PREDICTIVE POWER OF VALUES, BELIEFS, NORMS
AND INCLUSION OF NATURE IN SELF
ON YOUNG STUDENTS' WATER CONSUMPTION BEHAVIOR

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ABSTRACT

PREDICTIVE POWER OF VALUES, BELIEFS, NORMS AND INCLUSION OF NATURE IN SELF ON YOUNG STUDENTS' WATER CONSUMPTION BEHAVIOR

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The aim of this study is to examine the water consumption behaviors of middle school students within the scope of the Value Belief Norm Theory. The Theory include constructs (i.e., values (egoistic, altruistic and biospheric), beliefs, awareness of consequences and ascription of responsibility, personal norms and pro-environmental behaviors) which affects each other in a causal chain of five variables. In the current study, inclusion of nature in self and hierarchy with nature were also examined as an additional construct in the context of connectedness with nature.

Data were collected in one of the districts of Istanbul in October 2021 with the participation of 616 middle school students. The method of the research was determined as correlational. Value-Belief-Norm Theory successfully explained the water conservation behaviors of middle school students. The multiple correlation (R) was 69.4, with R^2 = .48.2. The results showed that the model significantly accounted for 48.2% of the variation in students' water consumption behavior (F = 419.51, p < .000). A hierarchical multiple regression analysis was applied to the data to

determine which variable were the best predictors of WCB. Result revealed that personal norms was the main predictor of WCB, explaining 45% of variance, while human based view accounted for 16%, biospheric and altruistic values accounted for 13% when they are combined and INS was accounted for 7% of the WCB.

Overall, middle school students' the water consumption behaviors predicted positively by their biospheric - altruistic values, nature based views, ascription of responsibilities, personal norms and connectedness to nature, and negatively by human based NEP views.

Based on the descriptive results of the research, it was observed that middle school students had high levels of biospheric and altruistic values, awareness of consequences regarding waste of water, water conservation behavior, moral obligation to conserve water and strong beliefs regarding nature based views. However, while the students felt close to nature, their egoistic values and human based views were at a moderate level.

Keywords: Water Consumption, Value-Belief-Norm Theory, Behavior, The Inclusion of Nature in Self, Universal Values

ÖZ

ÖĞRENCİLERİN SU TÜKETİMİ DAVRANIŞLARININ DEĞERLER, İNANÇLAR, NORMLAR VE DOĞA İLE YAKINLIK KAPSAMINDA İNCELENMESİ

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Bu çalışmanın amacı, ortaokul öğrencilerinin su tüketim davranışlarını Değer-İnanç-Norm Kuramı kapsamında incelemekti. Kuram, beş değişkenden oluşan bir nedensel zincirde birbirini etkileyen yapıları (yani temel değerler (egoist, özgecil ve biyosferik), inançlar, sonuçların farkındalığı ve sorumluluk bildirimi, kişisel normları ve çevreye karşı sorumlu davranışları) içerir. Ayrıca, bu çalışmada, dağaya aidiyet ve doğa ile hiyerarşi de doğaya bağlılık bağlamında ek bir yapı olarak incelendi.

Veriler, Ekim 2021'de İstanbul'un bir ilçesinde 616 ortaokul öğrencisinin katılımıyla toplandı. Araştırmanın yöntemi korelasyon olarak belirlenmiştir. Değer-İnanç-Norm Kuramı ortaokul öğrencilerinin su tüketimi davranışlarını başarıyla açıkladı. Çoklu korelasyon değerleri (R) 69.4, ile R^2 = .48.2 olarak bulundu. Sonuçlar, modelin öğrencilerin su tüketim davranışındaki varyasyonun %48.2'sini istatistiksel olarak anlamlı bir şekilde açıkladığını gösterdi (F = 419.51, p < .000). Hangi değişkenin su tüketim davranışının en iyi yordayıcısı olduğunu belirlemek için verilere hiyerarşik çoklu regresyon analizi uygulandı. Sonuçlar, kişisel normların, öğrencilerin su

tüketimi davranışlarının ana yordayıcısı olduğunu ve varyansın %45'ini gösterdi. Ayrıca, öğrencilerin su tüketimi davranışının %16'sını insan temelli ekolojik dünya görüşün, %13'ünü biyosferik ve özgeci değerlerin birleşiminin ve %7'sini doğaya aidiyetin açıkladığını ortaya koydu.

Genel olarak, ortaokul öğrencilerinin su tüketim davranışları biyosferik - özgecil değerleri, doğa temelli ekolojik dünya görüşleri, sorumluluk bildirimleri, kişisel normları ve doğaya bağlılıklarıyla olumlu, insan temelli ekolojik dünya görüşleriyle ise olumsuz olacak şekilde açıklanabildiği bulundu.

Araştırmanın betimleyici istatistik sonuçlarına göre ortaokul öğrencilerinin yüksek derece biyosferik ve özgecil değerlere, su tasarrufu davranışına, suyu az tüketmeye karşı ahlaki yükümlülüğe, doğa temelli ekolojik dünya görüşüne ve suyu fazla tüketmenin kötü sonuçlarının farkındalığına sahip oldukları bulundu. Ancak, öğrenciler kendilerini dağaya yakın hissetse de, egoist değerleri ve insan temelli ekolojik dünya görüşleri orta seviyededir

Anahtar Kelimeler: Su Tüketimi, Değer-İnanç-Norm Kuramı, Davranış, Doğaya Aidiyet, Temel Değerler

To the future of all students

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

Sustainability, according to Environmental Protection Agency, is the creation and preservation of conditions in which nature and people can be harmonious and productive, where present and future generations can meet their economic-social needs are in great danger by anthropogenic activities which contribute several environmental problems, including pollution, global warming, and climate change (Oskamp, 2000; UNECE, 2009). Eventually all of these factors, together with increase in population, increase of demand on water for industry and society, causes another problem to occur, known as ''water scarcity''. In fact, currently, water scarcity, is one of the serious problem threatening the world (Intergovernmental Panel on Climate Change [IPCC], 2014; World Wide Fund for Nature Turkey [WWF], 2014). For example, Cape Town faced with a serious water scarcity called ''day zero'' (Burls et al., 2019). This meant that the capacity of freshwater resources was greatly reduced, and that if it went any further, millions of people would be subject to severe water restrictions. Another example, 'Aral Sea'' which is the one of the greatest lakes of World, 'facing with serious drought for the first time for last 600 years due to overuse of rivers that carries water to lake, dry conditions and anthropogenic reasons (Howard, 2014). The problem of water scarcity could lead humanity to other problems such as migration or military conflict as well (World Economic Forum [WEF], 2013). Thus, it is crucially important to find solutions that can bring balance between water demand and water scarcity (Fielding, Russell, Spinks & Mankad, 2012). Although, founding new water sources such as desalinization and rainwater harvesting can be helpful for solution, due to their practical difficulties and high costs, managing water demand is the best way to bring a balance to the scales (Kumari & Singh, 2016; Schultz et al., 2014). In order to do that it is crucial to develop water conservation behavior of students since they are the

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future of our society that will effect nature (Lyons and Breakwell; 1994) Therefore, it's also important to explain students' determinants regarding to water conservation behavior. It is known that environmental friendly behaviors internalized by individuals on their early stages of life through education or with involvement in nature (Lieflander, Fröhlich, Bogner & Schultz, 2013; Wells & Lekies, 2006). Educational programmes importance highlighted by researchers as a strong method in order to strengthen individual's personal norms that highly affects students' pro-environmental behaviors (Yeboah & Kaplowitz, 2016). Educating individuals about environmental problems has a great importance in solving both universal and local problems and gaining pro-environmental behaviors (Liobikinie & Poskus, 2019). Additionally, researchers pays attention on importance of educational institutions in order to ensure moral obligation towards nature for adaptation of pro-environmental behaviors by individuals. In order to do that, teachers must be well equipped with such behaviors so they can be a good role model for their students since their students are the citizens of future generations (Sahin, 2013). Curriculum another factor that effect students' lives through education. Thus, curriculums must be well prepared as much as teachers and must be comprehensive on environmental issues and aim to enhance students' pro-environmental behaviors (Yildirim & Semiz, 2019). Therefore, it is important to investigate determinants of pro-environmental behaviors of middle school students who citizens of future and help to creation of methods that can establish a sustainable world. Moreover, household water consumption is a collective behavior and individuals' intentions are being affected by each other (Fielding et al., 2012). Thus, by doing so sustainability can be possible not only for future generations, but also for present. Otherwise many challenging problems awaits livings on earth (IPCC, 2014; Oskamp, 2000, WEF, 2013).

There are many studies in order to explain determinants of pro-environmental behaviors but, the Value-Belief-Norm Theory is the one who combines those important determinants of pro-environmental behaviors in a broad concept such as sociodemographics, values, beliefs, worldviews, and personal norms (Ghazali, Nguyen, Mutum & Yap, 2019). Moreover, although the VBN theory is a valued

theory and it has been used countless time in order to investigate determinants of other pro-environmental behaviors such as energy conservation or sustainable behaviors, yet it still new for water conservation behavior (Yildirim & Semiz, 2019).

Connectedness with nature refers to individuals' self perception of being included with nature (Schultz, 2001). Based on the researches, although they were considered as two different concepts of the environmental physiology branch, a relationship between connectedness with nature and the VBN was reported by various researchers (Martin & Czellar, (2017; Mayer & Frantz, 2004; Schultz, 2001). Moreover, the mediation effect on biospheric value orientation was highlighted (Martin Czellar, 2017; Schultz, 2001). These findings are especially important because, after all attribution to the VBN Theory, it is important to improve the VBN Theory in order to enhance pro-environmental behaviors of individuals and increase the prediction power of it. Additionally it's possible to use the connectedness with nature in order to improve biospheric values of individuals (Martin Czellar, 2017), which it's crucial in order to lead them on pro-environmental behaviors (Stern, 2000). Moreover, relationship of connectedness with nature is not just limited with the VBN Theory, it also effects well-being and psychological health (Nisbet, Zelenski & Murphy, 2011), water conservation (Sidiropoulos, 2018), eco-friendly behaviors in order to create a sustainable environment (Dutcher, Finley, Luloff & Johnson, 2007), such as recycling, transportation or household settings and it can be attainable via environmental education (Gedzune, 2015).

1.1   Theoretical Framework of the VBN Theory

Environmental psychology's roots goes back to 1960s and this search of field interest's interaction between humans and nature called pro-environmental behavior (Kollmuss & Agyeman, 2002). Pro-environmental behavior simply defined by Kollmuss & Agyeman (2002) as ''behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world'' (p. 240). Although pro-environmental behavior seemed like it can be understood simply by a linear

model of environmental knowledge, environmental attitude and pro-environmental behavior it turns out that this model is not that much successful. Because pro-environmental behaviors are not simply arises by just increase in environmental knowledge (Kollmuss & Agyeman, 2002). There were many other aspects that influences pro-environmental behavior. As a result there were many inconsequence in order to explain pro-environmental behavior which they are broadly examined by Rajecki and results shows that the inconsequence seems reasoned by attitudes and behaviors that is not specific for each other (1982).

To overcome this deficiency, Theory of Reasoned Action (TRA) is developed (Fisbein & Ajzen, 1975; Ajzen &Fisbein, 1980). According to this theory motivated individuals about a specific behavioral intention are more likely to behave accordingly to it. Additionally, this behavioral intention can be affected by attitudes; which refers to negative or positive feeling about the behavior and subjective norm; which it refers to importance of is this specific behavior in a social context. But (TRA) is criticized about that, personal factors and situational factors could influence individual's normative decisions other than subjective norms and social normative beliefs. (Schwartz & Tessler, 1972). As a result of it (TRA) is extended into Theory of Planned Behavior (TPB) (Ajzen, 1985). According to this new theory, perceived behavioral control considered important as much as attitudes and subjective norms and it could affect behavior direct and indirectly. Perceived behavioral control refers to higher motivation and positive opportunities must be highly correlated with performing that specific behavior (Madden, Ellen & Ajzen, 1992). As a result, it has been proven that Theory of Planned Behavior is have more predictive power then Theory of Reasoned Action (Madden et al., 1992).

But seems like some researchers already knew what would be the next step '' Most needed now are strategies to discover patterning in how intervening events and situational factors change the values and weights of antecedents that predict behavior, thereby illuminating what may be the largest sources of discrepancy.'' (Schwartz & Tessler, 1972, p. 235). Although progress has been made in the literature, another branching occurred on the tree because researchers are insisted on

importance of value due to its predictive power on pro-environmental behaviors since individuals' pro-environmental behaviors are highly shaped by their valued objects on their lives (Sahin, 2013).

There are many successful attempts in context of environmental psychology in order to clarify factors that leading individuals to pro-environmental behaviors. With information that has been gathered since, Value – Belief – Norm (VBN) theory has been merged (Stern et al., 1999; Stern, 2000). The VBN Theory forms links between Value Theory (Schwartz & Bilsky, 1987, 1990), Norm Activation Model (NAM) (Schwartz, 1977) and beliefs in the context of New Environmental Paradigm (NEP) (Dunlap, Van Liere, Mertig & Jones, 2000). The VBN Theory merges these three concepts into bigger one. According to the VBN Theory, these constructs affects each other in a causal chain of five variables. These variables are: values (egoistic, altruistic and biospheric), beliefs, awareness of consequences and ascription of responsibility, pro-environmental personal norms and environmental behaviors (Stern, 2000). For a better understanding; values are influences our general beliefs about environment (NEP), in turn awareness of consequences (AC) and ascription of responsibility (AR) gets influenced and eventually our norms about taking action is gets affected which these norms are prior determinants of environmental behaviors.

According to VBN Theory; three different value orientations (egoistic, altruistic and biospheric) are the first component which they are highly predicts individuals' environmental beliefs. Environmental beliefs (NEP) mediates between values awareness of consequences (AC) and ascription of responsibilities (AR) while directly effecting them. Awareness of consequences and ascription of responsibilities mediates between personal norms (PN) and values and environmental beliefs while directly affecting personal norms and each other. In the following, the constructs that forms the Value-Belief-Norm Theory will be introduced.

1.1.1 Values

Values are defined by Rokeach as '' enduring beliefs that a specific mode of conduct is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence'' (p. 160). As values are endures in time, values are the first variable of the casual chain of the VBN Theory. These values are developed by Rokeach in the name of Rokeach Value Survey (Rokeach, 1968). This System is improved by (Schwartz & Bilsky, 1987, 1990) to Schwartz Value Survey. There are 56 items in this survey and participants are asked to rate these items with a 9-point Likert type scale according to how important is each reported value as a guiding principle in their lives. There are 10 different value types in this survey: power, achievement, hedonism, stimulation, self-direction, universalism benevolence, tradition, conformity and security. These value types can be categorized into 4 groups that represents two dimensions which one of them specifies distinction between self-enhancement and self-transcendence. The other dimension is specifies distinction between openness to chance and traditionalism. While openness to chance refers to being willingly to adopt new circumstances traditionalism refers to being conservative (Schwartz, 1992, 1994).

The study modified by (Stern & Dietz, 1994; Stern, Dietz & Guagnano, 1998) to better capture differences between biospheric and altruistic values and number of items are minimized to 15 for convenience reasons. From point view of clusters, As a result, today the VBN Theory involves three different value orientations which they are egoistic, altruistic and biospheric (Groot & Steg, 2007; Stern, 2000). While egoistic orientation refers to acting environmental friendly for self-benefit or personal perceived costs, altruistic orientation refers to acting environmental friendly for self with addition of perceived costs to other people to it and biospheric value orientation refers to acting pro environmentally not because of personal costs or benefits but for sake of whole ecosystem and biosphere (Groot & Steg, 2007).

1.1.2   Beliefs

Schultz, Shriver, Tabanico & Khazian (2004) defined worldview term as ''person's belief about humanity's relationship with nature''. In the context of environmental psychology these beliefs are generally represented and measured by NEP. (Dunlap & Van Liere, 1978; Dunlap et al., 2000). NEP contains 15 items that focuses on beliefs about balance of nature, limits to growth of human presence and humanity's right to dominate rest of the world included all livings (Dunlap et al., 2000). Shortly, higher scores on NEP means seeing world ecologically and in turn these beliefs leads to environmental friendly behaviors.

The NAM is developed by Schwartz (1977) in order to determine role of personal norms and moral values of humans' altruistic behaviors. Altruistic behavior is one of the key value orientations of VBN Theory as mentioned earlier and this orientation is refers to giving decisions for benefit of others instead of self in the light of morality. Harland, Staats and Wilke (2007) indicated that if a person feels morally obligated that person is more likely to act pro-environmental friendly. NAM, predicts human decisions in context of moral obligation with help of awareness of consequences and ascription of responsibilities. AC refers to being aware about negative outcomes of a specific action that threatens environment. And AR refers to effort and responsibility in order to reduce negative outcomes of these specific actions (Stern, 2000).

1.1.3   Personal Norm

Personal norms are the specific actions that individuals are committed because of activation of environmental beliefs under influences of three different value orientations (egoistic, altruistic and biospheric) (Stern & Dietz, 1994). Personal norms directly influences pro-environmental behaviors of individuals as being the prior construct to the pro-environmental behaviors in the causal chain of the Value-Belief-Norm Theory (Stern, 2000).

1.1.4   Behavior

Pro-environmental behaviors are the last construct of the causal chain of VBN Theory. These behaviors differ from the others and are directly affected by personal norms. These behaviors could be environmental activism (e.g. active involvement in environmental organizations), non-activist behaviors in the public sphere (e.g. voting a pro-environmental candidate), private sphere behaviors (e.g. buying eco-friendly products) and organizational environmentalism (e.g. giving environment friendly decisions in organizations or work) (Stern et al., 1999; Stern, 2000).

In conclusion, each construct of the VBN Theory provided (see Figure 1.1) below.
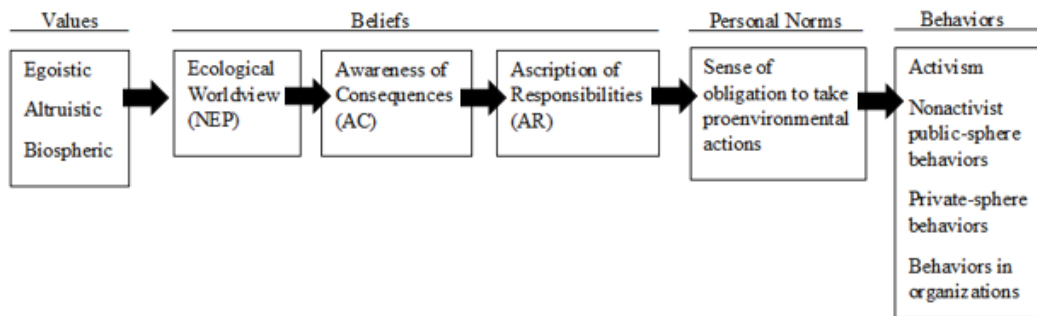
Figure 1.1 The Value Belief Norm (VBN) Theory (Stern, 2000, p. 412)

1.2   Theoretical Framework of Connectedness with Nature

The Earth is facing with numerous of crucial environmental problems such as climate change, pollution, global warming etc. (IPCC, 2014; IPCC, 2018; WWF, 2014). Although humans are the only specie that can reverse these harms, yet we can't see a major breakthrough in human behaviors that can reverse these harms ultimately. Because these problems are not new. 70 years ago Leopold (1949) wrote:

> ''This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter down

river. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species.'' (p. 2)

And yet we are still dealing with almost same problems with increasing rate of them. Thus it is essential to understand driving forces behind human endeavors and their effect to environment.

Leopold (1949) illuminated us with *intrinsic* value idea. This idea suggest that individuals must care and protect the nature maybe just because of its own innate value. Similarly, Wilson (1984) introduced us with his own *biophilia hypothesis* which it refers to admiration and inclination towards life and its ongoing processes. To be more specific, it was described as human's affiliation toward nature. Due to their relationship with nature and its associates (such as plants and animals) since the beginning of existence of humans. Therefore, by evaluation process and time human and nature become bonded.

Metaphors are very crucial for humans to understand and represent an information more simply in their daily lives (Lakoff & Johnson, 1980). Accordingly, (Aron, Aron & Smollan, 1992) developed ''The Inclusion of Other in the Self (IOS) Scale to reveal level of interconnectedness with self to other. They are aimed to reveal relationship between self and social environment. This scale contains one single item. And that item contains seven pair of overlapping circles which they gets closer more and more. When circles are get closer they represent closer relationship with other and self. After, this scale is adapted to nature concept and called ''The Inclusion of Nature with Self'' (INS) by '' (Schultz, 2001).

Schultz, (2002) reported that '' A psychological analysis of inclusion focuses on the understanding that an individual has of her place in nature, the value that s/he places on nature, and his/her actions that impact the natural environment'' (p. 67). And it can be summarized as Inclusion of nature includes three components which

Schultz (2002) named them *Connectedness with Nature, Caring for Nature* and *Commitment to Protect Nature.* Connectedness with nature generally refers to amount of self inclusion with nature based on cognitively perceived (Schultz, 2001). Thus, it is possible to be determined with metamorphic scales such as the Inclusion of Nature in Self. Additionally, *Caring for Nature* represents the extent of care about nature and *Commitment to Protect Nature* refers to behaviors in benefit of nature.
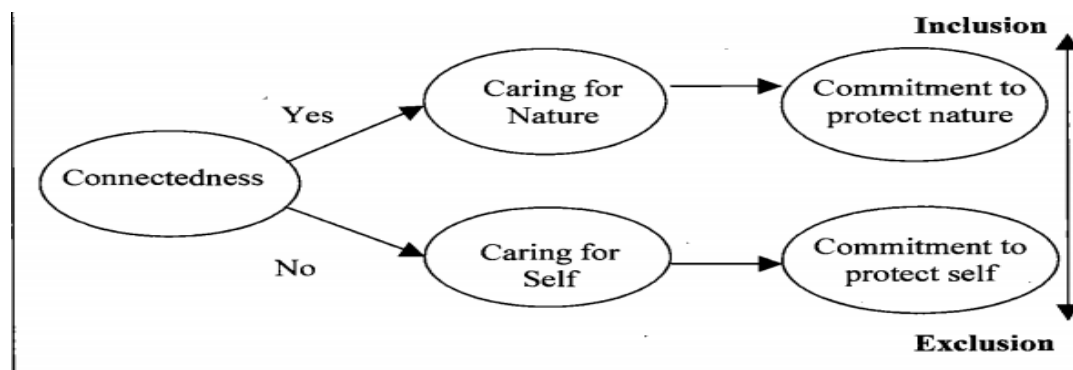
Figure 1.2 the Components of Inclusion (Schultz, 2002, p. 69)

In this context, Schultz (2001) reported that the more an individual able to adopt psychological point of view of other aspects, more likely to feel included with it. Thus, individuals with biospheric or altruistic value oriented are more likely to include nature in self whereas, more likely to exclude nature if they are egoistic value oriented. Additionally, based on the work of Schultz (2001; 2002), the perceived importance or hierarchy of self over nature was adapted and found as a predictor of water conservation and other pro-environmental behaviors (e.g. being volunteer, donation for environmentalism) (Sidiropoulos, 2018).

1.3   Research Questions

As introduced and reasoned the water consumption management is vital in order to create a sustainable future and even more crucial to determine its predictors on young students since they are adults of future. This study will address to uncover

predictive power of values, beliefs, norms and inclusion of nature in self as well as hierarchy with nature on young students' water consumption behavior.

1. What are the middle students' universal values, beliefs, personal norms, inclusion of nature in self, hierarchy with nature and water consumption behaviors?
2. What are the water consumption behaviors of the middle school students?
3. How well can middle students' water consumption behaviors can be explained by universal values, beliefs, personal norms, inclusion of nature in self and hierarchy with nature?

The following hypothesis has been tested in the study:

Hypothesis 1: The linear combination of universal values, beliefs, personal norms, inclusion of nature in self and hierarchy with nature is positively and significantly related to middle school students' water conservation behaviors.

Hypothesis 2: Personal norm is the best predictor of middle school students' water conservation behaviors.

1.4   Definition of Key Terms

Value – Belief – Norm Theory: The theory has been introduced by Stern, Dietz, Abel, Guagnano and Kalof (1999); Stern (2000) in order to explain environmentalism with help of values, beliefs and personal norms.

Water Conservation Behavior: Water conservation behavior refers to using water efficiently and curtailment efforts in order to maintain water demand management (Russell & Fielding, 2010).

Universal Value: Phenomenon that serves as a guiding principle in the life of a person or other social being (Schwartz, 1992).

Belief: Responsibility for causing or ability to mitigate threats to any valuable object (Stern, 1999).

Personal Norm: A sense of personal moral obligation that enables one to act morally in a situation (Schawrtz, 1977).

Pro-environmental Behavior: Pro-environmental behavior refers to willingly behaviors of individuals that aims to prevent or reduce negative impacts of human endeavors on nature or built world such as less consumption of resources or less waste production (Kollmuss & Agyeman, 2002).

Inclusion of Nature in Self: The measure of the perceived relationship between the nature and self of individuals (Schultz, 2001).

