



A STUDY ON DEVELOPING AN ENVIRONMENTAL BEHAVIOR AND ATTITUDE SCALE FOR UNIVERSITY STUDENTS

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Abstract

The aim of this study one of the highest consumption rate is belong to university youth and the Likert-type questionnaire was developed in order to measure university youth environmental attitude and behavior as Phase I. In order to develop questionnaire first of all litterateur was reviewed. With the help of specialist 2 dimensional 31 items questionnaire was prepared. Every item in the questionnaire has 5-point likert scale. To calculate the validity and reliability, questionnaire was applied to Suleyman Demirel University students. As volunteer, 531 students are participated to calculate the reliability and validity of questionnaire. To emphasize validity and reliability of the questionnaire confirmatory and explanatory factor analysis, inter class correlation, discrimination power of items was calculated. In order to determine the level of internal consistency reliability of the scale Cronbach's alpha for attitude is 0.803 and behavior is 0.761.

Keywords: Consumption, Environment, Environmental Attitude, Environmental Behavior

INTRODUCTION

Environmental damage is one of the major problems in our life. Humans still continue damage the environment with the help of government and the society. The human environmental behaviors and attitudes was emphasized by (Abd El-Salam, El-Naggar & Hussein, 2009; Ferna' Ndez-Manzanal, Rodríguez-Barreiro & Carrasquer, 2007; Courtenay-Hall & Rogers, 2002; Dunlap, Van Liere, Mertig, & Jones, 2000; Zelezny,2000; Leeming, Bracken & Dwyer, 1995; Chandler & Dreger,1993; Thompson & Barton, 1994 or Wiegel & Wiegel, 1978).

Last 10 years, Turkey has the fastest growth in carbon emissions in the world also Turkey depletes the natural resources quicker than among all of the countries in Europe. In 2012 the Yale University composed World Environmental Performance Index (WEPI). WEPI also consists of criterion environmental health and nature protection. Turkey is the 17th Economical size but according to WEPI criterion Turkey is 109 in rank among 132 countries. According to 2009 World Health Organization (WHO) data, Turkey ranks in mortality volume is 14th and the China is the first among the countries. Rapid change in population growth and the requirement of the population, the consumption also increases then environment pollution and environmental problem are come across. Environment pollution is related with production as well as consumption. According to TÜİK 2012 Household Labor Survey Results; 3899000 youth among 11585000 between 15-24 years old are unemployed. 845000 of them do not have regular occupation and the other 6882000 of them are students or do not want to work.

Humans continue to engage environmental damage behaviors at the individual, corporate, governmental and societal levels. These behaviors contributed to the creation of several environmental problems, which may expose serious threats to the health of humans and all living species (Gore, 1993). While it is thought that the main source of many environmental problems is irresponsible behaviors of people on the environment, it is important that humans have awareness of environmental problems. This is a fact that human beings need to raise awareness of environmental problems as a result of necessary trainings.



METHODOLOGY

Aim of this study is to develop to a Phase I environmental behavior and attitude scale for university students. With the participation of 531 students in the spring semester of 2013 academic year in Isparta Suleyman Demirel University (SDU), this scale study was conducted.

Before implementing the scale to students, a pilot study was conducted to check the readability and comprehensibility of the questionnaire items. As a volunteer, 60 students from SDU examine the questionnaire. After interviewing with the students, the questionnaire was revised with the specialists whose research area on Turkish literatures and environmental educationists. The final draft of behavior and attitude scale with 31 items was applied to 531 students. Data was stored at Postgre SQL server.

Sample

The sample from SDU and age interval of students is between from 17 to 27. The mean and standard deviation of age according to gender are for females 20.44 ± 1.74 and for males 21.00 ± 1.76 . The 69.7 % of students are female and 30.3 % of students are male. 48.8 % percent of students are freshman (first year), 18.8% percent of students are sophomore, 26.0 % percent of students are junior and 6.4 % percent of students are senior.

Environmental Behavior and Attitude Scale for University Students Development Process

At first in order to determine the nature and basic characteristics of the university student environmental behavior and attitude the scale that has two dimensions with 31 items was developed. The first dimension (16 items) is about environmental behavior of university students. The second dimension (15 items) is about environmental attitude of university students. Every item in the questionnaire has 5-point likert scale. The first dimension of environmental behavior Likert-type scale consists five possible responses: Always, Often, Usually, Seldom and Never. The second dimension of environmental attitude Likert-type scale consists five possible responses: Strongly agree, Agree, Indifferent, Disagree and Strongly disagree. Students were questionized to respond to the statement using a five-point Likert scale ranging from 0 (Strongly Disagree) to 4 (Strongly Agree). In order to prevent entering wrong data, the optical form was used to gather the data from participant.

