EARLY CHILDHOOD EDUCATION TEACHERS' SELF-REPORTED ENERGY CONSERVATION BEHAVIORS AMONG ECO AND NON-ECO PRESCHOOLS

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

ELİF DÜZGÜN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF ELEMENTARY AND EARLY CHILDHOOD EDUCATION, EARLY CHILDHOOD EDUCATION

DECEMBER 2022

Approval of the thesis:

EARLY CHILDHOOD EDUCATION TEACHERS' SELF-REPORTED ENERGY CONSERVATION BEHAVIORS AMONG ECO AND NON-ECO PRESCHOOLS

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ABSTRACT

EARLY CHILDHOOD EDUCATION TEACHERS' SELF-REPORTED ENERGY CONSERVATION BEHAVIORS AMONG ECO AND NON-ECO PRESCHOOLS

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December 2022, 139 pages

This study sought to compare the energy conservation behaviors of early childhood teachers across eco and non-eco preschools along with the possible predictors of energy conservation behaviors. The data was collected from 270 early childhood education teachers working in public eco and non-eco preschools in İstanbul and Antalya through Demographic Information Form, the Energy Conservation Behavior Scale, and the New Environmental Behavior Scale. The validity and reliability of the instruments were satisfied based on the EFA and CFA results. The results showed that, regardless of the school type, early childhood teachers had highly positive environmental attitudes and were highly active in energy conservation. However, teachers scored average on the “Human Rules” dimension of the NEP Scale, revealing that early childhood education teachers consider humans superior to nature. Multiple linear regression was conducted to examine the power of predictor variables on the energy conservation behaviors of teachers. The “Growth Limits” dimension of the NEP significantly contributed to explaining the energy conservation of teachers'

behaviors in both school types. However, childhood household type made a statistically significant contribution to the energy conservation behaviors of teachers in eco preschools but not in non-eco schools. Other Significant Life Experiences variables (Childhood location and NGO membership) and pre-service or in-service EE and/or ESD course experiences didn't have statistically significant exploratory power in the energy conservation behaviors of teachers.

Keywords: Sustainable Development, Education for Sustainable Development, Energy Conservation Behaviors, Environmental Attitudes, Early Childhood Education Teachers

ÖZ

EKO VE EKO OLMAYAN OKULLARDAKİ OKUL ÖNCESİ ÖĞRETMENLERİNİN ÖZ BİLDİRİMLERİNE DAYALI ENERJİ TASARRUFU DAVRANIŞLARI

Düzgün, Elif
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Tez Yöneticisi: Prof. Dr. Refika Olgan

Aralık 2022, 139 sayfa

Bu çalışmanın amacı eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını ve bu davranışların olası yordayıcılarını karşılaştırmaktır. Veriler, İstanbul ve Antalya illerindeki devlete bağlı anaokullarında görev yapan 270 okul öncesi öğretmeninden Demografik Bilgi Formu, Enerji Tasarrufu Davranış Ölçeği ve Yeni Çevresel Paradigma Ölçeği aracılığıyla toplanmıştır. AFA ve DFA sonuçlarına göre veri toplama araçlarının geçerliliği ve güvenilirliği sağlanmıştır. Bulgular, hem eko sertifikalı okullarda hem de eko sertifikalı olmayan okullarda görev yapan okul öncesi öğretmenlerinin yüksek düzeyde pozitif çevresel tutumlara sahip olduğunu ve enerji tasarrufu konusunda oldukça aktif olduklarını göstermiştir. Ancak öğretmenlerin NEP Ölçeği'nin “İnsan Kuralları” boyutundan ortalama puan almaları, okul öncesi öğretmenlerinin insanı doğadan üstün görme eğiliminde oldukları şeklinde yorumlanabilir. Yordayıcı değişkenlerin öğretmenlerin enerji tasarrufu davranışları üzerindeki yordama gücünü incelemek amacıyla çoklu doğrusal regresyon analizi yapılmıştır. NEP'in “Büyüme

Sınırları" boyutu, her iki okul türünde görev yapan öğretmenlerin enerji tasarrufu davranışlarını açıklamaya istatistiksel olarak anlamlı katkı sağlamıştır. Diğer bir deyişle, gezegenin sınırları olduğuna inanan öğretmenlerin enerji tasarrufunda daha aktif oldukları bulunmuştur. Buna ek olarak, çocuklukta yaşanılan ev tipinin sadece eko anaokullarındaki öğretmenlerin enerji tasarrufu davranışlarının açıklanmasında anlamlı olduğu belirlenmiştir. Yani çocukken müstakil evde yaşayan eko-okul öğretmenlerinin enerji tasarrufu konusunda daha aktif oldukları bulunmuştur. Diğer "Etkin Yaşam Deneyimleri" değişkenlerinin (çocukluk lokasyonu ve STK üyeliği) ve hizmet öncesi veya hizmet içi çevre eğitimi ve/veya Sürdürülebilir Kalkınma için Eğitim ders deneyimlerinin, öğretmenlerin enerji tasarrufu davranışlarını açıklamaya anlamlı bir etkisinin olmadığı bulunmuştur.

Anahtar Kelimeler: Sürdürülebilir Kalkınma, Sürdürülebilir Kalkınma için Eğitim, Enerji Tasarrufu Davranışları, Çevre Tutumları, Okul Öncesi Öğretmenleri

To my one and only

ACKNOWLEDGMENTS

I would like to express my appreciation to the people without whom I would not have been able to complete my master's degree.

Foremost, I would like to express my sincere gratitude to my supervisor Prof. Dr. Refika Olgan, for her guidance, constructive feedback, academic encouragement, and patience. Thank you for your mentorship during this research project.

Many thanks to my committee members, Prof. Dr. Feyza Tantekin Erden and Doç. Dr. Zeynep Erdiller Yatmaz, for their feedback, comments, and suggestions.

I am also grateful to my ophthalmologist Prof. Dr. Raciha Beril Küçümen, for diagnosing me with pigment dispersion syndrome after months of hospital visits and health challenges. Undoubtedly, starting treatment for this condition has enhanced my quality of life.

To my sisters Ayşegül and Yasemin, and my brother Gökhan, thank you for your emotional support and encouragement.

I dedicate this thesis to my love, Muhammet Karaçalık. This endeavor would not have been possible without you. You stood beside me as I navigated my way through this long journey. You lit my path up with your unyielding love and support. Thank you for making me feel confident in my abilities.

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LIST OF ABBREVIATIONS

ABC	Attitude-Behavior-External Condition Theory
AGFI	Adjusted Goodness-of-Fit Index
AVE	Average Variance Extraxted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
COP26	26th Conference of the Parties
ECE	Early Childhood Education
ECEfS	Early Childhood Education for Sustainability
EE	Environmental Education
EFA	Exploratory Factor Analysis
ESD	Education for Sustainable Development
DSP	Dominant Social Paradigm
GAP	Global Action Programme
GFI	Goodness-of-Fit Index
GHG	Greenhouse Gas Emissions
IPCC	The Intergovernmental Panel on Climate Change
NEP	New Environmental Paradigm
NFI	Normded Fit Index
NGO	Non-Governmental Organizations

NNFI	Non-Normed Fit Index
OECD	Organization for Economic Co-operation and Development
RMSEA	Root Mean Squared Error of Approximation
SD	Sustainable Development
SDGs	Sustainable Development Goals
SLE	Significant Life Experiences
SRMR	Standardized Root Mean Residual
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Conference on Sustainable Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	The United Nations Framework Convention on Climate Change
VBN	Value-Belief-Norm Theory
WCS	The World Conservation Strategy
WSSD	World Summit on Sustainable Development

CHAPTER 1

INTRODUCTION

Ecological crises are rooted in the values, beliefs, and ideologies of modern industrial society (Cotgrove, 1982; Dunlap & Van Liere, 1984; Gottlieb, 2006; Kureethadam, 2017), which are acknowledged as the fundamental components of the Dominant Social Paradigm (DSP) (Shafer, 2006). This worldview is characterized by a belief in human superiority over nature, limitless resources, continuous economic development, and a faith in science and advanced technology to solve ecological problems (Albrecht et al., 1982). This premise entails "human rules" that humans are superior to nature; they can make maximum use of natural resources for their benefit, and economic growth is always possible and useful (Scott et al., 2016). Nature, however, has its own rules and limits (Dunlap et al., 2000). More specifically, natural limits exist for resource use and economic growth; humans are part of nature which is vulnerable to human interference; ecological crises are possible, reflecting the New Environmental Paradigm worldview on the other side of the spectrum (Pe'er et al., 2007). Human dominance over nature, exploitation of natural resources over the years, and policies of laissez-faire government put the planet at risk of an imminent ecological clash (Scott et al., 2016; Shafer, 2006).

The world confronted many issues, including pandemics, contamination of waterways and air, climate change, and deficiency of energy resources (Gore, 2006). Climate change was called "the biggest threat to security that modern humans have ever faced" by Davis Attenborough (United Nations, 2021, para. 2). Energy has accounted for nearly 75% of the emissions that have already increased the global average temperature by 1.1 °C. Thus, the energy industry must be at the center of the efforts to combat climate change (International Energy Agency, 2021).

Population growth, improvement in living standards (Sinding, 2009), and advancement in technology cause energy to be crucial for people's well-being and social and economic progress (International Energy Agency, 2021). Wang and Moriarty (2017) have reported that household energy consumption represents a significant share of total energy use in the OECD (Organization for Economic Co-operation and Development) and non-OECD domiciles, except for low-income households. Energy has been consumed by households for space heating and cooling, water heating, operating electronic devices, lightning, and cooking. Most household energy relies on fossil fuels like oil and gas (International Energy Agency, 2021). The same scenario is accurate for Türkiye. In 2021, electricity production was primarily based on fossil fuels, including coal and natural gas (Turkish Ministry of Energy and Natural Resources, 2022).

Even though COVID-19 led to a drop in energy demand around the globe, the need for all fuels increased due to the world's partial recovery from the pandemic, which pushed CO_2 emissions higher. (International Energy Agency, 2021). In order to meet rising energy demand, more fossil fuels need to be burned to generate energy (Goldstein et al., 2011). As more fossil fuels such as petrol, natural gas, and coal have been burned, carbon dioxide and other greenhouse gases have been increasing in the atmosphere (Hinrichs & Kleinbach, 2012). Increased level of CO2 and other gas byproducts in the atmosphere results in climate changes through greenhouse gas emissions (US GCRP, 2009).

The issue began to be addressed at international conferences, and various activities were commissioned to respond to the issue of climate change (United Nations Development Programme, 2010). The United Nations Conference on the Human Environment brought up the issue for the first time in 1972. Climate change issue captured international attention during the following 20 years. The Intergovernmental Panel on Climate Change (IPCC) was constituted in 1988 by when the subject of global warming was getting significant international attention international attention (United Nations, 2007). As a result of the Rio Summit, The United Nations Framework Convention on Climate Change (UNFCCC), the primary mechanism for fostering reactions to climate change (Barker et al., 2017), had emerged (United Nations, 2002). Five years later, the Kyoto Protocol was adopted to

stop human-induced climate change (UNFCCC, 2008). Recently, COP26 took place in Glasgow in the United Kingdom. COP26 is considered critical to keeping warming within reach of the 1.5°C target previously agreed in Paris (UNCCC, 2021a). If countries fulfill their pledges made at Glasgow, warming will be limited to below 2°C (UNCCC, 2021b).

It was thought that national and international policy development, adaptation to green technologies, and financial resources are necessary for mitigation efforts to be successful. However, they have proved to be insufficient to address the challenges of global climate change and sustainable development (International Energy Agency, 2022b; Nolet, 2009). Since greenhouse gas emissions are linked to anthropogenic actions (Barker et al., 2017), each citizen's attitudes, beliefs, and behaviors initiate the responses to this global threat (UNESCO, 2016). In this respect, energy conservation behaviors significantly curb greenhouse gas emissions and fight climate change (Von Borgstede et al., 2013).

Individual behavioral changes are instrumental to lowering emissions as reductions can be reached through raised citizen awareness and engagement (International Energy Agency, 2021). Education programs can foster energy-saving and acceptance of renewable energy sources (UNESCO, 2020). In this respect, Chapter 36 of Agenda 21 placed a strong emphasis on the pivotal role of education in promoting sustainable development through raising the environmental awareness of children, youth, and adults and fostering their sense of responsibility to achieve sustainable development (UNCED, 1992). Moreover, education is revealed as a key since it enables people to acquire knowledge, skills, values, and attitudes in order to achieve the whole 17 Sustainable Development Goals (SDGs), which are at the center of Education for Sustainable Development for 2030 (UNESCO, 2017). Youth participation, climate education, and public engagement were promoted through Youth & Public Empowerment Program as a part of COP26 (UNCCC, 2021b). In this respect, UNCED (1992) and UNESCO (2007, 2017) put an emphasis on the integration of ESD in all curricula of formal education, including early childhood education.

The early childhood period is particularly important in the adaptation of pro-environmental behaviors, including energy conservation behaviors and energy awareness (Didonet, 2008; Dumciuviene et al., 2019; UNESCO, 2008), since young children's views, values, attitudes, and behaviors towards any issue begin to take shape in this period which may become permanent (Didonet, 2008; Pramling Samuelsson & Kaga, 2008; UNESCO, 2008). Furthermore, children are remarkably vulnerable to the long-lasting effects of climate change (Clark et al., 2020). They should be involved in the issues that are influencing them (United Nations, 1989) as they have a right to live in a healthy and sustainable environment (United Nations Human Rights Council, 2022). In this respect, Early Childhood Education for Sustainability (ECEfS) is recognized as an inclusive, transformative, and empowering education about sustainability subjects, issues, and experiences within the context of early childhood education in order to fulfil this right (Davis, 2022). It supports young children to be problem seekers and solvers as well as action takers in their surroundings (Davis, 2010), which resonates with the philosophy of early childhood education (Arthur et al., 2008). Nevertheless, the successful integration of sustainability into daily educational practices is closely related to the competence of teachers (Samuelsson & Park, 2017).

Teachers are one of the primary actors in shaping young children's learning processes (Ärlemalm-Hagsér & Sandberg, 2011). In this sense, teachers play a critical role in shaping children's environmental attitudes and beliefs. With adequate awareness and knowledge, they can provide children with opportunities to question and challenge "taken-for-granted beliefs and practices"(Pramling Samuelsson & Kaga, 2008, p. 14). For instance, a competent educator can address topics like energy shortage, energy conservation, water shortage, and water conservation which are already part of children's lives (Davis, 2010). Furthermore, teachers act as role models in school settings (Hedefalk et al., 2015; Sandberg & Ärlemalm-Hagsér, 2011) since children learn through observing people around them (Bandura, 1977b). Thus, consistency between rhetoric and actions provides children with more meaningful experiences. Specifically, this situation makes more sense for children when they talk about energy conservation and practice it (Davis, 1998). When we consider the fact that the childhood period is the best time for the formation of energy awareness (Dumciuviene et al., 2019), early childhood education teachers

who are able to guide children to develop sustainable behaviors can support them to be not only environmentally but also economically, socially, and culturally aware citizens to construct a sustainable future (Cincera et al., 2017). In this sense, sustainable learning settings, such as green schools or eco-schools, allow teachers to incorporate sustainability principles into their daily life and promote capacity-building and competency development (UNESCO, 2017).

