The Development of Environmental Motivation Scale at Secondary Schools and Analysis of Different Variables of Students' Motivation Towards Environment*

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Abstract

This study aims at developing Secondary School Environment Motivation Scale (SSEMS) in order to analyze the motivations of the students for the environment in terms of gender, grade, socio-economic level. The data were collected from 677 secondary school students to develop the scale and 1775 secondary school students for the survey study. SSEMS was developed as16 items, on three-point Likert scale and two dimensions (intrinsic and extrinsic motivation). The results of the research show that the general environmental motivation and intrinsic motivation of female students is significantly higher than the male students. There was no significant difference in the environmental motivation levels of female and male students in terms of extrinsic motivation dimension. When the relationships between the students' grade and their environmental motivations are examined, it is revealed that as their grades increase, all motivation levels (general, intrinsic and extrinsic) of students towards environment decrease. Moreover, there is not substantial correlation between the students' socio-economic levels and general environmental motivations. However, as the socio-economic levels of the students increased, their intrinsic motivation increased significantly, and their extrinsic motivations decreased significantly. The gradual change of intrinsic and extrinsic motivation as to gender, class and socio-economic level is discussed at length in the article.

Keywords: Environment, motivation, the secondary schools, development scale.

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Introduction

In the recent years, human beings have caused environmental problems due to human activities. Environmental education is of great importance to reduce these damages and eliminate environmental problems (Erol & Gezer, 2006; Eryaman et. all. 2010; Özdemir, 2010). Environmental education is taught from the earliest ages. Especially gaining knowledge, skills and sensitivity of elementary and secondary school students is of vital importance in human-environment interaction at science curriculum (Doğan, Saraç & Çiçek, 2017; Erol & Gezer, 2006).

Being aware of the factors that are effective in students' learning and which facilitate their learning will help to plan the learning process for teachers. Interest, attitude and motivation are very important factors in revealing students' knowledge and skills they have acquired (Yaman & Dede, 2007). Moreover, the motivation, which is one of them, is an important factor that influences students' learning and achievement (Acat & Demiral, 2002; Freedman, 1997; Lumsden, 1994). Motivation for a purpose, is an effective factor that provides for the perpetualness of the behavior and shows right direction (Ames, 1990; Yılmaz & Huyugüzel-Cavas, 2007). Intrinsic and extrinsic motivation which divides into two general types of motivation can lead to differences in the quality of individual performances (Ryan & Deci, 2000). Intrinsic motivation is defined as the behavior of the individual for his own sake and inner satisfaction (Benabou & Tırole, 2003; Lumsden, 1994; Ryan & Deci, 2000). Extrinsic motivation is defined as the behavior of individuals to gain something positive atthe end of the activity or to avoid something negative (Benabou & Tirole, 2003; Deci, 1972; Guay, Vallerand & Blanchard, 2000). Being motivated allows the individual to lead something into action. The motivation of a motivated person is closely related to the cause of the movement. The individual can take action due to his interest and may also take action because he wants to be approved by another person (Ryan & Deci, 2000).

The Importance of the Study

When the studies in the literature are reviewed in general, it has been determined that there are studies regarding environmental awareness, environmental problems, the perceptions of environment, environmental behaviors, environmental literacy and responsible behaviors of students at secondary school level (Atasoy, 2005; El Batri, Alami, Zaki, Nafidi & Chenfour, 2019; Erdoğan, 2009; Erten, 2003; Tarsus-Baş, 2010;Uzun, Gilbertson, Keleş & Ratinen, 2019). However, a study focusing on the role of motivation in learning the concepts and units related to environment has not been achieved at the science curriculum. Furthermore, no studies have been found that reveal and assess the motivations towards the environment at the secondary school level. Motivation studies in science education are mostly related to students' motivation towards science lessons and science learning (Dede & Yaman, 2008; Tuan, Chin & Shieh, 2005; Uzun & Keleş, 2010; Yaman & Dede,2007; Yenice, Saydam & Telli, 2012; Yılmaz & Huyugüzel Çavaş, 2007).

Motivation has a significant impact on students' science achievements, critical thinking, building the knowledge and learning. (Palmer, 2005; Tuan, Chin & Shieh, 2005; Wolters & Rosenthal, 2000) Students with high motivation are more willing to take an active role in activities in the learning environment (Wolters & Rosenthal, 2000). For this reason, there is a need for a scale that is a means for reliability and validity analysis have been done in order to determine the motivation of secondary school students.