In the last stage in this study the data, acquired from 531 students, was analyzed under R-project. In order to reveal factor structure of environmental behavior and attitude scale factor analysis using the principle component method followed by varimax rotation was applied. Moreover in order to emphasize reliability of environmental behavior and attitude scale Cronbach's alpha correlation coefficients were used. There are many scales towards the environmental behavior and attitude. The scale used in this study developed with help of studies Metin, 2010; Ferna' Ndez-Manzanal, Rodr'iguez-Barreiro & Carrasquer, 2007; Alp, Ertepinar, Tekkaya, & Yilmaz, 2006; Uzun & Sađlam, 2006; Atasoy, 2005; Sama, 2003; Leeming, Bracken & Dwyer, 1995; Berberođlu & Tosunoglu, 1995; Thomson & Barton, 1994; Wiegel & Wiegel, 1978.

RESULTS

Both Behavior and Attitude scale was conducted on 531 students, exploratory factor and item analysis was applied to data separately. The question 6 from Behavior scale was omitted because the question isn't understood correctly. Most of the students say that the ATM of banks receipt is not free of charge.

In order to calculate sampling adequacy Kaiser-Meyer Olkin (KMO) and Barlett's test were calculated for both Behavior Scale and Attitude Scale. Information of KMO and Bartlett's statistics emphasize that the validity of this test is supported or not. For Attitude Scale the result of KMO statistics is 0.872 that is higher than the threshold value of 0.5. Barlett's test of Sphericity statistic was significant ($p < 0.01$ & $\chi^2_{df=66}=1347.699$). For Behavior Scale the result of KMO statistics is 0.722 that is higher than the threshold value of 0.5. Barlett's test of Sphericity statistic was significant ($p < 0.01$ & $\chi^2_{df=66}=2676.159$) (Kline, 1994; Tabachnick & Fidell 2007; George & Mallery 2003).

Exploratory factor analysis objective is to describe variability among observed, correlated variables (items) in terms of a potentially lower number of unobserved variables called factors and the number of separate components could be derived for a group of items. (Alpar, 2012). In this study, the aim of using factor analysis was to reveal factors of Behavior and Attitude scale separately. Furthermore behavior and attitude scale were united and factor analysis was applied in order to show there was no concurrence of these two scales items in factor components.

Attitude Scale

At first exploratory factor analysis was conducted on the 15 items. Only two factors Eigen value is greater than 1 to determine the components. In attitude scale 2 items (a14, a15) was deleted because their factor loadings is lower than 0.4 (Alpar, 2012). Kline (1994) emphasized that eliminating the items with this method overestimates the number of factors.

Table 3.1. Attitude Scale Factor Structure and Loadings After Varimax Rotation

	Components	
	Factor 1	Factor 2
The First Scale: Environmental Attitude		
a04. I think awareness of environmental issues contributes to a country's development.	.621	
a06. I think squatter's houses and unplanned urbanization are an important environmental issue.	.580	
a07. It pleases me if brands in Turkey also behave as much responsive to environmental signs and logos on packaging packs as large trademarks in Europe.	.470	
a08. In my opinion the state should provide people who voluntarily afforest the nature with taxation discount in some taxes on the basis of incentives.	.472	
a09. I think that buildings in Turkey should be constructed as green, smart or eco-friendly buildings and this should be certificated by The Turkish Green Building Council (ÇEDBİK).	.650	
a10. I think visual and print media should attach more importance to environmental issues and solutions.	.760	
a11. I think environmental education at schools should be offered to students practically (by doing by experiencing).	.773	
a12. In my opinion, beginning from preschool period environmental education should be offered at schools.	.692	
a13. I think that if the cleaning of the school is performed by the students during the first eight years of education (4+4) this will increase their awareness of environmental cleanliness.	.650	
a01. I think the vehicle exhaust emission control in Turkey must comply with standards such as the European Union, EURO 6.		.717
a02. I think that the use of natural gas in houses - workplaces and LPG in vehicles contributes to the solution of air pollution problem.		.481
a03. I think that the reason why electric cars are not put on the market depends on the profit and loss relationship of the companies.		.607
a05. I think Turkey which is the fastest country in Europe in the last 10 years to deplete its natural resources should comply with the Kyoto Protocol.		.613
Eigen Values	3.95	1.208
Total Variance Explained in %	28.445%	14.558%
Total	42.983%	