The eco-schools program is a global environmental, sustainable development, and educational program run by the Foundation for Environmental Organization. (FEE Eco-Schools, 2019a). In Türkiye, the Eco-Schools program has been run by the Turkish Foundation for Environmental Education since 1995 (TÜRÇEV, n.d.). The program has 12 main themes: biodiversity and nature, climate change, energy, food, global citizenship, health and well-being, litter, marine and coast, school grounds, transport, waste, and water. The purpose of the program is to promote sustainability through a holistic approach involving all occupants (teachers, school staff, administration, and children) (FEE Eco-Schools, 2019b). The whole-school approach has brought about some positive shifts in resource management (i.e., energy, water, and waste reductions) and increased children's and teachers' levels of awareness regarding sustainability (Henderson & Tilbury, 2004). Bearing in mind that "green" curriculum, school culture, teacher and peer modeling, and school administration foster individual energy conservation behaviors (Jorgenson et al., 2019), the current study aimed to explore the energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools. In doing so, the researcher would compared teachers' energy conservation behaviors and possible predictors of them.

1.1.Possible Predictors of Early Childhood Education Teachers' Energy Conservation Behaviors

Significant life experiences, initiated by Tanner (1980), attempt to examine the connection between childhood nature experiences and adult "environmental commitment" through various demographic variables. Based on the results of many studies, experience in nature during childhood, adult role models, involvement in environmental organizations, and adverse environmental experience (Barratt

Hacking et al., 2020; Chawla & Derr, 2012; Chawla, 1999; D'Amore & Chawla, 2020; Hsu, 2009; Palmer & Suggate, 1996; Wells & Lekies, 2012) were found to have an influence on people's environment-friendly behaviors. In this sense, it is believed that significant life experiences may also have an effect on the energy conservation behaviors of early childhood teachers.

Outdoor experiences during childhood were associated with children's love of the natural world, which eventually raises environmental concerns (Tanner, 1980). Indeed, positive natural experiences during childhood are essential for acquiring pro-environmental behaviors (Hsu, 2009; Monroe, 2003; Wells & Lekies, 2006). In line with that, Hsu (2009) has addressed that people raised in nature-rich places where they can have first-hand experience and contact with nature, such as the countryside or rural areas, are more likely to adopt environmentally friendly behaviors. On the contrary, people raised in districts where they do not have an opportunity to contact nature, such as urban areas, were less likely to engage in environmental actions. Besides, children and adolescents with higher nature connection score exhibit more conservation behaviors such as energy saving and recycling (Hughes et al., 2018; Otto & Pensini, 2017; Roczen et al., 2014). Engaging with nature during childhood is the most frequently mentioned experience associated with later environmental commitment (D'Amore & Chawla, 2020). In this respect, the childhood period is considered a beginning time for constructing an emotional connection with nature that can bring societal change toward conservation actions (Chawla, 2020).

Involvement in Non-Governmental Organizations (NGOs) is one of the variables in SLE. In Agenda 21, it was addressed that NGOs are the sources of innovation and action locally, and the involvement of the NGOs is significant to achieve a sustainable society (UNCED, 1992). A large body of research has associated NGO membership with environmental commitment (Chawla, 1999; Chawla & Derr, 2012; Chawla, 1998). The membership status of NGOs was incorporated as a variable in the current study to explore its relationship with the energy conservation behaviors of early childhood education teachers.

Environmental attitude is defined by Abrahamse and Steg (2009) as "the degree to which a person has a favorable or an unfavorable evaluation of a behavior, and

depends on the weighing of various costs and benefits such as financial costs, effort, or time" (p.712). Hines et al. (1987) concluded that attitudes are associated with behaviors. Attitudes are considered a strong precursor of environmental behaviors (Kaiser et al., 1999). In other words, attitudes and values are critical to fostering the transformation of knowledge into environmental behaviors (Pe'er et al., 2007).

Early childhood education teachers' comprehension of environmental education, nature education, and ESD have an impact on their educational practices (Inoue et al., 2016). Considering the literature, some studies have addressed the relationship between taking a course on environmental education or ESD and individuals' environmental attitudes, behaviors, and self-efficacy beliefs in ESD (Evans et al., 2012; Hsu, 2009; Köklü Yaylacı & Olgan, 2021; Li & Chen, 2015).

Considering the abovementioned information, childhood location and household type, NGO membership, environmental attitudes, and in-service and pre-service course experience in EE and ESD were included as independent variables in the current study to determine early childhood education teachers' motives regarding their energy conservation behaviors.

1.1. The Significance of the Study

The beginning of 2022 has been marked by a worldwide energy crisis, which has affected global economies. The world's speedy and extensive recovery from the COVID-19 pandemic has disturbed the balance between energy demand and supply, resulting in soaring energy prices. Russia's invasion of Ukraine has further led to a disruption in supply and demand patterns, which has pushed energy prices higher (Berahab, 2022). As World Commission on Environment and Development (1987) pointed out, ecological limits to energy use will demonstrate themselves in the form of increasing costs and declining returns instead of any dramatic loss of a resource. The world was far from reaching its energy and climate goals even before Russia's invasion of Ukraine. In 2021, global CO_2 emissions reached the highest level in history. The current crisis entails the risk of passing larger-scale environmental challenges to future generations (International Energy Agency, 2022b). Therefore it is fundamental to solve the energy crisis by lowering the demand through a shift to

renewables, low-emissions technologies, and energy efficiency (International Energy Agency, 2022b). The overuse of renewable sources causes environmental issues. Therefore, conservation and efficiency in energy use must be the central point of a sustainable future (WCED, 1987).

Lifelong education plays a significant role in leveraging the changes necessary to lower consumption to sustainable levels (McNichol et al., 2011). Raising people's awareness of climate issues requires them to change their behavior in order to decrease energy consumption and emissions footprints (International Energy Agency, 2021). The concept of Education for Sustainable Development emerged from the requirement for education to point out environmental challenges, including climate change and energy issues (UNESCO, 2018). Education for Sustainability for 2030 put forward that all learners should gain the knowledge and skills to foster sustainable development by 2030. To that end, all levels of education, from preschool to tertiary education, should be reoriented to improve competencies to contribute to sustainable development (UNESCO, 2018, 2020). Placing children at the forefront of sustainable development goals foster our drive for sustainable development when we consider the fact that children are particularly vulnerable to the lifelong ecological degradation caused by climate change (Clark et al., 2020), and early years lay the foundation for future pro-environmental attitudes and behaviors (Cutter-Mackenzie & Edwards, 2013).

Teachers are pivotal in getting people on a sustainable path because they are the primary actors in shaping young children's learning processes (Ärlemalm-Hagsér & Sandberg, 2011). Teachers can support children to assume an active role in sustainability issues only if they have sufficient knowledge (Flogaitis & Agelidou, 2003), awareness (Pramling Samuelsson & Kaga, 2008), skills and commitment to sustainable development (Pe'er et al., 2007). Moreover, teachers act as role models regarding sustainability issues (Ärlemalm-Hagsér & Sandberg, 2011; Hedefalk et al., 2015), including energy conservation behaviors (Pratt, 2010). Teachers' educational and daily practices are affected by their knowledge, attitudes (Björneloo et al., 2008), behaviors, beliefs, and thinking (Evans et al., 2012). In the literature, some studies discussed attitude as a strong precursor to behaviors and practices (Barr et al., 2001; Hines et al., 1987; Kaiser et al., 1999; Tonglet et al., 2004; Vining & Ebreo, 1992).

Individuals with more positive attitudes towards the environment were reported to exhibit more environmentally responsible behaviors. Şahin (2013) reported that environmental attitudes of pre-service teachers have predictive power for teachers' awareness of negative consequences of energy consumption and their feelings of responsibility to save energy. On the contrary, some other studies concluded that behavioral change can occur without any alteration in attitudes (Siero et al., 1996). Hence, it is important to explore early childhood education teachers' energy conservation behaviors and attitudes toward the environment.

A whole-school approach to sustainability involves incorporating sustainability into all aspects of the institution (UNESCO, 2017). The FEE Eco-schools program stands out to be the most extensive internationally coordinated whole-school program (Eco-Schools, 2022). This approach enables all school community to live and practice what they learn (UNESCO, 2020). The school serves as a role model for children (UNESCO, 2017). The whole-school approach has brought about some positive shifts in some areas like resource management (i.e., energy, water, and waste reductions) and increasing children's and teachers' levels of awareness regarding sustainability (Henderson & Tilbury, 2004). In this respect, it is significant to make a comparison between eco and non-eco schools to reveal these learning environments' status quo regarding energy conservation. When the relevant literature was reviewed, it was found that international studies focus on the outcome of eco-schools for students (Bajd & Leščanec, 2011; Cincera et al., 2018; Cincera et al., 2017; Hallfreðsdóttir, 2011; Lace-Jeruma & Birzina, 2019) as well as teachers' perceptions' of the eco-school program implementation (Cincera et al., 2018).

In the Turkish context, several studies have investigated early childhood education teachers' ESD practices across eco and non-eco preschools (Kahriman-Pamuk & Olgan, 2018) and public and private eco-preschools (Korkmaz & Guler Yildiz, 2017) and their attitudes and knowledge regarding ESD across eco and non-eco preschools (Kahriman-Pamuk & Olgan, 2020). However, to the best of the researcher's knowledge, no study focused on energy conservation behaviors of in-service early childhood education teachers specifically. In this sense, to the best of the researcher's knowledge, this study was the first to draw on the energy conservation behaviors of in-service early childhood education teachers and reveal the present status of energy

conservation practices in eco and non-eco preschools. Moreover, the current study is important since it is a comparative research design, and the relevant literature presents only a limited number of studies comparing eco and non-eco learning environments.

Sustainable development has three intersecting pillars, which are the environment, economy, and society (UNESCO, 2005). In a recent research study (Güler Yıldız et al., 2021) which reviewed the ECEfS research published between 2008 and 2020, it was reported that there exist only a limited number of studies focused on the economic dimension of sustainability. It was found that studies primarily focused on the environmental pillar of SD. The economic dimension of sustainability addresses daily habits such as energy conservation and water saving (Furu & Valkonen, 2021). Because it is vital to emphasize all dimensions of sustainability to scale up sustainable change (Elliott & Davis, 2009), this study contributes to the literature with its focus on the economic and environmental pillars of sustainability.

Considering the predictors of early childhood education teachers' energy conservation behaviors, the relationship between their level of energy conservation behaviors and environmental attitudes, significant life experiences (childhood location and household type, NGO membership), and enrollment in an environment or ESD course or seminar during pre-service and in-service years are worth investigating since these factors can be a precursor of their practices. Some studies have reported a positive association between people's environmental attitudes (Abrahamse & Steg, 2009; Şahin, 2013; Martinsson et al., 2011; Von Borgstede et al., 2013) and their energy-saving behaviors. Other studies reported a positive link between course or workshop experience and people's environmental attitudes, behaviors, and self-efficacy beliefs in ESD (Evans et al., 2012; Gan & Gal, 2018; Hsu, 2009; Köklü Yaylacı & Olgan, 2021; Li & Chen, 2015). Although many research studies have documented a positive association between sustainable practices and significant life experiences (Hsu, 2009; Kahriman-Pamuk & Olgan, 2020; Kahriman Öztürk & Olgan, 2016; Li & Chen, 2015), to the best of researcher's knowledge, the relevant literature provides limited evidence about energy conservation behaviors and abovementioned variables. Moreover, it is vital to explore the predictor variables explaining energy conservation behaviors of early

childhood education teachers in order to consider how to promote them (Çakır Yıldırım, 2017). In this sense, the current study contributed to the literature by exploring the predictor variables and energy conservation behaviors of early childhood education teachers.

1.2. Aim and Research Questions

Considering the abovementioned aspects, the purpose of the current study is to compare the energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools along with the possible predictors of energy conservation behaviors of early childhood education teachers, including childhood location and households type, environmental attitudes (human rules, nature rules, growth limits), membership of Non-Governmental Organizations, pre-service or in-service course experience in environmental education or ESD. This study explored and compared the possible predictors of early childhood education teachers' energy conservation behaviors among eco and non-eco preschools. On this basis, the following research questions were addressed in the current study:

R.Q.1. What are the levels of energy conservation behaviors and environmental attitudes of early childhood education teachers serving at eco and non-eco preschools?

> R.Q.1.a. Is there a significant difference between the energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools?
>
> R.Q.1.b. Is there a significant difference between the environmental attitudes of early childhood education teachers serving at eco and non-eco preschools?

R.Q.2. To what extent do teacher-related variables [childhood location and household type, membership of Non-Governmental Organizations, environmental attitudes (human rules, nature rules, growth limits), pre-service or in-service course experience in environmental education and ESD] explain the difference in energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools?

1.3.Definition of the Important Terms

Early Childhood Education: Early Childhood Education is a term that refers to the appropriate programs for young children between the ages of 0-8 in order to improve their cognitive, socio-emotional, physical, language, and personal development (Gordon & Browne, 2008).

Sustainable Development (SD): Sustainable development has defined as the "development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987, p.43).

Education for Sustainable Development (ESD): Education for sustainable development (ESD) refers to promoting people to construct knowledge and develop values and skills in order to involve in decision-making processes about performing actions individually and collectively, locally and globally that will result in improvement in the quality of life now without degrading the planet Earth for the future generations (Sustainable Development Education Panel, 1998).

Energy: It is defined as the "underlying currency that governs everything humans do with each other and with the natural environment that supports them" (KEEP, 2003, p.9).

Conservation: It is defined as "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations" (IUCN, 1980, section 1). Energy conservation involves direct (e.g., using gas and electricity) and indirect (e.g., buying local foods) saving (Steg, 2008). The current study focused on the direct household energy use of early childhood education teachers. Energy conservation and energy saving are used interchangeably in the present study.

CHAPTER 2

LITERATURE REVIEW

The current study examined the energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools along with the possible predictors of energy conservation behaviors of early childhood education teachers, including childhood location and household type, environmental attitudes, membership of Non-Governmental Organizations, pre-service or in-service course experience in environmental education and ESD. In this sense, this chapter presents a summary of the research literature regarding the purpose of this study. The concept of sustainable development and education for sustainable development and energy conservation were mentioned. The role of early childhood education, teachers, and eco-schools in education for sustainable development was discussed. Lastly, possible predictors of early childhood education teachers' energy conservation behaviors were identified and compared with those observed in other international and national research studies.

2.1. Sustainable Development (SD)

The term sustainable development originates in the global nature conservation movements of the 1960s; however, the term started to be broadly embraced after the United Nations Conference on the Human Environment in Stockholm in 1972. The emergence of the United Nations Environment Programme (UNEP) was the most obvious result of the Stockholm Conference. In 1980, The World Conservation Strategy (WCS) placed emphasis on the conservation of natural resources and improvement in the quality of human life (Adams, 2001). On this basis, conservation is defined as the "management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to

meet the needs and aspirations of future generations" (IUCN, UNEP, WWF, FAO, & UNESCO, 1980, p.1).

The World Commission on Environment and Development (WCED) published the Brundtland Report, also called Our Common Future, in 1987 and offered the most frequently used definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987, p. 43). The term gained its notability with the Rio Summit, also known as the Earth Summit, in 1992 (Adams, 2001).