The Aim of the Study

In this study, the aim of this research is to analyze various variables which are the motivation of the students for the environment (gender, grade, socio-economic level of family) and develop Secondary School Environment Motivation Scale (SSEMS) in order to determine the level of motivation for environment. Environment factors such as family incentive level, expectations and home education activities are related to family socio-economic level (Song & Hattie, 1984). Parents' education affects their home education practices, their educational system skills, values and knowledge (Acharya & Joshi,2009). In the survey study, the socio-economic levels of the students are determined according to their parents' education level, income level and occupations.

Methodology

In this study, Secondary School Environment Motivation Scale (SSEMS)was developed to determine the validity and reliability of the students about the environmental motivation. Expert opinions were obtained. Elucidative and confirmatory factor analyses and item analyses were performed and Cronbach's Alpha reliability coefficient was calculated. Survey method was performed with reliability and validity analysis and data were collected.

Participants

In this research, different samples concerning the development of SSEMS and survey study were studied. While developing SSEMS, the data were collected from 677 students from five secondary schools that were randomly selected in Kilis in order to do other analyses in the first stage except for corroborative factor analyses for validity and reliability analyses (Table 1).With SSEMS, the data were collected from totally 677 students who were 351 female and 320 male students and 6 students whose genders were not specified, 185 students from 5th grade, 174 students from 6th grade, 134 students from 7th grade and 184 students from 8th grade students (Table 1). In this study, for the survey study SSEMS was applied to 1775 secondary school students who were at the 5th, 6th, 7th and 8th grades at different ten secondary schools which were randomly selected (Table 2).

Table 1. Sampling for Statistical Analysis in Scale Development

Gender	Frequency	Percentage(%)
Female	351	51.85
Male	320	47.27
Not specified	6	0.88
Total	677	100
Grades	Frequency	Percentage(%)
5th	185	27.33
6th	174	25.70
7th	134	19.79
8th	184	27.18
Total	677	100

Table 2. Sampling and Demographic Information for Survey with SSEMS

Gender	Frequency	Percentage (%)
Female	914	51.49
Male	861	48.51
Total	1775	100
Grades	Frequency	Percentage (%)
5th	467	26.31
6th	434	24.45
7th	489	27.55
8th	385	21.69
Total	1775	100
Socio-economic level of the family	Frequency	Percentage (%)
Lower	923	52.0
Middle	537	30.25
Upper	315	17.75
Total	1775	100

Data Analysis

In order to analyze the obtained data, "Microsoft Excel 2010" software program, Statistics IBM SPSS Statistics 20 and "LISREL 8.7" were used. In order to meet the assumptions of statistical techniques, whether the scores showed normal distribution or not were decided. The independent sample t-test was used to determine whether the environmental motivation levels of secondary school students differ according to their gender. Spearman's rho correlation coefficient was used to determine whether the environmental motivation levels of secondary school students differ according to their grades and the socio-economic level of the family or not.

Development Steps of Motivation Scale at Secondary School Environment

Many sources have different approaches about scale development steps (Çiçek & İlhan, 2017; DeVellis, 2014; Özdamar, 2016; Tavşancıl, 2014). These stages are followed in the development of SSEMS at the sub-headings in the results section of this study.

Theoretical Framework and Item Writing

In the development of SSEMS, first of all, literature review was done to construct the theoretical framework of the scale. In the literature, motivation scales and motivation theories were

examined. (Altun & Erden 2006; Büyüköztürk, Akgün, Özkahveci & Demirel, 2004; Glynn & Koballa, 2006; İlhan, Yıldırım & Sadi-Yılmaz, 2012; Kutu & Sözbilir, 2011; Yılmaz & Huyugüzel-Çavaş, 2007). As a result of these analyses, and when motivational theories and secondary school level are taken into account, it is decided that the scale should be consisted of two dimensions which are intrinsic motivation and extrinsic motivation. The following stage of this study is forming the items of the scale.

Tracing the literature review obtained for writing the scale items, informal interviews were carried out among teachers and students. The learning outcomes which are stated in the teaching programme in Turkish Ministry of Education (TME) were analyzed, the educational skills were examined and the conceptual framework of the scale was determined (MEB, 2018). The content validity of the scale was determined by these procedures (Tavşancıl, 2014). As a result of the data obtained from the opinions of teachers and students and literature review, the first scale draft consisting of 38 items was prepared on three-point (I disagree, I agree slightly, I strongly agree) Likert scale.

