**SOSYODEMOGRAFİK DEĞİŞKENLERE GÖRE ÖĞRENCİLERİN SU TASARRUFU DAVRANIŞLARI VE BUNLARI ETKİLEYEN FAKTÖRLER**

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**Özet**

Bu araştırmada öğrencilerin su tasarrufuna yönelik öznel norm, ADK, tutum ve davranışlarına sosyodemografik değişkenlerin etkisi incelenmiştir. Araştırmanın çalışma grubunu ortaöğretim kurumlarında öğrenim gören öğrenciler (N= 497) oluşturmuştur. Veri toplama aracı olarak “Planlanmış Davranış Teorisi” temel alınarak geliştirilmiş olan “Su Tasarrufu Davranışı Anketi” kullanılmıştır. Sosyodemografik değişkenlerin “öznel norm”, “ADK” ve “tutum” üzerine etkisi tek yönlü MANOVA ile incelenmiştir. Sosyodemografik değişkenlerin davranışa etkisi ise T-Testi ve ANOVA ile incelenmiştir. Araştırma sonucuna göre kız öğrencilerin su tasarrufuna yönelik öznel norm puanları erkek öğrencilere göre daha yüksektir. Öğrencilerin tutumlarında annenin eğitim düzeyine göre anlamlı farklılık tespit edilmiştir. Anneleri okuma yazma bilmeyen öğrencilerin tutumları diğer öğrencilere göre daha yüksektir. Anlamlı etkisi bulunan diğer bir değişken de konut türüdür. Müstakil evde yaşayan öğrencilerin su tasarrufuna yönelik öznel norm ortalamaları apartmanda yaşayanlara göre daha yüksektir. Öğrencilerin su tasarrufu davranışlarında incelenen sosyodemografik değişkenlerin hiçbirine göre anlamlı fark bulunmamıştır.

**Anahtar Kelimeler:** Su tasarrufu, Planlanmış Davranış Teorisi, sosyodemografik değişkenler, ortaöğretim öğrencileri

***Students’ Water Saving Behaviors and Its Influencing Factors According to***

***Socio-demographic Variables***

***Abstract***

*In this study, students’ subjective norm, attitude, perceived behavioral control (PBC), and behavior towards water saving were examined according to various socio-demographic factors. Participants consists of students (N= 497) studying at secondary schools. A “Water Saving Behavior Questionnaire”, developed on the basis of Theory of Planned Behavior, was used as data gathering tool. Effect of socio-demographic variables on “subjective norm,” “PBC,” and “attitude” were examined via univariate MANOVA. Effect of socio-demographic variables on behavior was examined by T-Test and ANOVA. As a result of the study, it was seen that female students’ average of subjective norm towards water saving is higher compared to male students. There was a meaningful difference in students’ attitude towards water saving according to their mothers’ level of education. Students with illiterate mothers have a higher attitude compared to other students. It was also determined that students living in detached houses have a higher subjective norm compared to students living in apartment buildings. There was no meaningful difference in students’ water saving behavior in any of the socio-demographic variables examined in this study.*

***Key words:*** *Water saving, Theory of Planned Behavior, socio-demographic variables, high school students*

1. Introduction

Water, the most important element of environment, constitutes the basis of life on Earth. Water also affects human health, quality of life, and the developments in social and economic fields[1]. However, with the ever-increasing human population and its demands, clean water per capita decreases [2]. Likewise, access to available water has become a global problem today. Especially due to increase in population, wrong policies on land use, urbanization, and global warming, pressure on water supplies increases [3]. Turkey, which is located in a region where water supplies have a strategic importance [4], is faced with the danger of becoming “poor in water” in the recent future due to similar reasons [5, 6]. In addition to this, draught is also another important problem for Turkey. Scantiness of precipitation and high temperatures pose a serious threat of draught especially in the central and southern regions. This also results in an increase in demand for water in these regions where the economy rests primarily on agriculture [7]. Hence, it is of utmost importance for Turkey to have a rational water management as well as an economical use of water supplies. One of the ways to bring people in using water sensibly is education. Students’ water saving behavior can be promoted through water education [8]. In order to be able to develop effective education tools to this end, it is necessary to know the factors affecting youths’ water saving behavior.