UNESCO (2005) has defined three pillars of SD as environment, economy, and society, intertwining with each other. The environmental pillar of SD captures the harmony between humans and nature (Yan & Fengfeng, 2008). Increased levels of greenhouse gas emissions, rising sea levels, contaminated waterways, and exhaustion of natural resources comprise the environmental aspect of SD (Siraj-Blatchford et al., 2010). The economy dimension of SD concerns the influences of economic growth on society and the environment and its potential and limits (Pressoir, 2008). Expanding the improvement and use of energy and water-efficient appliances, decreasing the effect of production and disposition on the environment, and the production of goods and services that are respectful to nature are the issues of the economy pillar of SD (Siraj-Blatchford et al., 2010). The society and culture dimension of SD focuses on social, cultural, and political issues that have an effect on the quality of people's lives (Siraj-Blatchford et al., 2010). Human rights, peace, human security, and gender equity are some issues that concern the society and culture pillars of SD (UNESCO, 2005). This dimension involves understanding the role of social institutions in change and development. These three pillars are intertwined. Considering environmental and socio-economic measures to adopt a sustainable lifestyle, education must be the focal point (Pressoir, 2008).

2.2.Energy Conservation

In order to put the planet on a sustainable track, the energy sector has to be set at the heart of the solution since worldwide energy use and supply is the primary source of greenhouse gas emissions (GHG) (Barker et al., 2017). It has already produced a 1.1

°C increase in global average temperature since pre-industrial times (International Energy Agency, 2021). Although the COVID-19 outbreak brought about a 5.4% fall in CO_2 emissions in 2020, global CO_2 emissions are rebounding to pre-pandemic levels, and atmospheric GHG concentration continues to grow (United Nations Environment Programme, 2021), which will result in temperature rise on Earth surface (Young et al., 2009).

According to the International Energy Agency's (2021) recent report, the building sector accounts for approximately one-third of total energy consumption, including residential and service. Even though worldwide electricity demand decreased by 1% in 2020, it returned to the pre-pandemic ground with a 4% rise in 2021 (International Energy Agency, 2021). Global electricity demand is projected to keep rising in 2022. It is estimated that the percentage of electricity in household energy bills will grow by 2050. Regarding the position of Türkiye, households, and service energy consumption share is higher in Türkiye's total energy consumption in 2017, corresponding to 24,8 % (Turkish Ministry of Energy and Natural Resources, 2017). It was reported that the electricity-based energy consumption of Türkiye rose by about 7.7% in 2021 compared to the rate in 2020 (Turkish Ministery of Energy and Natural Resources, 2022). It was projected that energy consumption would increase by about 4.8% in 2023 (Turkish Ministry of Energy and Natural Resources, 2020). In this sense, it is vital to decrease energy consumption through efficiency strategies and behavior changes to reach climate mitigation goals (International Energy Agency, 2020). Pisello et al. (2016) have addressed that technical solutions, along with behavioral change, may result in better energy efficiency. However, the behavioral aspect of energy conservation is under-researched (Dumciuviene et al., 2019), and it is revealed as a barrier to combating climate change (Şahin, 2013). In this respect, education has been revealed as a key to improving the capacity of people to point out environmental and developmental issues (UNCED, 1992). Thus, education for sustainable development (ESD) has been revealed as a key to tackling climate change and reducing energy use (Şahin, 2013).

2.3.Education for Sustainable Development (ESD)

Education for Sustainable Development (ESD) was first defined by Sustainable Development Education Panel to promote people to construct knowledge, values, and skills to involve in decision-making processes about performing actions individually and collectively, locally and globally, that will result in improvement in the quality of life now without degrading the planet Earth for the future generations (Sustainable Development Education Panel, 1998). ESD was recognized as a critical enabler of Sustainable development (SD) in the 2002 World Summit on Sustainable Development (WSSD), the 2012 UN Conference on Sustainable Development (UNCSD), and the Paris Agreement. It was underscored that ESD must be integrated into the school curriculum since sustainable development issues directly affect all people. The importance of these issues needs to be understood by everyone (Sustainable Development Education Panel, 1998). In this respect, in Chapter 36 of Agenda 21, a strong emphasis has been put on the pivotal role of education in promoting sustainable development through raising environmental awareness of children, youth, and adults and fostering their sense of responsibility to achieve SD (UNCED, 1992). The United Nations Decade of Education for Sustainable Development (2005-2014) established an international movement to rebuild the curriculum to highlight sustainable development's challenges (UNESCO, 2018). It proposed incorporating all the principles, values, and practices of SD into all facets of education and learning and promoting changes in attitudes, values, and knowledge to move us towards a more sustainable future (UNESCO, 2005, 2014a, 2014b). Beginning in early childhood, ESD must be regarded as an indispensable part of quality education, and every educational institution should assume responsibility for achieving SD (UNESCO, 2017). Thereby, all pupils can acquire the knowledge, skills, and values to involve sustainable development issues as citizens (Sustainable Development Education Panel, 1998).

Following the UN Decade of Education for Sustainable Development, Global Action Programme (GAP) on Education for Sustainable Development (2015-2019) was introduced, and the main goal is to promote sustainability-related actions at all levels of education (UNESCO, 2014c). The Global Action Programme had five key leverage points: (1) Policy advancement, (2) Transformation of learning

environments, (3) Capacity building for educators, (4) Empowerment of youth, and (5) Scaling up sustainable solutions at the local level (UNESCO, 2014b).

Education for Sustainable Development for 2030 is an international framework with 17 sustainable development goals (SDGs) in order to implement ESD from 2020 to 2030. ESD for 2030 put a strong emphasis on the role of education in reaching these 17 SDGs. The aim is to reorient education, from preschool to tertiary education, in order to promote sustainable development (UNESCO, 2020). Target 4.7 of the SDGs mainly focuses on the role of education:

> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development (p. 14).

Education is essential to equip individuals with relevant knowledge, values, attitudes, and skills to achieve sustainable development. In this respect, the purpose of ESD is to improve the competencies of individuals to make informed decisions and act responsibly, considering the carrying capacity of the planet. In order to reach 17 SDGs, ESD is recognized as critical to transforming individuals' behaviors and contributing to societal, political, and economic change (UNESCO, 2017).

2.4.Education for Sustainable Development in Early Childhood (ECEfS)

In Our Common Future in 1987, it was stated that the state of the planet compromises the ability of future generations to lead a healthy and safe life since current practices are environmentally, socially, and economically unsustainable (WCED, 1987). Thereafter, although many international agreements addressed the significance of sustainable development, most largely disregarded early childhood children. UNESCO (2005) published the United Nations Decade of Education for Sustainable Development which recognized Early Childhood Education for Sustainability (ECEfS) as an emerging national and international area. Moreover, with the publication of "The Role of Early Childhood Education for a Sustainable Society" (Pramling Samuelsson & Kaga, 2008), the early childhood community took

up the sustainability challenge. ECEfS acknowledges that children have the capacity to be competent and active participants in environmental and social issues (Davis et al., 2008) since they are particularly vulnerable to the influences of ecological degradation (Clark et al., 2020; UNCED, 1992) and investment in early years create greater benefits for society (Chua & Heckman, 2007). ECEfS endeavors to empower children and adults to mitigate environmental degradation and promote ecologically and socially sustainable behaviors and practices within early childhood contexts, their homes, and the broader community (Elliott & Davis, 2009).

Early years are particularly significant in the formation of pro-environmental behaviors and attitudes, including energy awareness (Cutter-Mackenzie & Edwards, 2013; Davis & Gibson, 2006; Dumciuviene, 2019), since learning experiences during early childhood years shape children's habits and values as well as concepts and misconceptions (Erdoğan et al., 2012; Palmer, 1995; Palmer & Suggate, 1996). Furthermore, the childhood period lays the ground for environmental activism in adulthood (Hsu, 2009; Wells & Lekies, 2006). ECEfS is a transformative pedagogy that is intended to empower children to find out and solve the problems in their surroundings within the context of early childhood education (Davis, 2010). All children have the right and obligation to cultivate their skills in SD, particularly in the early years. A substantial body of research demonstrated that children's capacity to learn is very high throughout the early years (Siraj-Blatchford & Pramling-Samuelsson, 2015). Even though children's right to be involved in sustainable development issues and their agency are well-documented in the literature (Engdahl & Rabušicová, 2011; Lansdown, 2005; Mackey, 2012; Siraj-Blatchford & Pramling-Samuelsson, 2015; United Nations, 1989), the capacities of young children are underestimated in terms of sustainable development (Pramling Samuelsson & Kaga, 2008). Yet studies have shown that children are able to perform sophisticated thinking regarding socio-environmental issues (Davis et al., 2008).

One of the most extensive studies on this issue was carried out by Engdahl and Rabušicová (2011). Their data was collected from 9142 children from 28 countries, including Türkiye. The participant children were presented with a picture of many children cleaning the globe, and they were asked their opinions about the picture shown. The results revealed that children have an understanding about the

environment, environmental problems, its effects on animals, habitats, and people, and what to do to protect the planet Earth. This study revealed that even very young children are capable of engaging in environmental and sustainable development issues around them and generating solutions regarding these issues (Davis, 1998; Otieno, 2008; Pressoir, 2008; Siraj-Blatchford et al., 2010).

2.5.The Role of Early Childhood Teachers in Education for Sustainable Development

Educators are potent agents of change since they are able to transmit educational responses needed to accomplish sustainable development. In order to reconstruct educational processes towards sustainability, teachers' understanding of the concept of SD, their belief regarding the significance of ESD and the potential of education to affect sustainability issues, and their image of a sustainable world have the utmost importance (Panatsa & Malandrakis, 2018; UNESCO, 2017). Qualified teachers can attract children's attention to various sustainability issues and questions within a play-based curriculum (Samuelsson & Park, 2017). Moreover, teachers can promote children to be active agents regarding sustainability only if they are equipped with relevant knowledge (Flogaitis & Agelidou, 2003), awareness (Pramling Samuelsson & Kaga, 2008), skills and commitment to sustainable development (Pe'er et al., 2007). Teachers with high awareness of sustainability issues are more likely to incorporate sustainability into their daily practices in the ECE context instead of regarding this as a separate subject to teach and move on (Björneloo et al., 2008). The philosophy of ESD is in line with this. It incorporates sustainable issues like climate change, energy saving, and sustainable consumption into the curriculum and constructs an interactive and learner-centered learning environment (UNESCO, 2017). Early childhood teachers with relevant knowledge, understanding, and vision become able to practice and discuss energy conservation, alternative energies, and how to integrate energy conservation behaviors into daily routines with children to carry out scientific inquiries, including circuits, sources of energy, light bulbs, to provide children with investigation opportunities about the science of electricity and to educate families through their children and newsletters (McNichol et al., 2011; Pratt, 2010).

The early childhood period is particularly significant since early childhood education lays the physical, intellectual, emotional, and psychological foundation for development and life-long learning. Furthermore, children form their fundamental beliefs, attitudes, behaviors, habits, and skills, affecting them later in life (Pramling Samuelsson & Kaga, 2008). In this period, early childhood education teachers transmit their values and attitudes to the children consciously or subconsciously (Salonen & Tast, 2013). For this reason, early childhood education teachers have immense potential to instill relevant values, skills, behaviors, and attitudes in children that promote sustainable development (Davis & Gibson, 2006; Wells & Lekies, 2006).

Social Learning Theory (Bandura, 1986) posits that children learn through watching people around them and imitating the observed behaviors. According to this theory, learning is a cognitive process that takes place in a social context and is influenced by social norms. Bandura (1977b) asserted that modeling is an important way of learning for the individuals involved. Therefore, the social environment has a significant and strong role in transforming a sustainable lifestyle (Glasser, 2007). In this sense, teachers act as role models regarding sustainability issues (Ärlemalm-Hagsér & Sandberg, 2011; Hedefalk et al., 2015), including energy conservation behaviors (Pratt, 2010). Children are more likely to acquire, perform and retain behavior when the observed person has an attractive quality for them, such as their teachers (Bandura, 1977; Higgs & McMillan, 2006). Thus, educators are regarded as agents of change in getting the world on a sustainable path (Salonen & Tast, 2013; UNESCO, 2017).

When we consider the fact that the childhood period is the best time for the formation of energy awareness (Dumciuviene et al., 2019), early childhood education teachers with relevant awareness will be able to integrate sustainability issues into the curriculum and daily life, and they will act as role models for children (Hedefalk et al., 2015; Sandberg & Ärlemalm-Hagsér, 2011).

2.6.The Role of Eco Preschools in Education for Sustainable Development

For Education for Sustainable Development (ESD) to be more efficient, the school needs to be transformed as a whole (UNESCO, 2017). In this respect, the whole-school approach integrates sustainability issues into all aspects of the institution. In this way, the school community has opportunities to live what they learn (Tilbury & Galvin, 2022). The eco-school project is an example of a whole-school approach (Eco-Schools, 2022).

The eco-schools program is a global environmental, sustainable development, and educational program run by the Foundation for Environmental Organization. The program is being implemented by 59,000 schools in 68 countries (FEE Eco-Schools, 2019a). In Türkiye, the Eco-Schools program has been run by the Turkish Foundation for Environmental Education since 1995 (TÜRÇEV, n.d.). The eco-school program revolves around 12 main themes: biodiversity and nature, climate change, energy, food, global citizenship, health and well-being, litter, marine and coast, school grounds, transport, waste, and water. Eco-school learning settings enable all occupants (teachers, students, and staff) to incorporate sustainability principles into their daily practices and gain competency and capacity in a comprehensive way (UNESCO, 2017).

The eco-school program provides students and teachers with indoor and outdoor learning opportunities embedded in their daily life to accomplish ESD at all levels of education (Bajd & Leščanec, 2011). In early childhood education, children can acquire sustainable practices through composting, gardening, and adopting water and energy-saving techniques. They can extend these practices by involving energy-efficient and recycling activities (Davis, 1998). The Eco-school program is vital in fostering SD because of the opportunities it offers.

Energy is one of the themes that the eco-school program adapts (FEE Eco-Schools, 2019b). In this respect, the eco-school program involves the cooperation of all occupants of the schools in order to raise awareness of energy issues and develop energy efficiency (Sevinc Kayihan & Tönük, 2013). The whole-school approach has been reported to achieve a reduction in energy and water consumption and an

enhancement in teachers' and children's levels of awareness about sustainability (Henderson & Tilbury, 2004).

In one study, the energy performance of elementary and secondary eco-Schools was compared to those of non-eco schools in Ontario. The findings have indicated that the overall energy performance of the former was better than those of the latter. Considering the behavioral aspect, the study has revealed that eco-school children have conserved slightly more energy than those in non-eco schools (Enerlife Consulting Inc., 2017).

A study was conducted with Eco-school-certified primary schools in İstanbul to examine these schools' energy management focusing on the technological aspect. It was found that there was a lack of awareness and economical use of energy in the outdoor and indoor settings of the eco-schools included in the study (Sevinc Kayihan & Tönük, 2013).

Kahriman-Pamuk and Olgan (2018) compared teachers' ESD practices in eco and non-eco preschools. They found that the time and frequency allocated for the Education for Sustainable Development of early childhood education teachers serving in eco-schools were significantly higher than those serving in non-eco preschools with a small size effect. Moreover, early childhood education teachers serving at eco preschools were found to be more knowledgeable, whereas those serving at non-eco preschools have reported holding more positive attitudes toward SD (Kahriman-Pamuk & Olgan, 2020). Korkmaz and Guler Yildiz (2017) have included teachers working in both private and public eco-preschools and reported that visual displays about the unnecessary use of electricity had been presented in the private preschools certified as eco-schools but not in the public schools, which are also member of Eco-School Project. The aim of these visuals is to raise awareness of the occupants of eco-school and lower greenhouse gas emissions (FEE Eco-Schools, 2019b). It was reported that the practice of "Turn off the light if not needed!" reduced the electricity consumption of eco-schools by 5% (Croydon Council Report, 2012). Moreover, private schools have been found to give more verbal reminders about using less water (Korkmaz & Guler Yildiz, 2017).

