analysis (EFA), and data from the remaining 429 participants were used in confirmatory factor analysis (CFA). To enhance the impact of the study and to increase the reliability and validity, data collection was made from different provinces in all seven regions of Turkey and from individuals aged 12 and above. Convenience sampling method was used to reach the participants.

In the study data collection was conducted online. During the preparation, printed survey form and electronic web survey interface (Google Forms) were devised to collect data; communication methods such as face-to-face, e-mail, phone message, and/or web-based applications, etc. were used to reach the participants electronically. Necessary clarifications were made to the participants within the printed form and electronic data collection tools; the participants were informed that the study was being conducted on a voluntary basis and

they gave their approval. Only the results from the participants who completed the study were taken; those who did not wish to complete were allowed to leave the system without having completed/saved the study.

Tools for Data Collection

In the tool used for collecting quantitative data, the first part had information-gathering questions asking for personal information (gender, age) from the participants; the second part had the items for the draft health self-efficacy scale.

The Health Self-Efficacy Scale

During the preparation stage for the development of the Health Self-Efficacy Scale, we have delved into literature on self-efficacy and health-related behavior. Moreover, we have asked 21 people to state their opinions on what they consider as the most important health-related fields when it comes to protecting health. Also taking the qualitative evaluations into account, we determined 10 areas of protecting health (nutrition, physical activity, weight increase, harmful habits, adequate sleep, infectious diseases, immunity, protective health services that provide early diagnosis, stress, and spiritual relaxation). Upon inspection of literature on the field, despite the presence of scales that tackle self-efficacy and health separately (Gandoy-Crego et al., 2016; Renner, Knoll & Schwarzer, 2000), we have seen that there are no measurement tools that deal with “health self-efficacy” taking into account health to such an extent and as a whole. That is why there was no direct use of resources during the development of factors; however, we have taken into consideration the findings of Schmitz and Schwarzer (2000) that self-efficacy could be better measured with items concerning overcoming hardships and obstacles. On top of that, the four notions that the belief of self-efficacy is based on and can change/affect self-efficacy, namely mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states (Bandura 1977), were used for creating four items for every field of health. As a result, we developed a total of 40 items, consisting of 4 items from each of the 10 fields we had determined that are important for protecting health. During the pilot study phase; four pedagogues of the field, two experts on assessment and evaluation, and two experts on the Turkish language examined the items. In accordance with expert opinions, four items related to immunity were removed due to the lack of direct relevance to health, but more relevance to after the loss of health. In the end, the draft of the scale was finalized with 36 items. On the scale, the participants stated to what extent they agree or disagree with the items on the Health Self-Efficacy Scale by choosing among the following responses: “I completely agree (5), I mostly agree (4), I partly agree (3), I hardly agree (2), I disagree (1)”.

Data Analysis

While developing the scale, we first examined the normality of distribution and the outliers to determine that the necessities for the factor analysis are met. After that, exploratory factor (maximum likelihood) analysis was used for setting forth the data structure and decreasing the factor; confirmatory factor analysis was used for testing the structure obtained. The proof of validity was tested with the total item test correlation and the correlation coefficient obtained from the highest and lowest 27% of the group. Reliability was confirmed with Cronbach’s alpha values of both the scale in general and of each factor. This study used IBM SPSS Statistics 28.0 and LISREL 8.80 softwares.

Results

This part includes findings related to the validity (exploratory factor analysis and confirmatory factor analysis) and reliability (internal consistency) of the measurements obtained from the Health Self-Efficacy Scale (HSS).

Findings Related to the Exploratory Factor Analysis

Kaiser Meyer Olkin (KMO) value and Bartlett Test of Sphericity were used to making sure the data set was consistent with the factor analysis. The KMO value was observed as .836 and the Bartlett Test of Sphericity was significant ($X^2 = 5776,051$; $p=,000$). This value gives information about whether the factor analysis is good or not.

Maximum likelihood analysis was conducted in order to set forth the structural validity of the scale and to determine the magnitude of factor loads of the items. During the maximum likelihood analysis, factors with an Eigenvalue over 1 were considered and the scale was grouped under 9 factors. These were chosen to ensure each item has a factor load to a factor of at least .32 (Tabachnick & Fidell, 2013). The total variance calculated as a result of the scale was 75.52%. Eigenvalues and the variance explored by each factor are given in Table 2.