Water saving is regarded as an environmental behavior. Factor affecting environmental behavior were examined in two basic contexts. The first one of those is the socio-psychological context which includes such factors as attitude, belief, and value. Many studies have shown that there is a strong relationship between environmental behavior and socio-psychological factors [9]. In this respect, it was reported that ecocentric attitude and values have a positive effect on environmental behavior [10, 11, 12]. In the other context, socio-demographic factors such as gender, income or education [9]. Socio-demographic factors are defined as signifiers or representatives of individual capacities. Although these factors are limited in explaining environmental behavior, they may have importance especially in circumstances where behavior is dependent on specific capacities [13]. While the effect of socio-demographic factors on environmental behavior changes according to the type of behavior, it is generally seen that girls are more environmentally-conscious than boys [14, 15, 16, 17, 18, 19, 20, 21, 22). Educational level is also in a positive correlation with environmental attitude and behavior (14, 23, 18, 24). On the other hand, it has been reported that income and environmental behavior usually have a negative correlation [25, 26, 21]**.**

Research findings on the effects of socio-demographic factors on water saving behavior are contradictory. For example some studies [27, 28] indicated that water saving increases as the level of education does. Contrary to this, other studies [29, 30] determined that as the level of education decreases, water saving behavior or intention increases. Similarly, the effect of gender on water saving behavior is rather volatile. Difference in the effect of socio-demographic factors is explained with the difference in the type of behavior, or the differences in the cultural or economic structure [29, 31].

Water saving behavior has often been examined through the “Theory of Planned Behavior” [29, 32, 33; 34, 35, 36]. TOPB is a strong socio-psychological theory which explains the attitude-behavior relationship. This theory contends that people’s behavior manifests in a planned way. According to this, in order for behavior to manifest, first of all there should form an intention towards that behavior in the individual. The stronger the intention towards a particular behavior, the more likely for that behavior to manifest [37]. Behavioral intention, and thus behavior, is basically under the influence of 3 variables [38]: Atitude towards Behavioris the positive or negative perspective of the person, who is going to manifest the behavior, towards that behavior. Subjective Normis the individual’s expectations s/he perceives as to whether s/he should manifest the behavior or not. Perceived Behavioral Controlindicated how easy or difficult one sees manifesting a certain behavior. In cases where behavioral control is in spite of oneself and where circumstances can be objectively determined, this factor can directly explain behavior (Figure1).

**Attitude**

**Subjective**

**Norm**

**Perceived**

**Behavioral Control**

**Behavioral**

**Intention**

**Behavior**

 *Figure 1.* Theory of Planned Behavior [38]

The purpose of this study is to determine the effect of socio-demographic variables on students’ subjective norm, PBC, attitude, and behavior related to water saving. Socio-demographic variables are gender, mother’s educational level, father’s educational level, family income, lived area, residence type, and experiencing water shortage. Education was examined under three levels, namely, “illiterate,” “primary school graduate,” and “high school graduate and higher.” Income was also examined under three levels, namely, “less than 600 TL,” “600-1200 TL,” and “above 2000 TL.” Lived area was divided into two as “rural,” and “urban.” Residence type was classified as “detached house” and “apartment building.” Findings of this study will contribute to water education in Turkey.

1. **Method**
	1. **Sample**

Participantsconsists of students (N= 497) studying at secondary schools in the 2011-2012 academic year. Information concerning the participants is given in Table 1.