Hierarchy with Nature: Individuals' perceived relationship with nature in terms of importance or dominance (Sidiropoulos, 2018).

1.5   Significance of the Study

With climate change, pollution and the increase in water demand, access to water is becoming more and more difficult (IPCC, 2014). Moreover, this difficulty in accessing water brings along other problems such as conflict or migration (WEF, 2013). Although there are methods such as rain harvesting or desalinization to solve this problem, they are not economical and practical (Kumari & Singh, 2016). Therefore, it is essential to protect water resources and reduce water consumption. Türkiye is located on an area in which highly affected by adverse consequences of climate change, including decrease of precipitation level and droughts eventually (WWF, 2014). This situation not only increases the need for water, but also results in changing our water consumption behavior and adapting better to this changing situation. Thus, there is an urgent need for developing new policies and adaptation strategies and integrating of those issues into school science curricula in attempt to develop awareness among students, and to raise scientifically in general, environmentally, in particular literate individual especially in early ages between 11-

14 (Fielding et al., 2012). In fact, current national middle science curricula (Grades 5-8) include depletion of water due to extravagance, pollution of water, importance of water conservation.

Another significance of the study is that, although several research regarding water conservation behaviors exist in the present literature, relatively few had attempted to identify those behaviors in the context of the VBN framework, especially using young students as participant (Yildirim & Semiz, 2019). However, studying with young students is very important for our future. Lyons and Breakwell, (1994, p. 224) states that "studying young people is particularly important as they are the ones who will be affected by and will have to provide solutions to environmental problems arising from our current actions". Similarly, Bogner and Wiseman (1997, p.120) claims that ''young people are the future environment users''. In addition, Bell (1997) emphasized the importance of the meaning we attach to the present in order to shape our future as we want. Therefore, we must comprehensively study and try to understand determinants of water conservation behavior of young students in order to not be affected by adverse consequences of incoming water shortage in the future.

Moreover the VBN Theory is a comprehensive theory that includes many components on their body, such as universal values, beliefs, norms that predicts various pro-environmental behaviors such as activist, avoider, green consumer, wgreen passenger, recycler and utility saver (Ghazali et al., 2019). That makes the VBN Theory a powerful framework in order to reveal different determinants of water conservation behavior of individuals.

The comprehensiveness of the VBN Theory and importance of water conservation behavior are not only motives of the study. Characteristics of individuals and determinants regarding to water conservation behavior may changes from one region to another or from students to students across different culture (Kollmuss & Agyeman, 2002; Russell & Fielding, 2010). Therefore it is essential to investigate determinants of water conservation behaviors of students as much as can be, broadly

across the country to include students living in all diverse regions in order to prevent limitation of location, in order to understand determinants of water conservation behavior and to help curriculum developers on maintenance of sustainability of water. Moreover there are few studies focusing on predictors of young students' water conservation behavior and even fewer by doing so in the context of the VBN Theory which these are the gaps of related literature. If we wish to maintain our future by helping curriculum developers to enhance young students' pro-environmental behaviors via education we must tap the gap in the related literature. Thus, this study tries to fill this existence of gap it's aimed to investigating water conservation behaviors of middle school students and determinants of it. Also it is important to reveal determinants of water conservation behaviors of students in order to be able to manipulate these behaviors in favor of environment before it's too late because studies revealed that school ages are the best age to adaptation of pro-environmental behaviors and gaining positive experiences against nature since students are still shaping their values and gaining new roles in society through their education life (Lieflander et al., 2013; Vecchione et al., 2016).

Additionally, national curriculum of Türkiye as well as science curriculum has recently renewed and the new curriculum highlights to importance of sustainability of natural resources among its implicit aims (Ministry of National Education [MEB], 2018). Therefore the present study will address to this concern and put the existing aims on a test whether students have realized the importance of sustainability of natural resources after passing years since the publishing of the new curriculum.

CHAPTER 2

LITERATURE REVIEW

In this chapter, detailed explanation and introduction of the VBN Theory and its constructs, pro-environmental behavior, water consumption, water consumption in education and connectedness with nature will be provided. The Chapter starts with researches that carried out under guidance of the VBN Theory and its constructs, continues with importance of water consumption, its reflection in education and connectedness with nature.

2.1 Research on the VBN Theory

After its development the VBN Theory has proven its worth countless time (Chen, 2015; Steg, Dreijerink & Abrahamse, 2005; Stern et al., 1999). In the following section, researches have been carried out under the guidance of the VBN Theory and its constructs will be examined.

2.1.1 Personal Norms and Beliefs

Based on work of Stern et al. (1999) investigated conditions necessary to act pro-environmental and collected data from 420 participants in U.S. which 56% of them were female and 44% were male. Personal norms are the best predictors of the environmentalism and the VBN Theory had prediction percentage in between 19% and 35%.

Steg et al. (2005) administered a study in order to examine 112 Dutch respondents' answers in context of energy policies. 52 of participants were male and 58 of participants were female and their ages were ranging from 19 to 81. According to

answers of participants, their NEP item score were (M = 3.5). Participants mean scores to other variables were; personal norms (M = 3.8), awareness of consequences (M = 3.4), ascription of responsibilities (M = 3.4). Causal chain of all variables explained 32% of the variance in acceptability with big contribution of personal norms (%29). According to this model, individuals with strong personal norms more strongly supported the policies aimed to reduce CO_2 emission (β = .37, p = .002). With direct effect of personal norms, the full model of VBN theory successfully explained 32% of the acceptability of policies. It is also examined that while altruistic and biospheric value orientations are predictive pro-environmental behavior positively, egoistic value orientation predicts negatively (Steg et al., 2005).

The VBN Theory has been used to explain various pro-environmental behaviors which energy conservation is one of them (Fornara, Pattitoni, Mura & Strazzera, 2016; Ibtissem, 2010; Steg et al., 2005). Work of Ibtissem (2010) indicated that more a person altruistic value oriented that person is more willingly (p = 0.001) to conserve energy.

Similarly Fornara et al., (2016) conducted a study to indicate home owners' intention to use renewable energy sources with 432 participants. Model has been found significant in order to explain these intentions in context of the VBN Theory. As usually personal norms are specified as best predictors of the model. This is predictable and similar with results of (Stern, 1999) because personal norms are the last concept of the five causal chain variables which allows it to mediate between pro-environmental behaviors and former concepts such as values and beliefs while directly effecting them. Ascription of responsibilities followed personal norms as second best predictor of the model. Also another results is that, individuals who using renewable energy devices in the household increasing their positive attitude to these devices and they get more ''green'' accordingly to it. Surprisingly, trust in neighbors and friends is must be considered important as much as personal norms because it has strong predictive power such as personal norms according to model. According to Fornara et al. (2016) neighbors with green energy attitude affects others moral obligations as well as their own.

A study with sample of Swedish people ($M = 1400$) who is trying to test value, belief and norm model had similar results (Nordlund & Garvill, 2002). According to Nordlund & Garvill (2002) individuals are always facing with choices. These choices have two consequences which one of them is individual benefits and one of them is acting pro-environmentally. But while benefits are immediate such as going to work with personal car instead of public transportation, environmental benefits are not immediate such as decrease in amount of global warming gasses in the air. Results of the study showed that individuals' personal norms have great predictivity on pro-environmental behaviors with mediating effect of biospheric and altruistic value orientations and awareness of consequences. This means that the VBN Theory can be seen as a successful model to predict which individuals more likely to act pro-environmentally.

A study by Van Riper and Kyle (2014) in order to reveal determinants of pro-environmental behaviors of Channel Islands National Park visitors in U.S. has been made. According to results most of the self-reported behaviors are highly demonstrated by visitors except ''use boot scraping stations to prevent the spread of non-native plants'' with ($M = 22.9$) and ''clean equipment to prevent the spread of exotic species'' with ($M = 32.6$). Personal norms of participants were highly related to their altruistic and biospheric value orientations. On the contrary individuals with egoistic value orientation were less likely to demonstrate these pro-environmental behaviors in order to sustain Channel Islands National Park of U.S. Complete model of the VBN Theory were successfully explained 22% of the variance in self-reported pro-environmental behavior. Visitors were aware that resources such as national parks are under the threat and they were highly willingly to take responsibilities in order to prevent harmful impacts. It is also suggested that policy makers should focus on individuals more stable concepts on the VBN Theory such as norms or AC and AR in order to behavior change (Van Riper & Kyle, 2014).

According to Ghazali et al. (2019) most of the studies are only focusing same type pro-environmental behaviors such as recycling or conserving and relationship between pro-environmental behaviors are remains concealed. According to study

there are six different pro-environmental behaviors which they are; activist (refers to public action and supporting environmental organizations etc.) avoider (refers to people wo avoids to consume any product that harmful for environment), green consumer (refers to ideal citizen who is aware environmental problems and buys green products), green passenger (refers to using public transportation instead of personal cars and etc.), recycler (refers to people who consumes recycled products and takes actions in order to recycling) and utility saver (refers to individuals who is conservative in order to usage of utilities such as energy or water). Ghazali et al., (2019) made a contribution to the VBN Theory with social norms (it refers to being affected by other people in order to behave pro-environmentally) in order to mediate between pro-environmental behaviors and personal norms. Results indicates that; social norms have promising effects on pro-environmental behaviors as personal norms, Chinese's scores higher than Malays on AC, AR and personal norms and their relationships with each other, effect of personal norms on Chinese green consumers and utility savers were significant while not significant for Malays. But results of the study must be interpreted in the light of information such as Malays public transportation system is not well and Chinese's monthly household income is much higher than Malays (Ghazali et al., 2019). Which behaving pro-environmentally can be expensive thing and this will lead people to act non-environmentally (Groot & Steg, 2009). As a supporting finding it turned to be out Malays are good recyclers regarding to their social norms (Ghazali et al., 2019). Thus, this type of behavior seems like unaffected from perceived costs.

On contrary, by addition of subjective norm (refers to other peoples approval on staying in a green hotel) to the VBN Theory it is extended by Choi, Jang and Kandampully (2015) in order to reveal determinants customers ''green hotel'' choices. According to results individuals with biospheric value which mediated by personal norms are more intended to visit a green hotel. But it seems like subjective norm is not a determinant of behavioral intention of costumers (Choi et al., 2015). In this study subjective norm's direct effect on pro-environmental behavior has been searched by the researcher instead of its mediating effect between personal norms

and pro-environmental behavior unlike study of Ghazali et al., (2019) for example which this could be the underlying reason of this result. But it could be just because personal norms are originally identified by social norms but processed by individuals such as their personal norms (Choi et al., 2015). According to study it also seems like products and environment that enhances customers' beliefs, values and their AC's and AR's can be profitable for managements for example using recycling products or local products which produced without harming environment (Choi et al., 2015).

Recently, the VBN Theory extended by Fornara et al., (2020) with addition of injunctive social norm, descriptive social norm and perceived behavioral control which adapted from Theory of Planned Behavior. According to this study, values, beliefs, and norms with addition of perceived behavioral control and social norms are successfully explains pro-environmental behavior towards biodiversity and nature protection. It also suggested by researchers that, biospheric value orientation must be promoted by educational institutions in order to establish moral obligation towards nature. Which this is very logical because results of the study shows that with the help of social norms, biospheric values and personal norms have great predictivity on pro-environmental behaviors. Because norms, especially social norms are seems like can be altered by social circle of individuals (Miller & Prentice, 2015). But this new extended version is prone to new researches because the study have a couple limitations such as, participants were mostly men and they are from higher ranks regarding to social demographic context and does not represents general population (Fornara et al., (2020).

2.1.2   Values

The VBN Theory's usefulness is not only limited with individuals. It is also successful to explain pro-environmental behaviors in organizations according to recent study of Ciocirlan, Gregory-Smith, Manika and Wells (2020). This study also supplemented the VBN Theory with conservation behaviors which includes;

reducing use, reusing, repurposing and recycling. According to result, all mediation effects of original concepts which they are; values, NEP, awareness of consequences and ascription of responsibilities and direct effect of personal norms on pro-environmental behaviors are exists. A surprising result indicates that egoistic value orientation predicted conservation behavior through awareness of consequences positively whereas it had to be negative predictor of pro-environmental behavior (Stern, 2000). There might be different explanations to this situation such as, personal life individuals might act non-environmentally according to their egoistic value orientation because they gain immediate personal benefits but in their work life they won't perceive immediate personal benefits. Instead this situation will affect their colleagues and his lifestyle and this situation might activate individuals' altruistic orientations instead of egoistic. Thus, private environmentalism and organizational environmentalism might be differ from each other regarding to measurement (Ciocirlan et al., 2020). Similarly, although egoistic value orientation negatively related with pro-environmental behaviors when biospheric or altruistic value orientations are positively related usually, it seems like it is not the case always. Because according to study of Groot & Steg (2009) since everyone possess each of these three value orientation, individuals priority may differ on a particular circumstance and even egoistic value orientation can lead individuals to pro-environmental behavior. For example an individual might refuse to use a car due to its financial costs instead of its threat on global warming. But on environmentalism perceived costs usually exceeds perceived benefits, hence, egoistic value usually related with non-environmentalism (Groot & Steg, 2009).

Similarly, a study has been made in order to reveal determinants of engagement in energy conservation and environmental citizenship behaviors by Yeboah and Kaplowitz (2016) in an institution context. Model was more successful to explain environmental citizenship behaviors (EAB) more than energy conservation behaviors (ECB) with direct effect of personal norms on behaviors. EAB are seems like relies on concerns such as altruistic and biospheric. Thus, it might be easy to capture their affects with help of the VBN Theory. Whereas ECB are could be under

effect of other circumstances such as social pressure and readiness of the environment (Yeboah & Kaplowitz, 2016). Which it seems like these findings are similar with results of work of Ibtissem (2010). These results makes sense under the guiding light of a study by Stern (2000). According to this study, there are not only just one type of causal variables but there are four. These variables are attitudinal factors, contextual forces, personal capabilities and habit or routines. While attitudinal forces refers to concepts such as norms, values and beliefs, contextual forces refers to interpersonal influences, community expectations or government regulations, personal capabilities refers to personal knowledge and skill that needed for an environmental action which social demographic variables also included to this type of casual variables. Lastly, habit and routines refers to routines that individuals behave on daily basis as can be understood from the title (Stern, 2000). The VBN Theory tries to explain attitudinal factors and their effects on pro-environmental behaviors mainly. Thus, other causal variables other than attitudinal factors might have bigger effect on some pro-environmental behaviors such as ECB and less effect on other pro-environmental behaviors such as EAB. Which, this might partially explain differences in the results. Also educational programmes suggested by researchers in order to strengthen individual's personal norms that affects their pro-environmental behaviors mostly than other variables in the VBN Theory (Yeboah & Kaplowitz, 2016).

From a different perspective to same situation, it is tested that if personal norms and biospheric values are successfully predicts pro-environmental behaviors such as energy use on work, on transportation and waste pre-vention and recycling with addition of self-identity by study of Ruepert et al. (2016). According to results, some of the employees did not behave pro-environmentally even they supposed to according to their personal norms. Which reason behind this revealed by interviews. According to these interviews, employees would behave more pro-environmentally if right conditions were created, for example if they had chance to choice their transportation vehicle for work purposes (Ruepert et al., 2016). It also has been revealed that personal norms are still preserves its explanation power on pro-

environmental behaviors even a slightly different model different than the VBN Theory.

According to work of Chen (2015) with sample of 757 Taiwanese participants, direct effect of personal norms and mediating effects of NEP, AC, AR and PN are significant ($p = 0.0001$) in the context of global warming Among value orientations, biospheric value with ($\beta = 89$) made biggest contribution to the model. Also this study is a proof of applicability of the VBN Theory to eastern countries other than western countries where theory originally developed.

Environmental tourism can't be done without environment. Thus cooperation with tourists and determinants of their behaviors towards nature is essential according to a study by Gupta and Sharma (2019). According to this study, the VBN theory successfully predicts tourists pro-environmental behaviors which their altruistic and biospheric values directly affects their beliefs (NEP, AC and AR) and affects personal norms through these beliefs while personal norms are the best predictor of the pro-environmental behavior. Also it is clear that biospheric and altruistic values are have great role for tourists in order to behave pro-environmentally. Because biospheric value oriented individuals are aware about consequences of their actions and takes responsibilities in order to not harm environment which builds personal norms that leads them to behave pro-environmentally. Same motivation applies to individuals with altruistic value orientation for sake of other people instead of other species end biosphere. Additionally it seems like people are aware that they can upset the balance of nature and takes responsibilities in order to prevent that (Gupta & Sharma, 2019).

Similarly, tourists' impacts on environment can be direct. Thus, it might be essential to research their pro-environmental intentions in dimension of localism which refers to consume local goods and services and willingness to sacrifice which refers to considering environment instead of self-benefit in order to sustainable environment (Landon, Woosnam & Boley, 2018). The VBN Theory successfully explained ($R^2 = 0.22 - 0.44$) pro-environmental behaviors with direct effect of biospheric value on

environmental worldview and on pro-environmental behaviors with mediation of AC, AR and personal norms. According to results, it can be summarized that tourist who morally obligated acts in pro-environmentally for care of nature. And, with enchantment strategies of altruistic and biospheric concerns, other tourists who does not behave pro-environmentally and extrinsically motivated can be altered in a long turn. Also local markets and products, who managed or prepared accordingly these values might be able to affect tourists in benefit of community (Landon et al., 2018).

2.2 VBN Theory in Education

There are many studies in the context of education for revealing determinants of pro-environmental behavior already (Akitsu & Ishihara, 2018; Bilir & Ozbas, 2017; Ignell, Davies & Lundholm, 2019; Karpudewan, 2019; Liobikiene & Poskus, 2019; Sahin, 2013).

Teachers who graduated from universities must highly equipped with necessary skills because they are going to be educators of next generations through school (Sahin, 2013). In order to determine a group of teacher candidate's energy conservative behaviors the VBN Theory has been used and results indicated that participants are mostly biospheric and altruistic oriented and conservative behavior mean scores lower than other aspects of theory. With contribution of personal norms, altruistic value orientations and biospheric value orientations the model explained 28% of the variance. Also it is important that, despite other studies, biospheric and altruistic value orientations were more successful to explain variance than personal norms. Results seems like promising, however, almost half of the participants are not involving to very basic behaviors such as turning off lights while leaving the room as last person or washing clothes on low temperatures or without prewash (Sahin 2013).

According to Stern (2000) values are more stable than other any concept in the VBN Theory thus, it is the first member of the variables of causal chain. But in order to sustain a better environment and enhancement of pro-environmental behaviors it is necessary to understand if these values are changes in time or how it does. In order to answer these questions there are some researches in the literature. Study of Ignell et al. (2019) examines if one year normal education in schools with public curriculum causes any change in students' values, behaviors, norms and their relationships between them. According to results it seems like; students are held stronger beliefs against education and information as helpful methods in order to combat with climate change. Their norms were not differ than last year but a surprising founding is that, students' value orientations were most changed concept in the VBN Theory (Ignell et al., 2019). Which this results is conflicts with suggestions of theory (Stern, 2000). But seems like there is a reason behind of this situation according to a study by Vecchione et al. (2016). Results suggest that it is more unstable values of young adults (refers to 20-21 years old university students). Because they are still gaining new roles in society which it provides to them change of environment but older they get and gain more stable life style change in their values decreases (Vecchione et al., 2016). Similarly, a shift on value types (from power to universalism) between 11th and 12th grade students has been captured (Bilir & Ozbas, 2017). Hence these ages maybe good times in order to develop biospheric and altruistic value clusters of individuals through educations for more sustainable environment. Similarly, Liobikiene and Poskus (2019) suggests that action–related environmental knowledge might effects the pro-environmental behavior and reinforces the VBN Theory with it in their study. For example a person without knowledge of that washing dishes with hand consumes more water than dishwashers, might won't buy a dishwasher and can't behave in line with private sphere behaviors which it is a group type of pro-environmental behavior. Results indicates that, although participants knew that dishwashers are great tools for conserving water they did not know that travelling by train is more environmentally than traveling by plane. Also action-related environmental knowledge is significantly predicts private sphere behaviors with

mediation of ecological worldview and awareness of behavioral consequences. It also suggested by study that it is important and necessary to educate individuals in order to enhance their pro-environmental behaviors through specific environmental knowledge about local and environmental issues (Liobikiene & Poskus, 2019).

Knowledge, attitudes, values and behaviors are carries great importance on actual energy and environmental issues which this hopefully can be altered by education (Akitsu & Ishihara, 2018). In this study 13-15 years old students' VBN theory concepts with addition of TPB, basic energy knowledge, civic scientific literacy and critical thinking ability have been assessed in Japan context. Results indicated that; female students scores significantly higher on basic energy knowledge, AC, AR and personal norm while male students scores significantly higher on subjective norm and critic thinking ability, scores of 7th grade students were higher on AC, AR, attitude toward behavior, intention, energy saving behavior, critic thinking ability than 9th grades. An interesting fact is that with increase of students' grade their scores were getting lower except cognitive ones (Akitsu & Ishihara, 2018). These results similar in context of environmental education with a research by Wells and Lekies (2006) because, it seems like children who have experiences and included with nature before 11 years old are more likely to carry pro-environmental behaviors when they grow up. Also, findings indicates that ages between 9 and 11 are appropriate to strengthen pupils' behaviors in order to promote sustainable environment (Lieflander et al., 2013). Back to study of Akitsu and Ishihara (2018), surprisingly it seems like stepping up on grades did not made any contribution to students' energy literacies. Results comprehensively indicates that, intention, perceived behavioral control, attitude, subjective norms and personal norms the predictors of the energy saving behavior with addition of AC is strong mediator of basic energy knowledge and attitude toward behavior which AC is can be predicted by basic energy knowledge, civic scientific literacy, critical thinking ability and environmental values (Akitsu & Ishihara, 2018).

Another study has been made in on Cyprus in order to reveal determinants of students regarding to biodiversity (Bilir & Ozbas, 2017). In the context of gender, results are

engrossing. It seems like while female participants are significantly more concerned with self-direction, universalism, stimulation and benevolence value types, males significantly concerned on power value only. Moreover, females' ascription to responsibility and perceived ability to reduce threats in context of biodiversity significantly higher than males, on both global and local threats. Results indicates that females' personal norms significantly higher than males. From point of the grade view, there are significant changes on students' value types. Additionally, while power is important and universalism is not for 11th grade students, this importance shifts from power to universalism when they move on to 12th grade. Also, their, responsibility to take actions and awareness on harmful consequences significantly increasing with each year on both global and local issues (Bilir & Ozbas, 2017). Stern and Dietz (1994) also observed same phenomena. According to their study women held stronger concern on biospheric and altruistic values than men. Which it seems like, although universal values are almost same for both gender, priorities on these values are can be different (Dietz, Kalof & Stern, 2002). According to this research which it conducted in 1994 with random telephone dials, women gives more priority to altruism then men. This is important because, altruism is seems like more related with environmentalism then other value concerns. According to researchers, the diversity on value priorities can be reasoned because of different social roles of men and women in society (Dietz et al., 2002). But this diversity of priority on values could be only limited with different ethnicity or culture. For example Kalof, Dietz, Guagnano and Stern (2000) have found that only white men and women are differ in environmentalism while black men, women and Hispanic men, women does not. But this could be a reason of diversity of socio-demographic variables between ethnicities. But maybe culture is not enough to explain everything. Because, even on the other side of world there are similar findings with this phenomena. Such as, women seems more likely to buy green products than men which it is a pro-environmental behavior (Lee, 2009).

It is important to predict primary school students' determinants and educate them in order to act in line with green behavior (Karpudewan, 2019). With contribution of

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300 5th or 6th grade students a research has been made in Malaysian context. Results indicated that; model successfully explains the pro-environmental behavior, values predicts pro-environmental behaviors with mediation of personal norms and biospheric value orientation has a significant indirect effect on students' personal norms. It also recommended that study should be repeated in order to measure influence of gender on climate change behaviors because, gender topic is variates according to context (Karpudewan, 2019).

2.3   Water Consumption

As briefly reviewed, The VBN Theory proven its worth in order to explain relationship between pro-environmental behaviors and psychological determinants of it on various context such as; energy conservation (Akitsu & Ishihara, 2018; Chen, 2015; Fornara et al., 2016; Ibtissem, 2010; Sahin, 2013; Yeboah & Kaplowitz, 2016), energy policies (Steg et al., 2005), recycle (Nordlund & Garvill, 2002), pro-environmental behaviors in organizations (Ciocirlan et al., 2020; Ruepert et al., 2016), sustainability (Choi et al., 2015; Gupta & Sharma, 2019; Karpudewan, 2019; Landon et al., 2018), engagement in pro-environmental behaviors (Van Riper & Kyle, 2014), climate change (Ignell et al., 2019), biodiversity (Bilir & Ozbas, 2017) and relationships between these contexts (Ghazali et al., 2019). Apart from these contexts, although water consumption behavior is an important pro-environmental behavior and its concepts examined with different theories already, it seems like that water consumption recently met with the VBN Theory (Yildirim & Semiz, 2019). And fertile results might be awaiting us in order to explain determinants of water consumption

Using water efficiently has been announced with different words. For example, Brooks (2006) defined it as water demand management:

> '' (1) reducing the quantity or quality of water required to accomplish a specific task; (2) adjusting the nature of the task so it can be accomplished

with less water or lower quality water; (3) reducing losses in movement from source through use to disposal; (4) shifting time of use to off-peak periods; and (5) increasing the ability of the system to operate during droughts,'' (p. 1).