Table 2. Scale-related eigenvalues and explored variances

Factor	Eigenvalue	% Variance	% Total Variance
1	11.11	10.10	10.10
2	3.43	9.27	19.37
3	3.23	9.08	28.45
4	2.71	9.01	37.45
5	2.22	8.09	45.55
6	2.01	7.89	53.44
7	1.80	7.41	60.86
8	1.56	7.36	68.22
9	1.22	7.30	75.52

Table 2 shows that the first factor explores 10.10% of the variance, and the others play a smaller part in percentage variance. A line chart based on the Eigenvalues, which is another way of determining the number of factors, is given below (Figure 1).

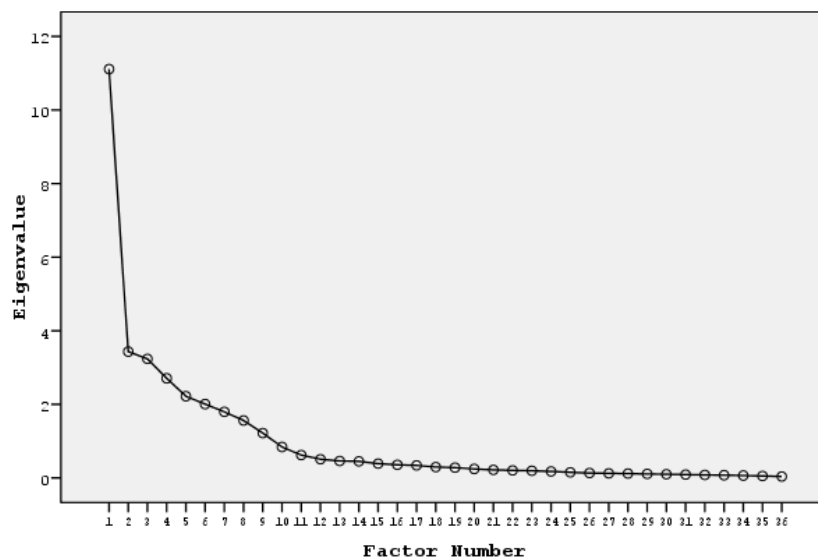


Figure 1. Scree plot

When we look at the change of Eigenvalues with respect to components, we can observe that there is a significant decrease in the trend of Eigenvalue line, and that the breaking point after which Eigenvalues become stable is 9. Due to the lack of any expectation of a high degree of correlation between the factors which were obtained during the maximum likelihood analysis, we preferred Varimax as the method of rotation. Table 3 contains the 9 factors which were obtained, the items under the factors, and their common variances.

As seen in Table 3, there are 4 items under each factor. The item referred to as M25 is a part of both the 7th and the 9th factors. However, due to M25’s load in the 7th factor being larger than in the 9th, and because of the content of the item, M25 should be placed under the 7th factor. The factors are named according to the content of the items. As such, the nine factors are named: Keeping Away from Harmful Habits Self-Efficacy (Items 1-4), Spiritual Relaxation Self-Efficacy (Items 5-8), Protection from Infectious Diseases Self-Efficacy (Items 9-12), Protection from Stress Self-Efficacy (Items 13-16), Physical Activities Self-Efficacy (Items 17-20), Access to Preventive Health Services Self-Efficacy (Items 21-24), Sleep Self-Efficacy (Items 25-28), Weight Control Self-Efficacy (Items 29-32) and Nutrition Self-Efficacy (Items 33-36). The factor load values of the items in the scale vary between .526 and .930.

Table 3. Items' factor load values

No of Item	1 th Factor	2 th Factor	3 th Factor	4 th Factor	5 th Factor	6 th Factor	7 th Factor	8 th Factor	9 th Factor
1	.884								
2	.922								
3	.930								
4	.883								
5		.833							
6		.873							
7		.881							
8		.774							
9			.895						
10			.862						
11			.795						
12			.754						
13				.757					
14				.868					
15				.882					
16				.841					
17					.644				
18					.693				
19					.873				
20					.856				
21						.557			
22						.704			
23						.897			
24						.884			
25							.529		.318
26							.712		
27							.842		
28							.839		
29								.813	
30								.833	
31								.526	
32								.735	
33									.660
34									.785
35									.601
36									.717

Findings Related to the Reliability of the Scale

We looked at the item discrimination for the lowest and highest 27% of the group and the item-total test correlation coefficient in order to determine the level of item discrimination. Internal consistency or in other words, Cronbach's alpha value which determines how closely-related the items are, was examined for the total scale and the sub-dimensions. The results of the scale's reliability are given in Table 4.