2.7.Possible Predictors of Early Childhood Education Energy Conservation Behaviors

Significant life experiences attempt to explain adults' environmental attitudes and behaviors based on some demographic variables (Chawla, 1999, 2006; Palmer et al., 1996). The significant life experience literature proposes that more prolonged time periods spent in nature, often during childhood; parents or other members of the family; teachers; membership of NGOs; and the loss of a valued place are linked to later environmental-friendly behaviors (Barratt Hacking et al., 2020; Chawla, 1999; Chawla & Derr, 2012; D'Amore & Chawla, 2020; Hsu, 2009; Palmer & Suggate, 1996; Tanner, 1980; Wells & Lekies, 2012).

2.7.1. Childhood Location and Households Type

Interaction with nature during childhood cultivates concern for the environment (Chawla, 1999; 1998), which results in pro-environmental behavior (Hsu, 2009; Palmer & Suggate, 1996). Many studies conducted in different countries with different participants have reported childhood experience with nature as the most frequently mentioned source for pro-environmental behaviors (Chawla, 1998; Hsu, 2009; Li & Chen, 2015; Palmer & Suggate, 1996). Considering this, it was underscored that people who spent their childhood in nature-rich places, such as rural areas, are more likely to act in an environmentally responsible manner (Hsu, 2009).

Wells & Lekies (2006) investigated the connection between childhood nature experiences and adult environmental attitudes and behaviors with a sample of 2000 adults aged 18-90 living in an urban region of the United States. They found that childhood engagement with nature, such as planting, watering plants, picking flowers, camping, and fishing, positively correlates with adult environmental attitudes and behaviors like outdoor recreation activities, recycling, and cleaning up litter.

Goldman et al. (2006) conducted a research study with college students in Israel. They reported that students who grew up in rural environments exhibited more environmental behaviors. Evans et al. (2012) conducted a longitudinal study for 12

years in order to find out six years old children's and 18 years old young adults' environmental attitudes and behaviors along with some factors, including childhood outdoor time, in New York. They reported that participants who spent more time outdoors during childhood exhibited more pro-environmental behavior.

Li & Chen (2015) conducted a study with two phases in China. They surveyed 34 environmentally active citizens about their life experiences in the first phase. In the second, they recruited 606 junior and senior students to fill out the questionnaires that researchers developed based on the first study's results. Natural experiences during preschool and primary school years were the most frequent factor in study 1; however, this factor became less critical in study 2. On the other hand, Howell & Allen (2019) surveyed 85 climate change educators in the United Kingdom. Even though childhood outdoor experiences were mentioned as an influential factor by some participants, other experiences were more frequent. Social justice was more salient for climate educators.

In the early childhood education context, Black (2020) explored two groups of 27 undergraduate teachers' childhood nature experiences and memories using narrative and art-based methods as a part of a sustainability course. Pre-service ECE teachers expressed childhood nature experiences as an impactful factor that eventually shaped their vision to work with children.

Extending SLE research to Türkiye, Kahriman Öztürk and Olgan (2016) have conducted a study with 838 preschool teachers from four cities of Türkiye, namely İstanbul, Ankara, Eskişehir, and Antalya, in order to explore preschool teachers' view about Education for Sustainable Development considering their childhood location and household type. The results of the study demonstrated that preschool teachers who lived in urban areas and apartments during their childhood had lower scores regarding their views on the significance of Education for Sustainable Development.

According to the results of a recent research study by Kahriman-Pamuk and Olgan (2020), preschool teachers serving at eco and non-eco preschools had higher levels of knowledge about ESD and held positive attitudes towards ESD. These findings

were associated with their childhood location and membership of NGOs. On the other hand, Köklü Yaylacı and Olgan (2021) have reported that childhood location and household type were not associated with pre-service early childhood teachers' ESD teaching efficacy beliefs.

2.7.2. Non-Governmental Organization Membership

In Agenda 21, Non-governmental organizations (NGOs) have been revealed as crucial partners in transforming into a sustainable society thanks to their capacity and expertise in the field (UNCED, 1992). In the significant life experiences research, involvement in NGOs has been revealed as a source of environmental commitment (Chawla, 1998; 1999; Chawla & Derr, 2012; Hsu, 2009).

Li and Chen (2015) conducted a study with Chinese college students to find out the factors that affect young adults' participation in environmental issues. It was reported that natural experiences during childhood and membership of NGOs were the most frequently mentioned life experiences.

Moreover, Arnold et al. (2009) conducted interview research with 12 environmentally active persons aged between 16 and 19. Almost half of the participants pointed out the importance of environmental organizations in informing people, raising awareness, and empowering people to cultivate their skills.

In Türkiye, Kahriman-Pamuk and Olgan (2020) have reported NGO membership as a predictor of early childhood education teachers' ESD practices serving at eco-preschools. The same results were not reported for the teachers that work in non-eco preschools. On the other hand, Köklü Yaylacı and Olgan (2021) reported that membership of NGOs does not contribute to early childhood teachers' self-efficacy beliefs about ESD.

2.7.3. Environmental Attitudes

The New Environmental Paradigm (NEP) was highly used in conservation psychology to explore individuals' attitudes through items that represent NEP and

Dominant Social Paradigm (DSP) premises (Albrecht et al., 1982; Dunlap et al., 2000; Scott et al., 2016). It was cited in more than 300 studies across different cultures (Hawcroft & Milfont, 2010; Scott et al., 2016). According to the DSP worldview, humans are superior to the natural environment; people have a right to control and modify nature based on their needs, economic growth is always good, and people can solve ecological problems through technological advancements. On the other hand, NEP posits that ecological limits exist for resource consumption and economic growth and that humans depend on the natural environment (Albrecht et al., 1982; Scott et al., 2016). The scale's dimensionality has changed across various cultures and populations (Bostrom et al., 2006). Even though factor structure changes across cultures (Albrecht et al., 1982; Erdoğan, 2009; Furman, 1998; Geller & Lasley, 1985; Kuhn & Jackson, 1989; Lalonde & Jackson, 2002; Noe & Snow, 1990; Öztürk, 2019), the scale captures three orientations which are a man over nature, growth limits, and balance of nature (Albrecht et al., 1982). A large body of research has demonstrated that NEP has predictive power on self-reported ecological behaviors (Clayton, 2012).

Menzel and Bögeholz (2010) have explored pupils' commitment to protecting biodiversity and found NEP as a positive predictor of commitment to protecting biodiversity for German pupils. However, NEP has not been found as a positive predictor of this behavior for Chilean pupils. On the other hand, Gadenne et al. (2011) have examined the antecedents of consumer environmental behaviors and reported a strong relationship between environmental attitudes and energy conservation behaviors. Some other research studies have supported this positive association between energy-saving and environmental attitudes (Abrahamse & Steg, 2009; Martinsson et al., 2011; Von Borgstede et al., 2013). In the Turkish context, Şahin (2016) conducted a research study with teacher candidates, and attitudes were reported to have more predictive power on the feeling of responsibility for energy conservation. However, opposite results were reported by Ibtissem (2010) and Steg et al. (2005).

2.7.4. Course Experience in Sustainable Development (SD) or Education for Sustainable Development (ESD)

Pre-service or in-service course experience in EE or ESD is one of the popular variables as antecedents of pro-environmental behaviors (Clark & Finley, 2007), including energy conservation behaviors (Frederiks et al., 2015). Early childhood education teachers' comprehension of environmental education, nature education, and ESD inform their educational practices (Inoue et al., 2016). The thrust of this literature proposes a positive relationship between taking a course on environmental education or ESD and individuals' environmental attitudes, behaviors, and self-efficacy beliefs in ESD (Evans et al., 2012; Hsu, 2009; Köklü Yaylacı & Olgan, 2021; Li & Chen, 2015). For instance, Gan and Gal (2018) conducted a study with 80 pre-service teachers from Israel in order to find out the contribution of the Education for Sustainability course in raising self-efficacy in promoting pro-environmental behaviors and attitudes. Most teachers were in the early childhood department, and the rest were in elementary school. The results have demonstrated that ninety-five percent of the participant pre-service teachers reported developing a positive attitude towards sustainability thanks to the course. They further explained that the course helped them expand their knowledge and comprehend key points in sustainability, promote environmental awareness, acquire sustainable behaviors, and gain skills for incorporating sustainability in the educational process.

Effeney and Davis (2013) reported a significant relationship between pre-service teachers' efficacy and their perceived knowledge of ESD. This finding was discussed as it might have been related to the environmental sustainability course pre-service teachers completed. In the study of Pe'er et al. (2007), college students majoring in environment-related disciplines were found to have more knowledge and more environment-friendly attitudes. In a study conducted with children aged 11 through 15 (Barata et al., 2017), those who took environmental education reported higher water-saving attitudes and behaviors. Besides, the statistical analysis indicated that those who took environmental education may have saved more energy at home than those who didn't.

In the Turkish context, Tuncer's research study (2008) has demonstrated the influence of preservice education. Enrollment in an environmental course has been reported as a significant factor in the environmental awareness of women. That is, women who took a course about the environment were found to hold environmental awareness. On the other hand, Wells and Lekies (2006) didn't report enrollment in an environmental education course as a strong predictor of environmental behaviors and attitudes.

2.8.Theoretical Background: Conceptualizing Energy Conservation

The sustainability literature discusses attitudes as the antecedent to behaviors and practices (Hines et al., 1987; Kaiser et al., 1999; Pe'er et al., 2007). Pro-environmental beliefs, attitudes, and values bring about environmentally friendly behaviors, including energy conservation (Becker et al., 1981; Hines et al., 1987; Seligman et al., 1978). People with more positive attitudes toward the environment are more likely to behave in environmentally friendly ways (Frederiks et al., 2015). Many social and psychological theories affirm this relationship, and researchers have empirically investigated underlying elements for the last four decades.

The Theory of Reasoned Action (TRA) puts forward that behaviors result from a person's intention to act, which is affected by attitudes and social factors. That is, beliefs, attitudes, and intentions lead to engaging in the behavior (Fishbein & Ajzen, 1975). The Theory of Planned Behavior (TPB) proposes the same pattern with the addition of behavioral control (Ajzen, 1991). TPB has been extensively used to predict individuals' recycling behavior (Kahriman-Ozturk, 2016; Şenyurt, 2018; Tekkaya et al., 2011) and energy and water conservation behaviors (Clark & Finley, 2007; Ru et al., 2018; Wang et al., 2014). For instance, Wang et al. (2014) gathered data from 276 residents in China to explore the predictors of energy conservation through the lens of TPB. According to the results, environmental attitudes, subjective norms, and perceived behavioral control have been found to predict energy conservation behaviors significantly.

The Value-Belief-Norm Theory (VBN) proposes a similar causal order where values, beliefs, and attitudes bring about social norms and responsibility and, eventually,

behavioral change (Stern & Guagnano, 1995). The VBN theory has been largely used to predict energy conservation behaviors (Han et al., 2016; Öztürk, 2019; Şahin, 2013; Steg et al., 2005; Whitley et al., 2016). For example, Steg et al. (2005) have tested the VBN theory to examine factors affecting the embrace of energy policies. The data was collected from 112 Dutch respondents. The casual chain of the variables in VBN theory was verified. Moreover, NEP was found to mediate the relationship between values and awareness of consequence beliefs.

Lastly, according to the Attitude-Behavior-External Condition (ABC) Theory, attitudes are translated into behaviors only if contextual factors (financial, physical, social, or legal) serve as either incentives or disincentives (Stern, 2000; Wilson & Dowlatabadi, 2007). Environmentally significant behaviors are the results of casually related internal (e.g., attitudes, beliefs, intentions, information) and external factors (physical facilities, economic forces, and social foundations) (Guagnano et al., 1995).

2.9.International and National Studies on Energy Conservation

In one study, the energy conservation efforts of two high schools built in the 1960s and 1970s in Colorado were compared. Rocky Mountain High School decreased its electrical energy consumption by 50% in eight years. This situation demonstrated that all school members were committed to energy conservation and sustainability. Besides, it was concluded that organizational culture and the presence of role models (e.g., teachers and environmental student clubs) encourage behavior change and motivation. Moreover, findings have proposed that efforts from all school occupants enable long-lasting behavior change (Schelly et al., 2011).

Higgs and McMillan (2006) examined the modeling practices of four secondary schools regarding sustainability education (SE). They collected the data through interviews with administrators, teachers, students, and staff and observations of daily activities, facilities, and meetings. As a result of data analysis, four primary means to model sustainability emerged: (1) individual role models, (2) school culture, (3) school facilities and operations, and (4) school governance. Teachers and staff modeled some behaviors, including turning off the lights when leaving the room,

eating local and organic food, biking or walking to school, driving a hybrid car, recycling, composting, reusing, and promoting democratic learning environments. Every member of the school served as a role model for other members about sustainability practices. Moreover, these schools showed the power of the school's campus facilities and operations as role models to equip students for sustainability. The schools put much effort into minimizing the school's adverse environmental effects. The school generated its energy via 150 photovoltaic panels. Also, they gathered and stored rainwater to reduce water consumption levels. It was observed that sustainable facilities and operations foster sustainability education by creating and practicing conservation culture, involving children in hands-on opportunities regarding sustainability, modeling environment-friendly practices, and promoting children's environmental stewardship. School cultures involve the school's shared values, beliefs, educational programs, extracurricular activities, traditions, and rituals (Stine, 2000). When the school embeds sustainability in its culture, they act as role models for members to support sustainability. At the end of the study, they concluded that schools could promote learning about sustainability and the adoption of sustainable lifestyles through modeling.

Jorgenson and his colleagues (2019) analyzed 70 articles published between 2012 and 2018 about climate change and energy education. The analysis demonstrated that "green" and "net zero" schools foster and encourage energy conservation at individual levels through school educational programs, school culture and management, peer and teacher modeling, and building characteristics. Besides, further instances were discovered where participatory educational strategies (e.g., project approach) were viewed as a way to encourage energy conservation behaviors. Moreover, the analysis showed that schools and households were regarded as the primary context to build personal and social norms concerning energy conservation, and children and youth were considered as the main drivers of the change. Embedding environmental actions in the daily lives of children was considered as a mean to empower them and promote their active participation in the process.

Şahin (2013) carried out a research study with 512 pre-service teachers to find out their energy conservation behaviors using Value-Belief-Norm Theory. The results indicated that pre-service teachers were not particularly active in energy

conservation. More than half of the teacher candidates reported that they leave the electric appliances on standby mode and they wash their dirty clothes with pre-washing. Moreover, the environmental attitudes of the pre-service teachers were found to have predictive power on their sense of responsibility to save energy.

In the preschool context, McNichol, Davis, and O'Brien (2011) examined the ecological footprint of an early childhood education center in Australia. The study included electricity, water, transport, food, waste, and paper footprints. Electricity consumption was found to have a third larger share in the total footprint of the kindergarten. It was recommended to reduce energy consumption via solar panels, renewable energy, and behavioral change.

Grodzińska-Jurczak et al. (2006) have explored children's attitudes towards plants and animals, paper saving, water, and energy conservation in Poland. Results have shown that 70% of children save energy. Another research study was conducted by Ärlemalm-Hagsér (2013) with children in one Swedish preschool in order to explore children's meaning-making and participation in a particular activity. Results have indicated that children had some understanding of energy conservation. When they were asked why we need to save energy, they stated, "Otherwise, the energy can go away, disappear." and "For the Earth to feel good."