Table 1. Demographic Characteristics of Students

|  |  |  |
| --- | --- | --- |
| Variables | Level | % |
| Gender | Female  | 23.5  |
| Male  | 76.5  |
| Mother’s educational level | Illiterate | 30.8  |
| Primary school  | 59.0  |
| High school and higher | 9.7  |
| Father’s educational level | Illiterate | 5.8 |
| Primary school  | 67.6 |
| High school and higher | 26.2 |
| Family income | Less than 600 TL | 23.3  |
| 600-2000 TL  | 59.0  |
| Above 2000 TL | 11.7  |
| Lived area | Urban |  78.7  |
|  Rural |  19.3  |
| Residence type | Apartment building |  51,9  |
| Detached house |  47.1  |
| Water shortage | Experiencing water shortage |  45.5  |
| Experiencing no water shortage |  52.5  |

* 1. **Procedure**

A “Water Saving Behavior Questionnaire” developed by Dervisoğlu and Kılıç [39] based on TOPB was used as data gathering tool. Answer choices in the questionnaire are 5-point Likert type. Crobach Alpha reliability coefficients of the scales are .86 for *Behavior* (9 items), .70 for Attitude Towards Behavior(4 items), .60 for Subjective Norm(3 items), and .59 for Perceived Behavioral Control(PBC; 3 items). There were questions concerning socio-demographic information as well (gender, level of family income, parents’ educational level, lived area, residence type, experiencing water shortage).

* 1. **Data Analyses**

Data were analyzed through univariate and multivariate variant analyses. Effect of socio-demographic variables on “subjective norm,” “PBC,” and “attitude” were examined via univariate MANOVA. Here, 6 different MANOVA was done for each independent variable. In order to ensure multivariate normality assumption of MANOVA, subject with higher Mahalanobis Distance Value than critical value were taken out of the sample. Box M value showed that co-variant matrixes of scores belonging to dependent variable were equal (p>.05). Which variable was the underlying reason for the meaningful differences observed as a result of MANOVA was examined by “Intergroup Interaction Test.” In the comparisons, alpha value was taken into consideration as .017 (.05/3) in accordance with “Bonferroni correction.” Effect of socio-demographic variables on behavior was examined by T-Test and ANOVA.

* 1. **Findings and Results**
		1. **Students’ Water Saving Behaviors**

Mean scores, standard deviations and frequency distribution of water saving behaviorswere given in Table 2. In the questionnaire, students were asked to assess to what extent they agree with the given statements in 5-point Likert type (1= completely disagree; 5= completely agree). When Table 2 is examined, it was seen that water saving behaviors performed by the majority of students. The item with the highest mean score is *“I do not waste water when I use it for personal hygiene (brushing the teeth, taking a shower)”* 184 students answered this question as “agree” and 245 students answered it as “completely agree.” “*Using water economically during housecleaning*” is also among behaviors with high scores. 175 students indicated that they “agreed” with this statement, and 208 students said they “completely agreed.” “*I make sure dripping taps and plumbing are fixed*” was answered as “agree” by 177 students, and as “completely agree” by 225 students. The item with the most “indecisive” (96 students) is “*Were I to take care of a plant, I would prefer ones that requires the least water*.” This item is also the one with the most “disagree” (42 students), and “completely disagree” (52 students).

Table 2. Mean Scores, Standard Deviations and Frequency Distribution of Water Saving Behaviors

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Completely disagree | Disagree | Undecided | Agree | Completely agree | M | SD |
| I make use of rain water (for watering the plants, etc)  | 38 | 40 | 87 | 165 | 167 | 3.77 | 1.21 |
| I do not waste water when I use it for personal hygiene (brushing the teeth, taking a shower, etc)  | 13 | 18 | 37 | 184 | 245 | 4.27 | .94 |
| I use water economically during housecleaning.  | 21 | 23 | 70 | 175 | 208 | 4.06 | 1.06 |
| encourage my family to use water saving goods (dishwasher, washing machine, etc)  | 17 | 22 | 72 | 166 | 220 | 4.11 | 1.03 |
| Were I to take care of a plant, I would prefer ones that requires the least water.  | 52 | 42 | 96 | 140 | 167 | 3.65 | 1.30 |
| I make sure dripping taps and plumbing are fixed  | 16 | 21 | 58 | 177 | 225 | 4.16 | 1.00 |
| I do not throw away re-usable water (e.g. watering the plants with the water I used washing vegetables)  | 30 | 30 | 72 | 170 | 195 | 3.94 | 1.15 |
| I use techniques that save me water when watering the plants/the garden/the field.  | 27 | 34 | 70 | 169 | 197 | 3.95 | 1.14 |
| I warn people around me (my family, friends, neighbors, etc) to save water.  | 35 | 24 | 72 | 172 | 194 | 3.94 | 1.17 |