Table 4. Results of the scale's reliability

Factors	Item	Item Total Correlation (n=170)	t (n=46)	Lowest %27-Highest %27	Cronbach's Alpha	McDonald's ω
Keeping Away from Harmful Habits Self-Efficacy	1- Even if I am feeling nervous, I can stay away from habits that are harmful to health (tobacco products, alcohol, etc.).	.890	-28.34*	.96	.96	.96
	2- Even if people around me consume them, I can stay away from habits that are harmful to health (tobacco products, alcohol, etc.).	.921	-29.09*			
	3- Even if I cannot get information from an expert (doctors, psychologists, teachers, etc.) on their harmful effects, I can stay away from habits that are harmful to health (tobacco products, alcohol, etc.).	.939	-24.41*			
	4- Even if I need to remind myself of the incidents where I had to resist, I can stay away from habits that are harmful to health (tobacco products, alcohol, etc.).	.890	-23.76*			
Spiritual Relaxation Self-Efficacy	5- Even if I cannot get information from an expert (psychologists, teachers, etc.) on spiritual relaxation, I can.840 do activities that make me feel better (various hobbies, yoga, religious activities, etc.).	.840	-19.73*	.94	.94	.94
	6- Even if I have never tried relaxing activities, I can do activities that make me feel better (various hobbies, yoga, religious activities, etc.).	.898	-24.46*			
	7- Even if my friends see them as a waste of time, I can do activities that make me feel better (various hobbies, yoga, religious activities, etc.).	.875	-22.52*			
	8- Even if I do not want to bother with them, I can do activities that make me feel better (various hobbies, yoga, religious activities, etc.).	.797	-19.37*			
	9- Even if I need take to care more about hygiene, I can take precautions against infectious diseases (due to viruses, bacteria, etc.).	.870	-16.83*	.93		
	10- Even if I am feeling anxious, I can take precautions against infectious diseases (due to viruses, bacteria, etc.).	.843	-17.77*			
	11- Even if I cannot get information from an expert (doctors, healthcare workers, teachers, etc.) to protect myself against them, I can take precautions against infectious diseases (due to viruses, bacteria, etc.).	.837	-18.57*			
	12- Even if my friends act differently than I do, I can take precautions against infectious diseases (due to viruses, bacteria, etc.).	.805	-16.51*			
Protection from Infectious Diseases Self-Efficacy	13- Even if I cannot getting support for stress from an expert (psychologists, teachers, etc.), I can cope with stress.	.818	-17.53*	.94	.94	.94
	14- Even if I am feeling anxious, I can cope with stress.	.880	-15.75*			
	15- Even if there is nobody around me who has succeeded in coping with stressful situations, I can cope with stress.	.889	-17.40*			
	16- Even if I have not been through a major stress issue, I can cope with stress.	.827	-16.24*			
	17- Even if I cannot get information about exercises from an expert (sports trainers, doctors, teachers, etc.), I can do physical exercise (walking, jogging/running, exercises with/without sports equipment, etc.).	.734	-17.54*	.91		
Physical Activities Self-Efficacy	18- Even if I am feeling tired, I can do physical exercise (walking, jogging/running, exercises with/without sports equipment, etc.).	.764	-18.16*		.91	.90