An Australian kindergarten started a “Water Conservation Project” in order to become more self-sufficient in terms of water and electricity. For the project, a 22,000-liter rainwater tank was introduced to children. This prompted further brainstorming, which eventually resulted in the construction of a photovoltaic panel and the power grid's connection to the rainwater tank to deliver electricity to the preschool (Bates & Tregenza, 2007).

In Argentina, a project was coordinated with primary school and preschool children to create a sustainable urban environment. Teachers and students from upper grades (4^{th} and 5^{th}) visited the children. They held workshops about climate change, waste, alternative energies, pollution, and natural buildings. At the end of the project, students’ and teachers’ level of awareness was elevated, and they became more committed to their neighborhood. Children created a responsibility chart and

explained their commitment to promoting energy conservation, switching to renewables and alternative energy sources like waste digesters (UNESCO, 2012).

Another preschool project, Pupeñi Project, was conducted with kindergarten children, teachers, and their families in Chili in order to combat climate change through energy efficiency, conservation, and water reductions at school and in households. Before the project, the school community was not conscious of the influences of unnecessary use of energy. The community was provided with workshops, an awareness-raising campaign, and training programs about environmental issues, including the effects of wasteful resource consumption and the link between energy and the environment. In 2004, the kindergarten was awarded a certificate for fostering a sustainability culture at the school (UNESCO, 2012).

In the Turkish context, Kahriman-Ozturk et al. (2012) conducted a study to assess preschool children's attitudes toward environmental issues concerning consumption patterns, recycling, reusing, and environmental protection. The sample included 40 preschool children from Ankara. The data were gathered through an interview questionnaire adapted from "The Children's Attitudes Toward the Environment Scale- Preschool Version." The study found that most children hold positive attitudes toward paper, water, and electricity consumption. However, their rationales for environmentally friendly actions were centered on anthropocentrism.

In order to examine their environmental attitudes, Aydın and Çepni (2012) conducted a study with 790 primary school children in Karabük. Children!s attitudes were measured using the "Environmental Attitude Scale" developed by Atasoy (2005). The scale includes 25 questions on energy sources and energy consumption, plants and animals, environmental degradation, consumption and conservation, and the human-nature relationship. According to the results, primary school children had positive environmental attitudes. Students get the highest mean on the item "It is necessary to save water, electricity and energy in all homes and workplaces."

Simsar (2021) carried out a study with 100 Turkish preschool children to explore their environmental attitudes and awareness about their ecological footprint. The data were gathered through an Ecological Footprint Awareness Scale for Children

(Güngör & Kalburan, 2018). Energy and water use is one of the five themes of this scale. The result showed that children hold low ecological footprint awareness. Children's answers about energy and water use demonstrated they are anthropocentric. A word cloud was used to analyze children's most repeated phrases. According to the results, "my mother," "our money," "bill," and "garbage" were some of the words most used by children. That is, children save water and energy, not for the environment's sake. It is recommended for early childhood educators and practitioners to make activities to raise children's awareness regarding water and energy consumption and waste management.

As the results of many studies have revealed, even very young children are capable of critically responding to environmental issues (Davis, 1998; Otieno, 2008; Siraj-Blatchford et al., 2010) and proposing a solution related to these issues (Pressoir, 2008) when the content is embedded in their real life and play (Liu & Fengfeng, 2008).

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents information about research design, population, sampling, data collection instruments used in the study, validity and reliability issues, data collection procedure, potential threats to internal and external validity, data analysis procedure, assumptions, and limitations.

3.1.Design of the Study

The current study intended to compare early childhood education teachers' energy conservation behaviors, their attitudes toward the environment across eco versus non-eco preschools, and predictor variables including childhood location and household type, membership of Non-Governmental Organizations, pre-service or in-service course experience in environmental education and ESD.

The present study employed both comparative and cross-sectional survey designs. A cross-sectional survey involves gathering data from a sample selected from a predetermined population at one point in time (Fraenkel et al., 2012). In order to explore early childhood education teachers' energy conservation behaviors and attitudes toward the environment, a cross-sectional survey was used. On the other hand, the comparative research design was used to make a comparison between two or more variables without manipulating these variables (Fraenkel, Wallen, & Hyun, 2012). Analysis regarding the association between teacher-related variables and school type (eco/non-eco) constituted the comparative research part of the current study.

3.2.Data Collection Procedure for Study

The data were gathered through an online survey. According to Frankel and Wallen (2006), a survey allows the researcher to collect data about participants' characteristics, behaviors, attitudes, and experiences. Survey data collection is a convenient way to collect data from a large number of individuals in short periods on many variables

Prior to data collection, necessary permissions were obtained from the Research Center for Applied Ethics (UEAM) at METU and the Provincial Directorates for National Educational Education in İstanbul and Antalya, under the Ministry of National Education. To confirm the validity and reliability of the scales, a pilot study was carried out in the spring semester of 2021-2022. At the start of the third week of February, all selected preschools were contacted by phone. The questionnaire link was shared with the school principals or assistant principals via e-mail or WhatsApp. They were requested to share the questionnaire with the teachers. The questionnaire was shared with a total of 366 teachers from 29 public preschools with the support of school principals and assistant principals. In the following week, schools were contacted for a reminder. Before participating in the study, teachers' consent was requested, and they were informed about the purpose of the study. A total of 80 teachers volunteered to participate in the pilot study and filled out the form.

The main study was conducted in April and May of 2022. The questionnaire was forwarded to 925 early childhood education teachers working in 68 public preschools. Two hundred and seventy teachers filled out the form for the main study. To assure the confidentiality of the information, participant teachers' personal information (e.g., names, school names) was not asked, and the information collected was used solely for research purposes.

3.3.Population and Sample

The target population of the present study is defined as all early childhood education teachers working in public preschools in Türkiye. However, it was not feasible to

reach the entire population since it would require extensive time and effort. Thus, the accessible population was identified as all early childhood education teachers serving at public eco and non-eco preschools in the metropolitan cities of İstanbul and Antalya. Since these cities have the largest number of eco-schools, teachers serving in these schools were assumed to have high environmental awareness. İstanbul has 20 public eco-preschools and 275 early childhood education teachers working in these schools. Antalya has 23 public preschools and 293 teachers serving in these eco-preschools (TÜRÇEV, 2020). Cluster random sampling was employed for this study. This sampling method is used when it is not possible to randomly select individuals from a group (Fraenkel et al., 2012).

For the pilot study, 8 and 5 eco-preschools were randomly selected from İstanbul and Antalya, respectively. In the second stage of the sample selection for the pilot study, nine non-eco preschools from the same district of İstanbul and seven non-eco preschools from the same district of Antalya were randomly selected. The data were collected for the pilot study through the spring semester of 2021-2022. At the start of the third week of February, all selected preschools were contacted via phone. The questionnaire link was shared with the school principals or assistant principals via e-mail or WhatsApp. They were requested to share the questionnaire with the teachers. The questionnaire was then shared with a total of 366 teachers with the support of their principal and assistant principals. For the following week, schools were contacted for a reminder. Before participating in the study, teachers' consent was requested, and they were informed about the purpose of the study. A total of 80 teachers volunteered to participate in the study and filled out the form. The response rate was 21.85 percent for the pilot study.

For the main study, 13 and 10 eco-preschools, a total of 23 preschools, were randomly selected from the schools in İstanbul, and Antalya, respectively. Then, 30 non-eco schools from İstanbul and 15 non-eco schools from Antalya were randomly selected from the same districts of the same cities for comparison purposes. The questionnaire was sent to school principals or assistant principals to share with 219 and 164 teachers serving at eco-preschools and 377 and 165 teachers serving at non-eco preschools in İstanbul and Antalya, respectively. The survey was forwarded to the school principals to be shared with 925 early childhood education teachers. Two

hundred and seventy teachers completed the questionnaire from İstanbul and Antalya, representing a response rate of 29.2 percent.

3.3.1. Background Information of Early Childhood Education Teachers in the Pilot Study

Prior to the execution of the main study, a pilot study was conducted with 80 early childhood education teachers. The demographic profile of the participants is presented in Table 3.1.

Table 3.1

Demographic Characteristics of the Pilot Sample (N = 80)

Demographics	Groups	Frequency *f*	Percentage *%*
Gender	Male	7	8,75
	Female	73	91,25
Education	Associate degree	4	5,00
	Bachelor's Degree	66	82,50
	Post-graduate Degree	10	12,50
School Type	Eco School	56	70,00
	Non-eco School	24	30,00
Childhood Location	Rural Areas	27	33,75
	Urban Areas	53	66,25
Household Type	Detached House	46	57,50
	Apartment	34	42,50
NGO Membership	Yes	12	15,00
	No	68	85,00
Environmental Course	Yes	30	37,50
	No	50	62,50
ESD Course	Yes	4	5,00
	No	76	95,00

Of the 80 teachers, 73 of the participant teachers were female (91,25%), while 7 (8.75%) were male; participants' ages ranged from 24 to 55. Four teachers had associate degrees (5%), 66 had Bachelor's degrees in education (82.5%), and 10 held post-graduate degrees (12.5%). Whereas 70% of the teachers served in eco-schools, 30 % served in non-eco preschools. While 53 teachers (66.25%) reported that they spent their childhood in urban areas, 27 (33.75%) reported it as rural. Besides, 46 participant teachers (57.50%) lived in a detached house during their childhood, and 34 of them (42.50%) lived in an apartment during their childhood years. Lastly, most of the teachers (N=68) reported that they are not a member of NGOs concerned with

environmental issues, and they had not taken environmental (N=50) and ESD courses (N=76) during their college years.

Table 3.2

Age and Teaching Experience of the Pilot Sample (N = 80)

	M	*SD*	*Min*	*Max*	*N*
Age	34,25	6.89	24	55	80
Teaching Experience	10,50	6.59	1	32	80

As shown in Table 3.2, early childhood education teachers' teaching experience ranged from one year to 32 years, with a mean of 10.5. Participant teachers' ages ranged from 24 to 55, with a mean of 34.25 and 6.89 standard deviations.

3.3.2. Background Information of Early Childhood Education Teachers in the Main Study

The socio-demographic information of respondents is summarised in Table 3.3 below.

Table 3.3

Demographic Characteristics of the Main Study Sample (N = 270)

Demographic	Group	Frequency (f)	Percentage (%)
Gender	Male	18	6.7%
	Female	252	93.3%
Education	Associate's Degree	18	6.7%
	Bachelor's Degree	226	83.7%
	Post-Graduate Degree	26	9.6%
School Type	Eco School	172	63.7%
	Non-Eco School	98	36.3%
Childhood Location	Rural Areas	87	32.2%
	Urban Areas	183	67.8%
Household Type	Detached House	138	51.1%
	Apartment	132	48.9%
NGO Membership	Yes	51	18.9%
	No	219	81.1%
Environmental Course	Yes	119	44.1%
	No	151	55.9%
ESD Course	Yes	21	7.8%
	No	249	92.2%

The vast majority of the participant teachers were female (93.3%), and only 6.7% were male (n=18). Eighteen teachers (6.7%) had Associate's degrees, 226 teachers (83.7%) held Bachelor's degrees in education, and 26 teachers (9.6%) had post-graduate degrees. Whereas most of the teachers (n=172) served in eco-preschool, 98 participants' teachers served in non-eco-preschools.

Table 3.4

Age and Teaching Experience of the Main Study Sample (N = 270)

	N	*Min.*	*Max.*	*M*	*SD*
Age	270	20	59	34,86	7,60
Teaching Experience	270	1	34	10,85	7,07

Participants' age, between the range of 20 to 59, was, on average, 34.86 years old. The teaching experience of the participants ranged from 1 to 34 years, with a mean of 10.85.

3.4.Research Variables and Data Collection Instruments

The current study included six variables. Four of them are categorical and independent variables: childhood location and household type, membership of Non-Governmental Organizations, pre-service or in-service course experience in environmental education and/or ESD, and; one independent variable is continuous, namely attitudes towards the environment (NEP). One variable is continuous and dependent: early childhood education teachers' household energy conservation behaviors.

Three instruments were employed in the present study. The data were gathered using the Demographic Information Form, which was developed by the researcher, an adapted version of the Energy Conservation Scale (Şahin, 2013), and the New Environmental Paradigm Scale (Tuncer et al., 2009).

3.4.1. Demographic Information Form

The Demographic Information form was developed by the researcher in order to gather socio-demographic information from the participants. The form included

questions related to participants' gender, age, educational level, years of teaching experience, types of school they serve (eco/non-eco), childhood location and household type, membership status of NGOs, and the history of taking elective courses about environmental education and education for sustainable development.

3.4.2. Energy Conservation Behaviors Scale

Energy Conservation Scale measured early childhood education teachers' energy conservation behavior. Since the scale's reliability was satisfied with pre-service early childhood education teachers, the current study's sample is considered to have similar characteristics to Şahin's sample. The scale was originally developed by Ibtissem (2010), and its initial version includes 11 items. The scale is a 5-point scale rated '1' = never, '2' = rarely, '3' = sometimes, '4' = frequently, '5' = always, and it focused on the use of natural gas and electricity for lighting, heating, cooling, etc. purposes. For instance, "I switch off the light when I leave the room.", "I wait until I have a full load before doing my laundry." The scale was adapted to Turkish by Şahin (2013) with a sample of 512 pre-service teachers enrolled in different programs, including early childhood education, elementary science, and math education. After subsequent analysis, two items ("In the winter, I leave the windows open for long periods to let in fresh air" and "I take a shower in a short period of time (less than ten min.)" were removed from the scale since they did not fit the uni-dimensional model. The Cronbach's alpha value was found to be $\alpha = .72$, indicating a fair value (Şahin,2013) since it is above $\alpha = .70$ (Pallant, 2007). A higher score is associated with being more active in energy conservation.

3.4.3. New Environmental Paradigm Scale

The New Environmental Paradigm Scale was developed by Dunlap and Van Liere in 1978 and revised in 2000 to improve content validity and make it more comprehensive and remove sexist language (Dunlap et al., 2000). In the scope of the present study, the revised NEP questionnaire was used to evaluate early childhood education teachers' environmental attitudes (Dunlap et al., 2000). The NEP scale was selected since it is the most extensively used instrument to evaluate people's environmental attitudes (Hawcroft & Milfont, 2010). The scale includes 15 items

that cover Dominant Social Paradigm (DSP) and New Environmental Paradigm (NEP) premises. The former entails a belief in human superiority over nature, limitless resources, continuous economic development, and a faith in science and advanced technology to solve ecological problems (Albrecht et al., 1982). On the other hand, NEP recognizes humans as a part of nature, carrying capacity and balance of the ecosystem, and limits to growth (Albrecht et al., 1982; Geller & Lasley, 1985). Agreement with the NEP items and disagreement with the DSP items demonstrate a pro-ecological view (Dunlap et al., 2000). The scale was a 5-point Likert scale that ranges from 'strongly disagree' to 'strongly agree.' For example, "We are approaching the limit of the number of people the earth can support.", "Plants and animals have as much right as humans to exist." and "Humans will eventually learn enough about how nature works to be able to control it." The high scores on the NEP Scale are associated with pro-environmental beliefs and attitudes on various issues. Tuncer et al. (2009) carried out the scale's adaptation. Cronbach's alpha was found as .64, which is regarded acceptable range in social science (Mohamad et al., 2015).

3.5.Pilot Study

In this section, pilot study results for the Energy Conservation Behavior Scale and the New Environmental Paradigm Scale were presented.

