

Original Article

## The Relationship between Environmental Consumption Consciousness and Behavior of University Students

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### Abstract

**Objective:** Environmental issues and their negative consequences are important problems of our time. Many health problems are associated with these issues. University students, who constitute an important population in society, are required to show conscious and positive attitudes towards the environment. The aim of this study was to evaluate the relationship between environmental consciousness and behaviors of university students.

**Methods:** The sample of this cross-sectional study consists of 280 students. The stratification sampling method used and data were collected with a 'Socio-Demographic Data Form', 'The Consumer Environmental Consciousness Perception Scale' and the 'Behavior Scale for Environmental Problems'. Mean, percentage, t-tests, variance analysis (One-Way ANOVA), pearson correlation analysis, and multiple regression analysis were used in the analysis.

**Results:** Female's, students 24 years of age, non-smokers and non-alcohol users, those who had environmental education, and members of any environmental organization demonstrated higher environmental consciousness and associated behaviors. It was found that while university students' consumption consciousness and behaviors towards environmental problems were positive ( $r=0.058$ ,  $p>0.05$ ) and the scores on the subdimensions of environmental consciousness explained 16.8% of environmental behavior.

**Conclusions:** Environmental consciousness has an impact on behavioral change and universities are also responsible for raising students as environmentally responsible individuals.

**Keywords:** Environmental behavior, environmental consciousness, environmental health, public health nursing

### Introduction

Environmental issues and their negative consequences are important problems of our time (Onurlubas, 2019; Swartz, 2018). Although the needs of people are increasing day by day, natural resources do not necessarily increase at the same speed and may even disappear. While it is thought that most of the natural resources will not be exhausted as a result of the increase in population and economic development since the 20th century, there is awareness that the world's natural resources are being depleted. The threat of an inability to meet the needs of future

generations has led to the adoption of responsible consumption (Atesoglu & Erkal, 2018).

There is a relationship between our health and the environment we live in, the water we drink, the air we breathe, and the food we grow and eat (WHO, 2020). Environmental problems, environmental pollution, and the problems it causes are the cause of many diseases. For instance, environmental pollution was responsible for nearly 9 million early deaths in 2015 and is one of the major causes of environmental diseases and deaths in the world today (Ruepert, Keizer, & Steg, 2017). The

World Health Organization (WHO) estimates that 7 million people die every year from exposure to fine particles in polluted air that penetrate deep into the lungs and cardiovascular system, causing conditions such as stroke, heart disease, lung cancer, chronic obstructive pulmonary disease, and respiratory infections, including pneumonia (WHO, 2018). WHO and UNICEF researchers state that more than one million deaths each year are associated with insufficient sanitation conditions. Infections caused by lack of proper sanitation account for 26% of newborn deaths and 11% of maternal deaths (Osseiran & Lindmeier, 2019). In the field of environmental health, nurses have several roles to assess environmental health risks for the individual, family, and society, improve sustainability and prevent exposure to hazards, also, they can achieve these roles by defending health-protecting laws, as well as generating nursing knowledge on environmental health issues (Ozsoy Altug & Simsek Gurgun, 2018). One of the basic concepts of nursing concern the environment and its protection and the belief that environmental health needs to be improved to maintain human health (Fox & Alldred, 2016). Florence Nightingale was the first person to emphasize the importance of environmental health and the health of soldiers, as well as improvement in the condition of wounded soldiers, during the Crimean War. Nightingale highlighted five key components for optimal health: clean air, clean water, effective drainage, sanitation, and lighting (Ozsoy Altug & Simsek Gurgun, 2018). The International Council of Nurses (ICN) sets a theme each year to draw attention to universal problems among nurses, to create and maintain a professional culture, and to reflect professionally shared values. The ICN identified the theme for 2017 as "Nurses: The Leading Voice in Achieving Sustainable Development Goals". Of these sustainable development goals, four are environmentally related and Target 12 is responsible consumption and production. In its 2017 theme, ICN aimed to raise awareness of what the Sustainable Development Goals are and why it matters, both among the nursing profession and community and policymakers. (ICN, 2017; Oksay et al., 2018).