Or it called water conservation behavior as suggested by Russell and Fielding (2010) which, it includes both of curtailment and efficiency behaviors due to their similarities in household level.

According to experts: with increase on population, demand on water increases but water is not unlimited. On the contrary, it is scarce and essential for food, agriculture, household and industry. And yet it is threatened by pollution and degradation (Rosegrant, Cai & Cline, 2003). Water is essential for every livings on earth including humans but, demand on fresh water resources are unsustainably increasing (Fielding et al., 2012). Moreover climate change joined to among problems which it has great impacts on water:

''In the future, rising sea levels and more extreme weather conditions may force millions of people to migrate, adding pressure on the use of natural resources—especially water—in the destination areas. Rising competition over these resources could eventually result in military conflict. Adverse changes in temperature and precipitation are likely to influence the capacity of many areas to produce food, thus increasing the vulnerability of the population. According to some studies, at present 1.7 billion people live in water-stressed countries. Industrialization and demographic forces are likely to further aggravate the situation, and climate change may exacerbate the situation even more by decreasing stream-flow and groundwater recharge'' (WEF, 2013, p. 60).

Accessible fresh water amount is less then 1% of the total water on world and almost more than 40% of the population on the world is going to live on a water stressed area. Which already 2.7 billion people lives on a water shortage area for one month per year at least (WWF, 2014). Almost 70% of the fresh water is used in agriculture

and it seems like this percentage going to be doubled within 30 years (Godfrey et al., 2010). Climate change changes water cycle and causes to drought and floods on different places on earth as a result. Which, it affects individuals' accessibility on fresh water. Turkey is no different than world. Among the same problems as world faces such as climate change effects Mediterranean Basin with decrease in precipitation around 20% and this might cause to environmental problems such as drought, water scarcity and loss of biodiversity (WWF, 2014). With decrease on participation and increase on temperatures on Turkey will lead to water scarcity for citizens and if population distribution won't change west side of the country will be highly affected (Intergovernmental Panel on Climate Change [IPCC], 2013). Most recently, a lake habitat of at least 232 different nomadic bird species in different times of year on located north east side of Turkey got drought due to climate change (''Kuyucuk Kuş Cenneti kuruyor'', n.d.).

Similarly, Cape Town the first metropolitan of the world who almost faced against absence of water because of drought in 2015 – 2017. This almost lead to day zero which it refers to there would be only 25L water per individual each day. It seems like caused by climate change due to CO_2 on atmosphere and similar droughts are expected (Burls et al., 2019).

All of these significant water problems are directly or indirectly reasoned by anthropogenic causes (IPCC, 2014). So, it is essential to understand determinants of water behavior of humans. Which, water conservation behavior can be considered as one of the main topics of environmental psychology (Corral-Verdugo et al., 2008). Human influence on climate system can't be denied and it seems like it is growing since 1950s with events such as; affection of global water cycle, melting glaciers, increasing sea level and warmer upper ocean (IPCC, 2014). Thus, it is essential to reveal underlying forces of water conservation and pro-environmental behavior, because it seems like there are many adaptations need to be done in order to overcome challenging days in our future. Because the water problem seems not going to end yet (IPCC, 2014; WWF, 2014).

Increasing water demand can be supported with different methods such as rainwater harvesting, desalinization or planting tree but none of them are efficient and effective as changing our attitudes and habits towards water (Kumari & Singh, 2016). Moreover, such methods are not practical due to their costs and required resources, it is more crucial to reduce water demand (Schultz et al., 2014).

In order to reveal water conservation determinants of farmers Pradhananga and Davenport (2019) conducted a research. Which, farmers' water conservation behaviors important because in developing countries such as Turkey, around 70% of the fresh water is used for agriculture (WWF, 2014). According to study, personal norms are one of the successful descriptor of pro-environmental behavior. Also, farmers are carries perceived ability to decrease unwanted results even more with availability of resource such as money or knowledge. Personal norms are effected by belief of being aware of bad consequences and responsibility to take action in order to inhibit unwanted results with effect of values on them. It is clear that biospheric and altruistic values are predictors of obligation to conserve water. It seems that individuals who uses biospheric and altruistic values as guiding principles in their lives are more aware about unwanted results of excessive water run off while egoistic oriented individuals are significantly not aware such as consequences (Pradhananga & Davenport, 2019).

When this is the case, a different approach revealed that people are wasting water to consume water and it seems like social norms also has effect on environmental behaviors like personal norms. Linden (2015) states that people around world consuming bottled water with an increasing demand instead of easily reachable tapped water. Which, producing bottled water consumes fresh water with addition of harm to environment and contribution to climate change. As known information on environmental issues are not necessarily ends up with adaptation of pro-environmental behaviors (Kollmuss & Agyeman, 2002; Stern, 1999). Which, results are supported that. While information more responsible than social norm regarding usage of bottled water, both of them together were able to explain more of the variance (Linden, 2015).

While population growth and climate change threatens existing fresh water resources it seems like there are other factors than personal ones that effects individuals' water conservation behavior. Jorgensen et al. (2009) states that if individuals does not trust water institutes and if they think that others does not behave environmentally like themselves, these individuals are probably won't adopt water conservation behaviors. Study of Lam (2006) revealed similar results. For example, people were considered to change their dual-flush toilet tanks if others cooperate but not for success of action. Although, usually women are considered more pro-environmentally than men, it seems like men are more willingly to adopt water conserving behavior. Income and education have engrossing prediction power on water conserving behavior which, income can easily effect water conservation behavior in this case because buying a dual-flush toilet costs money (Lam, 2006).

There are natural effects on water usage such as seasons. Klein et al. (2006) reported that in summer and spring, individuals consumes more water but it can be hard to detect because while weather changes quickly (daily basis) water bills are paid monthly. Moreover, after a rainy day it seems water demand reduces 38% which it indicates how temperature is related with water demand (Klein et al., 2006).

With participation 97% of the sample, a research by Clark and Finley (2007) on Bulgaria context revealed that; intention, attitude and subjective norm are strong and significant predictors of water conservation behavior with weak but significant addition of concern over future. Sociodemographic variables such as greater age, not owning a house and lower education were also positive predictors of water conservation. Additionally, participants with higher knowledge about dominance over nature, global warming and climate change more intended to water conservation. But this might be reasoned by, due to their economic situation, participants might conserving water because of financial reasons instead of beliefs (Clark & Finley, 2007).

From anthropocentric and ecocentric point of view in context different cultures, it seems like individuals who thinks themselves as a mutual member of dynamic of

earth and who must be responsible from restoration and renewal of nature more likely to conserve water instead of individuals who serve their own interests instead of environment (Corral-Verdugo et al., 2008). In context of beliefs, although NEP has been used by researches often in the context of water conservation (Pradhananga & Davenport, 2019; Yildirim & Semiz, 2019) interestingly, it seems like NHIP is more successful predictor of water conservation behavior than NEP but limits of growth concept of NEP and it's prediction power and success regarding to it could be the reason behind that why NEP is frequently used (Corral-Verdugo et al., 2008). Similarly, another research by Corral-Verdugo et al. (2003) revealed that, instead of general environmental beliefs, specific behaviors towards water as a natural source were more successful in order to predict water consumption behavior. As a result it can be understood that while individuals with anthropocentric beliefs considers water as an unlimited source and does not adopt water conserving behaviors, individuals with ecological beliefs who considers water is limited and must be valued, highly adopts water conservation behaviors (Corral et al., 2003). Additionally, belief of preventable of droughts is one of the predictor of water conservation behavior (Lam, 2006; Ramsey, Berglund & Goyal, 2017).

From the point view of sociodemographic variables there are engrossing results. For example, Clark and Finley (2007) found that older individuals are more likely to conserve water, but Lam (2006) did not found any significant result regarding to age. Randolph and Troy (2008) related lower age with lower knowledge and practice about water saving behavior even they are supporting water conservation. Indeed knowledge seems like a predictor of water conservation because according to Aprile and Fiorillo (2017) individiauls who follows environmental programs on television or radio are more likely to adopt water conservation behaviors. Ramsey et al. (2017) have found that being in between 26 and 35 ages is also significant determinant of water conserving behavior through dual-flush toilet appliances with addition of higher income and neutrality on that governments should provide relief during droughts. But income can effect water conservation behavior various ways. Results indicates that home owners are more considered and more power have on their own

property so they can install water conserving appliances or contrary, home renters are usually does not have any effect on their home equipment or they don't consider about water bill because it is included on rent. Additionally, home type or size is another predictor of water conservation per individual because, some of the houses such as dwells are consumes more water than other houses because of facilities such as pools or gardens but flats (another type of house) consumes less water due to their size and usage of facilities by more people (Randolph & Troy, 2008). Also, there are conflicting results regarding to education levels. For example, while Ramsey et al. (2017) found that education does not correlates with water conservation, Aprile and Fiorillo (2017) found that less educated individuals are more likely to adopt water conservation behaviors. On contrary, Onyenankeya, Onyenankeya and Osunkunle (2019) have found that homeowners in urban areas with higher education with addition of higher income are more likely to conserve water. Age might be influencing water conservation behavior through other variables such as place attachment even participants were low educated. Because individuals' longer resistance for a particular place strongly related with their ages (Garcia, Muro, Ribas, Llausas, Jeffrey & Sauri, (2013). It also seems like individuals with rural background are more water conservers than residents with urban backgrounds (Garcia et al., 2013). These contrary results are probably reasoned because of different contexts of researches such as participants' backgrounds about water, cultural differences among participants and studies (Russell & Fielding, 2010).

Values and other environmental behaviors are other determinants of water conservation behavior according to a study by Aprile and Fiorillo (2017). People with altruistic and biospheric value oriented and concerned about pollution and resource exhaustion are more likely to adopt water conserving behaviors. On contrary individuals with no concern on alteration of environmental heritage less likely to adopt those behaviors (Aprile & Fiorillo, 2017). Additionally individuals are considers other members in their social context and they are more like to conserve water if their social context behaves as water conserver which findings of Lam (2006) similar with these results and supports them (Aprile & Fiorillo, 2017). But

results according to gender indicates that women are more likely to water conserve which these results contradicts with results of Lam (2006) but similar with results of the literature (Aprile & Fiorillo 2017). In the context of the VBN Theory, causal chain of variables were significant determinants of water conservation behavior. More generally, while personal norms directly affecting water conservation behavior it was mediating between AC, AR and worldview beliefs, AC, AR and worldview beliefs were also mediating between values and personal norms but study did not reveal any significant effect of egoistic value orientation on water conservation (Yildirim & Semiz, 2019).

A study in order to change participants' water conservation behavior through their norms have been made by Schultz et al. (2014) in San Diego context. Which it is different from most of the studies in the literature because, studies usually based on self-reports and not aimed to change water conservation behavior (Koop, Dorssen & Brouwer, 2019). Individuals were informed according to their water conservation via post-mail and website. Results indicated that only information about the consumption might be not sufficient for conservation if that information does not aimed to activate individuals' norms. Although an important determinant is that normative information given to individuals must be related with their normative orientation. Because, it seems like, individuals with strong personal norms does not affected from social normative messages as much as individuals with lower personal norms due to their norm priority (Gockeritz et al., 2010). This phenomena did not occur in this study and normative messages were significant behavior changers and individuals with strong personal norms are willingly to behave as water conservers even their social environment were not participating. A surprising fact is that, households with low water consumption and who informed due to study, began to consume more water. Additionally results indicated that personal post-mails are more effective than web site information (Schultz et al., 2014). But because of limitation due to selecting method (might eliminated individuals with less strong personal norms) and lack of behavior changing studies in the literature, future studies needed in order to better understanding of these concepts. Although individuals'

norms are important for adopting water conservation behaviors, there are other important factors exist such as facilities, encouragement or habits (Randolph & Troy, 2008).

Although, water conservation can be maintained with manipulation of individual's behavior through self-determinants such as attitude, value, norm etc. it seems like external factors also can be alter individuals' behavior such as price and policies (Grafton et al., 2011; Worthington & Hoffman, 2008). For example volumetric water charge and higher average price examples of effect of price on water conservation (Worthington & Hoffman, 2008). Also it has been found negative relationship between water conservation and average price of water and positive relationship between water conservation and charging households volumetrically (Grafton et al., 2011). But according to Randolph and Troy (2008) increasing water price might be not best method to enhance individuals' water conservation because either they are not interested with how much they uses or how much it costs. Moreover most of the individuals does not even want to pay more for conservation of water on a broader concept and they think water consumption is reasoned by others. Although this situation might be related with price elasticity, which it refers to higher or lower costs of water differs less and individuals mostly ignore it and use same amount water despite higher prices, Worthington and Hoffman (2008) states that this effect exist for short period of time and more advanced models might better explains it. Also results indicates that price elasticity is higher in summer and for garden watering, filling swimming pools and car washing. Which, there are other techniques present without considering price but restrictions on watering garden, washing car or even filling swimming pool (Worthington & Hoffman, 2008). Also it has been suggested that water conservation behaviors and appliances such as taking short showers or using dual-flush toilet would be more effective if water volumetric charged (Grafton et al., 2011). Additionally since water conservation is a pro-environmental behavior it seems like correlates with other pro-environmental behaviors. Carrying pro-environmental behaviors for example supporting and being a member of an environmental organization and being active in environmental protection which it

refs to activism or public-sphere activism as Stern (2000) deeply explained and categorized in his study, can successfully predict water conservation behavior (Aprile & Fiorillo, 2017; Grafton et al., 2011).

But for sure there is no an absolute right or a model that explains or predict pro-environmental behavior perfectly. On contrary, results are specific to its context and it seems like there are still many concepts exists that waiting to be tested (Kollmuss & Agyeman, 2002).

2.4 Water Consumption in Education

As Colom and Sureda (1981) suggested, environmental education can be conceptualized as, reviewing our relationship with biosphere and a guide for society to a sustainable future (as cited in Varela-Candemio, Novo-Corti & Alvarez, 2018). Environmental education has significant effects on students' awareness, consumption behaviors and lifestyles which, education institutes are implemented environmental education to their curriculum accordingly (Zsoka, Szerenyi, Szechy & Kocsis, 2012). Moreover results supports that environmental education and environmental knowledge correlates with each other and this is an important accountant on students' attitudes, awareness and consumption behavior. Additionally university students considers water pollution as most important problem with addition of climate change (Zsoka et al., 2012). Moreover, environmental education does not only influence students' awareness, knowledge, attitude and skills for sustainability but improves their critical thinking, decision giving and problem solving skills with related issues (Varela-Candamio et al., 2017).

Indeed recently changed elementary curriculum of Turkey defines water as a valued source and highlights threats towards it (MEB, 2018). Information about water issues such as; depletion of water due to extravagance, pollution of water due to waste of industry or litter, importance of conservation of water and methods to use water efficiently such as; usage of dishwasher machine, necessity of full load of clothes to

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use washing machine, water efficient shower head, not leaving tap open while brushing teeth have provided on 4th grade with similar suggestions on electricity and food (Ozkan, 2019). Additionally it is aimed to activate personal and social norms of students with sentences such as '' saving resources is part of our responsibility to both ourselves and our environment'' or ''we can leave a more livable world for future generations by saving money in the use of resources '' (Ozkan, 2019, p. 181). But as it can be seen, while altruistic value considered biospheric value orientation ignored, if the author only meant people while referring to future generations. This is important because biospheric value is an important predictor of pro-environmental behavior (Chen, 2015; Choi et al., 2015; Landon et al., 2018; Ruepert et al., 2016). Similarly on 7th grade, harms of domestic waste oil on fresh water, other livings and drainages and on 8th grade, global warming and its threats on fresh water and agricultural economic issues related to it and water cycle have been provided to students (Seyrek, Türker, Bozkaya & Üçüncü, 2019; Yancı, 2019). But according to Yildirim and Semiz (2019) curriculum is shallow and it must be more detailed. Additionally, Covitt, Gunckel & Anderson (2009) were revealed that secondary school students have difficulty in perceiving abstract concepts such as the water cycle and evaporation or infrastructure systems that contribute to the daily use of water, and accordingly, they cannot fully grasp how water resources and running waters affect the areas on their routes. Moreover, secondary school students need to be aware that, in addition to local resources, people consume or pollute water resources in remote areas of the world through their daily purchasing and consumption choices (water footprint) in order to ensure a sustainable future. Therefore appropriate geographic and environmental education is required for this. (Benninghaus, Kremer & Sprenger, 2018). Increase on students' awareness and water conservation behavior in order to maintenance of sustainability is essential which, courses through formal education might be helpful (Yildirim & Semiz, 2019). The importance of information was also highlighted by Kronrod et al. (2023) since combination of information and encouraging messages was found as a helping tool

in order to overcome robust nature of adaptation of a new pro-environmental behavior especially on young students.

2.5   Connectedness with Nature

Humans are involved in nature since the beginning of their lives. However, it is not as it is used to be because of the urbanized life style with help of technology. Robinson & Silvers (2000) revealed that people in America only spent 89 minutes per day in outside. Which it is incomparable with our history when it is considered that humans used to be living in nature as hunters and gathers and they become familiar with agriculture approximately ten – twelve thousands years ago. Moreover, researchers found that spending more time with nature or engagement with nature's beauty increases happiness and well-being (Capaldi, Dopko & Zelenski, 2014; Richardson & McEvan. 2018).

A qualitative content analysis research with participation of pre-service teachers was found a relationship between connectedness with nature and universal value of the VBN theory of Stern (2000). These participants involved to learning activities that can reflect human nature relationship called eco-story and eco-poetry. Which it indicates; more a person connected to nature more likely to have biospheric value that defines him/herself as a part of nature and live in a harmony with it and environmental pedagogy can be strong tool for environmental education (Gedzune, 2015).

Another research similarly conducted by Schultz (2001) with 148 undergraduate psychology course students and they are completed a series of measures which one of them were INS. Results indicated that biospheric oriented students ($r = 0.31$) with $p < 0.001$ are believes that they are more connected with nature according to altruistic ($r = 0.18$) with $p < 0.05$ oriented students.

Similarly, it was reported that connectedness with nature is significantly related with biospheric and also altruistic universal value orientations by Gkargkavouzi,

Pareskovopoulos & Matsiori (2018). Moreover, it is also possible to observe a positive relationship between connectedness with nature and egoistic value orientation because individuals are likely to ac pro-environmentally if perceived costs exceeds the benefits (Groot and Steg, 2009) even if they are egoistic oriented.

Connectedness with nature is crucial because it has a self-empowerment effect. Happiness and connectedness indicators to participations ($n = 746$) was administered on a web portal on internet and with (p < 0.001). Zelenski & Nisbet, (2014) revealed that spending time in nature increases connectedness to nature and connectedness to nature increases time spent in nature. Which this is also important because feeling connected to nature leads to eco-friendly behaviors that leads to more sustainable environment (Dutcher et al, 2007). Similarly, a mixed method and participation of 37 disabled individuals it was revealed by Jakubec, Hoed, Ray & Krishnamurthy (2016) that nature experience have an insignificant positive effect on well-being.

Inclusion of nature is have a great applicability in education also. Teachers are the educators of future generations and if they are in a positive relationship with environment and can pass this on their students it might will be easier to create a sustainable environment (Liefländer, Fröhlich, Bogner & Schultz, 2013). A study with 818 pupils with age groups of 9-10 and 11-13 years old tried to reveal interaction different variables and if environmental education can generate or improve connectedness with nature. Pre-, post- and retention test and four days environmental education program applied and as result it was found that; 9-10 ten years are better for an environmental education to sustain connectedness between nature and individual. Also, for this particular age group it is found that there is a robust increase regarding to connectedness with nature and it was revealed that education program is a way to increase it. Similarly 9-10 years are best ages for strengthening connectedness with nature feeling (Liefländer et al., 2013). Moreover, as reported by Cho & Lee (2018) it is possible to influence positively even young students around 3th grade in order to adverse their fears to affinity by environmental education through connectedness with nature.

From cultural point of view, there were no significant difference between Chinese and Canadian students regarding connectedness of nature and its explanation on pro-environmental behavior (Krettenauer et al., 2020). Moreover, there was a decrease in connectedness with nature of students for both culture as similar results that reported in literature (Sidiropoulos, 2018). Which this phenomena reasons by adolescence and peaks with it and then diminishes. Therefore it could be important to support such individuals with environmental education and environmental experience enhance their connectedness with nature in order to affect their value orientations that could lead pro-environmentalism (Lieflander et al., 2013; Stern 2000).

Similarly, based on study of Sidiropoulos (2018) it was revealed that hierarchy feelings toward nature is also important in order to reveal if humans are aware that environment makes possible anthropocentric endeavors. Because, people might think that environment is co-operating with anthropocentric actions instead being a host to them. For example; one might think that environment, economy and society are balanced, dependent and acting together (SANZ, 2009). But the truth is environment includes economy and society because without it, society and economy would not be exist. Additionally, this research indicated that students' perceived hierarchy with nature could vary based on their study field. For example, students of education faculty ($N = 19$) with ($M = 4.62$) found sustainability more important than, science faculty students ($N = 127$) with ($M = 4.31$) and art faculty students ($N = 25$) with ($M = 4.29$).

There are many studies in related literature. Most of them indicates feeling connected with nature leads to eco-friendly behaviors and there are better ages to inspire people. Thus, it is very crucial to understand teacher candidate's connectedness and hierarchy believes if we want to live in a sustainable and fertile environment because teachers are able to affect their students and students are generation of future who can effect nature with anthropogenic or ecocentric methods.

2.6   Summary

In summary, the VBN Theory was numerously used by researchers in order to reveal prediction power of values (Chen, 2015; Groot & Steg, 2009; Landon et al., 2018; Nordlund & Garvill, 2002), beliefs (Fornara et al., 2016; Stern, 2000) and personal norms (Steg et al., 2005; Van Riper & Kyle, 2014) on different pro-environmental behaviors such as energy conservation (Ibtissem, 2010; Sahin, 2013; Yeboah and Kaplowitz, 2016) or water conservation Yildirim & Semiz (2019). Based on results findings; values are capable in order to predict pro-environmental behaviors directly (Sahin, 2013) or through other variables of causal chain of the VBN Theory (Stern, 2000). For example, awareness of consequences and ascription of responsibilities was found as important predictors of energy conservation behavior by Akitsu & Ishihara (2018). Moreover, personal norms were also found crucial regarding pro-environmental behaviors additionally to these constructs. Based on study of Ghazali et al. (2019) the personal norms were the best predictor of green consumers and utility savers such as energy or water.

Parallel to this in the context of water consumption, individuals with biospheric and altruistic value oriented more likely to conserve water (Aprile & Fiorillo, 2017) but also egoistic values could lead to same result due to high perceived costs (Clark & Finley, 2007). Additionally to values, it was also found that beliefs are an important predictor of water consumption (Lam, 2006; Ramsey, Berglund & Goyal, 2017) as well as norms (Clark & Finley, 2007; Linden, 2015).

Connectedness of humans with nature goes back the very beginning of their existence but it was dramatically decreased significantly since then (Robinson & Silvers, 2000). This connectedness is in a strong relationship with universal value orientations of individuals (Schultz, 2001) makes them feel healthier (Jakubec et al., 2016), directs them to pro-environmental behaviors (Dutcher et al., 2007) and it will have more fruitful results if maintained on early ages (Liefländer et al., 2013).

From an educational point of view, environmental education has significant effects on students (Zsoka et al., 2012), and it was provided in national science curriculum of Türkiye in different topics as well as water consumption but students altruistic value was addressed mainly in order to sustain that, (Ozkan, 2019). Therefore, the curriculum considered shallow and needs adaptations (Yildirim & Semiz, 2019).

CHAPTER 3

METHOD

Under this heading, information about research design, population and sample, data collection instruments, procedures, including steps followed during pilot and main studies, together with validity - reliability issues of instruments and statistical analysis was provided. The chapter ends with the addition of assumptions, limitations, ethical concern and internal validity of the study.

3.1 Research Design

Main purposes of the study are to uncover what are the water conservation behaviors among middle school students and to explore the determinants of these behaviors in the framework of Value Belief Norm Theory namely universal values, beliefs, personal norms with addition of two connectedness with nature components namely inclusion of nature in self and hierarchy with nature. To successfully carry out the study, correlational research has been selected as research design. Because, correlational research is a method that seeks relationship between variables and can be carried in order to explain important behaviors of individuals or predict possible outcomes of these behaviors (Fraenkel, Wallen & Hyun, 2012). Accordingly, multiple regression analysis was applied to unveil determinants of the water consumption behavior of middle school students in context of the Value-Belief-Norm Theory.