3.5.1. Pilot Study Result of The Energy Conservation Behaviors Scale

This section present reliability statistics and exploratory factor analysis results for the Energy Conservation Behaviors Scale.

3.5.1.1.Reliability Statistics

First of all, Cronbach's Alpha value was examined. Şahin (2013) reported a .72 Cronbach's Alpha value for the Energy Conservation Behavior scale. In the pilot study, the Cronbach alpha value for 11 items was found to be .926, which indicates the scale has high internal consistency (Pallant, 2016).

3.5.1.2.Exploratory Factor Analysis Results

Firstly, item-scale values were explored prior to Exploratory Factor Analysis (EFA). Item-total values indicate the degree of correlation each item has with respect to the total score. Values lower than .3 demonstrate that the item measures something different from the other items on the scale (Pallant, 2016). As presented in Table 3.5 below, the inter-item value for eleven items varied between .620 and .923. All items had values higher than .3.

Table 3.5

Item-Total Statistics for Turkish Adapted Version of Energy Conservation Behaviors Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	42,190	49,142	0,923	0,910
Item 2	41,890	53,139	0,752	0,920
Item 3	42,660	50,429	0,620	0,923
Item 4	42,640	47,272	0,751	0,917
Item 5	42,360	51,171	0,630	0,922
Item 6	42,160	52,594	0,636	0,922
Item 7	42,690	45,281	0,782	0,916
Item 8	42,310	50,395	0,697	0,919
Item 9	42,430	51,615	0,663	0,921
Item 10	42,410	49,992	0,670	0,920
Item 11	42,390	48,595	0,731	0,917

In the next phase, the communalities, which provided information about how much of the variance in each item is explained, demonstrated that all values were greater than .30. Thus, it is concluded that all items fit well with other items in the scale (Pallant, 2016).

Table 3.6

Communalities for the Turkish Version of the Energy Conservation Behaviours Scale

Item	Initial	Extraction
Item 1	1,000	.883
Item 2	1,000	.658
Item 3	1,000	.467
Item 4	1,000	.644
Item 5	1,000	.486
Item 6	1,000	.510

Table 3.6 (cont'd)

Item 7	1,000	.681
Item 8	1,000	.569
Item 9	1,000	.531
Item 10	1,000	.527
Item 11	1,000	.613

Extraction Method: Principal Component Analysis.

Following communalities, item-total correlation values were examined. Since the item-total correlation value was above 0.30 for all items, it was determined that the items' measurement power was sufficient. As seen in Table 3.7, the relationships between the scale items and the total score obtained from the scale ranged between .691 and .937, and it was determined that the relationships were statistically significant ($p<0.01$). It was concluded that there was no problem with the consistency of the items with each other (Pallant, 2016).

Table 3.7

Item-Total Correlation Values for Energy Conservation Behaviors Scale

Item	r	p
Item 1	.937**	0,000**
Item 2	.784**	0,000**
Item 3	.695**	0,000**
Item 4	.810**	0,000**
Item 5	.697**	0,000**
Item 6	.691**	0,000**
Item 7	.841**	0,000**
Item 8	.754**	0,000**
Item 9	.719**	0,000**
Item 10	.736**	0,000**
Item 11	.789**	0,000**

**$p<0.01$

In the next step, Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy (Kaiser, 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) were examined to check the factorability of the dataset. Bartlett's Test of Sphericity tests H_0; in order words, it tests whether the correlation matrix is an identity matrix. The presence of an identity matrix would show that the items are not interrelated (Pett et al., 2003). In

order to conduct the factor analysis, Bartlett's test of sphericity should be significant at $p < .05$ (Tabachnick & Fidell, 2013). Bartlett's Test of Sphericity value was found to be .00 for Energy Conservation Scale. The Kaiser-Meyer-Olkin test (KMO) value was found to be .909. According to Kaiser (1974, p.35), KMO values above .90 are "marvelous," in the .80s are "meritorious," in the .70s are "middling," and less than .60 is "mediocre." In this respect, the .828 KMO value was regarded as "marvelous." Bartlett's Test of Sphericity and KMO values are presented in Table 3.8.

Table 3.8

The Results of the KMO and Bartlett's Test for the Turkish Adapted Version of Energy Conservation Behaviors Scale

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.909
Bartlett's Test of Sphericity	Approx. Chi-Square	593.972
	df	55
	Sig.	.000

Following the assessment of the item-total statistics, communalities, and the KMO and Bartlett's test of sphericity values, Principal Component Analysis was carried out in order to find out the number of initial factors. Based on the eigenvalues obtained, the results have shown that a one-factor solution explained 59.725% of the variance. (see Table 3.9).

Table 3.9

Total Variance Explained for Turkish Adapted Version of Energy Conservation Behaviors Scale

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.570	59.725	59.725	6.570	59.725	59.725
2	.884	8.036	67.760			
3	.756	6.868	74.629			
4	.561	5.100	79.729			
5	.501	4.553	84.281			
6	.424	3.854	88.135			
7	.416	3.786	91.921			
8	.329	2.991	94.912			
9	.261	2.371	97.283			
10	.212	1.924	99.207			
11	.087	.793	100.000			

Extraction Method: Principal Component Analysis.

A scree plot was also evaluated in order to decide on how many factors to retain. As seen in Figure 3.1, the plot started to level off and reached a stable level after the first component. There is also a clear break between the first and second components. Considering the initial eigenvalues and scree plot, the Energy Conservation Behavior Scale was retained as a one-factor solution since the original scale (Ibtissem, 2010) and the Turkish adapted version of the scale (Şahin, 2013) were both found to be uni-dimensional.

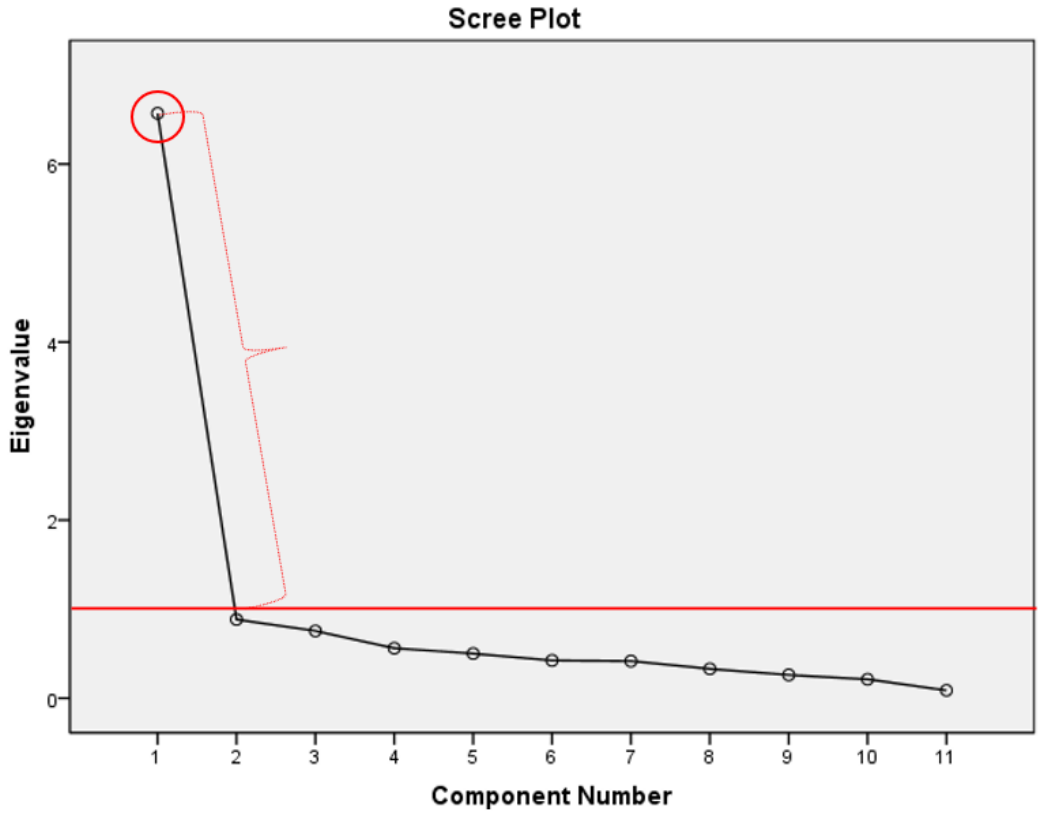


Figure 3.1. The first scree plot for the Turkish Adapted Version of Energy Conservation Behaviors Scale

Items' loading on the component is demonstrated in Table 3.10. Factor loadings ranged from .684 to .940. All items were retained for the main study since all loading is greater than .6 (Pallant, 2016). In the last phase, the component was tested for reliability through SPSS. The Cronbach alpha for the total scale was found at .926 for the current study; it was considered acceptable because it is greater than .7 (Pallant, 2016).

Table 3.10

Factor Loadings of the Items of the Turkish Adapted Version of Energy Conservation Behaviors Scale to the Factors

	Component
	1
Item 1	.940
Item 2	.811
Item 3	.684
Item 4	.803
Item 5	.697
Item 6	.714
Item 7	.825
Item 8	.754
Item 9	.729
Item 10	.726
Item 11	.783

Extraction Method: Principal Component Analysis.

3.5.2. Pilot Study Result of the New Environmental Paradigm Scale

The pilot study analysis for the NEP scale involved three steps which include identification of Cronbach Alpha, Exploratory Factor Analysis (EFA), and reliability analysis for latent components.

3.5.2.1.Reliability Statistics

First of all, Cronbach's Alpha value was examined. Dunlap et al. (2000) have reported a .83 Cronbach's Alpha value for the revised NEP scale. They have found five latent factors, including limits to growth (Item1, Item 3, Item 14), anti-anthropocentrism (Item 11, Item4, Item 8), the fragility of nature's balance (Item 2, Item 5, Item 15), rejection of exemptionalism (Item 12, Item 6, Item 9), and the possibility of ecocrisis (Item 13, Item 7, Item 10). Even though they have reported five interrelated factors of an ecological worldview, they cautioned about the presence of a single component (Dunlap et al., 2000). The factor structure of the revised NEP scale (Dunlap et al., 2000) is presented in Table 3.11. In the pilot study, the Cronbach alpha value for 15 items was found to be .851, which indicates the scale has high internal consistency (Pallant, 2016).

Table 3.11

The Factor Structure of the revised NEP Scale

Factors	Items
The Reality of Limits to Growth	We are approaching the limit of the number of people the earth can support. The earth has plenty of natural resources if we just learn how to develop them. The earth is like a spaceship with only limited room and resources.
Antianthropocentrism	Humans have the right to modify the natural environment to suit their needs. Plants and animals have as much right as humans to exist. Humans were meant to rule over the rest of nature.
The Fragility of Nature's Balance	When humans interfere with nature, it often produces disastrous consequences. The balance of nature is strong enough to cope with the impacts of modern industrial nations. The balance of nature is very delicate and easily upset.
Rejection of Exemptionalism	Human ingenuity will ensure that we do NOT make the earth unlivable. Despite our special abilities, humans are still subject to the laws of nature. Humans will eventually learn enough about how nature works to be able to control it.
The Possibility of an Ecocrisis	Humans are severely abusing the environment. The so-called "ecological crisis" facing humankind has been greatly exaggerated. If things continue on their present course, we will soon experience a major ecological catastrophe.

3.5.2.2.Exploratory Factor Analysis Results

Before conducting Exploratory Factor Analysis (EFA), item-scale values were examined. The item-scale correlation for all items was found to be above .3, which shows that all items are intended to measure the same construct (Pallant, 2016). The corrected item-total statistics for NEP Scale are indicated in Table 3.12.

Table 3.12

Item-Total Statistics for Turkish Adapted Version of New Environmental Paradigm Scale

Item No	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	54,763	73,297	,467	,844
Item 2	54,850	71,927	,462	,844
Item 3	54,925	74,501	,332	,850
Item 4	54,613	73,202	,435	,845
Item 5	55,800	65,225	,659	,831
Item 6	54,925	71,994	,449	,844
Item 7	55,638	64,209	,646	,832
Item 8	55,688	64,066	,676	,830
Item 9	55,988	68,899	,499	,842
Item 10	54,938	73,072	,366	,848
Item 11	55,988	67,531	,556	,838
Item 12	56,013	68,164	,584	,837
Item 13	54,825	72,804	,387	,847
Item 14	55,075	74,070	,358	,848
Item 15	55,125	73,123	,315	,852

Communalities which indicate how much of the variance in the item that can be explained by the extracted components (Pett et al., 2003), revealed that all values were higher than .30, which demonstrates all items fit well with the other items in its factor (Pallant, 2016) (see Table 3.13).

Table 3.13

Communalities for Turkish Adapted Version of the New Environmental Paradigm Scale Items

Item	Initial	Extraction
Item1	1,000	,835
Item 2	1,000	,636
Item 3	1,000	,741
Item 4	1,000	,823
Item 5	1,000	,866
Item 6	1,000	,738
Item 7	1,000	,850
Item 8	1,000	,822
Item 9	1,000	,698
Item 10	1,000	,738
Item 11	1,000	,632
Item 12	1,000	,615
Item 13	1,000	,701
Item 14	1,000	,755

Table 3.13 (cont'd)

Item 15	1,000	,585

Extraction Method: Principal Component Analysis.

Following communalities, item-total correlation values were examined. Since the item-total correlation value was above 0.30 for all items, it was determined that the measurement power of the items was at a sufficient level. As seen in Table 3.14, the relationships between the scale items and the total score obtained from the scale ranged from .420 and .752. It was determined that the relationships were statistically significant (p<0.01). It was concluded that there was no problem with the consistency of the items with each other.

Table 3.14

Item-Total Correlation Values for the New Environmental Paradigm Scale

Item	r	p
Item 1	,532**	0,000**
Item 2	,541**	0,000**
Item 3	,414**	0,000**
Item 4	,508**	0,000**
Item 5	,734**	0,000**
Item 6	,530**	0,000**
Item 7	,730**	0,000**
Item 8	,752**	0,000**
Item 9	,594**	0,000**
Item 10	,457**	0,000**
Item 11	,645**	0,000**
Item 12	,662**	0,000**
Item 13	,475**	0,000**
Item 14	,439**	0,000**
Item 15	,420**	0,000**

**p<0.01

In order to examine the construct validity and factor structure of the NEP Scale, Exploratory Factor Analysis with Principal Component Analysis (PCA) was conducted using the pilot study dataset. The analysis yielded a .828 Kaiser-Meyer-Olkin Measure of Sampling Adequacy value which is considered satisfactory for carrying out Factor Analysis (George & Mallery, 2003). Besides, Bartlett's Test of Sphericity value was calculated to confirm the multivariate normality of the distribution and correlation matrix. The analysis produced a KMO value of less than .05, which indicated that the assumption was not violated (Tabachnick & Fidell,

2013). The relevant KMO and Bartlett's test of Sphericity values are presented in Table 3.15.

Table 3.15

The Results of the KMO and Bartlett's Test for the New Environmental Paradigm Scale

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.828
Bartlett's Test of Sphericity	Approx. Chi-Square	850.106
	df	105
	Sig.	.000

Principle Component Analysis (PCA) with Varimax Kaiser Normalization was conducted after examining the item-total statistics, communalities, and the KMO and Bartlett's test of Sphericity values. The analysis revealed a three-factor model with eigenvalues higher than 1, which explained 73.557 % of the variance (see Table 3.16).