While not responsible for today's environmental problems, the younger generation is most affected by them. Being responsible and conscious consumers with regard to

environmental health and exhibiting environmental protective and educated behaviors are of great importance to students who constitute a significant portion of society (Celik, Basaran, Gokalp, Yesildal, & Han, 2016). It is very important for university students to take part in the solution of environmental problems that may arise in the future and to share information with the next generations. According to a study, it has been stated that non-governmental organizations make the most important contribution in combating environmental problems, while universities contribute the least. Universities have important responsibilities in raising environmentally conscious individuals who have the necessary knowledge, skills, and values that will contribute to increasing the quality of life of the global society. In order to use environmental information in daily life, to be aware of environmental hazards, and to contribute to the solution of current and future problems, it is of great importance to raise consciousness among university students. (Erdal, Erdal, & Yucel, 2013; Oguz, Cakıcı, & Kavas, 2011).

Today, knowledge about the environment and environmental problems are created with the awareness of gaining awareness and a positive attitude, but it is not sufficient to protect the environment and prevent environmental problems encountered. The best solution to this issue will be to show positive behavior towards the environment (Güven & Aydogdu, 2012). University students, who form an important consumer group today and in the future, are expected to be positive behavior to the environment in addition to being conscious consumers. Behavior is affected by many factors by its nature. According to the studies, education, cost and culture are some of the factors that affect the behavior. (Collado, Evans, & Sorrel, 2017).

The aim of this study was to evaluate the relationship between environmental consciousness and related behaviors of university students. Research questions;

1. What is the level of environmental consciousness of university students?
2. What is the level of environmental behavior of university students?
3. What is the relationship between university students' environmental consciousness and behavior?

4. What is the effect of environmental awareness on environmental behavior?

### Method

**Population and Sample:** The population of this cross-sectional study consisted of 8958 students studying at a private university in Istanbul. Sampling was calculated using alpha ( $\alpha$ ) 0.05 and power ( $1-\beta$ ) 0.90 using the G\*Power 3.0.10 program which determined the number of required samples to be 255. A total of 280 students were sampled taking into consideration the ratio of male to female students in the departments where the students were studying and the recruitment of students from each class. Students volunteered to participate in the study during the selection process.

**Variables:** Demographic characteristics were evaluated as independent variables and environmental consciousness and environmental problems behavior total score means were evaluated as dependent variables.

**Data Collection Tools:** A 'Socio-Demographic Characteristics Form' prepared by the researchers was used to record the students' personal information. The 'Environmental Consciousness Scale' (ECS) was used to determine consumption consciousness and the 'Environmental Problems Behavior Scale' (EPBS) was used to determine student behaviors towards environmental problems.

**Socio-Demographic Characteristics Form:** A Socio-Demographic Characteristics Form was prepared by the researchers based upon the literature (Oguz, Cakıcı, & Kavas, 2011; Laureti & Benedetti, 2018). This form was used to record students' sex, age, current cigarette and alcohol use, any previous environmental education, and any membership in an environmental organization.

**ECS:** The ECS consists of a 5-level Likert-type scale as developed by Dikmenli and Konca (2016). Scale items were divided into four factors: susceptible consciousness, behavioral consciousness, social pressure, and bias. Points were assigned to answers as follows: 1 point for 'Strongly Disagree', 2 points for 'Disagree', 3 points for 'Undecided', 4 points for 'Agree', and 5 points for 'Strongly Agree'. The scale consisted of 28 items, 8 negative and 20 positive. The lowest total score possible was 28 and the highest total score was 140. To assure the validity of the scale, explanatory factor analysis, item-factor

total correlation, and item discrimination values were analyzed. Item-factor correlations of susceptible consciousness were between .46 and .65, behavioral consciousness between .54 and .73, social pressure between .48 and .59, and bias between .53 and .64. Each item had a positive and significant statistical difference ( $p < .001$ ). After exploratory factor analysis (EFA), confirmatory factor analysis (CFA) was done to support the four-factor model. Cronbach's alpha value of the scale derived from the EFA was .87. Chi-square, GFI, RMSEA, CFI, NFI, RFI, IFI, and AGFI indexes were analyzed in the CFA. Cronbach's alpha reliability coefficient was used as an internal consistency coefficient. Cronbach's alpha reliability coefficient of the whole scale was .77. The increase in the scores obtained from the scale indicates the high environmental consciousness of the individuals as the consumer, and the decrease in the scores indicates the unconscious consumer (Dikmenli & Konca, 2016). The internal consistency Cronbach's alpha value of the ECS in this study was .69.