3.2 Population and Sample

Population of the study was defined as all public middle school students (from grade 5th to grade 8th) in Istanbul. But, Istanbul, as the most crowded city of the Türkiye

and included 1730 public middle schools and about 1 million middle school students (MEB, 2019). Since it requires large amounts of funding, time and resources to access a representative sample of its results, all public middle school students in one of the largest districts of Istanbul was defined as accessible population. Convenience sampling method was determined as sampling method due to its suitability for pandemic regulations (Fraenkel, Wallen & Hyun, 2012). Consequently, sample of the study consists 616 students attending to two public schools located in the Ataşehir district as shown in Table 3.1.

Table 3.1 *Background Information*

Gender	Frequency	Percentage
Girl	273	44.3
Boys	337	54.7
Missing	6	1.0
Total	616	100.0
Grade		
5	71	11.5
6	210	34.1
7	134	21.8
8	192	31.2
Missing	9	1.5
Total	616	100.0
Father Education Status (FES)		
Illiterate	6	1.0
Elementary	130	21.1
Secondary School	147	23.9
High School	195	31.7
University or Higher	99	16.1
Missing	39	6.3
Total	616	100.0
Mother Education Status (MES)		
Illiterate	15	2.4
Elementary	169	27.4
Secondary School	150	24.4
High School	170	27.6
University or Higher	84	13.6
Missing	28	4.5
Total	616	100.0

As the table indicates, of the participants; 44.3% were girls and 54.7% were boys. About 11.5% of the participants were on 5th grade, 34.1% were on 6th grade, 21.8% were on 7th grade and 31.2% were on 8th grade.

Educational status of the parents of the participants was also obtained since they considered to be determinant of sociodemographic situation. As shown in the Table 3.1; almost 25% of them are primary school graduates, nearly 25% are secondary school graduates and 27.6% are high school graduates. In addition, 13.6% of the mothers have a bachelor's or master's degree from a university. Relatively few were reported to be illiterate. On the other hand, a few of fathers' are illiterate, almost one in five are primary school graduates, almost 24% secondary are school graduates, and the majority with 31.7%, are high school graduates. In addition, 16.1% of the fathers studied undergraduate or graduate education at the university.

3.3   Statistical Analyze Procedure in the Study

As clearly depicted in the following table, descriptive statistics, including such as mean, frequencies and standard deviation used to answer following research questions, 'what are the middle students' universal values, beliefs, personal norms, inclusion of nature in self, hierarchy with nature and water consumption behaviors?' and 'what are the water consumption behaviors of the middle school students?'. To address following research question Multiple Linear Regression Analysis was conducted ' How well can middle students' water consumption behaviors be explained by universal values, beliefs, personal norms, inclusion of nature in self and hierarchy with nature?' and 'How well can the VBN Theory account for middle students' water consumption behaviors?'.

25th edition of SPSS used in order to run necessary reliability, validity and factor analyses as well as descriptive statistics, such as mean, frequencies, standard deviation and inferential statistical procedure of multiple linear regression analysis in order to reveal correlation between water conservation behaviors and universal

values, new environmental paradigm, awareness of consequences, ascription of responsibility and personal norms.

Table 3.2 *Summary of Statistical Analyses*

Research Question	Data Collection Instrument	Used Statistical Analyses
1. What are the middle students' universal values, beliefs, personal norms, inclusion of nature in self, hierarchy with nature and water consumption behaviors?	Universal Values Awareness of Consequences Ascription of Responsibilities New Environmental Paradigm Personal Norms Water Conservation Behavior Inclusion of Nature in Self Hierarchy With Nature	Mean Frequencies Standard Deviation
2. What are the water consumption behaviors of the middle school students?	Water Conservation Behaviors	Mean Frequencies Std.Deviation
3. How well can middle students' water consumption behaviors be explained by universal values, beliefs, personal norms, inclusion of nature in self and hierarchy with nature?	Universal Values Awareness of Consequences Ascription of Responsibilities New Environmental Paradigm Personal Norms Water Conservation Behavior Inclusion of Nature in Self Hierarchy With Nature	Multiple Linear Regression

3.4 Procedure

An overview of the study was depicted by the flowchart.
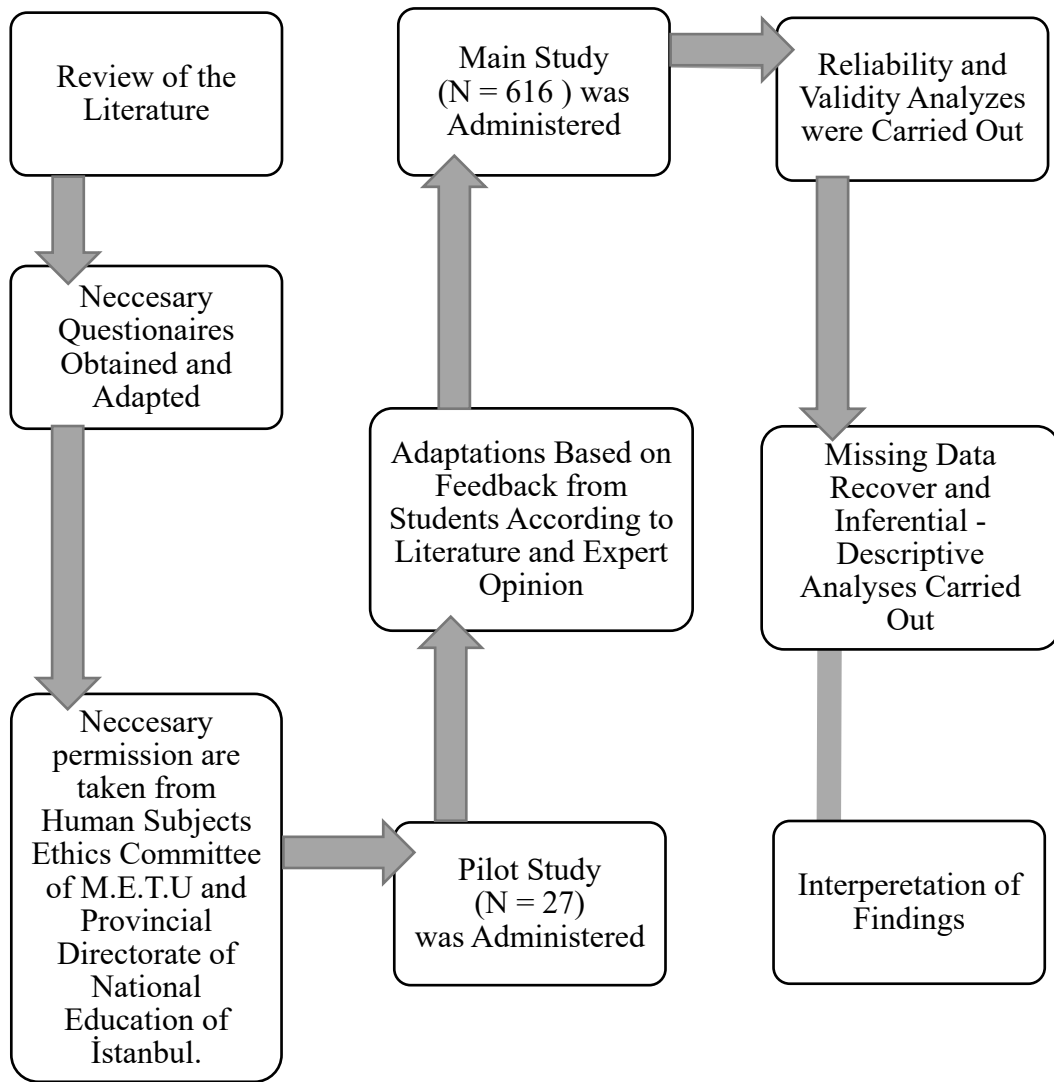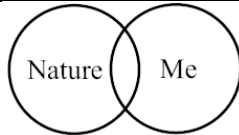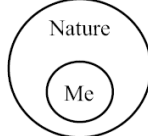
Figure 3.1 Sequential Path

3.5   Data Collection Instruments

Data were collected through sociodemographic scale, constructs of VBN Theory (i.e., universal values, new environmental paradigm, awareness of consequences, ascription of responsibility, personal norms, and behaviors regarding water conservation) and as additional constructs nature connectedness scales, namely inclusion of nature in self and hierarchy with nature as shown in Table 3.3.

Table 3.3 Information on the data collection tools used in the Main Study

Scales	Number of items on the Scale	Type of Scale	Sample Item
VBN Components			
Universal Values	12	5 point Likert Type 1 = NI, 5 = VI	'Preventing pollution'
New Environmental Paradigm	15	5 point Likert Type 1 = SD, 5 = SA	'Plants and animals have as much as right as humans to exist.'
Awareness of Consequences	9	5 point Likert Type 1 = SD, 5 = SA	'Excessive water consumption is a serious problem.'
Ascription of Responsibilities	7	5 point Likert Type 1 = SD, 5 = SA	'I am responsible, as well as other people, for excessive water consumption.'
Personal Norms	7	5 point Likert Type 1 = SD, 5 = SA	'Regardless of the behavior of others, I feel a moral responsibility to conserve water'
Water Conservation Behavior	17	5 point Likert Type 1 = SD, 5 = SA	'If I see a draining faucet, I turn it off.'
Nature Connectedness			
The Inclusion of Nature in Self	1	7 point Likert Type 1 = ZC , 7 = MC	
Hierarchy With Nature	1	3 point Likert Type 1 = SI, 3 = NI	
TOTAL	**69**		

(SD: Strongly Disagree, SA: Strongly Agree, NI: Not Important, VI: Very Important, NC: Zero Connectedness with Nature, MC: Maximum Connectedness with Nature, SI: Self Importance over Nature, NI: Nature Importance over Self)

After obtaining permissions from Middle East Technical University Human Subjects Ethics Committee (see Appendix A), and Ministry of National Education (see Appendix B), all nine Scales were pilot tested at the beginning of the fall semester of 2021 – 2022 with relatively few students (N = 27) could obtain permission of their parents in order to participate the study. During the time of the pilot study, the pandemic was still affecting society severely. Due to the low number of participants, Bartlett's test, exploratory factor analysis and reliability analysis could not be done. Nevertheless, pilot study was used in order to get expert opinion in order to modify items on survey necessarily and student opinion in order to understand its intelligibility by students.

After the pilot study, scale containing 69 items were administered to 616 middle school students as main study during the spring semester of 2021 – 2022. Then, data were subjected to reliability and validity analyses. KMO value, Bartlett's test of sphericity and exploratory factor analysis (EFA) were carried out for each scale. Detail information about each scale such as alpha, KMO and Bartlett's Test of Sphericity values were presented below.

3.5.1   Awareness of Consequences Scale

The first construct of the Value Belief Norm Theory was the Awareness of Consequences that aims to assess whether individuals are aware of the adverse outcomes if threats towards (i.e., water shortage) the environment persist or not (e.g., Steg et al. 2005).

In the context of this study, the study of Yildirim & Semiz (2019) adapted not only into water conservation but also to level of middle school students with guidance of available scales in the literature (Engel, Vaske & Bath, 2016; Fornara et al. 2020; Ibtissem, 2010; Mosquera & Sanchez, 2012; Steg et al. 2005) and expert opinion. Initial item pool was concluded 9 items measuring the extent to which young learners are aware of the negative questions.

Then, the questionnaire was administered to the participants of main study. In order to check its reliability the Cronbach's alpha value (α =.88) was found as in the scope of the main study.

To check validity of the scale, exploratory factor analysis with principal components extraction method and varimax rotation evaluated in order to confirm unidimensionality of the Scale. Results were confirmed that the scale is unidimensional with KMO value of .89 and Bartlett's test of sphericity (p = .000). The unidimensional factor was successfully explaining 43.6% of the variance. Additionally, the Cronbach's alpha value was tested of the scale and found as.83 which it refers to a good reliability (Pallant, 2011).

Table 3.4 *Unidimensional Awareness of Consequences Scale Based on the Main Study*

Items	Factor 1
1. The exhaustion of water sources is a problem.	.604
2. The scarcity of water resources is an important problem for the environment and nature.	.690
3. Water pollution is one of the important problems in Türkiye.	.643
4. Depletion of fresh water resources, increases water scarcity.	.521
5. Depletion of water resources is an important problem for Türkiye.	.706
6. Protecting water resources is for the benefit of all humanity.	.723
7. Measures against water scarcity will improve people's future quality of life.	.659
8. Protecting water resources means a better world for me and my future children.	.692
9. Water scarcity is a threat to society.	.681

3.5.2   Ascription of Responsibilities Scale

Second construct of the Value Belief Norm Theory was Ascription of Responsibilities which refers to feeling responsibility by individuals in order to prevent negative consequences of current conditions (i.e., excessive water consumption) that harms environment (De Groot & Steg, 2009). The scale, included 6 items, was adapted to water conservation previously by Yildirim & Semiz (2019) to assess preservice teachers' ascription of responsibility levels in the context of water consumption. Within the scope of this study, the scale was adapted into middle school students and one more item was added with guidance of expert opinion and help of students feedback based on the pilot study. Finally, 7 item Ascription of Responsibilities Scale was administered to students participated in the main study and then subjected to the exploratory factor analysis (EFA) using varimax rotation. Factor analysis revealed two-dimensional structure with KMO value of 0.76 and Bartlett's test of sphericity $p = .000$. In order to ensure unidimensionality of the scale 2 negative items (6th and 7th) loaded in factor 2 (Table 3.5) were deleted based on eigenvalue of 1.00. Remaining 5 items, explaining 56.1% of the variance, retained for the subsequent analyses. Accordingly, the Cronbach's alpha reliability of the scale was increased from .50 to 0.80.

Table 3.5 *Factor Loadings of Ascription of Responsibilities Based on the Main Study*

Items	Factors	
	1	2
I am responsible, as well as other people, for excessive water consumption	.747	
I feel that I, along with other people, are responsible for the exhaustion of water resources	.854	
I feel that I am responsible for global warming along with other people	.788	
I do not hold myself responsible for excessive water consumption	.591	

Table 3.5 (Cont'd)

Along with industrial establishments, I am also responsible for excessive water consumption	.738
No one can contribute to the solution of water consumption problems alone*.	.869
Unless I have to change my lifestyle, I do my best to use water sparingly*	.855

Removed items

3.5.3   Water Conservation Behavior Scale

Third construct of the Value Belief Norm Theory was Water Conservation Behavior, a kind of Pro-environmental behavior. There were 17 statements to which students indicated their level of agreement regarding their own water conservation behavior.

The Scale was originally developed by Dascher et al. (2014) and adapted into Turkish by Yildirim & Semiz (2019) who assess the water consumption behavior of preservice teachers. In the context of the current study, this Scale was revised and adapted to the levels of young learner, in the light of the literature (Dijkstra & Goedhart, 2011; Ghazali, 2019; Gkargkavouzi, 2019; Ibtissem, 2010, Yildirim & Semiz, 2019).

Main study data was produced accepted reliability coefficient of .79. Then, an EFA was conducted to test the validity. The uni-dimensional scale, consisted of 17 items was explaining 36.70 of the variance with KMO value of 0.89 and Bartlett's test of Sphericity $p = .000$.

Table 3.6 *Factor Loadings of Each Item in Scale Based on the Main Study*

Items	Factor 1
1. I use water sparingly at home.	.642
2. If I see a draining faucet, I turn it off.	.618
3. I do not leave the tap open unnecessarily.	.626
4. I turn off the tap when I don't need it while brushing my teeth.	.578
5. I take care to consume less water while taking a bath.	.653
6. I do not keep the tap on all the time while soaping my hands.	.618
7. I try to save water by reducing the time I spend in the shower.	.362
8. I don't leave the water on until it gets hot while taking a shower.	-.525
9. Whenever possible, I take measures to conserve water.	.684
10. I try to consume less water.	.581
11. I do my best to reduce water use.	.681
12. I encourage people to conserve water.	.596
13. If I see a dripping faucet in my house, I inform my parents (family elders) to fix it.	.614
14. If I see a dripping faucet in my school, I inform the school administration to fix it.	.573
15. I encourage my family to donate to organizations that aim to conserve water resources.	.565
16. I watch documentaries on water resources and the protection of water resources	.512
17. I read or listen to reports and news about water resources and protection.	.513

Although the 17 item WCB scale found to be reliable with Cronbach' alpha value of .70, it was noted that 7th item stating 'I try to save water by reducing the time I spend in the shower' and 8th item stating 'I don't leave the water on until it gets hot while taking a shower' were found to be decreasing reliability of the whole scale drastically

(Table 3.7). Therefore, these items were deleted from the scale and resulting 15 items suggested high internal consistency with value of α =.87 were kept for further analyses (Pallant, 2011).

Table 3.7 *Item Based Reliability of WCB Scale Regarding the Main Study*

Items	Cronbach's Alpha if Item Deleted
1. I use water sparingly at home.	.772
2. If I see a draining faucet, I turn it off.	.779
3. I do not leave the tap open unnecessarily.	.777
4. I turn off the tap when I don't need it while brushing my teeth.	.779
5. I take care to consume less water while taking a bath.	.768
6. I do not keep the tap on all the time while soaping my hands.	.773
7. I try to save water by reducing the time I spend in the shower.*	.817
8. I don't leave the water on until it gets hot while taking a shower.*	.842
9. Whenever possible, I take measures to conserve water.	.770
10. I try to consume less water.	.776
11. I do my best to reduce water use.	.769
12. I encourage people to conserve water.	.770
13. If I see a dripping faucet in my house, I inform my parents (family elders) to fix it.	.772
14. If I see a dripping faucet in my school, I inform the school administration to fix it.	.772
15. I encourage my family to donate to organizations that aim to conserve water resources.	.770
16. I watch documentaries on water resources and the protection of water resources	.775
17. I read or listen to reports and news about water resources and protection.	.773

*deleted items

3.5.4   Personal Norms Scale

Next construct of the Value Belief Norm Theory was Personal Norms which assesses middle school students' moral obligations to act responsibly towards water conservation. The Scale, including 8 item was adapted to water conservation by Yildirim & Semiz (2019).

In the present study, during the adaptation period, two of the 8 items in Yildirim and Semiz's study (i.e., ''If I would buy a new dishwasher, I would feel morally obliged to buy a water-efficient one'' and ''I feel guilty when I buy products that require too much water in the production phase'') were thought to be not suitable for participants for the age of the participating student (age ranged between 11 – 14) and removed. The remaining 6 item Personal Norms scale was administered to participant of the main study.

The 6 item scale was found as uni-dimensional similar to original instrument (Yildirim & Semiz, 2019). KMO value of .86, ($p = .000$) with a .80 Cronbach's alpha value. (Pallant, 2011).

Table 3.8 *Factor Loadings and Reliability of Personal Norms Scale*
Regarding the Main Study

Items	Factor 1	Cronbach's Alpha if Item Deleted
I feel personally obliged to save as much water as possible.	.731	.762
I feel morally obliged to save water, regardless of what others do.	.724	.763
Anyone like me should do anything they can to reduce water use.	.718	.766
I feel guilty when I waste water.	.703	.769
I feel obliged to bear the environment and nature in mind in my daily behavior.	.712	.766
I would be a better person if I saved water.	.658	.780

The uni-dimensional scale based on more than eigenvalues of 1 was found to be explaining 50.16% of the variance.

3.5.5 New Environmental Paradigm Scale

Fifth construct of the Value Belief Norm Theory was the New Environmental Paradigm (Dunlap et al. 2000), Used to assess participants' views about human – nature relationship. The 15 item NEP translated and adapted to Turkish middle school students by Ateş, Öztekin, & Teksöz, (2019). In their study, there were two sub-dimensions labelled as Human Based Views ($\alpha = 60$) and Nature Based Views ($\alpha = .64$).

For the purpose of the current study, The 15 item NEP scale was pilot tested. Based on the feedback of students some of the items were hard to understand and therefore they are adapted with expert opinion in order to make it more suitable for middle school students (Table 3.9) and later administered to 616 middle school students.

Table 3.9 *Reliability of the New Environmental Paradigm (NEP) Scale on Item Basis Regarding the Pilot Study*

Items	Cronbach's Alpha if Item Deleted
1. We are approaching the limit of the number of people the earth can support.	.638
2. Humans have the right to modify the natural environment to suit their needs.	.475
3. When humans interfere with nature it often produces disastrous consequences.	.506
4. Human ingenuity will insure that we do not make the earth unlivable	.470
5. Humans are severely abusing the environment.*	.672
6. The earth has plenty of natural resources if we just learn how to develop them.	.557
7. Plants and animals have as much right as humans to exist.*	.692
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	.495
9. Despite our special abilities humans are still subject to the laws of nature.*	.711
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	.527
11. The earth is like a spaceship with very limited room and resources.	.523
12. Humans were meant to rule over the rest of nature.	.505
13. The balance of nature is very delicate and easily upset.	.538
14. Humans will eventually learn enough about how nature works to be able to control it.	.552
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	.483

: modified items based on pilot study

In order to reveal dimensionality and validity of the scale, exploratory factor analysis with principal components and varimax rotation evaluated. The scale has been found

two dimensional as in the original study by Ates et al. (2019) as it was suggested Dunlap et al. (2000) and the results are printed in Table 3.10.

Authorities reported that factorability of the NEP varieties from sample to sample and with enough reliability support it can be threated even as unidimensional scale and Dunlap et al (2000) follows as:

> ''The decision to break the NEP items into two or more dimensions should depend upon the results of the individual study. If two or more distinct dimensions that have face validity emerge and are not highly correlated with one another, then it is sensible to employ them as separate variables. If substantively meaningful dimensions do not emerge, however, and the entire set of items (or at least a majority of them) are found to produce an internally consistent measure, then we recommend treating the NEP Scale as a single variable'' (p. 431).

Results indicated that items are almost perfectly loaded into two factors except 14th item ''Humans *will eventually learn enough about how nature works to be able to control it*" and 6th item ''the *earth has plenty of natural resources if we just learn how to develop them*''. They were the same items that were removed from the original study by Ates et al. (2019).

Table 3.10 *Two-dimensional New Environmental Paradigm Scale Based on the Main Study*

Items	Factors	
	1	**2**
1. We are approaching the limit of the number of people the earth can support.	.568	
2. Humans have the right to modify the natural environment to suit their needs.		.680
3. When humans interfere with nature it often produces disastrous consequences.	.483	
4. Human ingenuity will insure that we do not make the earth unlivable		.722
5. Humans are severely abusing the environment.	.431	
6. The earth has plenty of natural resources if we just learn how to develop them.*	-.059	.159
7. Plants and animals have as much right as humans to exist.	.490	
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.		.480
9. Despite our special abilities humans are still subject to the laws of nature.	.539	
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.		.548
11. The earth is like a spaceship with very limited room and resources.	.563	
12. Humans were meant to rule over the rest of nature.		.721
13. The balance of nature is very delicate and easily upset.	.593	
14. Humans will eventually learn enough about how nature works to be able to control it.*	-.351	
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	.580	

removed items

In order to examine reliability of the scale, Cronbach's alpha values have been evaluated. Cronbach's alpha value of the instrument has been measured as .61 for with respectively of each item as shown in Table 3.11. It has been found that 14th item and 6th item are not just miss-loading on their factors, they were also highly increasing the reliability of the instrument if they deleted.

Table 3.11 *Cronbach's Alpha Values of New Environmental Paradigm Scale*

Items	Cronbach's Alpha if Item Deleted
1. We are approaching the limit of the number of people the earth can support.	.598
2. Humans have the right to modify the natural environment to suit their needs.	.587
3. When humans interfere with nature it often produces disastrous consequences.	.590
4. Human ingenuity will insure that we do not make the earth unlivable	.580
5. People seriously abuse the environment.	.608
6. The earth has plenty of natural resources if we just learn how to develop them.	.620
7. Plants and animals have as much right to live as humans.	.597
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	.601
9. Despite our special abilities, we are still subject to the laws of nature.	.595
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	.581
11. The earth is like a spaceship with very limited room and resources.	.597
12. Humans were meant to rule over the rest of nature.	.593
13. The balance of nature is very delicate and easily upset.	.597
14. Humans will eventually learn enough about how nature works to be able to control it.	.644
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	.593

Therefore, Cronbach's Alpha value of two-dimensional scale was evaluated after these items were deleted with similar to study by Ates et al. (2019) and printed in Table 3.12.

Table 3.12 *Cronbach's Alpha Values of NEP Scale Regarding Both Factors*

Items	Factor	Cronbach's Alpha of the Dimension	Cronbach's Alpha if Item Deleted
NEP1			.623
NEP3			.630
NEP5			.649
NEP7	Nature Based View	.66	.644
NEP9			.628
NEP11			.624
NEP13			.621
NEP15			.629
NEP2			**.582**
NEP4			**.550**
NEP8	**Human Based View**	**.65**	**.658**
NEP10			**.622**
NEP12			**.562**

As shown in table 3.12 in the absence of the 14th item and 6th item the instrument is two-dimensional and reliable respectively to Human based and Nature based Views with 0.66 and 0.65 Cronbach's alpha, KMO values .75 and Bartlett's test of Sphericity $p = .000$ (Pallant, 2011).