Obtaining Expert Opinions

For SSEMS consisting of 38 items, expert opinion form was prepared and expert opinions were received from three science teachers and seven lecturers (Associate Professors, Assistant Professors, Research assistants) and regulations were carried out according to opinions of the experts. Demographic information of the experts is shown in Table 3. Thus, the content and face validity of SSEMS were provided.

Table 3. Demographic Characteristics of the Experts

Codes	Gender	Degree	Areas of core expertise
1	Male	Assistant Professor	Biology Education
2	Male	Assistant Professor	Biology Education
3*	Female	Assistant Professor	Science Education
4	Male	Associate Professor	Chemistry Education
5*	Female	Assistant Professor	Chemistry Education
6*	Male	Associate Professor	Educational Sciences
7	Female	Research Assistant	Turkish Education
8	Female	Science Teacher	-
9	Male	Science Teacher	-
10	Male	Science Teacher	-

*These experts have done scientific researches about motivation.

As a result of the feedback received from the experts, SSEMS consists of 30 items. 2nd, 3rd, 6th, 8th, 10th, 11th, 13th, 14th, 16th, 18th, 25th, 26th and 29th items include negative expressions.

Pilot Studies

Pilot studies were conducted twice as pre-pilot study and pilot study. The aim of pre-pilot study is to determine the average duration of implementation of the scale and to observe how the scale

is evaluated by students in terms of language and comprehensibility of the words on which students had difficulty in understanding.

Pre-Pilot Study

In the pre-pilot stage, SSEMS, consisting of 30 items, was applied to 24 students studying in the 5th grade in one session. The average duration of responses at the test was 30-35 minutes. During the pre-pilot study process, all the responses which were given by the students were dictated by the researcher. Researcher's observations obtained from pre-pilot study show that students could not fully understand the negative expressions and had difficulty in marking these items. In addition, one-to-one interviews were with the three students and their teachers during pre-pilot study. Thus, one-to-one interviews, observations and students' feedback, arrangements were made with regard to the items included in the SSEMS. As a result of the pre-pilot study, no item was removed from the scale, but seven negative items which students had difficulty in responding were turned into positive root.

Pilot Study

Within 30-item items prepared for the SSEMS, it was decided to include negative expressions of the 6th, 13th, 14th, 23rd, 25th and 30th items. In order to calculate the statistical reliability and validity of SSEMS, 5th, 6th, 7th and 8th grade secondary school students attended the pilot study which was the data collection stage. While the reliability in the measurements reveals the consistency between the scale or questionnaire answers. The validity of the scale concerns with how accurate the measurement is done and shows the degree of serving the purpose of the scale (Büyüköztürk, 2012).

Descriptive analysis

Since the SSEMS was prepared as a three-point Likert type and it was initially prepared as 30 items, the lowest score that could be taken in this scale was 30 and the maximum score was 90. The lowest score was 45 and the highest score was 89 from 677 samples which were obtained from the data. When the distribution of total score of SSEMS was examined; arithmetic mean is 98.72; standard deviation is 7.77; median is 69. These values were obtained. The coefficient of skewness was .173 and the coefficient of kurtosis was 48 was obtained. These values show that data do not deviate from the normal distribution (Büyüköztürk, 2012).

Item Analysis Based on Differences Between the Lower-Upper Group

The total or arithmetic mean scores of each student were calculated according to the distinguishing index of the items to determine the items to be included in the scale. All students' scores were arranged in order from upper to lower. Upper and lower groups were formed from 183 people who were accounted for 27% of the whole sample. Then, independent groups t-test was applied between the mean of the upper group and the lower group for each scale item. According to independent groups t-test results (p> .01), it was recommended to remove 14th, 28th, and 30th items

from SSEMS (Table 4). Apart from these items which were removed from the scale, other items can be said to have a high level of discrimination.