	sports equipment, etc.).		
	19- Even if I have to try until I get accustomed to it, I can do physical exercise (walking, jogging/running, exercises with/without sports equipment, etc.).	.837	-18.22*
	20- Even if the people close to me do not, I can do physical exercise (walking, jogging/running, exercises with/without sports equipment, etc.).	.818	-20.17*
Access to Preventive Health Services Self-Efficacy	21- Even if I cannot get information on protective health services from an expert (doctors, teachers, etc.), I can make use of protective health services (early diagnosis, vaccination, etc.).	.679	-20.04*
	22- Even if people around me have never used protective health services, I can make use of protective health services (early diagnosis, vaccination, etc.).	.783	-17.42*
	23- Even if I think I do not get sick very often, I can make use of protective health services (early diagnosis, vaccination, etc.).	.807	-20.63*
	24- Even if I do not like going to the doctor's, I can make use of protective health services (early diagnosis, vaccination, etc.).	.787	-18.93*
Weight Control Self-Efficacy	25- Even if I cannot get support on nutrition from an expert (dietitians, doctors, teachers, etc.), I can control my weight.	.814	-15.47*
	26- Even if I love so eating, I can control my weight.	.808	-15.05*
	27- Even if I have tried and failed to lose weight in the past, I can control my weight.	.624	-15.00*
	28- Even if my friends do not pay attention to their weight, I can control my weight.	.803	-17.14*
Sleep Self-Efficacy	29- Even if I enjoy staying up late, I am sure I could get enough sleep.	.567	-16.12*
	30- Even if I cannot get information on the importance of good sleep from an expert (doctors, teachers, etc.), I am sure I could get enough sleep.	.788	-16.80*
	31- Even if I have to rearrange my sleep schedule, I am sure I could get enough sleep.	.829	-14.37*
	32- Even if people around me do not pay attention to their sleep schedule, I am sure I could get enough sleep.	.825	-17.06*
Nutrition Self-Efficacy	33- Even if I cannot get information on a balanced diet from an expert (dietitians, teachers, etc.), I can have a balanced diet (by eating enough of each of the groups: meat, dairy, grains, fruit, vegetables, and oil).	.677	-13.98*
	34- Even if people around me do not pay attention to having a balanced diet, I can have a balanced diet (by eating enough of each of the groups: meat, dairy, grains, fruit, vegetables, and oil).	.751	-13.70*
	35- Even if I have to reduce my junk food (cookies, chocolate, chips, etc.) intake, I can have a balanced diet (by eating enough of each of the groups: meat, dairy, grains, fruit, vegetables, and oil).	.613	-11.57*
	36- Even if preparing my meals out of different food groups takes time, I can have a balanced diet (by eating enough of each of the groups: meat, dairy, grains, fruit, vegetables, and oil).	.722	-14.78*

The item-total test correlation values vary between .567 and .939 for the Health Self-Efficacy Scale consisting of 36 items with 9 factors. Items with item-total test correlation value greater than and equal to .30 are known to discriminate between the individuals well (Büyüköztürk, 2014). Moreover, when we look at the difference in average item points of the highest and lowest 27%, the difference seems significant ($p < 0.001$). The mentioned values imply that the items in the scale have high validity.

The reliability values (Cronbach’s alpha and McDonald’s ω) for the Health Self-Efficacy Scale were calculated as .93. This value is known to be highly reliable (Can, 2014). Cronbach’s alpha and McDonald’s ω values of the factors vary between .85 and .96 (Table 4). Based on these values it can be said that the scale in total and its nine factors are quite reliable (Özdamar, 2002; George & Mallery, 2003).

Findings Related to the Confirmatory Factor Analysis

In order to obtain proof related to the Health Self-Efficacy Scale’s structural validity and to see to what extent it is consistent with the data of the nine-factor scale, we used confirmatory factor analysis (CFA). To show that the model tested with the CFA is sufficient, the Chi-squared fit test was conducted (Table 5). For the fit index criteria, for χ^2/df , values smaller than 3 generally show perfect fit; values between 3 and 5 show acceptable fit (Schumacker Lomax, 1996; Schermelleh-Engel, Moosbrugger & Müller 2003). The path diagram obtained through the CFA is given (Figure 2).