3.5.6 Universal Values Scale

Sixth construct of the Value Belief Norm Theory was Universal Values. It's originally developed by Schwartz (1992) 56 item. It is a five-point Likert type

measure values that leading life choices of participants in their lives while ''1 point'' refers to ''zero importance'' and ''5 point'' refers to '' very important''. The shorter version that consists 12 items and three dimensions (i.e., biospheric, altruistic and egoistic values) was developed by Stern et al. (1998). The Universal Values Scale translated and adapted to Turkish middle school students by Ates et al. (2019) who confirmed the three sub-dimensions (i.e., Egoistic, Altruistic and Biospheric) structure. In the present study the same scale with 12 items adapted by Ates et al (2019) for middle school students was used.

Universal Values Scale administered to the student participants in the main study. In order to reveal validity of the instrument, exploratory factor analysis with principal components extraction and varimax rotation has been conducted. The scale has been found three dimensional in parallel with the original study conducted by Ates (2019) with KMO value of .84 and Bartlett's test of Sphericity (p = .000) which they are adequate in order to reveal participants universal values (Pallant, 2011). Moreover, eigenvalues for each factor has been checked and found 3.725 for biospheric value orientation, 1.878 for altruistic value orientation and 1.010 for egoistic value orientation. Additionally, the instrument explains 55.1% of the total variance successfully with these three factors combined.

Table 3.13 *Exploratory Factor Loadings of Universal Values*

Items	Factors		
	1	2	3
Unity With Nature		.766	
Respecting the Earth		.769	
Protecting the Environment		.773	
Preventing Pollution		.508	
Social Justice	.672		
Helpful	.672		
A world at Peace	.763		
Equality	.740		
Authority			.730
Social Power			.712
Wealth			.653
Influential			.617

In order to reveal reliability of the Scale, Cronbach's alpha value evaluated for each three factors of the Scale (see Table 3.14); biospheric, altruistic and egoistic and have found respectively .76, .75 and .61 which it indicates sufficient reliability for egoistic orientation and good reliability for both biospheric and altruistic orientations (Pallant, 2011).

Table 3.14 *Cronbach's Alpha Values for each Factor of Universal Values*

Items	Orientation	Cronbach's Alpha of the Dimension
Unity With Nature		
Respecting the Earth	Biospheric	
Protecting the Environment		.76
Preventing Pollution		
Social Justice		
Helpful		
A world at Peace	**Altruistic**	**.75**
Equality		
Authority		
Social Power	Egoistic	
Wealth		.61
Influential		

3.5.7 Connectedness with Nature

In addition of construct of value belief norm Theory, The Inclusion of Nature in Self and Hierarchy with Nature were used as additional constructs of the study in order to test whether participants' connection with nature influence their water consumption behavior.

3.5.7.1 The Inclusion of the Nature in Self (INS)

The scale was originally developed by Aron, Aron & Smollan (1992) to measure interpersonal closeness. Later on improved by Schultz (2001) to assess level of interconnectedness with nature by. The scale consisted of seven pairs of circles,

ranging from 1 to 7. Each circle represented participants' level of connectedness with nature between self and nature through eyes of participant and they are. Higher scores indicate higher level of connectedness with nature. Since the scale consist only one item and not possible to calculate its Cronbach's alpha value regarding reliability, it was already satisfied prior to this study with re-tests and correlations with other scales that measures connectedness with nature (Lieflander et al., 2013; Schultz et al., 2004). Schultz et al. (2004) found reliability of the INS Scale as .90 based on a one week re-test .and 0.84 based on a 4 week re-test. Similarly, it was also found .93 based on a three week re-test by Lieflander et al. (2013). Moreover, based on many studies that carried out by experts in the literature and their results, the content validity of the INS Scale was already satisfied (Lieflander et al., 2013; Martin & Czellar, 2016; Mayer & Frantz, 2004; Nisbet et al., 2011; Schultz, 2001; Schultz et al., 2004; Sidiropoulos, 2018).

The Turkish version of the INS scale (Bulbul, 2019) was used in the current study. According to Fraenkel et al. (2012) validity refers to appropriateness, meaningfulness, correctness and usefulness of collected data. Therefore, participants were asked to justify their answers to support validity of the scale by giving their reason of choice next to the answers as shown in Table 3.15. Thus, it would be more possible to understand the motivation behind the students' answers.

Table 3.15 *Information Regarding the INS Scale Based on the Pilot Study*

Items	Circle	Examples from Justifications of Students
A		'I don't have much to do with nature.'
B		'Because I don't like nature very much.'
C		'I love and protect nature, but I am allergic to certain things.'
D		'We are half whole.'
E		'Because I love the nature.'
F		'Because I treat nature sometimes well, sometimes badly.'
G		'Because I am in the nature.'

Reprinted from 'The extended Inclusion of Nature in Self scale' p. 47, Martin, C. & Czellar, S. (2016).

3.5.7.2   Hierarchy with Nature (HWN)

To assess hierarchy between self and nature, the scale developed by Sidiropoulos' (2018) was used. She adapted HWN from INS. The scale contains three pairs of circles each representing different levels of hierarchy with nature through eyes of participant. The circles are ranging from A = 1 to C = 3. Higher scores indicate that a person considers her/himself more important than nature whereas lower scores indicate that nature is more important than him/herself.

Within the scope of the study, the HWN scale translated into Turkish by researchers and, the students were asked to explain reasons behind their choices to support validity of the Scale as shown in Table 3.16.

Table 3.16 *Information Regarding the HWN Scale Based on the Pilot Study*

Items	Circle	Examples from Justifications of Students
A	Self / Nature	-
B	Self = Nature	'Nature is important, and so am I.'
C	Nature / Self	'Because without nature, I would not exist.'

Reprinted from 'the personal context of student learning for sustainability: Results of a Multi-university research study' Sidiropoulos, (2018, p.541).

Although the Scale consisted of only one item and it's relatively new in the literature it was found by Sidiropoulos (2018) that it produces very similar results according to pro and post test results for both control and intervention groups in her study with mean of 2.21, 2.31, 2.24 and 2.28.

3.5.8 Sociodemographic Scale

Demographic Scale was applied in order to reveal participants' gender, grade level, grade card of last year, education level of parents, present of separate study room, accessibility to technology, their perception about important environmental problems, such as water scarcity, knowledge on fresh water percentage of the world, world water day and source of information regarding to water scarcity.

3.6 Assumptions and Limitations

Possible assumptions and limitations of the study considered below (Fraenkel et al., 2012).

3.6.1 Assumptions

1. Participants must fully understand each question and they must be honest on their answers.

2. Participants should not be influenced by any other secondary person or context during the participation.

3. There is no manipulation of data during collection or afterwards.

3.6.2 Limitations

1. Sample of the study is small amount of the whole Istanbul and the sample selected with convenience sampling method. Therefore, results of the study are won't be generalized to all population probably but only to Ataşehir district.

2. Results will be a represent of self-report answers only. Therefore, the actual situation may differ than study.

3. Since participants are still in adolescence their answers might be different in the future due to maturation. Therefore, results are might be limited with period that data collected.

3.7 Ethical Concern of the Study

By fulfilling the requirements of Human Subjects Ethics Committee of M.E.T.U (Appendix A) and provincial directorate of national education of İstanbul (Appendix B), ethical standards regarding to study are satisfied.

3.8   Internal Validity

Possible internal threats towards correlational study that reported by Fraenkel, Wallen and Hyun (2012) who experts of it will be considered below.

3.8.1   Location

In order to eliminate or minimize the threat, data collected in classroom always. But classrooms are might differ even for public schools.

3.8.2   Data Collector Characteristics

Data always collected under supervision of the researcher, with permission of teacher of class and school management with the same procedure in order to minimize the threat.

3.8.3   Subject Characteristics

All possible subject characteristics are considered and they are aimed to be detected by descriptive statistics results regarding instruments such as sociodemographic.

3.8.4   Mortality

Although the data collected only once and there is no re-test needed in this study, the participating was based on being volunteer. Therefore, some of the participants from sample group did not participate but there was not a pattern that might affect the results and it was randomly distributed among the sample which it will be examined in results section.

3.8.5 Instrumentation

Validity and reliability of each possible instrument are examined with methods such as exploratory factor analysis, Cronbach's Alpha value, KMO value, Bartlett's test and content validity. Therefore, the instrumentation threat will not affect the internal validity.

3.8.6 Data collector Bias

Data was not manipulated in any way.

3.8.7 Maturation

Data only collected once from each participant and the all procedure has been done in a week.

CHAPTER 4

RESULTS

In this part, results of descriptive statistics and inferential statistics of the study were reported. First of all, descriptive statistics such as frequencies, means, standard deviations, maximum and minimum values were presented related to participants' sociodemographic status, awareness of consequences, ascription of responsibilities, beliefs, water conservation behaviors, values and connectedness with nature. Then, findings of multiple linear regression analysis (i.e., inferential statistics), were reported. What is more, perquisites and missing data analysis for each statistical analysis were checked and satisfied. This part ends with the summary and evaluation of the findings.

4.1 Descriptive Statistics

In this section, mean, frequency, standard deviation, minimum - maximum values, range and skewness - kurtosis for each construct and demographic were given.

4.1.1 Descriptive Statistics Regarding to Self-Assessment of water Consumption

Students were asked a series of questions to reveal their perceived interest in environmental problems and view on the importance of environmental problems; self-assessment of environmental knowledge and sources of information about environment.

First students were asked their level of knowledge and interest in water and water scarcity (see Figure 4.1).

Attides Toward Water Scarcity
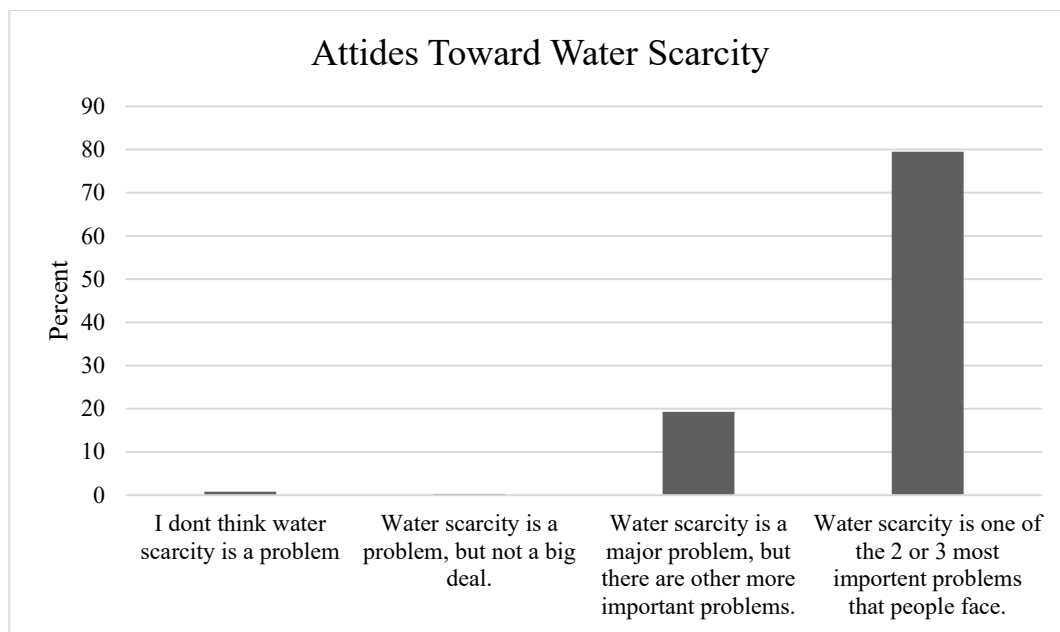
Figure 4.1 Frequency Distribution of Students Perception on Water Scarcity

Figure 4.1 indicated that more than three quarters of students (76.1%) agree that 'water scarcity is one of the 2 or 3 most important problems that people face' followed by 'water scarcity is a major problem but there are other more important problems' (18.5%). a few (1.1%) thought that 'water scarcity is not a big problem or not a problem at all'.

When asked, "What percentage of the world's water is suitable for human use?" The results indicated that majority of the students did not have any idea about the percentage of the world's water is suitable for human use. Only a few chose the correct answer, which is one percent (5%). (see Figure 4.2).

76
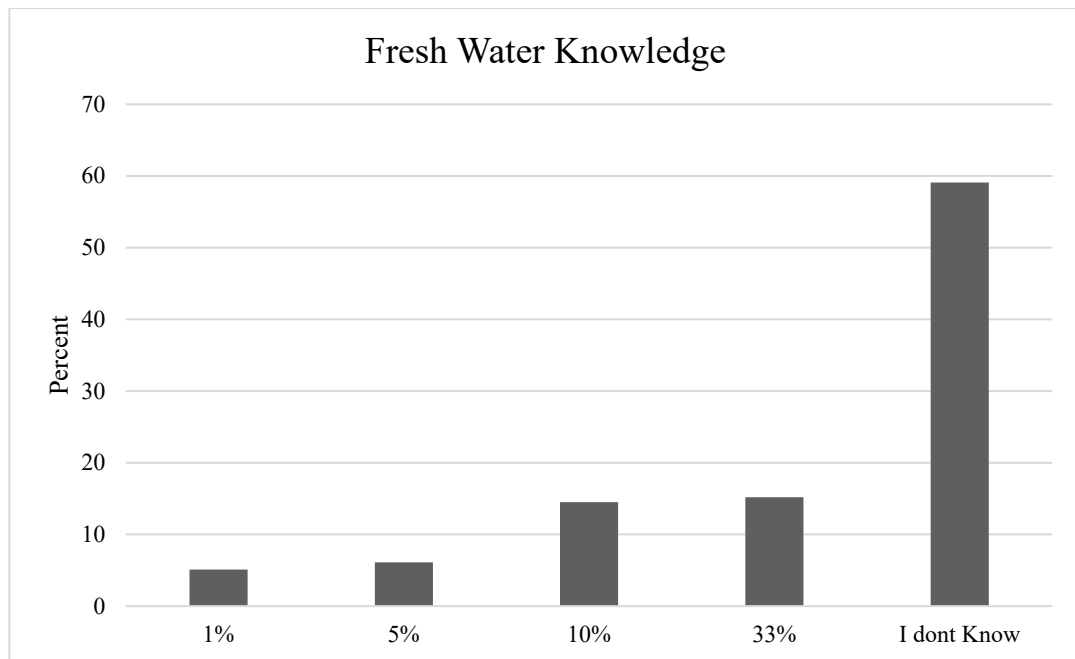
Figure 4.2 Frequency Distribution of Students Knowledge about the Amount of Fresh Water on the World

Likewise, the vast majority of students (78.1%) declared that they do not know the date of the Earth water day. Only a small percentage (19.5%) found to knowledgeable about water day (see Figure 4.3).
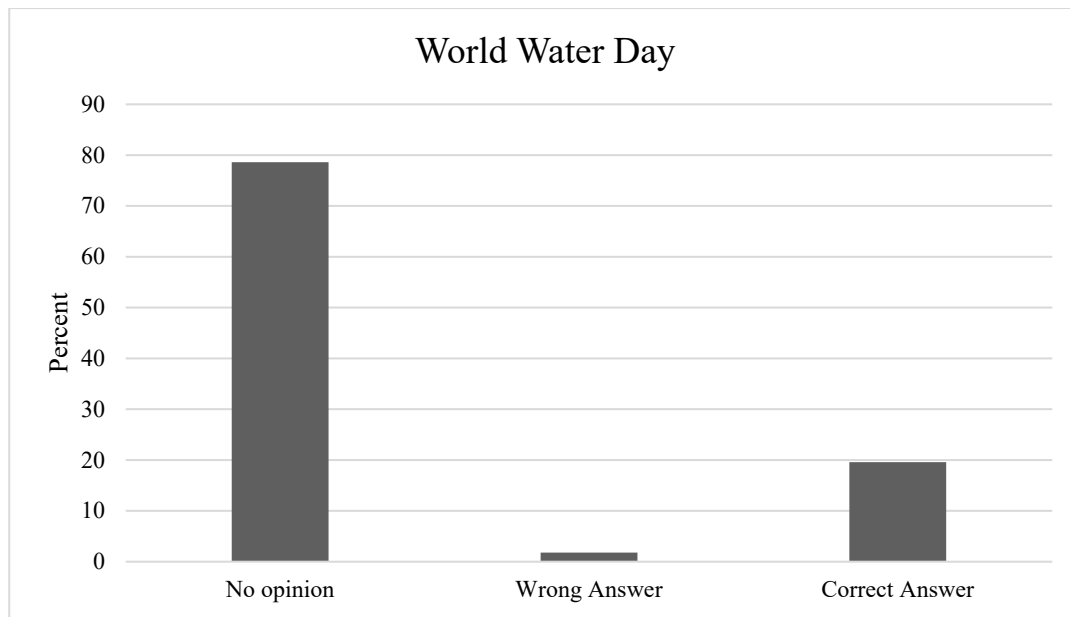
Figure 4.3 Frequency distribution of answers given by students to World Water Day

To understand their interest, students were asked whether they watched or heard about the documentary called '25 liters' which addressed the 'zero day'. The results indicate that only less than 15% of the students watched this documentary. Among them, a student wrote that:

'The documentary is about how difficult to live with limited amount of water (i.e., 25 liters) which encouraged me to realize the importance of water'

Remaining students reported that:

S1: 'I learned the value of water and how people use it unnecessarily.'

S2: 'We should not waste water.'

S3: 'I learned the importance of water and 25 liters is not enough to survive?'

S4: 'Not only for washing the dishes but leaving the faucet open for even 10 seconds causes liters of water loss and our water is getting lower.'

This part continued with a 5-question assessing students' level of agreements to a serious of statements about their concerns and opinions about water consumption and water resources (see Table 4.1).

Table 4.1 *Percentages of Participant Agreement with Statements and Corresponding Item Means and Standard Deviations.*

Items	SA	A	U	D	SD	M	StD
1. I am concerned about problems with water resources in my area.	21.1	32.3	30.5	10.2	4.7	3.55	1.08
2. It worries me to see water being wasted around me.	50.2	34.4	6.2	4.9	2.6	4.27	0.97
3. I have knowledge about water resources.	6.7	20.0	47.6	16.6	7.1	3.02	0.97
4. I am interested in environmental issues.	11.5	34.4	32.1	15.1	4.9	3.33	1.03
5. Environmental problems in Türkiye are exaggerated.	8.8	8.0	14.8	20.3	46.3	2.10	1.32

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

According to the results, participants seemed to be 'highly concerned' about 'waste of water (50.2%, *M*= 4.27)' followed by the problems with water resources in their area (32.3. %, *M*= 3.55). However slightly more than 30% of students reported that they were undecided about these items, means that they are uncertain about water resources and have a lack of knowledge about water related problems. Almost half of the students reported that they are undecided if they have knowledge about water resources or not (47.6%, *M*=3.07). Likewise, almost one third of students remained undecided on their interest regarding environmental issues. When this is the case,

almost half of the students highly aware that environmental problems in Türkiye are not exaggerated (26.3%).

4.1.2 Source of Information about Water Scarcity

A scale was used to obtain information about where the students got information about water scarcity. According to the results as shown in Table 4.2 students did learn information mostly from social media (77.1%, M=4.02), followed by their teachers (56.2%, M=3.57) and their families (53.6%, M=3.49) when strongly agree and agree statements are considered together. On contrary, voluntarily participating to an environmental work or their friends were not found as source of information.

Table 4.2 *Distribution of the Source of Students' Water Scarcity Information by Frequency*

Items	SA	A	U	D	SD	M	StD
1. From social media	41.1	36.0	8.4	6.5	5.8	4.02	1.14
2. From my family	16.4	37.2	21.4	13.8	5.4	3.49	1.11
3. From textbooks	14.4	32.1	21.4	14.6	11.9	3.24	1.25
4. From my teachers	23.4	32.8	21.4	8.8	8.3	3.57	1.20
5. From my friends	4.4	11.7	21.8	25.5	28.6	2.32	1.18
6. By participating in voluntary work on the environment	7.3	8.4	21.3	28.2	26.6	2.36	1.21

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.3 Preliminary Data Analysis Regarding the Scales of the Study

In this section, the prerequisites for the scales on which inferential statistical analyzes will be made have been checked, missing data, skewness and kurtosis values, minimum maximum values, standard deviation and averages have been examined.

According to the results; ascription of responsibilities, water conservation behavior, personal norms, new environmental paradigm and universal values, that is, almost all scales can be considered to have observed a normal distribution, considering that the skewness and kurtosis values are between acceptable values (-2 to +2). Only awareness of consequences scale was not fitting the acceptable range (-2, +2) in order to accept the distribution as normal with 5.67 Kurtosis value. While this is the case, authorities states that Kurtosis may have an impact on variance, while stating that this risk gradually decreases in samples of over 200 participants (Pallant, 2011, Tabachnick & Fidell, 2013). Since the number of participants participating in this study is well above 200, this value can be considered sufficient.

Necessary analyzes were made in order to observe the missing data and to perform the necessary statistical operations, and as a result, while the missing data was 5.5% in the variables to be used in inferential statistical analysis, the missing data was found to be only 2.3% when the entire questionnaire was taken as a basis. Experts have shown that the effect of the method to be chosen when the rate of missing data is below 5% does not have a very serious effect on the results. However, the multiple imputation method, which is seen as the most respectable method by the experts, was used in order to use the missing data in the inferential analyzes to be made and to obtain results closer to the reality (Tabachnick & Fidell, 2013). Moreover, it has been observed that the missing data does not follow any pattern, which is missing completely at random (MCAR), even though it is not necessary in order to use this method, according to the experts (Tabachnick & Fidell, 2013). In this context, Skewness - Kurtosis values, standard deviations and means for awareness of consequences, ascription of responsibilities, water conservation behavior, personal norms, new environmental paradigm and universal values are provided below on Table 4.3.

In addition to the original construct of the Value Belief Norm Theory, 2 extra construct, namely the Inclusion of Self in Nature and Hierarchy with Nature scales, were also subject to missing data analysis. It was found that more than 10% of the data were missing (INS = 17.5%; HWN = 13.3%). Since the data is Missing at

Random (MAR) with value of .000 Little's MCAR test, the missing data replaced with the Expectation-Maximization (EM) method (Tabachnick & Fidell, 2013).

Table 4.3 *Descriptive Statistics Based on Variables*

Items	Skewness	Kurtosis	M	StD
Awareness of Consequences	-1.08	5.67	4.39	0.57
Ascription of Responsibilities	-0.56	0.67	3.64	0.91
Water Conservation Behavior	-0.53	0.24	3.95	0.61
Personal Norms	-0.81	1.08	4.03	0.69
New Environmental Paradigm	0.29	-0.30	3.70	0.48
Universal Values	-0.40	1.11	3.94	0.44

(M: mean, StD: standard deviation)

In this point it is necessary to mention that although current study is not interested in identifying influence of sociodemographics such as gender or grade level on water consumption behavior of students, to give a detailed information and considered subject characteristics validity threat of the study, their descriptive statistics such as mean and standard deviation were presented.

4.1.4   Awareness of Consequences Scale

By using the 5 point Likert type awareness of consequences scale, it is aimed to measure how aware students are of the possible bad consequences of threats to the environment. According to the results shown in Table 4.4, it has been revealed that female students are well aware (*M*= 4.40) of the negative consequences of these threats to nature with a very small difference, but at least as much as (*M*= 4.39) male students. In addition, eighth graders (*M*= 4.47) were followed by sixth grades (*M*=

4.39) and then seventh grades (*M*=4.37) with little variation, with eighth graders being the group most aware of these potential adverse outcomes. Finally, although the fifth grade students (*M*= 4.22) had a very high level of awareness, they were at the bottom of the ranking in terms of grade levels. As a result, it was revealed that all students were quite aware of the possible bad consequences of threats to the environment, with a total mean of 4.39.

Table 4.4 *Awareness of Consequences Scale According to Gender and Grade Distribution*

Gender	M	StD
Boys	4.39	0.58
Girls	4.40	0.55
Grade		
5th grade	4.22	0.61
6th grade	4.39	0.53
7th grade	4.37	0.61
8th grade	4.47	0.54

(M: Mean, Std: Standard Deviation)

In addition, the relevant descriptive statistics for each item used in the awareness of consequences scale are given in Table 4.5. Considering the answers given by the students, most of them were strongly aware of the consequences of water scarcity on nature and environment (70%, *M*=4.61) while they also perceived importance of protecting water resources for benefit of all humanity (67%, *M*=4.56). Moreover, students' altruistic concerns were not limited to that. They were also strongly concerned with water protection means a better future (64%, *M=4.52*). On the other hand, students were not decided if depletion of freshwater resources increases water scarcity (23.2%, *M=4.01*). Which was in line with prior statements of students regarding water resources and water consumption as shown in Table 4.1.