Table 4. Item-total Correlations and Lower-upper Group Averages t-test Results

Item No	Item-Total Correlations(r)	The t-value of the difference between the lower / upper group means
1	.449**	10.989**
2	.347**	9.607**
3	.459**	12.869**
4	.350**	9.469**
5	.395**	9.929**
6	.091*	2.645**
7	.416**	11.655**
8	.389**	9.765**
9	.500**	13.969**
10	.387**	10.236**
11	.427**	11.224**
12	.498**	13.943**
13	.205**	5.152**
14	.081*	2.559
15	.319**	7.113**
16	.306**	7.834**
17	.323**	8.041**
18	.440**	13.020**
19	.486**	12.804**
20	.526**	14.992**
21	.472**	12.013**
22	.458**	12.740**
23	.032	.126**
24	.435**	10.993**
25	.265**	6.094**
26	.371**	10.558**
27	.480**	12.973**
28	.001	.249
29	.440**	11.985**
30	.061	.879

**p<.01   *p<.05

Correlation Based Upon Item Analysis

Correlation values between the total score of the students and each item were examined. (Table 4). The correlation between a scale item and the total score was .25 and above, and the significant correlation value was considered as an important criterion when selecting the item. (Özdamar, 2016). When the 30-item scale was examined, the item-total correlation values ranged between .001 and .526 (Table 4). According to these results, the items 6th, 13th, 14th, 23rd, 28th and 30thfrom SSEMS can be removed.

Exploratory Factor Analysis (EFA)

The all 30 items were initially prepared for SSEMS, which was developed to measure the environmental motivation of secondary school students. The items were written in two dimensions as intrinsic motivation and extrinsic motivation. In exploratory factor analysis (EFA), variables that

measure the same structure or quality are collected and explained with measurement factors (Büyüköztürk, 2012).

As a result of item analyses, exploratory factor analysis procedures started with 24 remaining items. The adequacy of the sample size for EFA was examined by Kaiser-Meyer-Olkin (KMO) and the KMO value was .860. It shows that the data are suitable for factor analysis as this value is higher than .60. The normal distribution of the data for EFA was investigated with the Bartlett Sphericity Test ($\chi^2_{(276)=}$ 2492.103, p<0.01). The results indicate that the data are suitable for EFA (Tabachnick & Fidell, 2007).

In this section, analysis of the basic components commonly used in factor analysis for the determination of the factor structure of SSEMS was made and the items to be found in each factor, varimax rotation method, percentage of total variance, eigenvalue and line graph, factor load values were analyzed.

For EFA, components with eigenvalues above 1 was taken into account and the contribution of each component to total variance was examined. In the analysis, it was carried out by 24 items, 6 components with more than one self-value have emerged. These is the variance explained by the eigenvalue 4.534 is 18.892; the variance which was explained by the eigenvalue 2.161 is 9.004; the variance which was explained by the eigenvalue 1.333 is 5.552; the variance explained by the eigenvalue 1.081 is 4.502; the variance which was explained by the eigenvalue1.041 is 4.337; the variance which was explained by the eigenvalue 1.016 is 4.231. These components were clarified as total variance of 46.518%. When the scree plot of 24-item SSEMS was examined, it was seen that the slope decreases with a high acceleration after the second factor. These results showed that SSEMS could have a two-factor structure and also supported the theoretical framework that was initially considered for the scale.

The analyses were repeated while the factor load values of the items were being analyzed, the varimax rotation method was being used and both of two factors of the items were being removed. The factor in the repetition of analysis by removing the materials was the load value .30 and above, there were as many as 10 differences at least in two factors between the factor load values of the ejected factors. (Büyüköztürk, 2012; Tabachnick & Fidell, 2007). After repeated analyses, it was necessary that the items which were 5th, 8th, 12th, 14th, 16th, 17th, 21st and 26th were removed from SSEMS.

In the final state of the scale consisting of 16 items; in the first factor, the items were 1st, 3rd, 7th, 9th, 11th, 18th, 19th, 20th, 22nd and 29th while in the second factor the items were 2nd, 4th, 10th, 15th, 24th and 27th (Table 5).
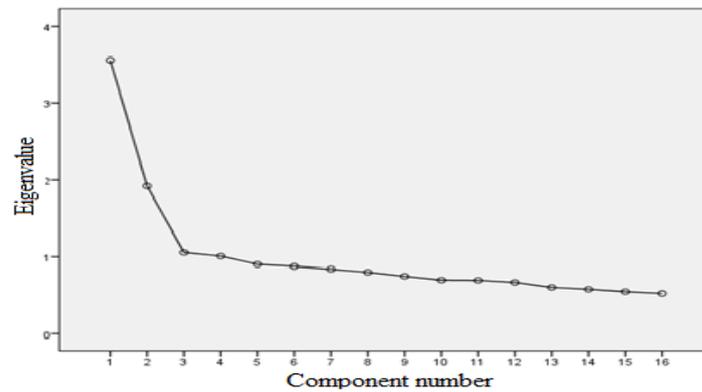
Figure 1. Scree plot

When two factors that were more than 1 were examined in the EFA results with 16 items, these were calculated as 3.019, 18.869, 18.475, and 15.354, respectively. These components can be explained 34.223% of the total variance (Table 6). When the scree plot of 16 items were examined, it was seen that the slope decreased with a high acceleration after the second factor (Figure 1). It was seen that the factor loadings for the first factor ranged from .454 to .618 and for the second factor from .455 to .711 (Table 5).