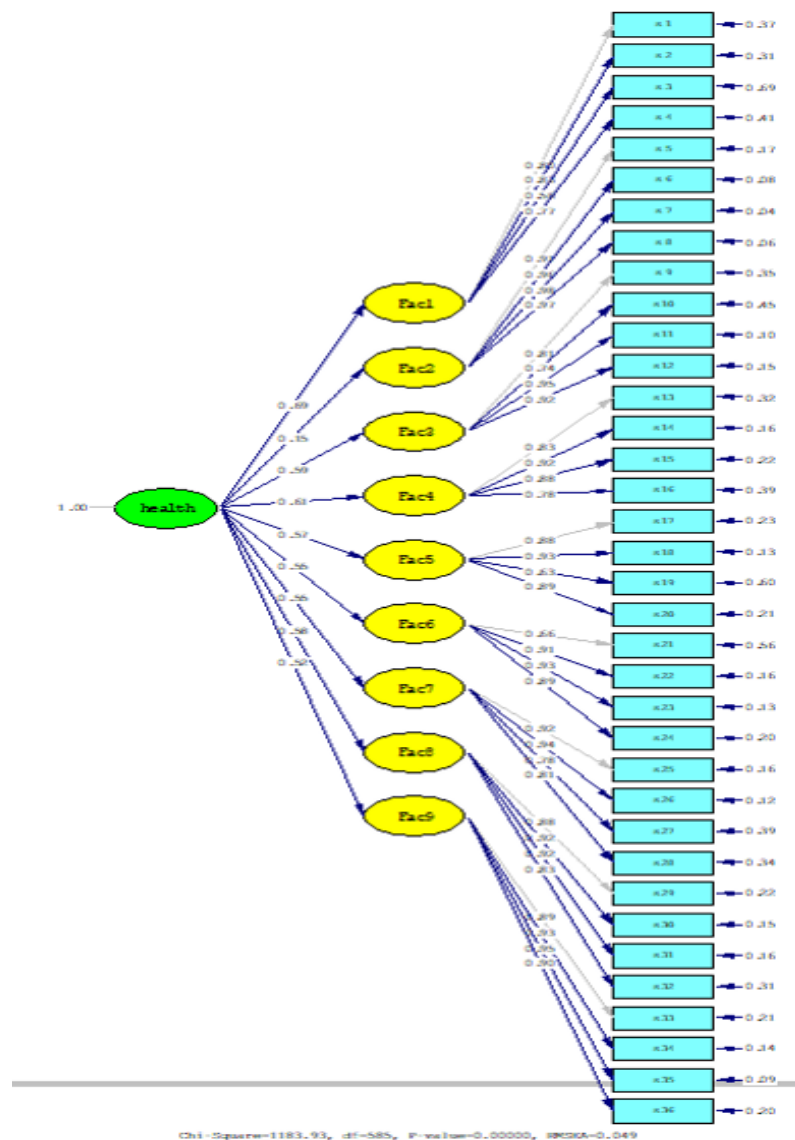


Figure 2. Confirmatory factor analysis path diagram: Standardized values

Table 5. Fit indices obtained as a result of CFA

Examined Fit Indices	Perfect Fit Criteria	Acceptable Fit Criteria	Obtained Fit Indices	Result
χ^2/sd	$0 \leq \chi^2/sd \leq 2$	$2 \leq \chi^2/sd \leq 3$	2.02	Acceptable Fit
AGFI	$.90 \leq AGFI \leq 1.00$	$.85 \leq AGFI \leq .90$	.85	Acceptable Fit
CFI	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$	.97	Perfect Fit
NFI	$.95 \leq NFI \leq 1.00$	$.90 \leq NFI \leq .95$	.95	Perfect Fit
NNFI	$.95 \leq NNFI \leq 1.00$	$.90 \leq NNFI \leq .95$	.97	Perfect Fit
IFI	$.95 \leq IFI \leq 1.00$	$.90 \leq IFI \leq .95$	.97	Perfect Fit
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	.05	Perfect Fit
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$	.05	Perfect Fit
PNFI	$.95 \leq PNFI \leq 1.00$	$.50 \leq PNFI \leq .95$	.88	Acceptable Fit
PGFI	$.95 \leq PGFI \leq 1.00$	$.50 \leq PGFI \leq .95$	.76	Acceptable Fit

$\chi^2=1183.93$ (fd=585) which was calculated through CFA is significant ($p<.01$) and $\chi^2/fd = 2.02$ was obtained. The results show that in the model, Comparative Fit Index (CFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI(TLI)), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) values show perfect fit (CFI=.97; NFI=.95, NNFI= .97, IFI=.97, RMSEA=.05; SRMR=.05). Adjustment Goodness of Fit Index (AGFI), Parsimony Goodness of Fit Index (PGFI), and Parsimony Normed Fit Index (PNFI) values show acceptable fit (AGFI=.85, PGFI=.76, PNFI=.88). For all the items, t values are significant at the level of .01. Fit indices that were obtained remark that the model has a good fit.