Table 4.5 *Frequency Distribution of Awareness of Consequences on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
The exhaustion of water sources is a problem.	59.3	29.1	6.5	2.4	2.4	4.41	0.90
The scarcity of water resources is an important problem for the environment and nature.	69.5	24.4	3.4	0.5	1.6	4.61	0.73
Water pollution is one of the important problems in Turkey.	52.1	35.2	8.6	2.6	1.3	4.34	0.84
Depletion of fresh water resources, increases water scarcity.	44.3	23.5	23.2	4.1	4.1	4.01	1.10
Depletion of water resources is an important problem for Turkey.	58.9	31.8	4.7	1.6	2.4	4.44	0.86
Protecting water resources is for the benefit of all humanity.	67.0	25.3	4.2	1.3	1.6	4.56	0.78
Measures against water scarcity will improve people's future quality of life.	57.3	25.6	13.0	1.8	0.8	4.39	0.84
Protecting water resources means a better world for me and my future children.	64.1	26.1	6.0	1.8	1.1	4.52	0.79
Water scarcity is a threat to society.	52.4	25.8	14.9	3.7	2.3	4.23	0.99
Total						4.39	0.58

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree,

M: mean, StD: standard deviation)

4.1.5 Ascription of Responsibilities Scale

In this scale, 5 items in the form of a five-point Likert type were used to measure how much responsibility the participants felt to prevent the damage caused by the

current situation to nature. According to the results seen in Table 4.6, although girls feel slightly more responsible ($M= 3.71$) than boys ($M= 3.60$), it was clear that students of both genders was feeling a high degree of responsibility. Moreover, when we analyze how much responsibility students feel on the basis of grade levels, it was revealed that it is at its highest ($M= 3.72$) in the fifth grade, then gradually begins to decline in the 6th ($M= 3.63$) and 7th ($M= 3.54$) grades, but reaches its highest level again in the 8th grade ($M= 3.72$), as in the 5th grade.

Table 4.6 *Ascription of Responsibilities According to Gender and Grade Distribution*

Gender	M	StD
Boys	3.60	0.90
Girls	3.71	0.91
Grade		
5th grade	3.72	0.77
6th grade	3.63	0.88
7th grade	3.54	0.94
8th grade	3.72	0.95

(M: Mean, Std: Standard Deviation)

According to the answers of the students on the basis of the items that make up the scale, when their answers to '' strongly agree'' and ''agree'' are combined, seventy percent of students felt responsibility for excessive water consumption and exhaustion of water resources as well as others. Similarly almost thirty percent of students strongly disagreed with the statement 'I do not hold myself responsible for excessive water consumption'. On the other hand, more than thirty percent of students were not decided if they are as well as industrial establishments responsible for excessive water consumption. Because, individuals are biased to ignore that the

damage to the environment may be minimal on a personal scale but high when the whole society is considered (Stern, 2000).

Table 4.7 *Frequency Distribution of Ascription of Responsibilities on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
I am responsible, as well as other people, for excessive water consumption	41.4	28.6	15.4	7.1	5.7	3.95	1.18
I feel that I, along with other people, are responsible for the exhaustion of water resources	34.9	29.4	22.1	6.2	6.8	3.80	1.18
I feel that I am responsible for global warming along with other people	24.7	30.0	25.6	9.6	6.7	3.59	1.17
I do not hold myself responsible for excessive water consumption	11.0	11.7	23.1	20.1	33.1	2.47	1.35
Along with industrial establishments, I am also responsible for excessive water consumption	20.0	25.3	31.0	12.0	10.7	3.32	1.23
Total						3.64	0.91

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.6   Water Conservation Behavior Scale

With this 5-point Likert-type scale consisting of 15 items, it is aimed to observe the behaviors of the students to use water efficiently. According to the results, it was revealed that girls ($M= 4.02$) behaved towards conserving water with a very slight difference compared to boys ($M= 3.89$). Moreover, when the results were analyzed on the basis of grades, it was clear that sixth grade students with mean of 4.08, fifth grade students with mean of 4.00, seventh grade students with mean of 3.86, and finally eighth grade students with mean of 3.85 acted water conservatively.

Table 4.8 *Water Conservation Behavior According to Gender and Grade Distribution*

Gender	M	StD
Boys	3.89	0.65
Girls	4.02	0.54
Grade		
5th grade	4.00	0.62
6th grade	4.08	0.56
7th grade	3.86	0.60
8th grade	3.85	0.63

(M: Mean, Std: Standard Deviation)

The results are analyzed on an item-by-item basis, when the answers given by the students to the statements "strongly agree" and "agree" are considered together, it was shown that students were highly behaving water conservatively. For example, they were; using water sparingly at home (79%), turning the draining faucet off (96%), not leaving the tap on unnecessarily (93%), turning off the tap brushing their teeth when not needed (92%) and taking measures to conserve water whenever its possible (79%). But, thirty percent of students were not decided if they will inform

school administration or their parents when they see a dripping faucet at school or home as well as if they encourage their family to donate to water conservation organizations. In addition, almost half of the students disagreed to not leaving water on until it gets hot before shower. When it was asked students' reason behind that they were answered 'we don't have any other choice' or 'I will get ill if I start showering before the water gets hot'.

Table 4.9 *Frequency Distribution of Water Conservation Behavior on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
I use water sparingly at home.	40.7	38.3	15.4	3.4	2.1	4.12	0.93
If I see a draining faucet, I turn it off.	70.3	25.5	1.8	1.5	1.0	4.63	0.69
I do not leave the tap open unnecessarily.	64.8	28.6	3.4	1.1	1.9	4.53	0.79
I turn off the tap when I don't need it while brushing my teeth.	61.0	30.8	4.4	2.4	1.3	4.48	0.80
I take care to consume less water while taking a bath.	30.2	32.0	24.2	10.1	3.6	3.75	1.10
I do not keep the tap on all the time while soaping my hands.	46.4	31.0	12.2	7.1	3.2	4.10	1.07
I try to save water by reducing the time I spend in the shower.	29.2	30.0	25.2	10.1	5.6	3.75	0.89
I don't leave the water on until it gets hot while taking a shower.	13.8	18.0	25.2	20.7	22.3	2.82	1.01
Whenever possible, I take measures to conserve water.	40.1	37.5	16.1	3.9	1.6	4.11	0.93
I try to consume less water.	27.1	34.4	24.0	10.7	3.1	3.72	1.07
I do my best to reduce water use.	47.6	34.6	9.7	3.9	3.9	4.18	1.02
I encourage people to conserve water.	27.9	32.1	24.8	8.0	6.5	3.67	1.16
If I see a dripping faucet in my house, I inform my parents (family elders) to fix it.	21.9	24.0	30.7	12.5	9.7	3.36	1.23
If I see a dripping faucet in my school, I inform the school administration to fix it.	15.4	24.1	30.4	15.4	14.7	3.10	1.26
I encourage my family to donate to organizations that aim to conserve water resources.	16.0	26.8	29.2	16.8	11.1	3.20	1.22
Total						3.95	0.61

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.7   Personal Norms Scale

The personal norms scale consists of 7 items of 5-point Likert type, aiming to measure how much participants are morally obligated while engaging in water consumption behavior. According to the results, girls (M=4.10) declared that they felt slightly more morally obliged than boys (M=3.99). When the results in Table 4.10 are examined in terms of grade levels, although all of the students reported that they felt moral responsibility while having pro-environmental behaviors with a total mean score of 3.95 it's shown that sixth graders take the first place with a mean of 4.16, followed by eighth grades (M=4.02), fifth grades (M=4.00) and seventh grades (M=3.89), respectively.

Table 4.10 *Personal Norms According to Gender and Grade Distribution*

Gender	M	StD
Boys	3.99	0.71
Girls	4.10	0.66
Grade		
5th grade	4.00	0.69
6th grade	4.16	0.60
7th grade	3.89	0.72
8th grade	4.02	0.73

(M: Mean, StD: Standard Deviation)

Results were analyzed and shown in Table 4.11 on the basis of items. Accordingly, more than seventy percent of students were; morally obligated to save water as much as possible, bear the environment and nature in their daily behavior and saving water to be a better person when their strongly agree and agree answers to statements are considered together.

Table 4.11 *Frequency Distribution of Personal Norms on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
I feel personally obliged to save as much water as possible.	36.5	37.7	16.9	6.5	1.6	4.02	0.97
I feel morally obliged to save water, regardless of what others do.	27.9	33.9	28.2	5.2	2.9	3.80	1.01
Anyone like me should do anything they can to reduce water use.	49.2	33.9	11.5	2.8	1.6	4.28	0.89
I feel guilty when I waste water.	37.7	32.6	17.5	7.8	3.9	3.93	1.10
I feel obliged to bear the environment and nature in mind in my daily behavior.	36.5	38.1	16.7	4.2	3.6	4.01	1.02
I would be a better person if I saved water.	45.1	32.6	13.3	4.7	3.6	4.12	1.04
Total						4.03	0.69

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.8 New Environmental Paradigm Scale

The New Environmental Paradigm scale, consisting of 13 items with 5 point Likert type, was used to understand whether the students' worldviews were Nature or Human oriented.

As can be seen in Table 4.12, according to the results obtained, girls partially adopt the Human based View with a mean of 2.60, while the same situation is observed with a very small difference with a mean of 2.64 for boys.

On the other hand, according to the results, both boys (*M*=3.88*)* and girls (*M*=3.92) reported that they adopted the Nature based View strongly. When the results examined on the basis of grade levels, the most adopters of the Human based View are fifth graders with a mean of 2.87, eighth graders with a mean of 2.64, seventh graders with a mean of 2.57 and sixth graders with a mean of 2.54, respectively. Similarly, the most adopting the Nature based View based on grade levels are sixth graders with a mean of 3.98, seventh graders with a mean of 3.91, eighth graders with mean of 3.85 and finally fifth graders with a mean of 3.82.

Table 4.12 *New Environmental Paradigm According to Gender and Grade Distribution*

	Nature based View		Human based View	
Gender	**M**	**StD**	**M**	**StD**
Boys	3.88	0.58	2.64	0.83
Girls	3.92	0.52	2.60	0.73
Grade				
5th grade	3.82	0.57	2.87	0.74
6th grade	3.98	0.52	2.54	0.75
7th grade	3.91	0.53	2.57	0.79
8th grade	3.85	0.57	2.64	0.82

(M: Mean, StD: Standard Deviation)

To examine the results under the Nature based View dimension, the students reported that they agreed with the statement "plants and animals have as much right as humans to exist" with a very high rate (89.9%) and with a mean of 4.61. Moreover, while the majority of the students (77.1%) agreed that if things continue as it is, we would face a major ecological disaster with a mean of 4.24, they also reported that (67.5%) the balance of nature is very delicate and can easily be disrupted with a mean of 3.91. Similarly, the majority of students (71.6%) also reported that people abuse the environment seriously with a mean of 3.96. But almost half of the students (42.0%) were undecided about whether the human life capacity on Earth was nearing its limit.

In addition, a substantial number of students (38.3%) reported that they were undecided about the statement "the earth is like a spaceship with very limited room and resources". Similarly, students preferred to remain undecided about whether people are subject to the laws of nature despite their special abilities, and whether people's interventions in nature generally result in disasters, respectively with a frequency of 34.3% and 33.6%.

If we look at the results from a human based point of view, nearly half of the students (47.2%) reported that they are not sure whether the balance of nature will be disturbed in the face of modern industrial nations. Similarly, 35.9% of the students could not decide whether human ingenuity is the guarantee of earth's preservation, while 46.6% of the students did not find it sufficient. In addition, almost thirty of the students could not decide whether the events called ecological crisis were exaggerated or not (33.0%), while almost half of the students (48.4%) declared that these events were not exaggerated. Likewise, more than half of the students (56.0%) did not agree with the idea that people may have the right to modify the natural environment as they wish, to suit their needs, and again, more than half of the students (50.8%) did not agree with the idea that to being human means to rule over the rest of the world.

Table 4.13 *Frequency Distribution of New Environmental Paradigm on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
Nature Based View							
1. We are approaching the limit of the number of people the earth can support.	25.3	21.6	42.0	6.2	4.2	3.58	1.06
3. When humans interfere with nature it often produces disastrous consequences.	26.0	26.5	33.6	8.3	5.2	3.60	1.11
5. Humans are severely abusing the environment.	40.6	31.0	16.7	5.7	5.5	3.96	1.14
7. Plants and animals have as much right as humans to exist.	71.9	19.0	6.2	1.3	1.0	4.61	0.75
9. Despite our special abilities humans are still subject to the laws of nature.	28.7	29.2	34.3	4.2	2.6	3.78	1.00
11. The earth is like a spaceship with very limited room and resources.	21.4	27.8	38.3	7.6	4.2	3.55	1.04
13. The balance of nature is very delicate and easily upset.	33.9	33.6	22.6	6.5	2.6	3.91	1.03
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	52.3	24.8	17.9	2.1	2.3	4.24	0.97
Total						3.90	0.55
Human based View							
2. Humans have the right to modify the natural environment to suit their needs.	9.6	12.3	21.6	26.3	29.7	2.46	1.29
4. Human ingenuity will insure that we do not make the earth unlivable	8.1	8.6	35.9	23.2	23.4	2.55	1.18
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	12.8	17.2	47.2	10.9	9.9	3.12	1.09
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	6.0	11.9	33.0	23.9	24.5	2.51	1.16
12. Humans were meant to rule over the rest of nature.	9.7	13.1	25.3	17.0	33.8	2.48	1.34
Total						2.62	0.78

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.9   Universal Values Scale

This scale, consisting of 5-point Likert-type 12 items, was used to reveal the values that shape the life choices of the students. According to the results, the boys reported that they mostly adopted the biospheric (M=4.46) value and then the altruistic (M=4.37) value, but the egoistic (M=3.17) value less. Similarly, girls reported that they adopted biospheric (M=4.53) and altruistic (M=4.52) values almost in the same amount and more than boys, but they adopted egoistic (M=3.02) value less than boys. When we analyze the results on the basis of classes, we see that only the fifth graders adopt the altruistic (M=4.44) value more than the biospheric (M=4.37) value. On the other hand, as the grade levels of the students increase in the form of the sixth (M=2.92), seventh (M=2.94) and eighth grades (M=3.40), we see that the amount of adoption of the egoistic value increases.

Table 4.14 *Universal Values According to Gender and Grade Distribution*

	Biospheric		Altruistic		Egoistic	
Gender	**M**	**StD**	**M**	**StD**	**M**	**StD**
Boys	4.46	0.56	4.37	0.61	3.17	0.88
Girls	4.53	0.50	4.52	0.59	3.02	0.81
Grade						
5th grade	4.37	0.62	4.44	0.62	3.08	0.90
6th grade	4.57	0.53	4.44	0.63	2.92	0.82
7th grade	4.44	0.51	4.37	0.57	2.94	0.89
8th grade	4.48	0.50	4.46	0.58	3.40	0.74

(M: Mean, StD: Standard Deviation)

After examination of the results on the basis of items, it was clear that the students adopt the biospheric value with a mean of 4.49 in total and that it is important for them to preventing pollution (93.5%), protecting the environment (92%), unity with nature (91.0%) and respecting the earth (88.3%). Similarly, students adopted the altruistic value slightly less than the biospheric value with a total mean of 4.43. In fact, the results revealed that the values of social justice (87.8%), a world at peace

(86.7%), equality (85.0%) and helpfulness (83.2%) greatly affect the life choices of the students.

On the other hand, the results revealed that the students also adopted egoistic values with a total mean of 3.10. Students embraced social power (22.1%) the least, followed by leadership (34.6%) and wealth (36.9%) respectively. But, more than half of the students (53.3%) reported that it is important for them to be effective on people and events. At the same time, it was observed that the students were undecided in terms of adopting or rejecting some egoistic values from their answers. Accordingly, 35.7% of the students were unsure about how the idea of being an authority, 33.9% of events and being influential over others, 28.1% of having social power and 27.3% of being wealthy directed their lives.

Table 4.15 *Frequency Distribution Universal Values on the Basis of Items*

Items	SA	A	U	D	SD	M	StD
Biospheric Value Orientation							
Unity With Nature	48.1	42.9	5.7	0.6	1.3	4.38	0.74
Respecting the Earth	52.4	35.9	8.3	1.3	0.3	4.41	0.73
Protecting the Environment	62.5	29.5	5.5	0.6	0.3	4.56	0.66
Preventing Pollution	67.5	26.0	3.4	1.0	0.5	4.62	0.65
Total						4.49	0.53
Altruistic Value Orientation							
Social Justice	59.7	28.1	9.3	0.6	0.6	4.48	0.75
Helpfulness	50.2	33.0	13.0	1.0	0.6	4.33	0.81
A world at Peace	62.7	24.0	9.1	1.3	1.3	4.48	0.82
Equality	61.0	24.0	9.9	1.9	1.0	4.45	0.83
Total						4.43	0.60
Egoistic Value Orientation							
Leadership	16.6	18.0	35.7	12.7	14.3	3.10	1.25
Social Power	10.7	11.4	28.1	19.2	28.7	2.55	1.31
Wealth	17.9	19.0	27.3	18.7	14.9	3.06	1.31
Influential	28.9	24.4	33.9	7.0	3.4	3.71	1.08
Total						3.10	0.85

(SA: Strongly agree, A: agree, U: undecided, D: disagree, SD: strongly disagree, M: mean, StD: standard deviation)

4.1.10   Inclusion of Nature in Self Scale

As shown in Figure 4.4, the majority of students felt the highest connectedness with nature (34.4%). In addition, as it can be clearly seen in Figure 4.1, when the options indicating connectedness with nature are considered together, almost 3 out of 4 students reported that they are connected with nature at a level.
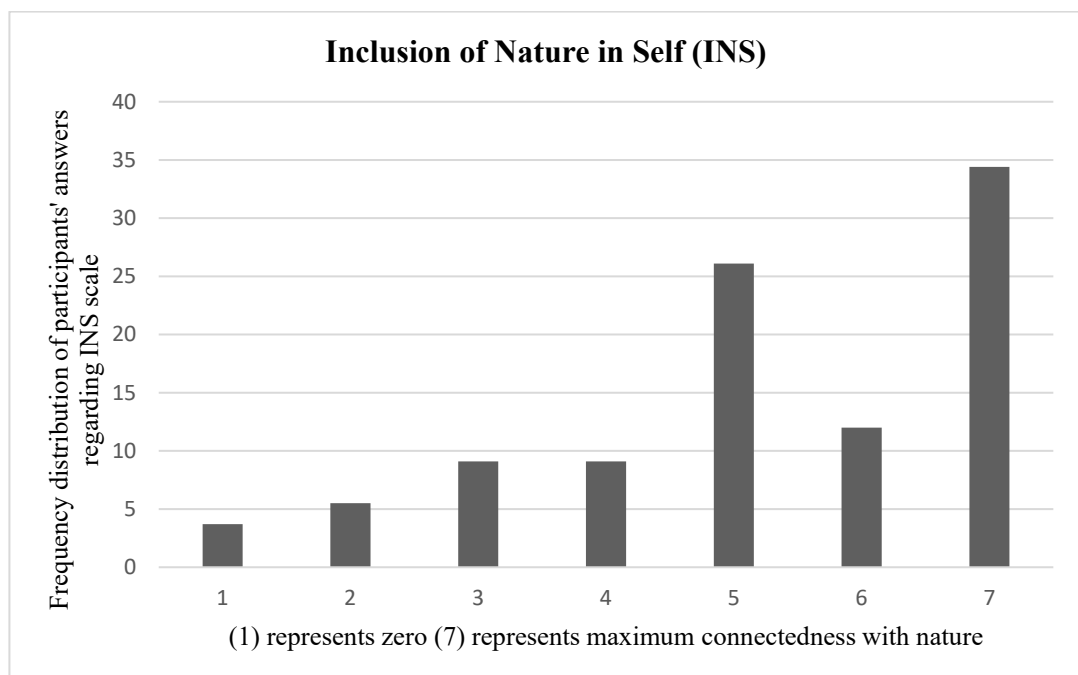
Figure 4.4 Frequency Distribution of INS According to the Answers of the Participants

4.1.11 Hierarchy with Nature Scale
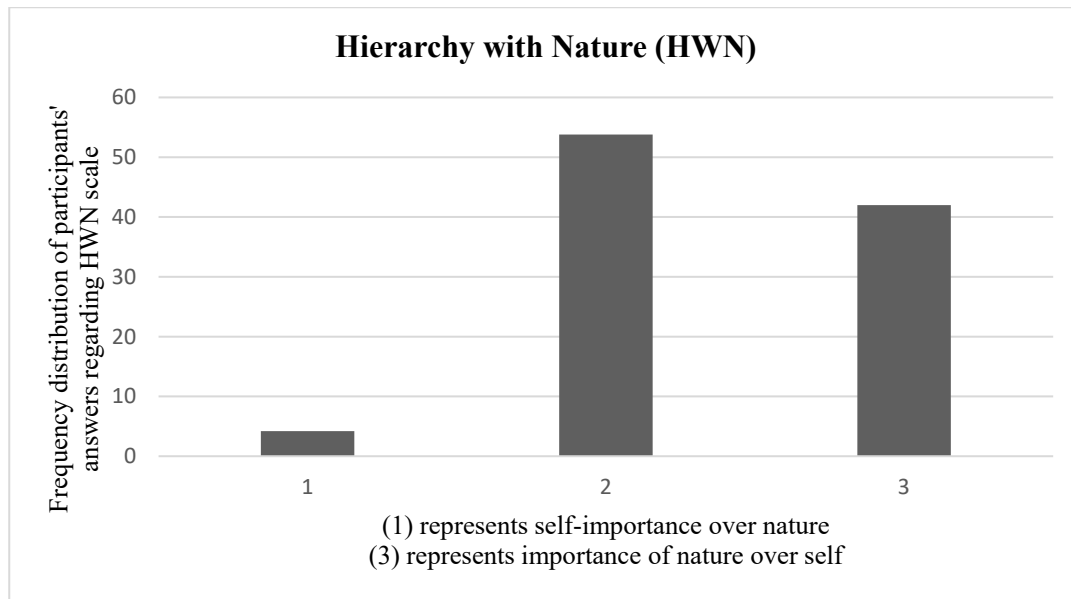
Figure 4.5 Frequency Distribution of HWN According to the Answers of the Participants

As displayed in Figure 4.5, while more than half of the students indicated that they think that they and nature are equally important, only a few believed their superiority over nature. On the other hand, approximately 40% perceived nature more important than themselves.

4.2 Inferential Statistics

In this section, results of multiple linear regression analysis, which was conducted to determine the variables explaining the students' water consumption behavior under the guidance of VBN theory, were reported. Multiple linear regression analysis is a method that allows researchers to determine correlation between a dependent variable and two or more independent variables (Fraenkel et al. 2011).

4.2.1 Assumptions

According to experts, the assumptions of path analysis are sample size, multicollinearity, outliers, normality, linearity, homoscedasticity and independence of residuals (Tabachnick & Fidell, 2013).

4.2.1.1 Sample Size

Tabachnick and Fidell (2011) suggest that the sample size for multiple linear regression analysis should be eight times the total number of independent variables plus 50 participants. In this study, 616 participants were involved which it's more than enough when it's considered that there were only eight independent variables.

4.2.1.2 Normality

In order to examine the normality of each dependent and independent variable, skewness and kurtosis values were taken into account in the previous section and according to results all variables except awareness of consequences were satisfying normality which had to be in between -2 and +2 (Pallant, 2011). In addition, the normality graphs of each variable were also examined and it was observed that awareness of consequences, ascription of responsibilities, biospheric value orientation and altruistic value orientation were skewed. In order to eliminate the problem in the variables that do not have a normal distribution, the data was transformed as suggested by the experts and the results are compared below (Pallant, 2011).

Table 4.16 *Skewness - Kurtosis Values Before and After Transformation*

Items	Before Transformation		After Transformation	
	Skewness	**Kurtosis**	**Skewness**	**Kurtosis**
Awareness of Consequences	-1.08	5.67	-0.38	-0.71
Ascription of Responsibilities	-0.56	0.67	-0.22	-0.42
Water Conservation Behavior	-0.53	0.24	Did not Transformed	
Personal Norms	-0.81	1.08	Did not Transformed	
Nature based View	-0.30	0.19	Did not Transformed	
Human based View	-0.34	-0.27	Did not Transformed	
Biospheric Value Orientation	-1.31	2.21	0.58	-0.34
Altruistic Value Orientation	-1.25	2.11	0.55	-0.54
Egoistic Value Orientation	-0.40	1.11	Did not Transformed	
The Inclusion of Nature in Self	-0.83	-0.25	Did not Transformed	
Hierarchy With Nature	-0.51	-0.33	Did not Transformed	

After the transformation, it can be understood from the skewness kurtosis values in table 4.16 that all variables provide normality. In addition, histogram graphics were examined and checked.

4.2.1.3 Linearity

To control the linearity assumption, scatterplots of each variable were examined and it was determined that there was no violence of linearity.

4.2.1.4 Multicollinearity

In order to examine multicollinearity assumption tolerance and variance inflation factor (VIF) values are considered. According to Pallant (2011) tolerance value must not be less than 0.10 but VIF value must be less than 10. As can be seen in Table 4.17, the values are in the required range and therefore the multicollinearity assumption is provided.

Table 4.17 *Multicollinearity Assumption of the Variables*

Items	Tolerance	VIF
Awareness of Consequences	.64	1.57
Ascription of Responsibilities	.83	1.21
Biospheric Value Orientation	.53	1.90
Altruistic Value Orientation	.64	1.57
Egoistic Value Orientation	.90	1.11
Personal Norms	.56	1.76
Nature based View (NEP)	.74	1.35
Human based View (NEP)	.85	1.18
The Inclusion of Nature in Self	.91	1.10

4.2.1.5 Homoscedasticity

To check the homoscedasticity assumption, the scatterplot plot was examined and it was observed that the scores were distributed in shape of rectangular, the majority of them were located near the center in the range of +2, -2, and the scores did not follow any pattern. Therefore the homoscedasticity assumption satisfied (Pallant, 2011).