Table 5. Factor Loads and Reliability Coefficient of SSEMS

	No	Items	F1	F2	Cronbach's Alfa
Intrinsic Motivation	i19	I believe that the natural habitats of relicts must be preserved.	.618		
	i1	As a result of human activities, I do not want the natural habitats of plants to be destroyed.	.605		
	i11	I don't want habitats of animals to be harmed.	.591		
	i20	I would like to know the damages of polluted waters to sea creatures.	.581		
	i7	I like to examine creatures living in nature.	.526		
	i3	I would like to learn the ways of protection off natural disasters (earthquakes, floods, etc.).	.481		.76
	i29	I want to use recyclable products to reduce environmental pollution.	.474		
	i9	I want to work voluntarily in organizations that aim to protect living things.	.471		
	i18	I like to share my suggestions about environmental pollution with my friends.	.471		
	i22	I enjoy reading information about global environmental issues (acid rains, ozone layer depletion, etc.).	.454		
Extrinsic Motivation	i4	I can investigate environmental problems to show that I'm better than other students.		.711	
	i15	I would like to participate in environmental activities (planting trees, etc.) to show that I am better than my classmates.		.674	
	i2	I'm not polluting the environment for my family to appreciate me.		.654	
	i10	I want to join the environmental protection club at the school to make good friendships with other students.		.628	.710
	i27	I want to be more knowledgeable than my friends about the factors that threaten biodiversity (population growth, environmental pollution, global warming, etc.)		.474	
	i24	Learning the concepts such as Habitat, ecosystem, biodiversity etc. is important for me to get a good grade.		.455	
	Total				.78

Note: Factor load below .40 are not given in the table.

Table 6. Factor Variance and Eigenvalues

Factor	Eigenvalue	Variance(%)	Total(%)
1	3.019	18.869	18.869
2	2.457	15.354	34.223

The KMO value, which indicated the adequacy of the sample size for SSEMS consisting of 16 items, was 828. It shows how the data was suitable for factor analysis that this value was higher than 60. With the Bartlett Sphericity Test, it was examined whether the data showed normal distribution and the results revealed the suitability of the data for EFA ($\chi^2_{(120)}$ = 1609.667, p<0.01).

Reliability Cronbach's Alpha

The alpha coefficient was developed by Cronbach when the items have three or more options in the case of Likert type tests (Büyüköztürk, 2012). The interval consistency reliability coefficient was obtained with Cronbach's Alpha for the data with SSEMS. The reliability coefficient for the intrinsic motivation factor of the scale was calculated as Cronbach Alpha .76; for the extrinsic motivation factor was calculated as Cronbach Alpha .71. The reliability coefficient for all items of the scale were calculated as Cronbach Alpha .78 (Table 5). These reliability coefficient values have shown that SSEMS is a reliable scale (Büyüköztürk, 2012).

Confirmatory Factor Analysis (CFA)

First of all; exploratory factor analysis was carried out with the data obtained from 677 participants in the development of SSEMS and the theoretical structure of the scale was formed by revealing the factors of the scale. Confirmatory factor analysis was performed with data from 1775 students in a different sample group for survey study (Table 2), in order to determine whether the theoretical structure of the developed SSEMS which was verified. It was tested whether the factor structures of SSEMS were verified and the confirmatory factor analysis was used in the structural equation modeling was performed with the LISREL 8.8 statistical program. (Çokluk, Şekercioglu & Büyüköztürk, 2012).

In order to determine the accuracy of the factor structures of the scale, the t values of between the latent variables (factors) and the observed variables (items) the significance at .01 level was examined (Table 7). In the modeling created for CFA, there is no item with non-significant t values and there is no item to be removed from the model. In Table 7 the Standardized Solution and t-value of the items was shown. The standardized factor loads for CFA were between .29 and .58.