Table 3.16

Total Variance Explained for Turkish Adapted Version of the New Environmental Paradigm Scale

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4,969	33,128	33,128	4,490	29,934	29,934
2	4,163	27,753	60,881	4,220	28,135	58,069
3	1,901	12,676	73,557	2,323	15,488	73,557
4	,626	4,173	77,730			
5	,573	3,820	81,550			
6	,475	3,168	84,718			
7	,424	2,825	87,542			
8	,407	2,712	90,254			
9	,345	2,300	92,554			
10	,325	2,165	94,719			
11	,236	1,576	96,294			
12	,198	1,319	97,613			
13	,166	1,109	98,722			
14	,112	,745	99,467			
15	,080	,533	100,000			

When the scree plot is examined, it indicates a tripartite model. There is a clear break after the third component, and the scree plot reached a stable level after the third

factor (see Figure 3.2). Thus, it was considered appropriate to proceed with the three-factor solution.

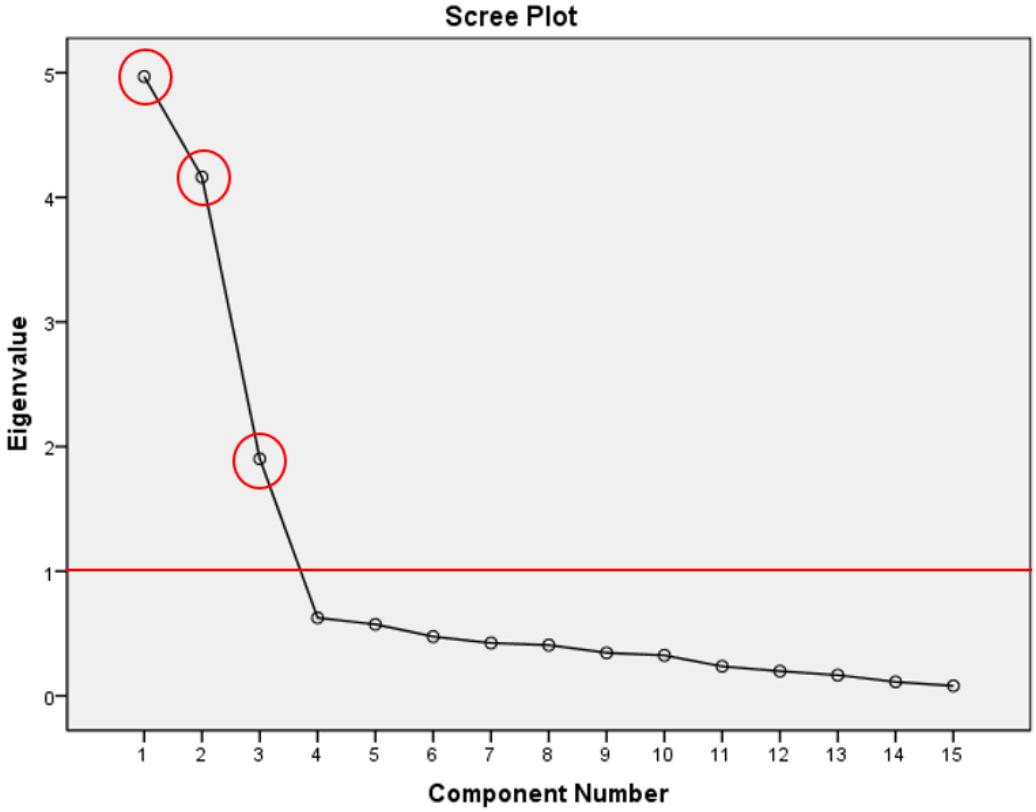


Figure 3.2 The scree plot for the Turkish Version of the NEP Scale

Table 3.17

Rotated Factor Loadings of Turkish Adapted Version of the New Environmental Paradigm Scale Items

	Component		
Items	**1**	**2**	**3**
Human ingenuity will ensure that we do NOT make the earth unlivable.	.773		
Humans have the right to modify the natural environment to suit their needs.	.788		
Humans will eventually learn enough about how nature works to be able to control it.	.831		
Humans were meant to rule over the rest of nature.	.892		
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	.910		
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	.912		
The balance of nature is very delicate and easily upset.		.760	

Table 3.17 (cont'd)

When humans interfere with nature, it often produces disastrous consequences.	.784	
Humans are severely abusing the environment.	.837	
Despite our special abilities, humans are still subject to the laws of nature.	.846	
If things continue on their present course, we will soon experience a major ecological catastrophe.	.856	
Plants and animals have as much right as humans to exist.	.907	
The earth has plenty of natural resources if we just learn how to develop them.		.844
The earth is like a spaceship with only limited room and resources.		.850
We are approaching the limit of the number of people the earth can support.		.876

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax Kaiser Normalization.

As presented in Table 3.17, Item 12 (Human ingenuity will ensure that we do NOT make the earth unlivable), Item 11 (Humans have the right to modify the natural environment to suit their needs), Item 9 (Humans will eventually learn enough about how nature works to be able to control it), Item 8 (Humans were meant to rule over the rest of nature), Item 5 (The balance of nature is strong enough to cope with the impacts of modern industrial nations), and Item 7 (The so-called "ecological crisis" facing humankind has been greatly exaggerated) were formed as the first component which is named "Human Rules" (Englis & Phillips, 2013). Its factor loading ranged from .773 to .912. On the other hand, Item 15 (The balance of nature is very delicate and easily upset), Item 2 (When humans interfere with nature, it often produces disastrous consequences), Item 13 (Humans are severely abusing the environment), Item 6 (Despite our special abilities, humans are still subject to the laws of nature), Item 6 (Despite our special abilities, humans are still subject to the laws of nature), and Item 4 (Plants and animals have as much right as humans to exist) were constituted the second component with factor loadings that were found to range between .760 and .907. This component included items concerning the "balance of nature" (Albrecht et al., 1982; Dunlap et al., 2000). In the present study, this factor was named "nature rules" (Englis & Phillips, 2013). Lastly, Item 3 (The earth has plenty of natural resources if we just learn how to develop them), Item 14 (The earth is like a spaceship with only limited room and resources), and Item 1 (We are

approaching the limit of the number of people the earth can support) made up the third component which is named as "limits to growth" (Albrecht et al., 1982; Dunlap et al., 2000; Englis & Phillips, 2013). This component is based on the premise that there are limits to growth that overlap with the carrying capacity of planet Earth (Englis & Phillips, 2013). Its factor loadings were found to be between .844 and .876. All items produced a strong loading (above .6) on the relevant factor.

For the last step, the reliability of the sub-dimensions was examined. Cronbach alpha values of sub-factors ranged from .843 to .930. A reliability score of .40 and above is acceptable (Kuhn & Jackson, 1989).

3.6.Confirmatory Factor Analysis of the Scales

Confirmatory factor analysis results for the Energy Conservation Behavior Scale and the New Environmental Paradigm Scale were presented in this section.

3.6.1. Confirmatory Factor Analysis for the Energy Conservation Behavior Scales

Confirmatory factor analysis is performed in order to test the model obtained from the exploratory factor analysis (Bangert, 2006). CFA is used to examine the scale's construct validity (Harrington, 2009). For this purpose, CFA was conducted on 11 items in the Energy Conservation Behavior Scale. In this regard, the Linear Structural Relations Statistics Package Program (LISREL 8.8) (Jöreskog & Sörbom, 2006) was used to conduct CFA. Figure 3.3 illustrates the hypothesized model produced using the LISREL 8.8 program.

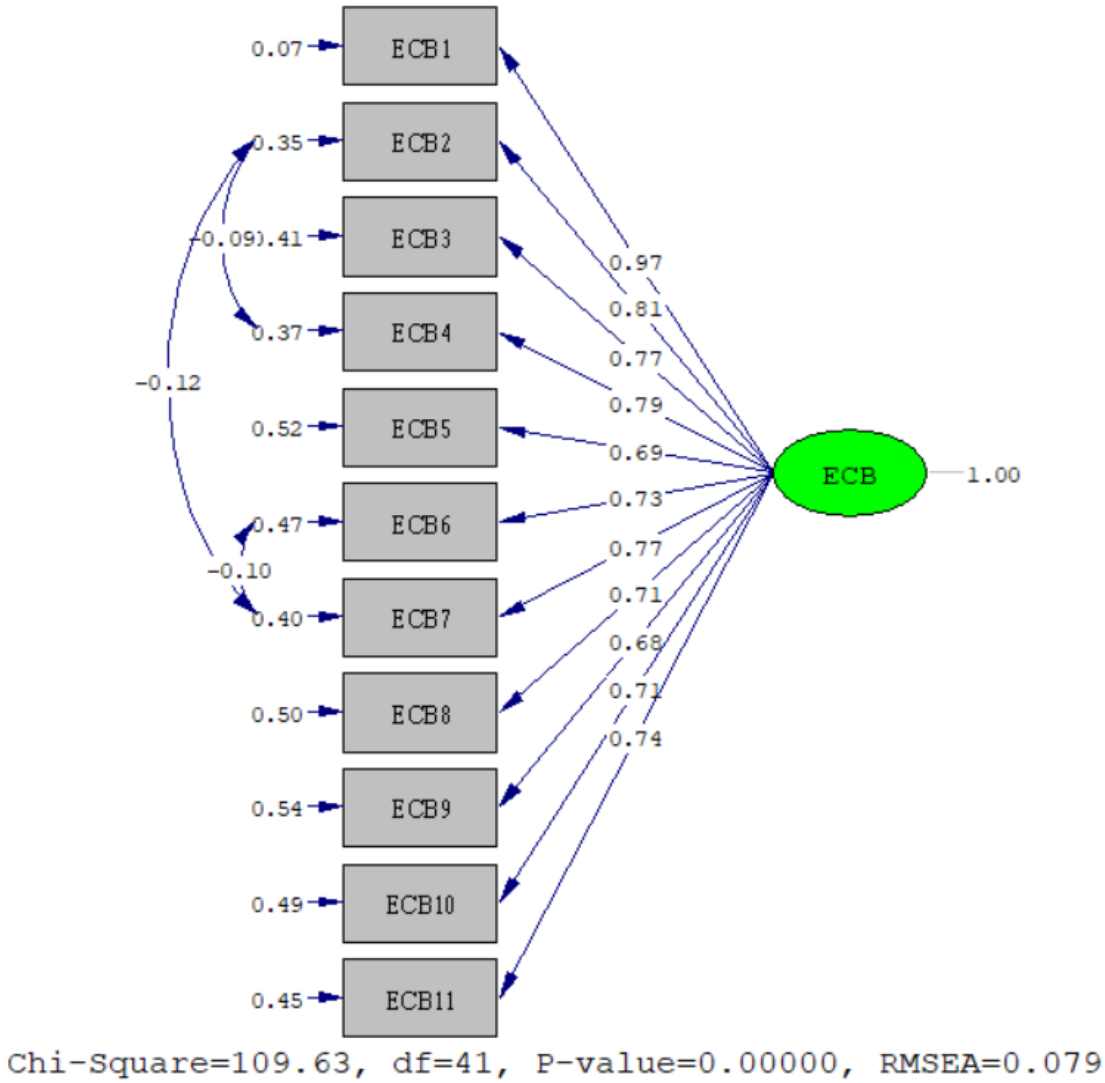


Figure 3.3 Hypothesized model for the Energy Conservation Behavior Scale

As illustrated in Figure 3.3, according to the CFA results of the energy conservation behavior scale, it was necessary to make modifications between items 2-4, 2-7, and 6-7 since the fit indices were not at the desired level in the first stage. The CFA produced items' factor loadings values between .68 and .97, which are in the acceptable range. The t values of the factor loadings of the scale are given in Figure 3.4.

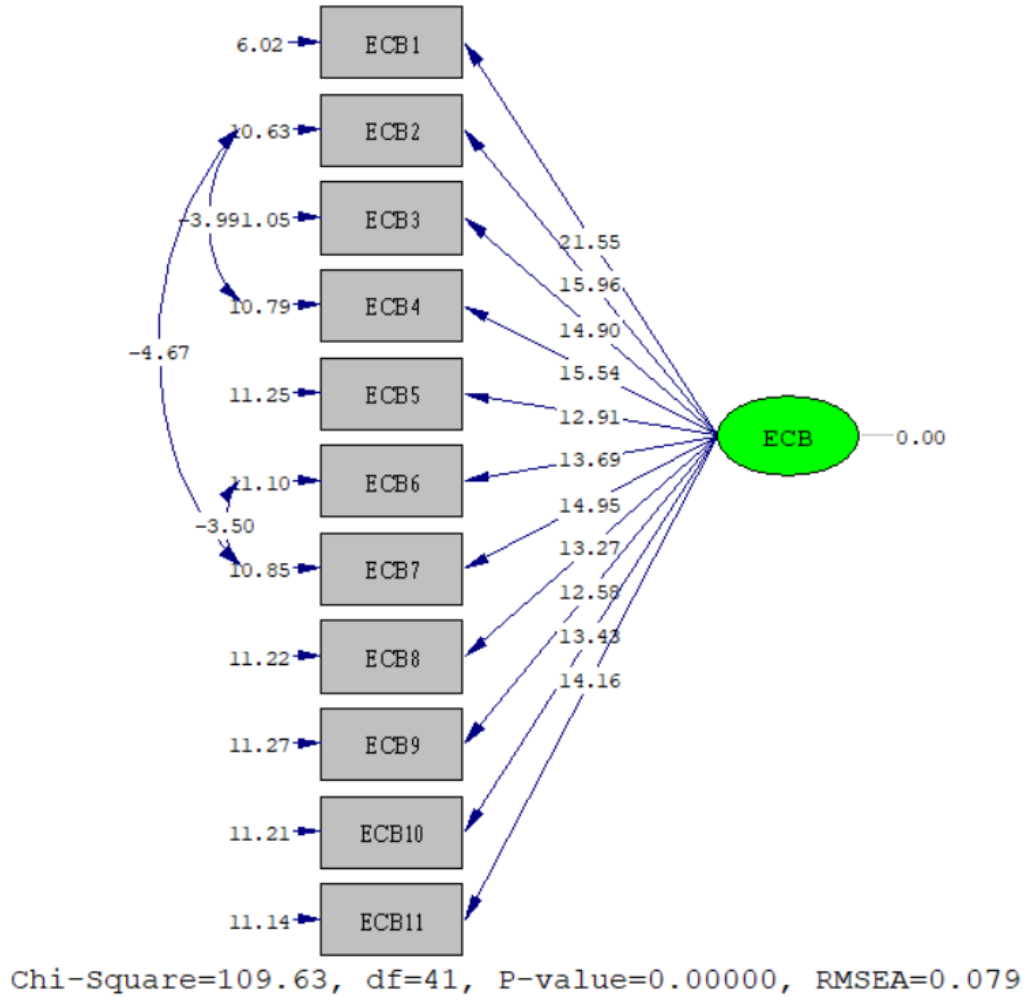


Figure 3.4 The Energy Conservation Behavior Scale's T-Value Path Diagram

The t values, which are the expression of the statistical significance level of the relations between the items and latent variables (Büyüköztürk et al., 2018), were found to be significant at p<.01 level. The t values of all items were found to be higher than 2.58. Goodness-of-fit indices of the proposed model should be examined in order to check the structural model assessment. In this respect, (Schermelleh-Engel et al., 2003) recommended some rules of thumb, which are presented in Table 3.18 below.