As seen from Table 3.1 there were 2 factors in attitude scale. After applying varimax rotation, Factor 1 explained 28.445% of total variance and factor 2 explained 14.558% of total variance. These two factors together could explain 42.983% of variance of attitude scale. Factor 1 includes attitude scale items a04, a06, a07, a08, a09, a10, a11, a12 and a13 and factor 2 consists a01, a02, a03, a05.

Table 3.2.Upper and Lower Cut Points Of Means, Standard Deviations, T Test and P Value For Attitude

# of items	Lower 27%		Upper 27%		Test	Significance
	Mean	SD	mean	SD	t	p
a01	2.74	1.095	3.84	0.431	11.236	0.000
a02	2.65	1.055	3.70	0.615	10.245	0.000
a03	2.54	0.998	3.56	0.735	9.900	0.000
a04	2.83	1.154	3.86	0.467	9.841	0.000
a05	2.39	1.116	3.71	0.599	12.486	0.000
a06	2.76	1.184	3.88	0.364	10.767	0.000
a07	2.94	1.043	3.92	0.291	10.848	0.000
a08	2.69	1.198	3.87	0.407	11.139	0.000
a09	2.52	1.086	3.83	0.442	13.380	0.000
a10	2.80	1.073	3.95	0.215	12.585	0.000
a11	2.89	1.069	3.95	0.246	11.550	0.000
a12	2.93	1.056	3.98	0.117	11.844	0.000

As shown at Table 3.2 data separated into two parts upper 27% and lower 27% points and they were compared with student t test in order to show item discrimination (Alpar 2012). This t test shows how performance on the item differs or discriminates between a high scoring group (the top 27% by assessment score) and a low scoring group (the bottom 27% by assessment score). All items after factor analysis elimination were significant.

Table 3.3.Factor Groups, Number of The Items and Croanbach Alpha Value Of Each Factor

Factor Name	# of items	Items' Cronbach Alpha	Significance
Overall (a01, a02, a03, a04, a05 a06, a07, a08, a09, a10, a11, a12, a13)	13	0.803	0.000
a04, a06, a07, a08, a09, a10, a11, a12, a13	8	0.802	0.000
a01, a02, a03, a05	4	0.510	0.000

As shown at Table 3.3 in order to reveal over all scale and factors reliability, Cronbach alpha correlation coefficient and its significance was shown. For each factor Cronbach alpha correlation coefficient and its significance was calculated among the factors. Cronbach alpha above 0.70 is considered reliable (Acceptable) and above 0.80 is considered good (George & Mallery, 2003). According to these results, attitude scale can be accepted as valid and reliable scale.

Behavior Scale

At first exploratory factor analysis was conducted on the 16 items. Only three factors Eigen value is greater than 1 to determine the components. In behavior scale 4 items (b01, b06, b09, b16) deleted in the same manner like attitude scale.

Table 3.4.Behavior Scale Factor Structure and Loadings After Varimax Rotation

The Second Scale: Environmental Behavior	Components		
	Factor1	Factor2	Factor 3
b05. Even if I don't know them, I can warn people polluting environment or nature.	.376		

b10. Rather than cheap and non eco-friendly products, I prefer eco-friendly products though they are cheap.	.675		
b11. I share links relevant with nature and environmental awareness on social networks (Facebook / Twitter/...)	.551		
b12. I prevent the formation of residue/waste by giving the left over to street animals.	.681		
b13. I can allocate effort/time to help the protection of wilds (wildlife).	.445		
b14. To protect the environment I'd rather be a volunteer in non-governmental organizations such as TEMA, ÇEVKO.	.652		
b15. I keep the garbage or waste material until I can find a trash can.	.618		
b02. The number of trees I planted.		.959	
b03. I set aside the household waste for recycling (Glass, plastic, paper, etc.)		.961	
b04. I throw used batteries in the waste battery collection box.		.554	
b07. I pay attention to using less water for water conservation.			.756
b08. When leaving a room, I turn the unnecessary lights off in order to contribute to energy conservation.			.812
Eigen Values	2.504	2.323	1.409
Total Variance Explained in %	20.863%	19.354%	11.738%
Total	51.955%		