Table 7. CFA Results That Were Done in the Survey for SSEMS

Factor	Item	Standardized item value	Solution	t-value
Extrinsic Motivation	2	.30		9.66
	4	.58		21.35
	6	.53		19.31
	8	.52		18.71
	10	.44		16.02
	14	.53		19.23
Intrinsic motivation	1	.29		10.48
	3	.46		17.02
	5	.42		15.20
	7	.53		19.58
	9	.30		10.61
	11	.51		19.16
	12	.31		11.14
	13	.50		18.45
	15	.44		16.28
	16	.39		13.87

It was calculated as compliance indices created for the structure of SSEMS X^2 (chi-square) = 444.3, df (degrees of freedom) = 97, p significance level .00 and RMSEA = .045 as shown in Figure 2. It is recommended to use a number of fit indices to investigate a model with CFA (Çokluk, Şekercioğlu & Büyüköztürk, 2012; Kline, 2010). The fit indices used for CFA in this study are given in Table 8.

In order to examine the compatibility of the model, 4.5 value was obtained by dividing the degree of freedom by the chi-square value. The fact that the chi-square / sd value is below 5 in large samples explains that the model has an acceptable fit. (Sümer, 2000). RMSEA was calculated as .045 as the fit index. The result of RMSEA which was smaller than .05 indicates refers excellent fit (Çokluk, Şekercioğlu & Büyüköztürk, 2012; Kline, 2010).

When the SRMR from the fit indices obtained by CFA was examined, it was calculated as .046. The result of SRMR which was smaller than .05 indicates excellent fit (Brown, 2006; Çokluk, Şekercioğlu & Büyüköztürk, 2012).

It was calculated as GFI = .97; NFI = .93; NNF1 = .96; CFI = .94; AGFI = .96; which were the fit indices used to test the model with CFA. It refers excellent consistence greater than 95 and good consistence greater than 90 the GFI, NFI, NNFI, CFI and AGFI values in the literature (Çokluk, Şekercioğlu & Büyüköztürk, 2012; Hu& Bentler, 1999; Sümer, 2000). When these compliance values are examined, it can be concluded that a good model is formed and SSEMS is a scale with structural validity.

Table 8. CFA Fit Indices for Survey Study Data

Fit indices	Value	Fit
X^2/df (Chi-Square /Degrees of Freedom)	444.3/97=4.5	Acceptable fit
RMSEA (Root Mean Square Error of Approximation)	0.045	Excellent fit
SRMR (Standardized Root Mean Square Residuals)	0.046	Excellent fit
NFI (Normed Fit Index)	0.93	Good fit
NNFI (Non-Normed Fit Index)	0.93	Good fit
CFI (Comparative Fit Index)	0.94	Good fit
GFI (Goodness of Fit Index)	0.97	Excellent fit
AGFI (Adjusted Goodness of Fit Index)	0.96	Excellent fit

Results and Discussion

Results of the Survey Study

Descriptive analysis and internal consistency reliability coefficient were calculated for the factors of the SSEMS for the data obtained by the survey study. When the skewness and kurtosis coefficient of SSEMS were analyzed, it could be said that it shows normal distribution (Table 9). Cronbach's Alpha was calculated to be .73 for all items, .70 for intrinsic motivation factor and .67 for extrinsic motivation factor. These values show that the data obtained for the survey study is reliable.

Table 9. Descriptive Statistics and Internal Consistency Reliability

	Intrinsic motivation	Extrinsic motivation	SSEMS
Item Number	10	6	16
N	1775	1775	1775
Mean	2.5019	2.1304	2.3626
Median	2.6000	2.1667	2.3750
Std. Deviation	0.35187	0.48338	0.32062
Skewness	-0.656	-0.195	-0.283
Kurtosis	-0.165	-0.718	-0.51
Cronbach's Alpha	0.7	0.67	0.73

Relationship Between Environmental Motivations of Secondary School Students and Their Genders

It was investigated that whether environmental motivation levels of secondary school students differ from according to their genders by applying independent groups t-test. As a result of the analysis, it was found that the environmental motivation levels of female and male students were significantly different from each other (t (1772) =4.915, p<.05). According to this, the environmental motivation levels of female students (M = 2.399) were significantly higher than that of male students (M = 2.325). For the intrinsic motivation factor of SSEMS, the environmental motivation levels of female and male students were found to be significantly different from each other, t (1733) =6.981, p<.05. Accordingly, the female students' intrinsic motivation levels (M = 2.558) were significantly higher than that of male students (M = 2.443). For the extrinsic motivation dimension of SSEMS,

there was no significant difference in the environmental motivation levels of female and male students, t (1770) = 0.261, p> .05.,t (1770) =0.261, p>.05. According to this, the extrinsic environmental motivation levels of the female students (M = 2.558) were close to each other with the motivations of the male students (M = 2.443).