**EPBS:** This scale was in the form of a triple Likert-type developed by Guven and Aydogdu (2012) and consisted of 40 items. 'Agree' was used for the positive items in the scale and 'disagree' was used for the negative items. A total of 2 points were given for items answered 'agree' on positive items, 0 points for 'disagree', and 1 point for 'undecided'. The 3rd, 4th, 8th, 10th, 12th, 22th, 23rd, 24th, 30th, 32nd, 33rd, and 35th items were negatively structured in the scale. The lowest total score possible was 0 points and the highest total score 80 points. The KMO value of the scale was found to be 0.79. In order to ensure the criterion validity of the scale, it was tested whether the difference between the averages of these two groups was upper and lower groups and whether the difference between the averages of these two groups was significant. Scale items discrimination indices at the level of significance of 0.05 range from 0.24 to 0.58. Content validity, criterion validity, and construct validity tests were performed to determine the soundness of the scale. The Cronbach's alpha value of the scale was .85. the increases in the total scores obtained from the scale indicate high environmental behavior (Güven & Aydoğdu, 2012) and the internal consistency Cronbach's alpha value of the scale in this study was .79.

**Data Analysis:** Data were evaluated by creating a database using the IBM SPSS Windows 22.0 software program. An increase in the ECS scores

indicated high environmental consciousness of the participants as consumers and a decrease in scores indicated less conscious consumers. An increase in the scores obtained from the EPBS indicated more environmentally aware behaviors and a decrease in scores indicated less environmentally aware behaviors. The total score of the scale was calculated by adding the answers given to each item. If the total score of each scale was found to be high, the group's level of awareness on the relevant scale was considered high. Comparisons made according to demographic characteristics were based upon the total scores of the scales. Before the analyses, a Shapiro-Wilk test was performed to determine the suitability of the data for normal distribution and it was determined that the data conformed to the normal distribution. To evaluate the data, t-test and one-way ANOVA tests were performed for independent groups using number, frequency, percentage distributions, and parametric tests. The relationship between environmental consciousness and environmental behavior was examined by Pearson correlation analysis. The study also used multiple regression analysis to determine the power of the entire ECS and its subdimensions to predict the EPBS. In addition, the multiple correlations between the variables were evaluated using tolerance and variance inflation factor (VIF). Independent variables that had tolerance values larger than 0.2 and VIF values larger than 10 were included in the model.

**Ethical Permissions:** The data of the study was collected by researchers with the decision of University Scientific Research Ethics Committee dated 22.06.2018 and numbered 99 and with the permission of University Rectorate numbered 43660838-770.

**Limitations of Research:** The results of this research are limited to the data obtained from students studying at a private university in Istanbul during the 2018-2019 academic year.

## Results

In this study, 53.9% of the participants were female, 46.1% were male, 40% were in the 18-20 age group, 48.9% were in the 21-23 age group and, 11.1% were in the 24 years and older. The prevalence of smoking among students was 40.7% and alcohol use was 36.8%. It was determined that 67.1% of the students had not received environmental education and 95.4% were not members of any environmental organization.

The mean scores of ECS, EPBS, and their subscales were given in Table 1. It was determined that the ECS mean score of the students was  $81.48 \pm 7.13$ , and the EPBS mean score was  $49.48 \pm 11.21$  (Table 1). Mean Scores of ECS According to Students' Descriptive Characteristics (n = 280). Based on the students' descriptive characteristics, there was no statistically significant difference between the mean ECS scores (Table 2). Female students who participated in the study, those in the 18-20 age group, and those who did not smoke or drink alcohol had higher ECS mean scores than those of the other groups ( $p > 0.05$ ) (Table 2). Students who received environmental education and those who were members of any environmental organization also had higher scores than the other groups ( $p > 0.05$ ) (Table 2).

Mean Scores of EPBS According to Students' Descriptive Characteristics (n = 280). Upon comparison, it was found that the mean EPBS scores of girls, non-smokers, and members of an environmental organization were significantly higher than the other groups ( $p < 0.05$ ) (Table 3). The mean EPBS scores of 24-year-olds and those who did not drink alcohol were higher than the other groups ( $p > 0.05$ ) (Table 3).