* 1. **Effect of Socio-demographic Variables on Subjective Norm, PBC and Attitude**

One-way MANOVA results of subjective norm, PBC, and attitude concerning water saving according to socio-demographic variables are given in Table 3. There is a meaningful difference in students’ subjective norm, PBC, and attitude concerning water saving according to gender (Pillai’s Trace=.020, F(3,493)=3.405, p<.05). When the “Intergroup Interaction Test” table was examined, it was seen that meaningful difference results from “subjective norm” (F(1,495)=3.405, p=017). According to this, female students’ subjective norm concerning water saving is higher than male students (M(female)= 4.30, M(male)=4.11). Students’ PBC and attitude scores indicated no meaningful difference according to gender (p>.017). A meaningful difference was observed in students’ subjective norm, PBC and attitudes according their mothers’ educational level (Pillai’s Trace=.045, F(6,980)=3.741, p<.05). According to “Intergroup Interaction Test” result, the meaningful difference results from “attitude” (F(2,491)=7.890, p=.00). As a result of “Post hoc” analyses, attitudes of students with illiterate mothers are higher compared to those of students with “primary school graduate” and “high school graduate and higher” mothers (M(illiterate)=4.84, M(primary school)=4.73, M(high school/higher) =4.64). The effect of mother’s educational level on PBC and subjective norm was not meaningful (p>.017). Another variable with a meaningful effect was the residence type (Pillai’s Trace=.020, F(3,488) =3.400, p<.05). When the “Intergroup Interaction Test” table was examined, it was seen that the meaningful difference stemmed from “subjective norm (F(1,490)=9.118, p<.017). According to this, mean scores of students’ living in detached houses concerning water saving is higher than those of students living in apartment buildings (M(apartment)=4.06, M(detached house)=4.26). Effect of “residence type” on PBC and attitude was not meaningful (p>.017). In the MANOVA result, there was no meaningful difference in students’ subjective norm, PBC, and attitudes according to their fathers’ educational level, family income, experiencing water shortage, and lived area (p>.05).

Table 3. MANOVA Results for Subjective Norm, PBC and Attitude

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Effect | Pillai’s Trace | F | Hypothesis df | Error df | P |
| Gender | .020 | 3.405 | 3.000 | 493.000 | .018 |
| Mothers’ educational level | .045 | 3.741 | 6.000 | 980.000 | .001 |
| Fathers’ educational level | .023 | 1.884 | 6.000 | 982.000 | .081 |
| Family income | .023 | 1.777 | 6.000 | 926.000 | .101 |
| Residence type | .020 | 3.400 | 3.000 | 488.000 | .018 |
| Water shortage | .007 | 1.162 | 3.000 | 483.000 | .324 |
| Lived area | .008 | 1.348 | 3.000 | 483.000 | .258 |

* 1. **Effect of Socio-demographic Variables on Water Saving Behavior**

One-way ANOVA results for water saving behavior according to level of education and income are given in Table 4. ANOVA result indicated that there was no meaningful difference in students’ water saving behaviors according to parents’ educational level and family income (p>.05).