Table 10. Independent Groups t-test by Gender

	Gender	N	M	df	t	df	p (Sig. (2-tailed)
SSEMS	Female	914	2.3988	.31121	4.915	1772	000*
	Male	860	2.3244	.32618			
Intrinsic	Female	914	2.5581	.33172	6.981	1733.109	.000*
Motivation	Male	860	2.4427	.36273			
Extrinsic	Female	914	2.1333	.50440	.261	1770.409	.794
Motivation	Male	860	2.1273	.46055			

*p<.05

There were studies which indicated that girls generally motivated themselves more than boys and reflected more socially focused behaviors than boys in the success environments (Lepola,2004; Thompson, 1999).It was inferred that in the study of Yılmaz (2007) which was investigated the effect of motivation on the academic achievement of students in English classes in secondary education, and also the general motivation level of female students was higher than the general motivation level of male students. Vecchione, Alessandri ve Marsicano (2014) who focused on how academic motivations of boys and girls were related to school success and they inferred that intrinsic motivation tended to be stronger than male for female in all educational levels. In the literature, there were not any studies related to environmental motivations of secondary school students. Meece, Glienke and Burg (2006), put forward in their study on the role of gender in psychological and educational research on motivation in secondary school students, and concluded that girls and boys keep maintaining stereotypical gender roles in the classroom.

Relationship Between Secondary School Students' Environmental Motivations with Grades and Socio-Economic Levels

In the analysis using 1775 data obtained by survey study, the relationship between general motivation, environmental motivation and extrinsic motivation levels of secondary school students and their relationship with the grades and socio-economic levels of the students were examined and were shown in Figure 2 and Figure 3. The relationship was demonstrated with Spearman's rho Correlation Coefficient. When Table 11 is examined, it can be considered that there is a low, negative and significant relationship between the grades of the secondary school students' levels and the general environmental motivation [r=-.157, p<.01], intrinsic motivation [r=-.125, p<.01], the extrinsic motivation [r=-.129, p<.01]. According to this result, it can be said that the level of environmental motivation of the students decreases as their grades increases. These results were similar to the studies when the students' grades increase the students' motivation decreases (Brouse vd.,2010; Yaman & Dede, 2007; Wigfield, Eccles & Rodriguez, 1998). Ryan and Deci (2000) stated that both intrinsic and

extrinsic motivation spent in school decreased gradually over the years. The decrease in the extrinsic motivation levels of the students as their grades increase may be related to the fact that the little students give too much importance to the awards, appreciation and acclaim they receive from outside.

When the Table 11 is examined, it can be considered that the relationship between the socio-economic levels of the secondary school students and the general environmental motivation levels is low, positive and not a significant relationship [r= .021, p>.01]. According to this result, it cannot be said that there is a relationship between socio-economic levels of students and general environmental motivation levels. Some studies suggest that the socio-economic level of the family (income, education level, occupations) do not have much effect on the motivation of children (Hao &Bonstead-Burns, 1998; Maya, 2001).The relationship between the socio-economic levels of the secondary school students and the intrinsic motivation levels are low, positive and significant [r= .096, p<.01]. According to this result, it can be said that as the socio-economic levels of student's increase, the intrinsic motivation levels of the students increase.

Families with a high level of education and an income create a different learning environment that affects their children's motivation as they have higher expectations for their children's education (Acharya & Joshi,2009; Alexander, Entwisle & Bedinger, 1994). Better educated families participate more actively in their children's education and provide more support for their children's self-confidence and motivation (Alexander, Entwisle & Bedinger, 1994; Grolnick ve Slowiaczek, 1994). For this reason, the education, occupations and income of the parents affect intrinsic motivation.

The relationship between the socio-economic levels of the secondary school students and the extrinsic motivation levels of the secondary school can be observed low, negative and significant [r= -.082, p<.01]. According to this result, it can be said that as the socio-economic levels of the students increase, the extrinsic motivation levels of the environment decrease. This is similar to the study results of Güven (2013), who concluded that the participants with low socio-economic level had higher motivation levels than the participants with high socio-economic level in the study which examined the relationship between religiosity and academic motivation among high school and university students in Turkey.