Discussion

In this study which aims to develop a valid and reliable data collection tool to be used for determining the health self-efficacy of individuals, the exploratory factor analysis aiming to determine the structure of the scale found out that health self-efficacy is grouped under nine factors. The factors were named as such: Keeping Away from Harmful Habits Self-Efficacy, Spiritual Relaxation Self-Efficacy, Protection from Infectious Diseases Self-Efficacy, Protection from Stress Self-Efficacy, Physical Activities Self-Efficacy, Access to Preventive Health Services Self-Efficacy, Weight Control Self-Efficacy, Sleep Self-Efficacy, and Nutrition Self-Efficacy. The factor load values of items on the scale are expected to be greater than or equal to .30 (Ho, 2006; 207). The factor load values of the items in the Health Self-Efficacy Scale are between .526 and .930. The calculated variance should be 30% or more in single-factor scales, and higher in multi-factor scales (Büyüköztürk, 2014). The mentioned nine factors explore 75.5% of the variable.

The reliability values (Cronbach's alpha and McDonald's ω) for the Health Self-Efficacy Scale in general are .93. Cronbach's alpha and McDonald's ω values for the sub-dimensions vary between .85 and .96. Internal consistency coefficients have a high level of reliability both for the scale in general and for the sub-dimensions. Indeed, .80-1.00 is regarded as a high-value interval by the literature on the field (Özdamar, 2002). The item-total test correlations of the scale vary between .567 and .939 and all items have a discrimination t value that is significant at $p<.001$. These results imply that the validity of the items in the Health Self-Efficacy Scale is high and that they discriminate the participants with regards to health-related self-efficacy.

Confirmatory factor analysis was applied to the 36-item and 9-factor structure of the Health Self-Efficacy Scale that was put forth by the exploratory factor (principal components) analysis. When the fit indices obtained by the confirmatory factor analysis are examined; Comparative Fit Index (CFI=.97), Normed Fit Index (NFI=.95), Non-Normed Fit Index (NNFI= .97), Incremental Fit Index (IFI=.97), Root Mean Square Error of Approximation (RMSEA=.05), and Standardized Root Mean Square Residual (SRMR=.05) values show perfect fit (25, 26). Adjustment Goodness of Fit Index (AGFI=.85), Parsimony Goodness of Fit Index (PGFI=.76), and Parsimony Normed Fit Index (PNFI=.88) values show acceptable fit (Schumacker & Lomax, 1996). Thus, the aforementioned structure is confirmed.

The health self-efficacy scale consists of 36 items and shows individuals' perceptions of self-efficacy on health in general and different dimensions of it. The health self-efficacy scale that was developed is related to the people's belief of being successfully involved in behaviors related to health; this is in line with Bandura's (1977) definition of the belief of self-efficacy in specific cases (16). Points received from the entirety of the

scale as well as its sub-parts show individuals' level of perception regarding their health self-efficacy. Designed as a 5-Point Likert Scale, the minimum attainable score for every sub-dimension on the Health Self-Efficacy Scale is 4 points, and the maximum is 20 points. The minimum possible score in total is 36 points, and the maximum is 180 points.

Conclusion

The "Health Self-Efficacy Scale" that was developed is specific to the individuals' belief that they can fulfill health-related behaviors and it could fill an important gap in the literature thanks to its tackling of health from such a broad scope. Health self-efficacy is a valid and reliable tool, which can be used for measuring both their general health self-efficacy as well as their self-efficacy on smaller dimensions, by providing data regarding people's beliefs on whether they can successfully fulfill the health-related acts and behaviors, starting from the age of 12.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the authors.