The Relationship Between Mean ECS and EPBS Scores (n = 280). Pearson correlation analysis was used to investigate the relationship between the ECS and EPBS and ECS sub-dimensions and EPBS sub-dimensions (Table 3). When the correlation between the total score averages of ECS and EPBS was examined, there was no significant relationship found between them ( $p > 0.05$ ) (Table 4). However, there was a weak positive correlation between the total scores of the EPBS and the behavioral consciousness sub-dimension of the ECS ( $r = .38$ ), and a weakly positive correlation between the ECS bias sub-dimension ( $r = .20$ ) ( $p < 0.05$ ) (Table 4).

Independent Variables' Power of Predicting the Status of Environmental Behavior. Table 5 presents the correlation between study variables and environmental behavior. The model includes the scores for subdimensions of environmental consciousness. These variables explained 16.8% of the environmental behavior. The factors that had an effect on environmental behavior were bias ( $\beta = -1.142$ ), social pressure ( $\beta = -0.067$ ), behavior consciousness ( $\beta = 0.360$ ) and, susceptible consciousness ( $\beta = 0.640$ ), respectively (Table 5).

**Table 1. Mean ECS and EPBS Scores**

Scales	Sub-dimension	Lower and Upper Values	Average Scores for Each Scale X±SS
<b>ECS</b>	Susceptible Consciousness	20-39	29.83±2.29
	Behavior Consciousness	18-37	27.10±3.29
	Social Pressure	5-25	13.95±3.49
	Bias	4-20	10.59±3.38
<b>Total ECS Points</b>		60-103	81.48±7.13
<b>EPBS</b>	Perception	0-8	5.19±1.91
	Set	2-16	9.43±2.91
	Guided Response	1-12	6.95±2.20
	Mechanism	2-20	13.37±3.40
	Adaptation	1-10	6.59±1.92
	Origination	2-14	7.96±2.09
<b>Total EPBS Points</b>		18-74	49.48±11.21

**Table 2. Mean Scores of ECS According to Students' Descriptive Characteristics (n = 280)**

Descriptive Characteristics	Environmental Consciousness Scale Points		
	n	X±SD	Test
<b>Gender</b>			
Female	151	82.07±6.95	t=1.484
Male	129	80.80±7.31	p=0.139
<b>Age</b>			
18-20 years	112	82.11±6.81	F= 1.042
21-23 years	137	80.86±7.23	p=0.354
24 years and older	31	82.00±7.79	
<b>Smoking</b>			
Yes	114	81.00±7.62	t= 0.934
No	166	81.81±6.78	p=0.351
<b>Alcohol Use</b>			
Yes	103	81.17±7.13	t=0.562
No	177	81.67±7.15	p=0.575
<b>Education Related to the Environment</b>			
Trained	92	82.43±7.15	t=1.555
Not trained	188	81.02±7.09	p=0.121
<b>Member of an Environment-Related Organization</b>			
Member	13	84.30±6.35	t=1.461
Not a member	267	81.35±7.15	p=0.145

**Table 3. Mean Scores of EPBS According to Students' Descriptive Characteristics (n = 280)**

Descriptive Characteristics	Environmental Problems Behaviour Scale Points		
	n	X±SD	Test
<b>Gender*</b>			
Female	151	51.37±10.61	<b>t=3.003</b>
Male	129	47.34±11.51	<b>p=0.003</b>
<b>Age</b>			
18-20 years	112	49.02±11.04	F=0.357
21-23 years	137	49.59±10.70	p=0.700
24 years and older	31	50.93±13.89	
<b>Smoking*</b>			
Yes	114	47.14±11.75	<b>t=2.969</b>
No	166	51.13±10.53	<b>p=0.003</b>
<b>Alcohol Use</b>			
Yes	103	47.92±10.73	t=1.822
No	177	50.44±11.39	p=0.070
<b>Education Related to the Environment</b>			
Trained	92	49.44±12.35	t=0.072
Not trained	188	49.54±10.62	p=0.943
<b>Member of an Environment-Related Organization*</b>			
Member	13	56.46±12.44	<b>t=2.308</b>
Not a member	267	49.17±11.05	<b>p=0.022</b>