Table 4. ANOVA Results for Water Saving Behavior

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Sum of Squares | df | Mean Square | F | p |
| Fathers**’** educational level |  |  |  |  |  |
| Between groups | 1.709 | 2 | .854 | 1.447 | .236 |
| Within groups | 290.551 | 492 | .591 |  |  |
| Total | 292.260 |  494 |  |  |  |
| Mothers’ educational level |  |  |  |  |  |
| Between groups | .000 | 2 | .000 | .000 | 1.000 |
| Within groups | 290.807 | 491 | .592 |  |  |
| Total | 290.807 | 493 |  |  |  |
| Family Income |  |  |  |  |  |
| Between groups | .851  | 2 | .426  |  .710 | . 492 |
| Within groups | 277.923  | 464 | .599  |  |  |
| Total | 278.774  | 466 |  |  |  |

T-Test results for the water saving behavior according to gender, residence type, experiencing water shortage, and lived area are given in Table 5. T-Tests indicated that there was no meaningful difference in students’ water saving behavior according to gender, residence type, experiencing water shortage and lived area.

Table 5. T-Test Results for Water Saving Behavior

|  |  |  |  |
| --- | --- | --- | --- |
|  | t | df | p |
| Gender | -.289 | 495 | .773 |
| Residence type | -1.423 | 490 | .155 |
| Water shortage | -.856 | 485 | .393 |
| Lived area | -.732 | 485 | .464 |

1. **Conclusions and Recommendations**

The study indicated that gender had a meaningful effect only on subjective norm. Female students’ subjective norm scores concerning water saving is higher compared to those of male students. Similarly, Leviston, Nancarrow, Tucker and Porter [40] reported that women’s subjective norm perceptions concerning water saving was higher compared to men. In this study, expectations of certain people and institutions were taken. Many studies have shown that girls are more environmentally-conscious than boys [14, 15, 16, 17, 18, 19, 20, 21, 22]. Thus, environmental sensibilities of girls may play a role in their having a higher perception concerning the expectations of environmental institutions or organizations. Social roles, too, may play a role in the perceived social pressure concerning water saving being higher for girls. In this study, there was no meaningful difference in students’ water saving behavior according to gender, either. One may think that “behavior type” plays a role in the effect of gender on saving water. It has been assumed that women are more environmentally-conscious when it comes to consumption and behavior related to health [28]. For example, Nancarrow et al. [35] posited that women’s intention of “re-using drain water” is lower compared to men as they consider it a risk for health. On the other hand, there was no difference between men and women in terms of their intention of using “dual-flush toilet,” which saves water [28]. Hence, the fact that no specific behavior type was represented may have been effective in having no difference in saving water according to gender.

Parent’s educational level generally has a positive effect on the young ones’ environmental attitudes. In this study, however, the result was just the opposite. Accordingly, students with illiterate mothers have a higher attitude towards saving water. Here, economic reasons may be effective. As a matter of fact, at the end of their study in Bulgaria, Clark and Finley [29] detected that water saving intention increased as level of education decreased, and they indicated that this may stem from the idea that such water saving behavior would be a way of saving money. In Turkish example, where level of income is generally not high most of the time, economic factors may be effective in the water saving behavior of students with illiterate mothers. In order to test this, joint effect of education and income on students’ water saving behavior should be investigated, too.

Another variable with a meaningful effect in this study is “residence type.” Subjective norm scores of students living in detached houses are higher compared to those living in apartment buildings. This finding indicates that expectations and social pressure concerning water saving perceived by students living in detached houses is higher. Here, familial expectation may be at work. Indeed, studies realized with the participation of adults [29, 41, 27] showed that people living in detached houses had a higher intention of saving water compared to those living in apartment buildings. There was no meaningful difference in students’ water saving behavior according to residence type. According to this, expectations concerning water saving perceived by students living in detached houses is not reflected in behavior.

Family’s level of income had no meaningful effect on any of the dependent variables. Level of income has been a variable that has a positive effect on water saving in many studies. In this study, level of income having no effect on water saving behavior may result from the fact that the sample of this study consists of youngsters who have no financial responsibility. Accordingly, Mayer et al. [42] reported that working adults had a higher water saving behavior than the youths. Students’ water saving behaviors should be investigated in different contexts as well.

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