4.2.1.6   Independence of Residuals

Independence of residuals causes the Type 1 error rate to increase and results to loss of power (Tabachnick & Fidell, 2011). Durbin-Watson test was conducted to measure the randomness of the errors (Tabachnick & Fidell, 2011). According to the result of the test, the Durbin-Watson value was found to be 1.99. Therefore, independence of residuals assumption is satisfied (Turner, 2020).

4.2.1.7   Outliers

Data has been analyzed to identify outliers and prevent their possible impact on results. According to results of casewise diagnostics there were four cases that have standardized residual values are not in range +3 or -3. But, Cook's Distance value was 0.002 which it is acceptable and refers that outliers are not significantly causing a problem on results (Tabachnick, Fidell, 2013). Moreover, Mahalanobis value was examined and it has been found adequate with the value of 7.96 (Pallant, 2011; Tabachnick & Fidell, 2011).

Table 4.18 *Outliers Based on IDs*

Case ID	Standardized Residual
66	-3.50
201	3.25
295	-3.69
296	-3.87

4.2.2   Multiple Regression Analysis

In this section, results pertaining to Pearson correlation analysis, multiple regression analysis, and hierarchical multiple regression analyses for total sample were presented, respectively (Tables 4.19, 4.20, 4.21 and 4.22).

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First, The Pearson correlation analysis was computed to see the relationship that might exist among students' water consumption behavior of students, universal values, beliefs, ascription of responsibility, awareness of consequences, new environmental paradigm, personal norms, and nature connectedness constructs namely inclusion of nature in self and hierarchy with nature (Table 4.19).

Table 4.19 Correlation coefficient among variables

Construct	BIO	ALT	EGO	NEP (NBV)	NEP (HBV)	AC	AR	PN	WCB	INS	HWN
BIO	--										
ALT	.594*	--									
EGO	.003	.026	--								
NEP (NBV)	.396*	.263*	.022	--							
NEP (HBV)	-.119*	-.139*	-.284*	.130*	--						
AC	.481*	.369*	-.032	.394*	-.210*	--					
AR	.271*	.250*	-.057**	.203*	-.026	.267*	--				
PN	.530*	.421*	.020	.443*	.151*	.487*	.421*	--			
WCB	.442*	.367*	.046**	.337*	-.047**	.348*	.262*	.663*	--		
INS	.274*	.109*	-.039***	.146*	.012	.153*	.164*	.204*	.222*	--	
HWN	.164*	.060*	-.079*	.059*	.014	.088*	.031	.052**	.017	.111*	--

*Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level, ***Correlation is significant at the 0.001 level.

Analysis reveals that participants' biospheric values, altruistic values, egoistic values, nature based view, human based view, awareness of consequences, ascription of responsibilities, personal norms and inclusion of nature in self correlated significantly with WCB ($r = .442$, $p = .000$; $r = .367$, $p = .000$; $r = .046$, $p = .001$; $r = .337$, $p = .000$; $r = -.047$, $p = .001$; $r = .348$, $p = .000$; $r = .262$, $p = .000$; $r = .663$, $p = .000$; $r = .222$, $p = .000$; respectively). The positive correlations showed that the higher the students' biospheric value and altruistic value oriented, more they involve in water consumption behavior. Similarly the students with high perceived personal norms are more likely to use water conservatively. In addition, it has been revealed that the more the students behave conservatively towards water, the higher their awareness of consequences and their ascription of responsibility. From the point of view of the personal norm, it was observed that the higher the altruistic and biospheric values of the students, the more developed their personal norms. Moreover, the positive relationship among value orientations and connectedness with nature was found. According to the results, the higher biospheric or altruistic value oriented students are, their connectedness with nature is increased. The finding is similar with literature. According to a study by Martin & Czellar (2017) high biospheric value orientations were associated with students' strong self-nature connections. High correlation between personal norms and awareness of consequences and ascription of responsibilities was revealed. It means that the lack of water and the adverse results of it and the sense of taking responsibility for the elimination of these consequences have a relationship with personal norms of students.

The negative correlations were revealed between students' human based view and universal values namely biospheric, altruistic and egoistic. It suggests that students who hold high beliefs about human dominance over nature are not necessarily in touch with their egoistic value orientations. Whereas, giving value on living things and their social environment is in a negative relationship with domination over the worlds' natural resources from students' perspectives. Similarly, there were a negative relationship between human based view and water conservation behavior

as well as awareness consequences and ascription of responsibilities. Accordingly, it can be said that, students who believe that humanity has dominion over nature are not aware of the dangers that nature faces, so they do not ascribe any responsibility on themselves to prevent these dangers. Therefore, the more the students have human based view beliefs, the less their water consumption behaviors are.

No statistically significant correlation between hierarchy with nature and water conservation behavior was found ($p>$. 05). These data led to the conclusion that water conservation behavior was not related to hierarchy with nature. Students who had a more hierarchy with nature did not necessarily have high water conservation behavior. Similarly, hierarchy with nature correlated with neither ascription of responsibilities nor human based view ($p> .05$). Finding no statistically significant correlation between ascription of responsibilities and hierarchy with nature means that giving importance on nature over self not support the students' water conservation behavior. Similarly, it also means that giving more importance on nature over self does not mean attribution of responsibility regarding water related problems, necessarily. It has been observed that the egoistic value is not related to the biospheric and altruistic values. Likewise, it was observed that egoistic values were not related to students' personal norms and nature-based views. On the contrary, a significant relationship was observed between students' egoistic values and their water consumption behaviors ($p>$. 01). This may mean that having egoistic values, not always refers to not exhibiting pro-environmental behaviors such as water consumption.

Then, a hierarchical multiple regression analysis was conducted to reveal contributions of students' universal values, ascription of responsibility, awareness of consequences, new environmental paradigm and personal norms (independent variables) to their the water consumption behavior (dependent variable) (Table 4.20).

According to the results shown in Table 4.20; the multiple correlation (R) was 69.4 with $R^2 = 48.2$. The results showed that the model significantly accounted for 48.2% of the variation in students' water consumption behaviors ($F= 419.51$, $p < .000$)

Personal norms, Human based View, altruistic and biospheric value orientations each made statistically significant contributions to the variation in students' water consumption behaviors. Among them, only Human based View contributed negatively to students' water consumption behaviors, which is not surprising.

Table 4.20 *Hierarchical Multiple Regression Analyses Coefficients*

	St ß	*Part-Cor.*	*t*	*p*	*R²*	*F*
Model 1					48.2	419.51
Biospheric Value	.08	.06	-4.75	.000***		
Altruistic Value	.08	.07	-5.52	.000***		
Egoistic Value	-.02	-.02	-1.26	.209		
NEP_ Nature based View	.04	.04	2.95	.003**		
NEP_ Human based View	-.17	-.16	-13.26	.000***		
Awareness of Consequences	.02	.01	-1.11	.269		
Ascription of Responsibilities	.04	.04	3.13	.002**		
Personal Norms	.60	.45	37.30	.000***		
Model 2					48.8	423.93
Biospheric Value	.07	.05	4.12	.000***		
Altruistic Value	.09	.07	5.78	.000***		
NEP_ Nature based View	.04	.04	3.19	.001**		
NEP_ Human based View	-.17	-.16	-13.52	.000***		
Ascription of Responsibilities	.05	.04	3.57	.002**		
Personal Norms	.60	.45	37.66	.000***		
Inclusion of Nature In Self	.08	.07	6.12	.000***		
Hierarchy with Nature	-.04	.-04	-3.15	.002**		

*significant at the alpha level of .05, **significant at the alpha level of .01, ***significant at the alpha level of .001*

According to results on Table 4.20, the first model, consisting of awareness of consequences, ascription of responsibilities, universal values, new environmental paradigm and personal norms estimation variables, successfully explained 48.2% of the total variance with $R^2 = 48.2$, $F(7,542) = 419.51$, $p < .000$ of water consumption behavior. Results indicates that personal norms (ß=.60; *part correlation* =.45) makes the strongest contribution to the model and the rest follows it from strongest contribution to lowest respectively; Human based View (ß= -.17; *part correlation =* -.16), altruistic value (ß=.08; *part correlation* =.07) biospheric value (ß= .08; *part correlation* = .06), ascription of responsibilities (ß=.04; *part correlation* =.04) and nature based view (ß= .04; *part correlation* = .04).

With addition the HWN and INS the multiple correlation (*R*) of second model was found as 69.9, with $R^2 = 48.8$ as shown on Table 4.20. The model significantly explained 48.8% of the variation in students' water conservation behavior (*F* = 423.93, *p* < .000). This finding implies that perceived connectedness with nature influence young learners' behavior regarding water conservation and addition of connectedness with nature constructs increased the predictive power of the model by 0.6 points after inclusion of the INS (ß= .08; *part correlation* = .07) and HWN (ß= - -.04; *part correlation* = -.04) to the original VBN Theory constructs of the first model and consequently personal norms (ß=.600; *part correlation* =.45), nature based View (ß= .04; *part correlation* = .04), human based View (ß= -.17; *part correlation* = -.16), ascription of responsibilities (ß= .05; *part correlation* = .04) biospheric values (ß= .07; *part correlation* = .05) and altruistic value (ß= .09; *part correlation* = .07) they were found.

4.3   Summary of the Results

In summary, it has been understood that although the majority of the students reported being worried about the waste of water and the problems related to the water resources in their region and consider water consumption as one of the 2 or 3 most important problems in the world, they do not have enough knowledge neither the

amount of fresh water in the world nor when we celebrate world water day. Another finding is related to source of knowledge, which identified social media as the main information source about water scarcity, follow by their teachers.

According to the descriptive statistics results of the study, it has been determined that the students are highly aware of the possible negative outcomes in terms of awareness of consequences. Similarly, students also reported that they attribute responsibility for excessive water consumption in terms of ascription of responsibilities. In addition, it has been determined that students try to be conservative in their water consumption behaviors and to stay away from excessive water consumption. Again, according to the descriptive statistical analyzes made, it was reported by the students that they are guided by their personal morality in order to use water sparingly and that they act according to these norms. It has been noticed that in the human-nature relation perspective, the views of the students are more inclined towards the Nature based View which it mean they are believing that nature has an intrinsic value and not humans' property to gain prophet from it. But, they also adopt the Human based View to a lesser extent. This mean that, among the students, there is the belief that nature is important for the values that it can provide to people .Similarly, it has been observed that students have highly biospheric and altruistic values. Which, it shows us that, the natural and their social environment is valuable for them. Similarly, it was noticed in the results that their egoistic values were not to be underestimated. Because according to the answers of students; they give importance to being wealthy ($M=3.06$) or being influential on others ($M=3.71$) and being a leader ($M=3.10$).

Inferential statistical analyzes were conducted to determine the determinants of students' water consumption behaviors and relationship between them. Based on the Pearson Correlation analysis results, there was a significant relationship between using water conservatively and their perceived value on ecosystem as well as other individuals that exist. Similarly, there is a significant relationship between their awareness on adverse consequences and personal moral obligations as well as water conservation behaviors. The analysis also revealed a significant correlation between

students' belief on being one with nature in terms of nature based view and belief on individual sense of responsibility in order to overcome adverse consequences that might environment with water conservation behavior.

Based on the findings of Multiple Regression Analysis by examining the relationship between each variable in the VBN theory, it is aimed to determine the existence of the consequential chain that starts from values and ends at water conservation behavior. Accordingly, the more students gave value their natural and social environments, they were more likely to have a belief that the environment have an intrinsic value and not exists for abuse of human kind for their own prosperity and less likely to have a belief that it is humankinds right to rule the world and its natural resources as they wish for their wealth. Which it leads to have an awareness on possible adverse consequences such as water scarcity that might nature and individuals will suffer on it. Therefore, they more likely to take responsibility in order to inhibit those adverse consequences which it activates their moral obligations. Finally, through the chain of variables as VBN Theory suggests, those students are more likely to use water conservatively and save it. Lastly, the VBN Theory was intended to enhance by addition of Inclusion of Self in the Nature and Hierarchy with Nature. Addition of these nature connectedness constructs slightly increased the predictable power of the model based on the results.

CHAPTER 5

CONCLUSION, DISCUSSION AND IMPLICATIONS

In this section, summary of the study, the conclusions of the research, the discussion of these conclusions and the implications for future studies are included.

5.1   Summary of the Study

In this study, it was aimed to determine water conservation behaviors of middle school students and determinants of the water conservation behavior of students. Framework of Value – Belief – Norm Theory was chosen as guide of the study in order to explain water conservation behavior in terms of universal values, awareness of consequences, ascription of responsibilities, new environmental paradigm and personal norms. Additionally connectedness with nature construct in terms of Inclusion of nature in self (INS) and Hierarchy with Nature (HWN) was considered.

A total of 616 public middle school students from Ataşehir district of Istanbul participated in this study. Based on participants' answers to self-reported survey, a series of multiple regression analyses were conducted in order to investigate students' water consumption behaviors and relationships between determinants of it.

Based on the results of the study students were highly adopted biospheric and altruistic values as well as nature based view but they also had egoistic value orientation. They were also highly internalized water conservation behavior, personal norms, responsibility and awareness towards nature. Based on results of the multiple linear regression analyses, participants' water consumption behavior was successfully explained in context of the Value – Belief – Norm Theory. Water consumption behavior of middle school students were significantly predicted by personal norms, human based view, biospheric and altruistic value orientations.

Additionally, chain based significant relationship between predictor variables of the Value – Belief – Norm Theory was successfully observed.

5.2   Conclusion and Discussion

In the present study, it was aimed to investigate public middle school students' water consumption behavior and predictors of it. Students had a high level of water conservation behavior except their water conservation were lower if that particular behavior involves indirect commitment based on results of descriptive statistics. For example, majority of the students were willingly to turn off a draining faucet or don't leave a tap open unnecessarily but almost thirty percent of them were undecided if they will inform their elders or school management in case of a dripping faucet in school or home. In order to overcome this challenge it's important that, according to study of Fielding et al. (2012) based on water conservation determinants, creating an identity and water conservation culture can help to maintain water conservation behaviors in households. Additionally, almost half of the students were reported that they will leave the tap open until water gets hot before getting shower. Which it reveals that, even water conservative individuals are tend to don't act pro-environmentally if the water conservation appliances not exist or information regarding to solution of a specific problem is not clear to them. These results were consistent with Ramsey et al. (2017) in his study regarding home appliances. Ramsey et al. (2017) reported that individuals who live in a house with water conservation appliances such as dual flush toilets are more likely to conserve water than others. In this case, as students reported, it was their only choice to wait until water gets hot otherwise they would get cold and there is not any appliances that somehow to use the wasted water.

Based on the results, public middle school students were more biospheric and altruistic value oriented than egoistic. But students' egoistic value orientations were far from low to be not considered. Which this could be reasoned from wide-ranging economic problems based on unintended responses on survey paper of students.

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Additionally, sociodemographic status of participants were found as low. Nevertheless, based on results of Groot and Steg (2009) egoistic value orientation could lead to environmentalism if perceived costs exceeds perceived benefits. Similarly, Hussien et al. (2016) found that water conservation increases with the rise in household income. In terms of awareness of consequences, students were well aware of the possible bad outcomes of water scarcity and water depletion. Moreover, they also had a high level of perceived responsibility in terms of excessive water consumption and global warming. On contrary, almost thirty percent of middle school students were undecided if they are responsible as much as an industry for excessive water consumption. These findings were similar to the results of a study by Stern (2000). Because, although the impact of personal behavior is small it can lead to greater effects when many others do the same.

In terms of the worldviews, middle school students were mostly nature-based oriented but their human-based orientations also existed even though it was few. Based on the results, almost all of the students were agreeing that animals and plants had the right to be exist as much as humans. It was quite normal when it was re-considered that students were highly biospheric and altruistic value oriented. Because universal values are the first component of the VBN Theory causal chain and successfully predict individuals' behaviors through new environmental paradigm. Moreover, these findings were in parallel with the study of Ates (2019) in terms of embrace of nature based view by participants in similar way.

Additionally, it was also found that students were highly connected with nature in terms of inclusion of nature in self in scope of this study. Almost 3 out of 4 students felt connected with nature but almost half of them perceived nature as much as important as themselves while around forty percent of them gave more importance to nature over themselves. A high level of connectedness with nature of students was more meaningful when results based on the research by Schultz (2000) in terms of correlation with biospheric value orientation and environmental behavior were considered. According to a study by Schultz (2000), connectedness with nature was in relationship positively with biospheric value orientation and it was also correlated

with environmental concern in terms of new environmental paradigm since the environmental paradigm is a psychological variation of the NEP. Similar results were also found in the study of Dutcher et al. (2007) in terms of connectivity with nature and its significant and positive relationship between both environmental concern and environmental behavior. Therefore it was not a surprise that middle school students felt a high level of inclusion with nature since they had a high level of biospheric value orientation and perceived importance of nature based view in terms of NEP.

Based on results of the study, the public middle school students had a high level of personal norm in terms of water conservation. This situation seems to be normal in the context of the Value-Belief-Norm Theory considering the students' value orientations, awareness and responsibility levels. Similar results were also found in the literature. Based on a study by Steg et al. (2005) altruistic and biospheric values had small effect on personal norms similar with the current study. But the when universal values are considered together with NEP, almost %51 of the personal norms is predicted and it reveals the significance of beliefs and values on personal norms in order to adaptation of pro-environmental behaviors (Ates, 2019)

As a main underlying reason of the study, middle school students' water consumption behavior was investigated in the context of Value- Belief –Norm theory with help of the multiple regression analysis method. Based on results, personal norms, human based view, biospheric and altruistic value orientations were found in a positive relationship with water conservation behaviors of middle school students. Among predictor variables, the personal norm is the one with the highest explanation percentage (45%) over middle school students' water consumption behavior. These findings were parallel with results in the literature. For example, Yildirim and Semiz (2019) personal norms are one of the biggest predictor of the water consumption behavior in context of the preservice teachers. Landon et al. (2018) also found that individuals are more likely to adopt environmental behaviors as a manifestation of their own personal norms. Therefore, methods that aimed to increase individuals' personal norms could have an important role to maintain their environmental behaviors. Because, it was found by Fielding et al. (2012) that individuals'

environmental behaviors are collective and can be affected by others and similarly Landon, Kyle and Kaiser (2016) revealed that individuals with high attachment to their community is more likely to internalize a personal norm in terms of water consumption that means protecting a community resource. Moreover, Schultz et al. (2014) found that individuals with high personal norms are more likely to continue behaving environmentally in terms of conserving water, even when others do not act in the same way.

Human based view in terms of the new environmental paradigm was found as significant but negative predictor of the water consumption behavior of middle school students. Considering the answers given by the students to the questionnaire, these results are meaningful. About half of the students have doubts about how long the balance of nature can withstand anthropogenic interventions. Similarly, they were skeptical or disagreed with the idea that people's intelligence is a guarantee that nature will not be harmed, and that people have the right to intervene in nature as they wish to suit their needs. As can be understood from the results of the multiple regression analysis, it was determined that human based view of the students was among the factors that determine their water consumption behavior. In parallel, the students reported that they strongly agree with the idea that especially plants and animals have the right to live at least as much as humans, that people abuse nature, and that if people's approach to nature continues like this, we will face an ecological crisis. These results may be promising given the debates about students' educational background and the extent to which the curriculum covers environmental issues. The reason why students have such favorable views may not necessarily be due to their education or curriculum. According to the answers of the students, they reported that they learned most of the news about water scarcity from social media, and this may be the reason why the students have such views. Because, public and media of Türkiye were busy with the news of anthropogenic activities, which had wide repercussions and are likely to destroy nature during the years of this study. One of them is the Canal Istanbul project, which is planned to be built in Istanbul, although it may cause great damage to nature and especially to fresh water resources. Another

project is gold mining operations in the Ida Mountains, located in an area of large natural springs in northwest Turkey, where there are concerns about the potential to damage these water resources. Regardless of the source of the human or nature based views of middle school students, results were similar to a study by Goldman, Assaraf and Shemesh (2014) in terms of endorsement of ecocentric worldview by participants. According to this research, students were asked to justify their answers to the NEP scale in order to reveal their underlying reasons. Based on their answers, they were able to find justifications to their point of view no matter if it was human or nature based. While recover ability of nature or being on the top of chain as human were reasons of human based viewed students, ethical reasons or harmony with nature were reasons of nature based viewed students for example. But, universal values were considered as preliminary predictors of the worldviews of participants in scope of this study and the fact that students have adopted a high degree of nature-based views is in parallel with their high altruistic and biospheric values. Another more recent study by Derdowski et al. (2020) found a positive relationship between nature based construct of the new environmental paradigm and pro-environmental behaviors as well as pro-environmental traveling and pro-environmental purchasing behaviors. When the Value Belief Norm framework is considered these results are appropriate because, the NEP component is one of the significant predictor of the causal chain that predicts pro-environmental behavior (Stern, 2000; Steg et al, 2005). Additionally, the similar results was reached by other researchers from across the world. Corraliza et al. (2013) was found that middle school students from Spain were adopted nature based view and internalization of them was higher if they are from rural areas. Moreover, there was a positive correlation between nature based view and another pro-environmental behavior namely energy conservation. Similarly, the predictive power of nature based view over personal norms was also observed on middle school students by Ates (2019).

According to the results of multiple regression analysis, students' biospheric and altruistic values are useful components in estimating their water consumption behavior as the VBN Theory suggested. This is not surprising given the students'

responses to the survey. Because the students reported that they avoid water consumption behaviors, on the other hand, they use water conservatively. In parallel, they adopted biospheric and altruistic values in terms of universal values. The same interpretation can also be reached by correlation coefficients among universal value orientations and water consumption behavior of students. According to these results, it was determined that there was a positive relationship between the biospheric and altruistic value orientations of the students, as well as a positive relationship between their water conservation behaviors and their biospheric or altruistic value orientations. The correlation between these two universal values are not surprising. In fact, it has been the subject of previous studies whether these two universal values should be counted as a single value orientation rather than separately (De Groot & Steg, 2007). But according to result of the study it was successfully distinguished in to two different orientations in order to capture different aspects of the reasons behind individuals. As a result, in the scope of this study and the framework of the VBN Theory, it represents that students are highly biospheric and altruistic value oriented and there is a positive correlation between their nature-based views and a negative correlation between their human-based views that eventually leads them to have water consumption behavior. Similarly, predictive power of biospheric and altruistic values on pro-environmental behavior is not also new in the literature. According to a study by Liu, Zou and Wu (2018) it was found that especially altruistic values had significant role in order to improve pro-environmental behavior of students. Liu et al. (2018) highlighted that also biospheric values had same important role as altruistic values but through personal norms and beliefs instead of a direct one in their case. Moreover, although the universal values are the first component of the VBN Theory chain they can do more than just affecting individuals' pro-environmental behaviors directly and predict pro-environmental behaviors more than even personal norms (Sahin, 2013). On contrary Yildirim and Semiz (2019) did not found a direct relationship but only indirect between any universal values and water consumption whereas there was a direct significant relationship between biospheric values and water consumption behavior of middle

school students in scope of the current study. In total, evidences highlight that, universal values had a great potential in order to enhance individuals' pro-environmental behaviors and therefore they always must be considered in all circumstances.

5.2.1 Implications

Based on the results of this study, it has some important implications for educational institutions, students, curriculum developers, researchers and individuals working in and interested in water consumption, pro-environmental behavior and related fields.

To begin with, it was determined that the students received the most information about water scarcity from social media and the least by participating in volunteer work on the environment. Although it may be difficult for students to participate in voluntary work considering their age and convincible to reach social media, it should be kept in mind that there may be some deficiencies in the scope and accuracy of the information on social media. Therefore, it can be thought that the interaction and experience gained by the students, preferably together with their teachers, with the environment during their education process, will be more favorable. Moreover, according to the results of the researchers, it is known that the time students spend with nature and the experience they gain, especially at a young age, permanently develop their biospheric values and they become more likely to exhibit pro-environmental behaviors (Lieflander et al., 2013; Vecchione et al., 2016).