\*p<0.05

**Table 4. The Relationship between Mean ECS and EPBS Scores**

Scales	Environmental Problems Behaviour Scale (EPBS)							
	EPBS Total Score Mean	Perception	Set	Guided Response	Mechanism	Adaptation	Originati on	
Environmental Consciousness Scale (ECS)	ECS Total Score Mean	r=0.058	r=0.084	r=0.049	r=0.080	r=0.014	r=0.027	r=0.085
	Susceptible Consciousness *	r=0.101	r=0.059	r=0.066	<b>r=0.157</b>	r=0.053	r=0.086	r=0.064
	Behavior Consciousness *	<b>r=0.382</b>	<b>r=0.366</b>	<b>r=0.362</b>	<b>r=0.223</b>	<b>r=0.301</b>	<b>r=0.212</b>	<b>r=0.287</b>
	Social Pressure*	r=0.17	r=0.068	r=0.085	r=0.029	<b>r=-0.128</b>	<b>r=-0.131</b>	r=0.032
	Bias*	<b>r=0.206</b>	<b>r=-0.148</b>	<b>r=-0.206</b>	<b>r=-0.126</b>	<b>r=-0.167</b>	<b>r=-0.184</b>	r=0.110

\*p&lt;0.05

**Table 5. Independent Variables' Power of Predicting the Status of Environmental Behavior**

Model 1					
	B	SH	Beta	t	p
(Constant)	14.958	9.268		1.614	0.108
Susceptible Consciousness	0.311	0.269	0.640	1.155	0.249
<b>Behavior Consciousness</b>	<b>1.226</b>	<b>0.189</b>	<b>0.360</b>	<b>6.492</b>	<b>0.000</b>
Social Pressure	-0.214	0.192	-0.067	-1.118	0.264
Bias	-0.469	0.198	-1.142	-2.367	0.019
R	0.425				
R <sup>2</sup>	<b>0.168</b>				
F	15.125				
p	0.000				

## Discussion

We found that the total scores of the students from both scales were above the average that could be obtained. Based on these results, it can be said that students' environmental consciousness and behavior levels are high (Dikmenli & Konca, 2016; Guven & Aydogdu, 2012). Accordingly, it may be assumed that today's increasing environmental problems have

caused an increase in society's consciousness regarding these problems.

It was determined that the mean scores of female students were higher than those of male students ( $p>0.05$ ). While this result is similar to some research findings in the literature (Akcaay & Pekel, 2017; Akkor & Gunduz, 2017; Celik et al., 2016), it also differs from some studies (Møller, Haustein, & Bohlbro, 2018; Ulas Kadioglu &

Uncu, 2017). The EPBS mean scores of female students were significantly higher than male students ( $p < 0.05$ ). Similar results were found in other studies on this subject (Atesoglu & Erkal, 2018; Güsta Sahin & Dogu, 2018; Karakus, Selim, Ardahanlioglu, Ozer, & Cinar, 2016; Liobikienė & Juknys, 2016; Tanık Onal, 2018). The positive characteristics associated with many health behaviors of women reflect positively on their attitudes and behaviors towards the environment (Bostan & Beser, 2017; Olsson, Gericke, Boeve-de Pauw, Berglund, & Chang, 2019). Due to upbringing, social and cultural factors, the fact that society has more expectations from women related to health care and environmental issues, increased responsibilities in adolescence, and their role as maternal candidates for future generations, the environmental consciousness, behaviors, values, and beliefs of women may be heightened (McCright & Sundström, 2013).

Related literature states that as the age of individuals increases, their environmental consciousness increases as well (Liobikienė & Juknys, 2016; Wiernik, S. Ones, & Dilchert, 2013). In this study, the age of the students did not make a significant difference in the level of environmental consciousness and behavior, but the behavior towards environmental problems did increase slightly with age. Although this finding supports similar studies (Akkor & Gunduz, 2017; Dursun & Gunduz, 2016; Gusta Sahin & Dogu, 2018; Karakus et al., 2016), some studies revealed significant differences between age and environmental consciousness and behavior (Atesoglu & Erkal, 2018; Melo, Ge, Craig, Brewer, & Thronicker, 2018). The lack of a significant relationship between age and environmental consciousness and behavior in this study is thought to be related to the number and characteristics of the study group, i.e. the fact that our study participants were all young students of a homogeneous age group studying at a private university, may have affected the results. Few studies in the related literature have examined the impact of smoking and alcohol use on environmental consciousness, awareness, attitude, or behavior (Collado vd., 2017; Laureti & Benedetti, 2018). In our study, we found that the environmental consciousness and behavior levels of non-smokers and non-alcohol users were higher than their counterparts ( $p > 0.05$ ). This finding is similar to that of the study of Laureti and Benedetti (2018), while Cinar et al.