References

- Ağaçdiken Alkan, S., Özdelikara, A. & Mumcu Boğa, N. (2017). Determination of nursing students health perception. *Gümüşhane University Journal of Health Sciences*, 6 (2), 11–21.
- Bangkok Charter (2005). *Bangkok charter for health promotion in a globalized world*. (https://www.who.int/healthpromotion/conferences/6gchp/hpr_050829_%20BCHP.pdf?ua=1 accessed 16 September 2020)
- Baş, M. & Dönmez S. (2009). Self-efficacy and restrained eating in relation to weight loss among overweight men and women in Turkey. *Appetite*, 52, 209–216.
- Büyükoztürk, Ş. (2014). *Sosyal bilimler için veri analizi el kitabı*. Ankara: Pegem A Yayıncılık.
- Can, A. (2014). *SPSS ile bilimsel araştırma süresince nicel veri analizi (3. Baskı)*. Ankara: Pegem A Yayıncılık.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Elshatarat, R. A., Yacoub, M. I., Khraim, F. M., Saleh, Z. T. & Afaneh, T. R. (2016). Self-efficacy in treating tobacco use: A review article. *Proceedings of Singapore Healthcare*, 25(4), 243–248.
- Gandoy-Crego, M., Clemente, M., Gómez-Cantorna, C., González-Rodríguez, R. & Reig-Botella, A. (2016). Self-efficacy and health: The SEH scale. *American Journal of Health Behavior*, 40(3), 389-395 <https://doi.org/10.5993/AJHB.40.3.11>
- George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference, 11.0 update (4th ed.)*. Boston: Allyn & Bacon.
- Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. London & New York: Chapman & Hall/ CRC Taylor and Francis Group.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York: The Guilford Press.
- Lu, C., Siu, O. & Cooper, C.L. (2005). Managers' occupational stress in China: The role of self-efficacy. *Personality and Individual Differences*, 38, 569–578.
- Marsh, H. W., Hau, K. T., Artelt, C., Baumert, J. & Peschar, J.L. (2006). OECD's brief self-report measure of educational psychology's most useful affective constructs: Cross-cultural, psychometric comparisons across 25 countries. *International Journal of Testing*, 6(4), 311-360.
- Omar Dev, R. D., Tengku Kamalden, T. F., Geok, S. K., Mohd Ayub, A. F., & Ismail, I, A. (2018). Spiritual intelligence on health behaviours among Malaysian University students in a Malaysian Public University: The mediating role of self-efficacy. *Malaysian Journal of Movement, Health & Exercise*, 7(2), 53-64. <https://doi.org/10.15282/mohe.v7i2.203>
- Özdamar, K. (2002). *Paket programlarla istatistiksel veri analizi-1 (4. Baskı)*. Eskişehir: Kaan Kitabevi.
- Renner, B., Knoll, N. & Schwarzer, R. (2000). Age and body make a difference in optimistic health beliefs and nutrition behaviors. *International Journal Of Behavioral Medicine*, 7(2), 143–159.
- Schermelleh-Engel, K., Moosbrugger, H. & Müller, H. (2003). Evaluating the fit of structural equation models: Test of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research-Online*, 8(2), 23-74.

- Schlarb, A. A., Kulessa, D. & Gulewitsch, M. D. (2012). Sleep characteristics, sleep problems, and associations of self-efficacy among German University students. *Nature and Science of Sleep*, 4, 1–7.
- Schmitz, G.S. & Schwarzer, R. (2000). Selbstwirksamkeitserwartung von Lehrern: Längsschnitt-befunde mit einem neuen Instrument. *Zeitschrift für Pädagogische Psychologie*, 14(1), 12-25.
- Schumacker, E. R., & Lomax, G. R. (1996). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Erlbaum.
- Schwarzer, R. & Renner, B. (2000). Social-cognitive predictors of health behavior: Action self-efficacy and coping self-efficacy. *Health Psychology*, 19(5), 487-495.
- Selzler, A. M., Moore, V., Habash, R., Ellerton L., Lenton, E., Goldstein, R. & Brooks, D. (2020). The relationship between self-efficacy, functional exercise capacity and physical activity in people with COPD: A systematic review and meta-analyses COPD: *Journal Of Chronic Obstructive Pulmonary Disease*, 17(4), 452–461. <https://doi.org/10.1080/15412555.2020.1782866>
- Stout, M. E., Christy S. M., Winger, J. G. Vadaparampil, S. T. & Mosher, C. E. (2020). Self-efficacy and HPV vaccine attitudes mediate the relationship between social norms and intentions to receive the HPV vaccine among college students. *Journal of Community Health*, 45, 1187–1195.
- Tabachnick, B. G. & Fidell, L. S. (2013). *Using multivariate statistics (Sixth Edition)*. USA: Pearson Education Limited.
- Umeh, K. & Chadwick, R. (2016). Early detection of testicular cancer: revisiting the role of self-efficacy in testicular self-examination among young asymptomatic males. *J Behav Med.*, 39, 151–160. <https://doi.org/10.1007/s10865-010-9262-z>
- Von Ah, D., Ebert, S., Ngamvitroj, A., Park, N. & Kang, D. (2004). Predictors of health behaviours in college students. *Journal of Advanced Nursing*, 48(5), 463–474.

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