In this study, it was noticed that while the biospheric and altruistic values of the students did not show a significant change over the years, their egoistic values increased. Similarly, while the natural-based views of the students did not change significantly, their human-based views also increased. Relationally, it was revealed that water consumption behaviors of seventh and eighth grade students were also increased compared to fifth and sixth grade students. At the end of the 8th grade, middle school students aim to go to a good high school by taking a national exam

that will seriously affect their education life. Especially in the 8th grade, the subjects that are more difficult and more likely to be asked in this national exam are taught in more detail and in a long time. On the other hand, it is not known whether the same importance is attributed to the issues such as recycling, acid rain, and the negative effects of biotechnology, which usually coincide with the last parts of the units. Moreover, although the water recycle is considered in the curriculum, conservation of water resources or possible adverse effects of water shortage is not highlighted (Yancı, 2019). Therefore, as Yildirim & Semiz (2019) reported, science curriculum must be more comprehensive and other courses must be available that aims to increase especially senior middle school students biospheric values that leads them to pro-environmental behaviors. Additionally, based on a study by (Garcia et al., 2013) revealed that individuals from rural areas are more likely to conserve water then individuals from urban areas. For this reason, the more we make the school environment natural and rural for students, the more we can increase their relationship with nature and natural resources and contribute to their becoming more sensitive to water and similar natural resources (Bögeholz, 2006). Another important conclusion to be made about universal values is that it is possible to improve the water consumption behavior of students according to their value orientation. For example, while the possible harms of water scarcity to the environment may not affect students with altruistic values, the effects of water scarcity on their friends, family and environment may affect them more. For this reason, it is important that the education that will be provided to students and whose purpose is to develop pro-environmental behaviors should also take into account individual differences (Liu et al., 2018).

The last implementation of this study, however, predicted a larger portion of the water consumption behaviors of secondary school students when the INS scale was included in the model, but it did so by excluding biospheric values from the model. This is not a surprise, because many previous studies have shown that INS has a significant relationship with biospheric and even altruistic values (Schultz, 2001; Schultz et al., 2004). Therefore, coexistence of the two in the same model may affect

the multicollinearity because the highest multicollinearity value belonged to the biospheric value, although it was within the limits according to the results of the model (Pallant, 2011). Therefore, using the advantage of the INS scale being a metamorphic scale, the possibility of using the INS scale should be considered in cases where it is not possible to collect data on biospheric values.

5.2.2 Recommendations

Considering the results of this study, it gave rise to some important suggestions for other studies to be done in this context. This study was conducted with a relatively small number of participants, which is the largest city in Turkey and has very different socioeconomic and different natural environments due to convenience constraints such as time and resources. Conducting further studies with more participants and using the random sampling method in which participants are randomly selected, will increase the generalizability of the results and provide results closer to reality.

The results of this study were based on the first-hand answers of the participants, and the answers of the participants, and therefore the results, may differ from the real situation. In order to prevent this, future studies can be carried out with the help of some devices that will directly measure their water consumption, not according to the answers of the participants, and results closer to the truth can be obtained.

In the scope of the study the multiple regression analysis was carried out in order to determine predictor of the VBN Theory. Therefore it was possible to determine only direct predictions of values, beliefs and personal norms on water consumption behavior of middle school students. It's possible to determine also indirect effects of independent variables on water consumption behavior in order to have a broader view by using different analysis such as confirmatory factor analysis.

Although possible sociodemographics determinants such as gender and grade were reported and considered as descriptive statistics in order to detect their possible effect

or diversity on water consumption behaviors of students, an inferential analysis was not carried out in order to examine possible prediction on water consumption behavior. Therefore, future studies focused on this regard would be fruitful.

According to the results, the relationship of INS with at least some components of The VBN theory was humbly emphasized. Other frameworks that are thought to strengthen people's pro-environmental behaviors by developing this area and making it more comprehensive can also be emphasized. In this way, we can create a more livable world by minimizing the impact of individuals on nature.

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APPENDICES

A. Permissions of Middle East Technical University Human Subjects Ethics Committee

FEN BİLİMLERİ ENSTİTÜSÜ MÜDÜRLÜĞÜ
GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

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Sayı : 44280379-000-E.34998
Konu : Öğrenci Bora Alpay- Anket
Çalışması

Rektörlük Makamı

İlgi : Matematik Ve Fen Bilimleri Eğitimi Bölüm Başkanlığının 06.01.2021 tarihli ve
24422252-000-E.34921 sayılı yazısı

Matematik ve Fen Bilimleri Eğitimi EABD yüksek lisans programı öğrencisi Bora Alpay'ın,
"Öğrencilerin Su Tüketimi Davranışlarının Değerler, İnançlar, Normlar ve Doğa ile
Yakınlık Kapsamında İncelenmesi" başlıklı tez çalışması kapsamında, 03.02.2021-
03.02.2022 tarihleri arasında, İstanbul İl Milli Eğitim Bakanlığına bağlı Ataşehir ilçesinde
bulunan devlet okullarındaki 5. 6. 7. ve 8. Sınıf öğrencilerinden nitel ve nicel veri
toplaması planlanmaktadır. Bu çalışma, ilgili Ana Bilimdalı Başkanlığı'nın görüşü ve İnsan
Araştırmaları Etik Kurulu'ndan alınan 349 ODTÜ 2020 protokol numaralı Etik Kurulu
tarafından onaylanmış ve Enstitümüzce uygun görülmüştür.

Gereği için bilgilerinize arz ederim.

Saygılarımla.

e-imzalıdır
Prof. Dr. Ayşegül ASKAN
GÜNDOĞAN
Enstitü Müdür Yardımcısı

EK: Dağıtım Listesi (1 Sayfa)

OLUR

Bu belge 5070 sayılı Elektronik İmza Kanununa göre güvenli elektronik imza ile imzalanmıştır.
Belge Doğrulama Kodu : https://ebys.metu.edu.tr/verifyrecord/bg.aspx?id=4D63B3FA-1E09-4C3D-B90A-66C48950318F

B. Permission of Provincial Directorate of National Education of İstanbul

T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

BÖ

GÜNLÜDÜR
30.03.2021

Sayı : E-59090411-44-23331038
Konu : Anket ve Araştırma İzinleri

DAĞITIM YERLERİNE

İlgi : a) Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.02.2020 tarihli ve 2020/2 sayılı genelgesi.
b) Valilik Makamının 25.03.2021 tarihli ve 23012049 sayılı oluru.

Valilik Makamının Anket ve Araştırma İzinleri konulu ilgi oluru, anket izni uygun görülenlerin listesi, kullanılması uygun görülen ölçme araçlarının Müdürlüğümüzce mühürlenen örnekleri ekte gönderilmiştir.

Olur gereğince işlem yapılması, araştırma sonuç raporunun, araştırma bittikten sonra 2 (iki) hafta içerisinde Müdürlüğümüz Strateji Geliştirme Şubesine gönderilmesi hususlarında gereğini arz ederim.

Levent YAZICI
İl Millî Eğitim Müdürü

Ek:
1- Valilik Oluru (1 Sayfa)
2- Liste (1 Sayfa)
3- Ölçekler

Dağıtım:
Orta Doğu Teknik Üniversitesi Rektörlüğüne
İstanbul Sabahattin Zaim Üniversitesi Rektörlüğüne

Bu belge güvenli elektronik imza ile imzalanmıştır.

Adres : Binbirdirek Mah. İmran Öktem Cad. No: 1 Sultanahmet Fatih İstanbul   Belge Doğrulama : https://www.turkiye.gov.tr/meb-ebys
Telefon : 0212 384 36 32   Bilgi İçin : Aydın BALTA
E-posta : stratejigelistirme34@meb.gov.tr   Unvanı : Veri Hazırlama ve Kontrol İşletmeni
Kep Adresi : meb@hs01.kep.tr   İnternet Adresi : http://istanbul.meb.gov.tr/

Bu evrak güvenli elektronik imza ile imzalanmıştır. https://evraksorgu.meb.gov.tr adresinden 0178-966e-3af9-88f8-6ad1 kodu ile teyit edilebilir.

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Sayı : E-59090411-20-23012049   25/03/2021
Konu : Anket ve Araştırma İzinleri

VALİLİK MAKAMINA

İlgi : Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 2020/2 sayılı genelgesi.

Aşağıda bilgileri verilen araştırmaların; 6698 sayılı Kişisel Verilerin Korunması Kanununa aykırı olarak kişisel veri istenmemesi, öğrenci velilerinden açık rıza onayı alınması, yüz yüze eğitime geçmiş olan kurumlarımızda, Covid-19 tedbirlerinin araştırmacı ve ilgili kurum idarelerince alınması, bilimsel amaç dışında kullanılmaması, bir örneği Müdürlüğümüzde muhafaza edilen mühürlü ve imzalı veri toplama araçlarının kurumlarımıza araştırmacı tarafından ulaştırılarak uygulanması, katılımcıların gönüllülük esasına göre seçilmesi, araştırma sonuç raporunun kamuoyuyla paylaşılmaması ve araştırma bittikten sonra 2 (iki) hafta içerisinde Müdürlüğümüze gönderilmesi, okul idarelerinin denetim, gözetim ve sorumluluğunda, eğitim ve öğretimi aksatmayacak şekilde, 2020-2021 eğitim ve öğretim yılında ilgi genelge esasları dâhilinde uygulanması kaydıyla Müdürlüğümüzce uygun görülmektedir.

Makamınızca da uygun görüldüğü takdirde olurlarınıza arz ederim.

Levent YAZICI
İl Millî Eğitim Müdürü

OLUR
25/03/2021
Dr. Hasan Hüseyin CAN
Vali a.
Vali Yardımcısı

Ek:
1- Yazılar ve Ekleri (32 Sayfa)
2- Genelge (3 Sayfa)

Bu belge güvenli elektronik imza ile imzalanmıştır.

Adres	: Binbirdirek Mah. İmran Öktem Cad. No: 1 Sultanahmet Fatih İstanbul	Belge Doğrulama	: https://www.turkiye.gov.tr/meb-ebys
Telefon	: 0212 384 36 32	Bilgi İçin	: Aydın BALTA
E-posta	: stratejigelistirme34@meb.gov.tr	Unvanı	: Veri Hazırlama ve Kontrol İşletmeni
Kep Adresi	: meb@hs01.kep.tr	İnternet Adresi	: http://istanbul.meb.gov.tr/

1/3

Bu evrak güvenli elektronik imza ile imzalanmıştır. https://evraksorgu.meb.gov.tr adresinden a9f3-6442-35d9-a47d-362d kodu ile teyit edilebilir.

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C. Data Collection Scales of the Study

Sevgili öğrenciler,

Bu anket soruları, su tasarrufu ve su kıtlığı konusunda sizlerin görüşlerinizi almak için hazırlanmıştır. Anketin tamamlanması yaklaşık 20-25dakikanızı alacaktır. Bu çalışmaya katkılarınız **gönüllü** olmanıza bağlı olup, çalışmanın sonuçlandırılabilmesi açısından çok değerlidir. Bu anketten elde edilecek verilerin değerlendirilmesi aşamasında, ankette yer alan kişisel bilgiler kesinlikle **gizli** tutulacaktır. Lütfen soruları dikkatle okuyunuz ve sizin görüşlerinizi en iyi yansıtan seçeneği işaretleyiniz.

Zamanınız ve yardımlarınız için çok teşekkür ederim.

<div style="text-align: right">

Bora Alpay
Orta Doğu Teknik Üniversitesi
Matematik ve Fen Bilimleri Eğitimi Bölümü
Yüksek Lisans Öğrencisi

</div>

Kişisel Bilgiler

1. Cinsiyetiniz: ❑Kız   ❑ Erkek

2. Doğum Tarihiniz (yıl olarak): _ _ _ _ _ _ _ _

3. Sınıfınız: ❑ 5. Sınıf ❑ 6. Sınıf ❑ 7. Sınıf ❑ 8. Sınıf

4. Geçen yılki fen bilimleri dersi not ortalamanız: _ _ _ _ _ _ _ _

5. Annenizin eğitim durumu	6. Babanızın eğitim durumu:
❑ Okuma-yazma bilmiyor	❑ Okuma-yazma bilmiyor
❑ İlkokul mezunu	❑ İlkokul mezunu
❑ Ortaokul mezunu	❑ Ortaokul mezunu
❑ Lise mezunu	❑ Lise mezunu
❑ Üniversite mezunu	❑ Üniversite mezunu

7. Evinizde kendinize ait bir çalışma odanız var mı?
   ❑ Evet   ❑ Hayır

8. Evinizde bilgisayarınız – tabletiniz var mı?
   ❑ Evet   ❑ Hayır

9. Evinizde internete erişiminiz var mı?
   ❑ Evet   ❑ Hayır

10. Aşağıdakilerden hangisi sizin görüşünüze en yakındır?
    ❑ Su kıtlığı insanların karşı karşıya olduğu en önemli 2 ya da 3 problemden biridir.
    ❑ Su kıtlığı önemli bir problemdir, ama daha önemli başka problemler de vardır.
    ❑ Su kıtlığı bir problemdir, ancak önemli değildir.
    ❑ Bence su kıtlığı bir problem değildir.

11. Dünya'daki suların yüzde kaçı insan kullanımı için uygun niteliktedir?
    ❑%1   ❑%5   ❑%10   ❑%33   ❑ Bilmiyorum

12. Dünya su günü hangi tarihte (ay ve gün) kutlanmaktadır? _ _ _ _ _ _ _ _ _ _ _

13. 25 litre belgeselini izlediniz mi?

❑ Evet   ❑ Hayır

Yanıtınız evet ise bu belgeselden ne öğrendiğinizi bir iki cümle ile açıklayınız lütfen.

14.

Aşağıda belirtilen ifadelere ne ölçüde katıldığınızı lütfen belirtiniz.	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Bulunduğum bölgedeki su kaynaklarıyla ilgili sorunlardan endişeliyim.	1	2	3	4	5
2. Çevremde suyun boşa harcandığını görmek beni endişelendiriyor.	1	2	3	4	5
3. Su kaynakları ile ilgili bilgi sahibiyim.	1	2	3	4	5
4. Çevre sorunları ile ilgiliyim.	1	2	3	4	5
5. Türkiye'deki çevre problemleri abartılıyor.	1	2	3	4	5

15.

Su kıtlığı (azlığı) ile ilgili bilgileri en çok nereden ediniyorsunuz?	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Sosyal medyadan (internet, vb.)	1	2	3	4	5
2. Ailemden	1	2	3	4	5
3. Ders Kitaplarından	1	2	3	4	5
4. Öğretmenimden	1	2	3	4	5
5. Arkadaşlarımdan	1	2	3	4	5
6. Çevre ile ilgili yürütülen gönüllü çalışmalara katılarak	1	2	3	4	5
7. Diğer (Buraya belirtiniz:)...	1	2	3	4	5

I.

Aşağıda belirtilen ifadelere ne ölçüde katıldığınızı lütfen belirtiniz.	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Aşırı su tüketimi ciddi bir sorundur.	1	2	3	4	5
2. Su kaynaklarının azlığı çevre ve doğa için önemli bir sorundur.	1	2	3	4	5
3. Su kirliliği Türkiye'deki önemli sorunlardan biridir.	1	2	3	4	5
4. İçilebilir su kaynaklarının tükenmesi su kıtlığını arttırır.	1	2	3	4	5
5. Su kaynaklarının azalması Türkiye için önemli bir sorundur.	1	2	3	4	5
6. Su kaynaklarını korumak tüm insanlığın yararınadır.	1	2	3	4	5
7. Su kıtlığına karşı alınan önlemler, insanların gelecekteki yaşam kalitesini artıracaktır.	1	2	3	4	5
8. Su kaynaklarının korunması benim ve gelecekteki çocuklarım için daha iyi bir dünya demektir.	1	2	3	4	5
9. Su kıtlığı (azlığı) toplum için bir tehdittir.	1	2	3	4	5
10. Aşırı su tüketiminden diğer insanların yanı sıra ben de sorumluyum	1	2	3	4	5
11. Su kaynaklarının tükenmesinden diğer insanlarla birlikte kendimin de sorumlu olduğunu hissediyorum.	1	2	3	4	5
12. Küresel ısınmadan diğer insanlarla birlikte kendimin de sorumlu olduğumu hissediyorum.	1	2	3	4	5
13. Aşırı su tüketiminden kendimi sorumlu **tutmuyorum.**	1	2	3	4	5
14. Aşırı su tüketiminden, sanayi kuruluşlarının yanı sıra ben de sorumluyum.	1	2	3	4	5
15. Su tüketimi ile ilgili sorunların çözümüne, hiç kimse tek başına katkıda **bulunamaz.**	1	2	3	4	5
16. Aşırı su tüketimi ile ilgili sorunların çözümüne tek başıma katkıda **bulunamam.**	1	2	3	4	5

II.

Aşağıda su tasarrufu davranışları ile ilgili bazı maddeler bulunmaktadır. Bu maddelerle ilgili görüşlerinizi belirtiniz	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Evde suyu tasarruflu kullanırım.	1	2	3	4	5
2. Boşa akan bir musluk görürsem kapatırım.	1	2	3	4	5
3. Musluğu gereksiz yere açık bırakmam.	1	2	3	4	5
4. Dişimi fırçalarken gerekmediği zamanlarda musluğu kapatırım.	1	2	3	4	5
5. Banyo yaparken az su tüketmeye özen gösteriyorum.	1	2	3	4	5
6. Ellerimi sabunlarken musluğu sürekli açık tutmam.	1	2	3	4	5
7. Duşta geçirdiğim süreyi azaltarak su tasarrufu yapmaya çalışırım.	1	2	3	4	5
8. Duş alırken suyu ısınıncaya kadar açık bırakmam.	1	2	3	4	5
9. Mümkün olduğunca, su tasarrufu yapmak için önlemler alırım.	1	2	3	4	5
10. Daha az su tüketmeye çalışıyorum.	1	2	3	4	5
11. Su kullanımını azaltmak için elimden geleni yaparım.	1	2	3	4	5
12. İnsanları su tasarrufu yapmaları için teşvik ederim.	1	2	3	4	5
13. Evimde su damlatan musluk görürsem onarmaları için ebeveynlerime (aile büyüklerime) haber veririm.	1	2	3	4	5
14. Okulumda su damlatan musluk görürsem onarmaları için okul yönetimine haber veririm.	1	2	3	4	5
15. Su kaynaklarını korumayı amaçlayan kuruluşlara bağış yapmaları için ailemi teşvik ederim.	1	2	3	4	5
16. Su kaynakları ile su kaynaklarının korunması üzerine olan belgeselleri izlerim	1	2	3	4	5
17. Su kaynakları ve korunması hakkında yazılan raporları, haberleri okurum yada dinlerim.	1	2	3	4	5

18. Kendimi, elimden geldiği kadar su tasarrufu yapmakla sorumlu hissediyorum.	1	2	3	4	5
19. Başkalarının davranışlarına bakmaksınız, su tasarrufu yapmak için ahlaki sorumluluk hissediyorum.	1	2	3	4	5
20. Benim gibi; herkes, su kullanımını azaltmak için yapabileceği her şeyi yapmalı.	1	2	3	4	5
21. Suyu boşa harcadığımda kendimi suçlu hissederim.	1	2	3	4	5
22. Günlük yaşamımdaki davranışlarımın, doğaya ve çevreye olan etkilerini dikkate almam gerektiğini hissediyorum.	1	2	3	4	5
23. Su tasarrufu yaparsam daha iyi bir insan olurum.	1	2	3	4	5
24. Yaşam tarzımı değiştirmek zorunda olmadığım sürece suyu tasarruflu kullanmak için elimden gelenin en iyisini yaparım.	1	2	3	4	5

III.

| Aşağıda yer alan ifadelere ne derece katılıyorsunuz?	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1.İnsanlar ihtiyaçlarını karşılamak için doğayı değiştirme hakkına sahiptirler.	1	2	3	4	5
2. İnsanların doğaya müdahalesi genellikle felaketle sonuçlanır.	1	2	3	4	5
3. İnsan zekası ve yetenekleri Dünyanın bozulmayacağının garantisidir.	1	2	3	4	5
4. İnsanlar doğaya çok kötü davranıyor.	1	2	3	4	5
5. Dünyada herkese yetecek miktarda doğal kaynak vardır, yeter ki bu kaynaklardan nasıl yararlanacağımızı bilelim.	1	2	3	4	5
6. Bitki ve hayvanlar da, insanlar kadar yaşama hakkına sahiptir.	1	2	3	4	5
7. Doğanın dengesi, modern endüstri toplumlarının etkileri ile rekabet edebilecek güçtedir.	1	2	3	4	5
8. Bizi diğer canlılardan üstün kılan özel yeteneklerimize rağmen, hala doğa yasaları ile mücadele ediyoruz.	1	2	3	4	5
9. İnsanların karşı karşıya kaldığı ''ekolojik kriz'' olarak adlandırılan olaylar çok abartılıyor.	1	2	3	4	5
10. Dünya, sınırlı alan ve kaynaklara sahip olan bir uzay gemisine benzer.	1	2	3	4	5
11. İnsan olmak doğanın geri kalan bölümüne hükmetmek demektir.	1	2	3	4	5
12. Doğanın dengesi çok hassastır ve kolayca bozulabilir.	1	2	3	4	5
13. İnsanlar, doğayı kontrol edebilmek için doğayı anlamak gerektiğini eninde sonunda öğrenecekler.	1	2	3	4	5
14. Eğer her şey bugünkü gibi devam ederse, yakında büyük bir ekolojik felaket ile karşı karşıya kalacağız.	1	2	3	4	5
15. Dünyanın, insan yaşamını destekleme kapasitesini doldurmak üzereyiz.	1	2	3	4	5

IV.

Aşağıdaki unsurların, **KENDİ HAYATINIZI YÖNLENDİRİRKEN** sizin için ne kadar önemli olduğunu [(1) Hiç Önemli Değil – (5) Son Derece Önemli] olacak şekilde lütfen belirtiniz. Eğer bir ifadeye daha fazla ya da daha az katılıyorsanız 1 ile 5 arasında sizin düşüncenizi en iyi ifade eden sayıyı işaretleyiniz. Doğru ya da yanlış cevap yoktur, sizin düşünceleriniz önemlidir.	Hiç Önemli Değil	Önemli Değil	Kararsızım	Önemli	Son Derece Önemli
Doğa ile bütün olmak (Doğaya uyum sağlamak)	1	2	3	4	5
Yeryüzüne saygı duymak (Diğer türlerle uyum)	1	2	3	4	5
Çevreyi korumak (Doğayı gözetmek)	1	2	3	4	5
Çevre kirliliğinin önlenmesi	1	2	3	4	5
Haksızlıkları düzeltmek, güçsüzlere yardım etmek (Sosyal adalet)	1	2	3	4	5
Yardımseverlik (Başkalarının refahı için çabalamak)	1	2	3	4	5
Barış içinde bir Dünya (Savaşsız ve çatışmasız bir Dünya)	1	2	3	4	5
Herkes için eşit fırsat sağlamak (Eşitlik)	1	2	3	4	5
Otorite sahibi olmak (Liderlik yapma hakkı)	1	2	3	4	5
Başkalarına hükmetmek / onları kontrol etmek (Sosyal Güç)	1	2	3	4	5
Mal mülk ve para sahibi olmak (Zenginlik)	1	2	3	4	5
İkna edici olmak (İnsanlar ve olaylar üzerinde etkili olmak)	1	2	3	4	5

V.

Aşağıda doğal çevre ile aranızdaki ilişkiyi inceleyen iki adet şekilli soru bulunmaktadır. Bu sorulardan ilki kendinizi doğal çevreye ne kadar yakın gördüğünüzü, ikincisi ise doğal çevre ile aranızdaki hiyerarşinin (önem sırasının) sizce nasıl olduğunu anlamayı amaçlamaktadır.

ŞEKİL 1: Aşağıdakilerden, doğal çevre ile aranızdaki ilişkiyi en iyi düzeyde açıklayan şıkkı lütfen seçin ve nedenini yanına açıklayınız.
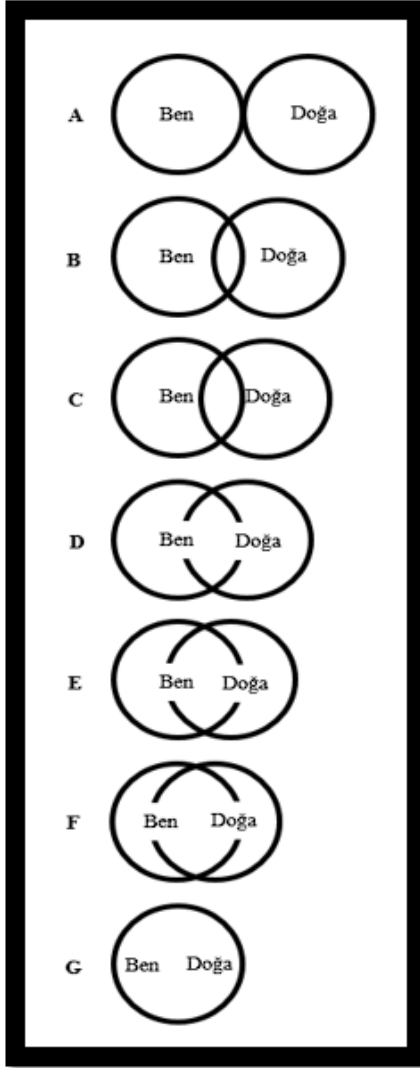
ŞEKİL 2: Aşağıdaki 3 şekilden doğal çevre ile aranızdaki hiyerarşiyi (önem sırasını) en iyi düzeyde açıklayan şıkkı işaretleyerek seçin ve nedenini altına açıklayınız.

A. Bence, ben doğadan daha önemliyim.

B. Bence, doğa ile ben eşit derecede önemliyiz.

C. Bence, doğa benden daha önemli.

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