(2010). The harmful habits of individuals such as alcohol and cigarettes use are reflected in their attitudes and behaviors towards health and the environment (Collado et al., 2017). When studies on healthy lifestyle behaviors are examined, we see that individuals who do not smoke have more positive behaviors than those who do (Bostan & Beser, 2017).

In this study, the students who were educated about the environment were more conscious about the environment, but this was not reflected in their behavior ( $p > 0.05$ ). This result may be related to the number of students in the study groups or the quality of the environmental education of the students. This result may also be related to many factors affecting human behavior (Ilgar & Cosgun-Ilgar, 2019). While this finding supports similar studies (Karakus et al., 2016; Tarkocin, Bilmez, & Gokceli, 2017; Uludag, Karademir, & Cingi, 2017), it is also in contrast to some studies (Atesoglu & Erkal, 2018; Landry, Gifford, Milfont, Weeks, & Arnocky, 2018).

It is of great importance that non-governmental organizations related to the environment contribute to the conscious of individuals in the society, increase their knowledge gained through experience, and contribute to positive behavior change (Yurtseven, Vehid, & Erdogan, 2010). In this study, the environmental behavior of students who were members of any organization related to the environment was significantly more positive, but this difference is thought to be related to the number of students in this group.

While we found no significant relationship between students' environmental consciousness and behavior ( $p > 0.05$ ), there was a weakly significant relationship between the total mean score of EPBS and behavior consciousness ( $r = .38$ ) and the bias sub-dimension ( $r = .20$ ) ( $p < 0.05$ ). There were also weakly significant correlations between EPBS sub-dimensions and some sub-dimensions of ECS ( $p < 0.05$ ). Another study reported a positive relationship between the intention to engage in pro-environmental behavior and the purchase of environmentally friendly products (Shimoda et al., 2019). Møller et al. (2018) concluded that a positive attitude towards energy-saving behaviors is partially reflected in the behaviors of adolescents. Mei et al. (2018) emphasized that there are individuals who are aware of the necessity to do the best for the environment, but this does not necessarily mean that they will make a positive behavior

change towards the environment. Gabarda-Mallorquí et al. (2018) revealed that environmental awareness does not always lead to pro-environmental behavior as well.

In this study, the sub-dimensions of the environmental consciousness scale as independent variables explained that it has a 16.8% impact on environmental behavior. There was a positive correlation between behavior consciousness subdimension and environmental behavior ( $\beta=0.360$ ,  $p<0.05$ ). Related literature states that environmental attitudes ( $R^2=0.21$ ), environmental awareness ( $R^2=0.12$ ) were responsible for environmental behaviors (Zareie & Jafari Navimipour, 2016). In another study, biospheric values were found to be associated with environmental self-identity ( $\beta = 0.69$ ,  $p < 0.01$ ) (Balundè, Perlaviciute, & Steg, 2019).

**Conclusion and Suggestions:** As a result of this study, it was found that university students' environmental consciousness and their behaviors towards environmental problems were positive but there was no significant relationship between the two factors.

It is recommended that families raise their children conscientiously with regard to the environment. As is the case with females, primary school staff and universities should make male students particularly aware of this issue. Universities should direct students to environmental non-governmental organizations and encourage student membership in these groups by promoting various programs in this direction. Student clubs at the universities should organize more activities addressing environmental problems and issues and in this way develop greater student consciousness and behaviors related to the environment. On special environmental days (Environment Week, World Water Day, International Recycling Day, World Environment Day, etc.), event programs such as seminars, panels, and conferences focusing on environmental problems and solutions should be created and university student participation in these programs should be encouraged. Primary health care personnel and medical staff in universities should be trained to provide and recommend counseling services that promote cessation of smoking and alcohol. Additional comprehensive research with different sample groups investigating consumption consciousness and behaviors related to the environment are needed.

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