As seen from table 3.4 there were 3 factors in behavior scale. After applying varimax rotation, Factor 1 explained 20.863 percent of total variance, factor 2 explained 19.354 of total variance and factor 3 explained 11.738 of total variance. These three factors together could explain 51.955% of variance of behavior scale. Factor 1 includes behavior scale items b05, b10, b11, b12, b13, b14, b15; factor 2 consists b02, b03, b04 and factor 3 consists b07, b08

Table 3.5.Upper and Lower Cut Points Of Means, Standard Deviations, T Tests and P Value For Behavior

# of items	Lower 27%		Upper 27%		Test t	Significance p
	Mean	SD	mean	SD		
b02	0.66	0.926	2.61	1.212	15.276	0.000
b03	0.67	0.946	2.67	1.163	15.929	0.000
b04	0.64	1.009	2.58	1.248	14.465	0.000
b05	2.69	1.251	3.76	0.487	9.569	0.000
b07	2.34	1.120	3.40	0.822	9.201	0.000
b08	3.02	1.054	3.81	0.482	8.185	0.000
b10	0.73	0.750	2.44	1.114	15.241	0.000
b11	0.94	0.794	2.57	0.996	15.292	0.000
b12	0.91	1.044	2.58	1.259	12.198	0.000
b13	1.55	1.123	3.00	1.106	10.998	0.000
b14	1.12	1.006	2.77	1.138	12.965	0.000
b15	0.97	1.150	2.88	1.125	14.220	0.000

As shown at Table 3.5 data separated into two parts upper 27% and lower 27% points and they were compared with student t test in order to show item discrimination. This t test shows how performance on the item differs or discriminates between a high scoring group (the top 27% by assessment score) and a low scoring group (the bottom 27% by assessment score).

Table 3.6. Factor Groups, Number of The Items and Cronbach Alpha Value Of Each Factor

Factor Name	# of items	Items' Cronbach Alpha	Significance
Overall (b02, b03, b04, b05, b07, b08, b10, b11, b12, b13, b14, b15)	12	0.761	0.000
b05, b10, b11, b12, b13, b14, b15	7	0.697	0.000
b02, b03, b04	3	0.807	0.000
b07, b08	2	0.506	0.000

As shown at Table 3.6 in order to reveal over all scale and factors reliability, Cronbach alpha correlation coefficient and its significance was shown. For each factor Cronbach alpha correlation coefficient and its significance was calculated among the factors. Cronbach alpha above 0.70 is considered reliable (Acceptable) and above 0.80 is considered good (George & Mallery, 2003). According to these results, attitude scale can be accepted as valid and reliable scale.

DISCUSSION AND CONCLUSIONS

Behavior has a concordance with habits, norms and attitudes. If these trilogy's factors are consolidated with concordance, the consistency of attitude and behavior will increase. Otherwise consistency of attitude and behavior disappears. Incoherence or inconsistency of attitude and behavior could be explained individual unawareness of how to express attitude (Inceoğlu, 2010). According to Erten (2002) there are too much behavioral studies that beneficial for environment but their statistical results of attitude and behavior are poor.

The aim of this study is completing Phase I stage of Environmental Attitude and Behavior questionnaire. As final summary of the research as an entire, the fundamental conclusions are summarized in order below:

1. There must be no concurrence between Attitude and Behavior scale. Attitude consists of three components. These are cognitive, affective and behavioral components. Cognitive component is individual's constituted knowledge towards object, affective component is the feeling towards an object and behavioral component is individual's behavior according to his/her feelings and notion (Gelbal, 2005).
2. Both Behavior and Attitude scale was conducted on 531 students, exploratory factor and item analysis was applied to data separately. For both attitude and behavior scale explanatory factor analysis result KMO statistics were enough also Bartlett's test of sphericity statistics was significant. Item factor loadings greater than 0.30 and upper and lower 27% subgroups significance also Cronbach Alpha results (0.803 and 0.761) could be seen as evidence of reliability and validity (Kline, 1994; George & Mallery, 2003; Tabachnick & Fidell, 2007; Alpar, 2012).
3. As a future studies (Phase II) our aim will reconstruct this Likert type attitude and behavior questionnaire in order to increase the reliability and validity.

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