Table 11. Spearman's rho Correlation Coefficient

	SEMS	Intrinsic Motivation	Extrinsic Motivation	Grade	Socio-economic Level
SEMS	1.000	.818**	.765**	-.157**	.021
Intrinsic Motivation	.818**	1.000	.282**	-.125**	.096**
Extrinsic Motivation	.765**	.282**	1.000	-.129**	-.082**
Grade	-.157**	-.125**	-.129**	1.000	-.062**
Socio-economic Level	.021	.096**	-.082**	-.062**	1.000

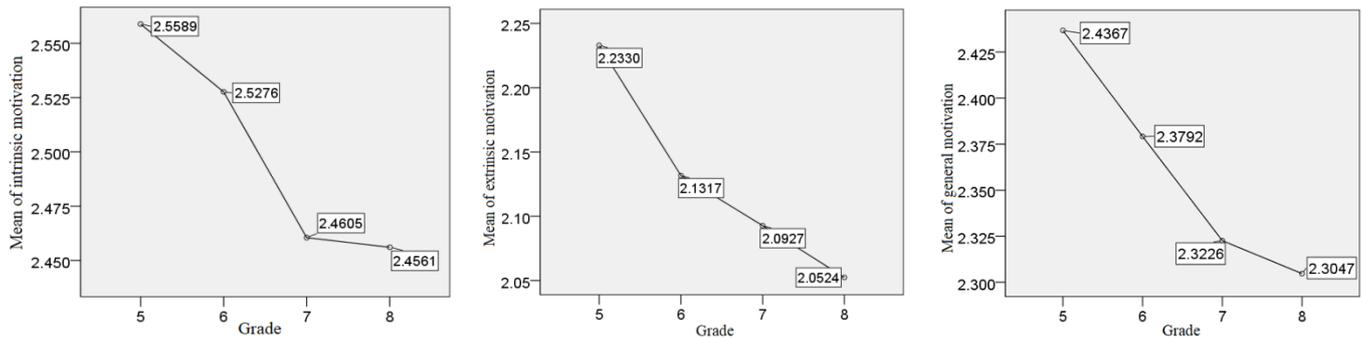**Correlation is significant at the 0.01 level.

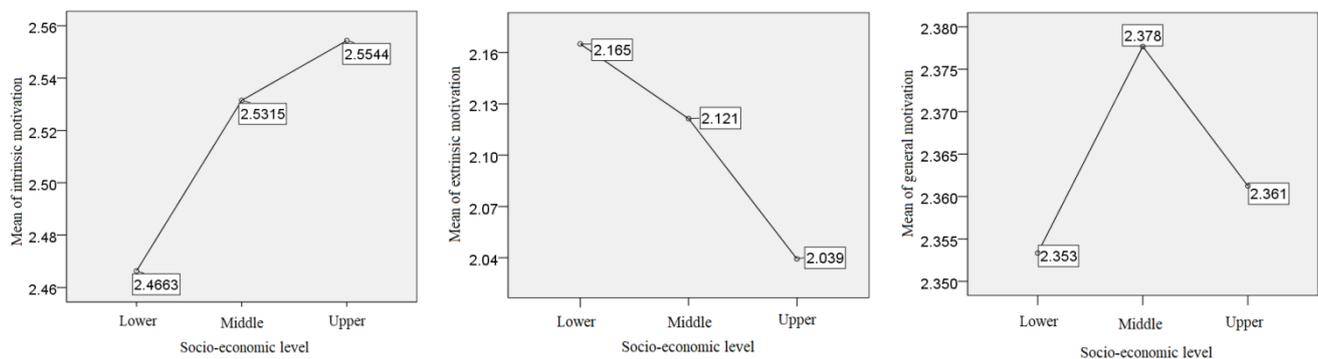**Figure 2.** The changes of intrinsic, extrinsic and general environmental motivation by grade

Figure 3. The changes of intrinsic, extrinsic and general environmental motivation by socio-economic level

Suggestions

- The SSEMS developed within the scope of this study can contribute to data collection by using in experimental studies and in screening studies.

- Using the SSEMS, researchers can do researches on different variables that affect the motivation of the secondary school students towards the environment.

- Teachers can prepare activities and learning environments to increase students' motivation by determining the motivation levels of their students by using SSEMS.

- Non-governmental organizations that organize environmental activities, educators or researchers working on nature education projects can collect data and make arrangements or plans in their activities through these data.

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