Table 3.18

Model Fit

Fit Index	Perfect Fit	Acceptable Fit
$\chi 2/ df$	≤3	≤5
RMSEA	< RMSEA<.05	.05 ≤ RMSEA ≤ .10
RMR	0 ≤ RMR<.05	.05 ≤ RMR ≤ .10
SRMR	0 ≤ SRMR<.05	.05 ≤ SRMR ≤ .10
NFI	.95 ≤ NFI ≤ 1	.90 ≤NFI ≤ .95
NNFI	.95 ≤ NNFI ≤ 1	.90 ≤NNFI ≤ .95
CFI	.95 ≤ CFI ≤ 1	.90 ≤CFI ≤ .95
GFI	.95 ≤ GFI ≤ 1	.90 ≤GFI ≤ .95
AGFI	.90 ≤ AGFI ≤ 1	.85 ≤ AGFI ≤ .90

Note. $\chi 2$=Chi-square; $\chi 2$/df=Ratio of Chi-square to Degrees of Freedom; RMSEA = Root Mean Square Error of Approximation; RMR= Root mean square residual; SRMR = Standardized Root Mean Square Residual; NFI= Normed Fit Index; NNFI=Non-Normed Fit Index; CFI=Comparative Fit Index; GFI=Goodness-of-Fit Index; AGFI=Adjusted Goodness-of-Fit Index.

The fit indices of the energy conservation behavior scale obtained as a result of the CFA are presented in Table 3.19.

Table 3.19

Goodness-of-fit Indices of the Energy Conservation Behavior Scale

X^2/df	p	RMSEA	CFI	GFI	AGFI	NNFI	NFI	RMR	SRMR
2,673	0,000	0,079	0,99	0,93	0,90	0,98	0,98	0,031	0,036

In order for the scale to be accepted, the criteria of goodness of fit obtained must be between the minimum acceptable limits. When the values of the fit criteria obtained as a result of CFA were examined, it was determined that the ratio of the most important fit value, X2, to the df value was at the perfect fit level of 2.673, and the RMSEA value with .079 at the acceptable fit level. As seen in Table 3.19, other indices are also acceptable or in the perfect range. In light of all these findings, it was determined that the one-factor structure was confirmed.

The reliability of the measurement model was tested by considering the average variance extracted (AVE) and composite reliability (CR) values. Since the CR value, indicated in Table 3.20, was found to be above the threshold value of 0.70 and the AVE value above the threshold value of 0.50 (Bagozzi & Yi, 1998), the reliability and convergent validity of the measurement model were satisfied. As a result of the main study, it was determined that the reliability level of the scale was high (Cronbach's alpha=0.933 > 0.70).

Table 3.20

Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) values of the Energy Conservation Behavior Scale

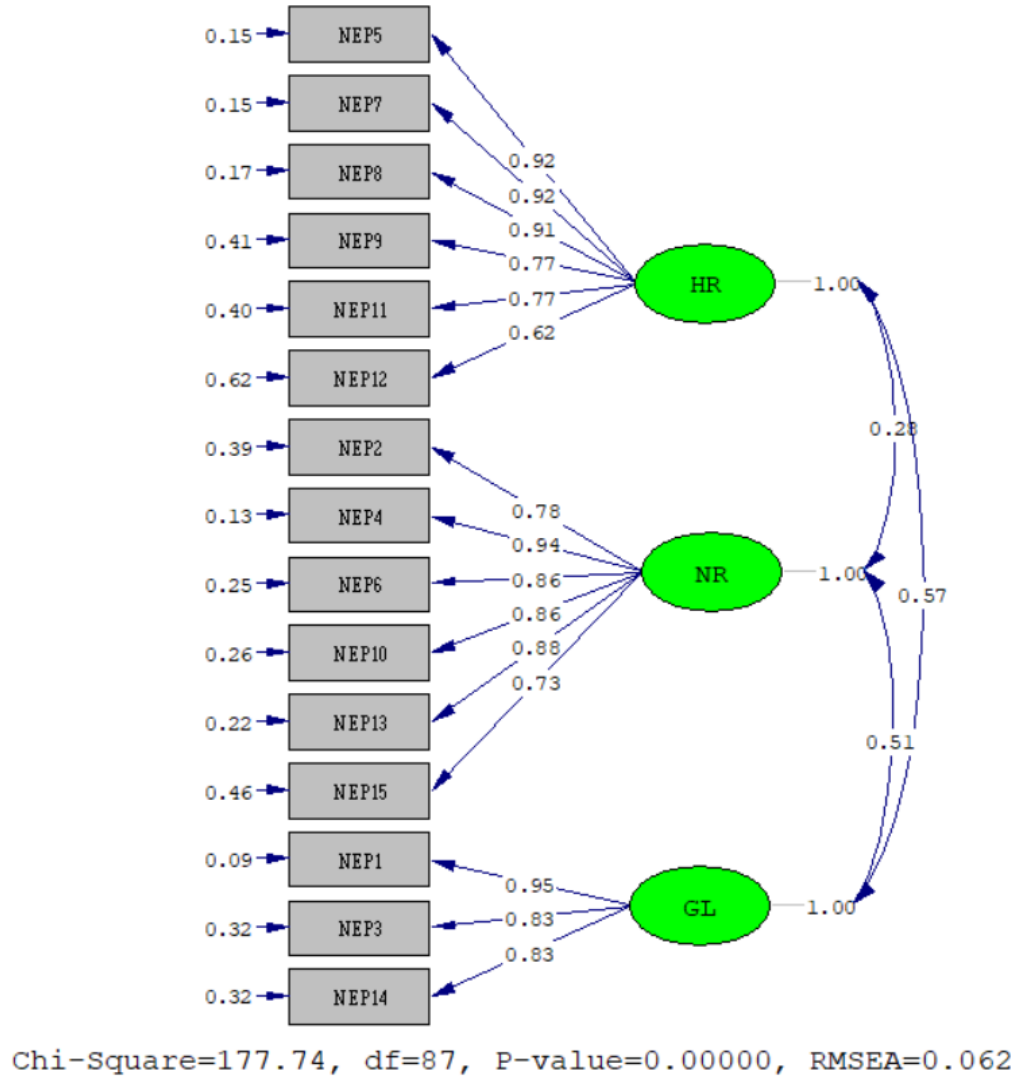
ECB	Cronbach's Alpha	AVE	CR
ECB	0,933	0,58	0,94

3.6.2. Confirmatory Factor Analysis for the New Environmental Paradigm Scale

Considering the relevant literature, different studies reported a different number of factors for the original and revised NEP Scale. Several studies reported two-factor (Gooch, 1995; Noe & Snow, 1990; Nooney et al., 2003), three-factors (Albrecht et al., 1982; Noe & Snow, 1990), and four-factor solutions (Furman, 1998; Kuhn & Jackson, 1989) for the original 12 item NEP scale. For the revised NEP scale, one factor (Hunter & Rinner, 2004), two factors (Ateş, 2019), three factors (Floyd & Noe, 1996; Müderrisoğlu & Altanlar, 2010; Öztürk, 2019; Thapa, 2001), four factors (Erdoğan, 2009), and five-factor solutions (Goldman et al., 2014; Hosseinnezhad, 2017; Ogunbode, 2013) were reported. Although in the study of Hunter and Rinner (2004), all the items were heavily loaded on the first unrotated factor, they carried out the analysis with varimax rotation to examine the multidimensionality. Even though rotation produced a tripart solution, they continued with a one-factor solution due to the absence of any clear pattern. Dunlap et al. (2000) argued that the NEP scale would produce more than one factor, which are typically sample-specific. They

proposed to use the scale and decide on the dimensionality based on the data analysis. Since EFA yielded a three-factor solution, the three-factor solution was tested.

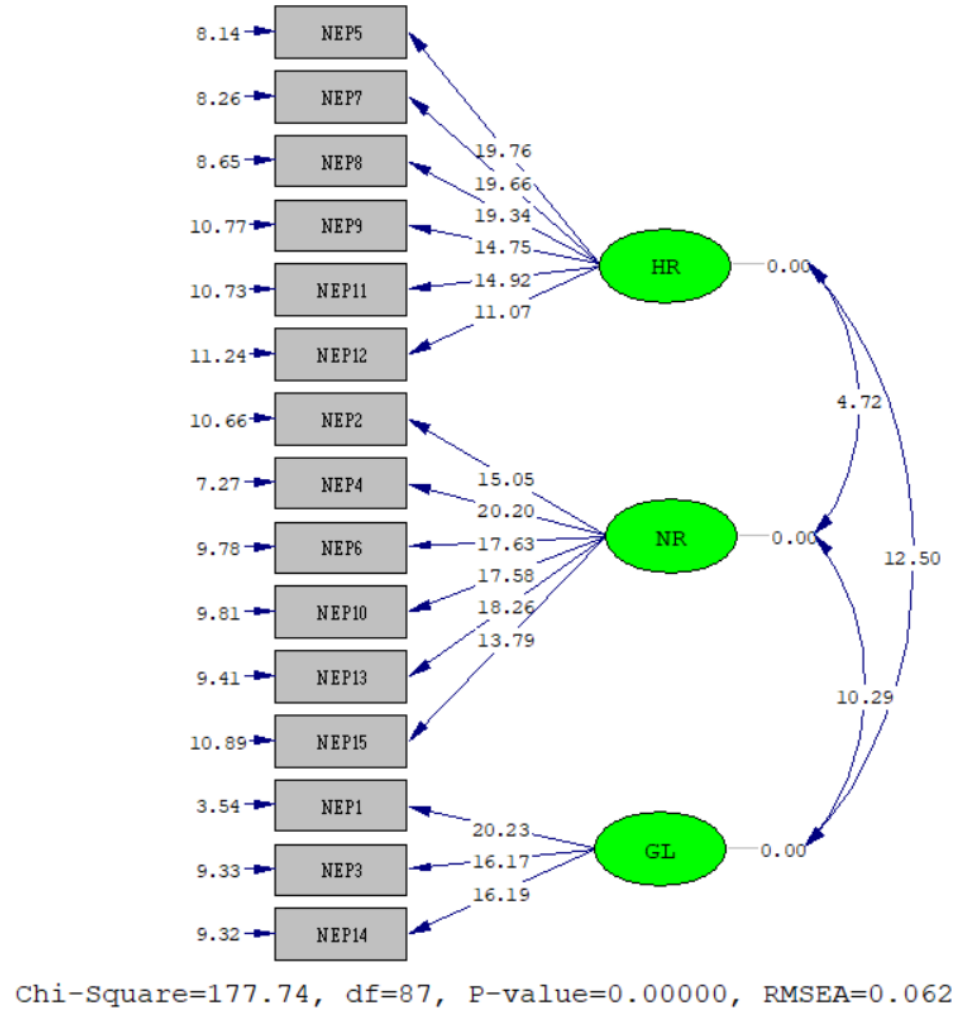
It was hypothesized that the observed variables NEP5, NEP7, NEP8, NEP9, NEP11, and NEP12 would be loaded on the latent variable "Human Rules" (HR); the observed variables NEP2, NEP4, NEP6, NEP10, NEP13, and NEP15 would be loaded on the latent variable "Nature Rules" (NR); and the observed variables NEP1, NEP3, and NEP14 would be loaded on the latent variable "Growth Limits" (GL). The hypothesized model, obtained using the LISREL 8.8 statistical program (Jöreskog & Sörbom, 2006), is shown in Figure 3.5.



HR= Human Rules, **NR**= Nature Rules, **GL**= Growth Limits

Figure 3.5 Hypothesized model for the New Environmental Paradigm Scale

When Figure 3.5 was examined, it was concluded that no modifications were needed between the items since the fit indices were at the desired level in the first stage. The factor loadings of the items of the scale were determined as a result of CFA, between .62 and .95, which are in the acceptable range. Figure 3.6 reveals the t values of the factor loadings of the scale.



HR= Human Rules, **NR**= Nature Rules, **GL**= Growth Limits

Figure 3.6 The New Environmental Paradigm Scale's T-Value Path Diagram

The t values were found significant at p<.01 level. The t values of all items were found to be higher than 2.58. Goodness-of-fit indices of the proposed model are presented in Table 3.21. As seen from the table below, the X2/df value was 2.042, which is a perfect fit since it is lower than .3 (Schermelleh-Engel et al., 2003). The NNFI and CFI values were found to be .97 and .92, which are regarded as a good fit since it is higher than .90 (Kline, 1998). The RMSEA value was .062, which indicated a reasonable fit since it is lower than .08 (Schumacker & Lomax, 1996). Thus, it was concluded that the tripartite factor NEP scale has a good fit.

Table 3.21

Goodness-of-fit Indices of the New Environmental Paradigm Scale

X^2/df	p	RMSEA	CFI	GFI	AGFI	NNFI	NFI	RMR	SRMR
2,042	0,000	0,062	0,98	0,92	0,90	0,97	0,97	0,062	0,049

The reliability of the measurement model was tested by considering the average variance extracted (AVE) and composite reliability (CR) values. Since the CR values, which are indicated in Table 3.21, were above the threshold value of 0.70 and the AVE values above the threshold value of 0.50 (Bagozzi & Yi, 1998), it was determined that the reliability and convergent validity of the measurement model were satisfied. As a result of the main study, it was determined that the reliability level of the scale was high (Cronbach's alpha > .70).

Table 3.22

Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) values of the New Environmental Paradigm Scale

Factors	Cronbach's Alpha	AVE	CR
HR	0,927	0,68	0,93
NR	0,934	0,71	0,94
GL	0,900	0,76	0,90

3.7.Internal Validity

Internal validity has been defined by Fraenkel, Wallen, and Hyun (2012) as an observed relationship between the dependent and independent variable that is directly related to the independent variable, not owing to other unintended variables. Identification and minimization of possible threats to internal validity are critical to making the study internally valid. Fraenkel, Wallen, and Hyun (2012) emphasize that potential threats to internal validity for survey-based research are subject characteristics, mortality, location, and instrumentation. In this respect, these threats and possible ways to deal with them are underscored in the present study.

Fraenkel, Wallen, and Hyun (2012) argued that although research subjects are selected based on specific characteristics, the results of the study may differ

according to other characteristics of individuals. The possibility of subject characteristic threat is the major threat to comparative research (Fraenkel, Wallen, & Hyun, 2012). In energy conservation studies, it was found that females are more active about energy conservation (Gonzalez et al., 2020; Şahin, 2016), and females feel more responsible for energy-related issues such as global warming and exhaustion of energy sources than males (Dumciuviene et al., 2019). The early childhood education teacher population includes women predominantly. There were 57,069 female and 4,935 male ECE teachers working in public kindergartens across Türkiye in 2020 (Republic of Türkiye Ministery of National Education, 2020). The large majority of the sample included female early childhood education teachers. In this way, gender-related differences aimed to be eliminated or minimized. On the other hand, Korkmaz and Guler Yildiz (2017) have reported differences regarding visual displays about the unnecessary use of electricity and the frequency of verbal reminders given for water use among public and private eco preschools. Only public and private eco-schools were included in the current study to eliminate the possible differences. Furthermore, some information about the participants, including their age, and years of teaching experience, was gathered to minimize the subject's characteristic threat to internal validity. With these, the aim was to control this subject characteristic threat.

Another threat to the internal validity addressed by Fraenkel, Wallen, and Hyun (2012) is mortality, which becomes an issue when subjects or participants of the study drop out, or researchers cannot gather all the distributed forms from the participants. In the current study, the questionnaire was shared with school principals or assistant principals to forward to teachers. Participants were informed about the approximate time needed to complete the scale and requested to fill out the form in their available times. In that way, the mortality threat was controlled or minimized for this study.

Location also posed a threat to the current study. According to Fraenkel, Wallen, and Hyun (2012), locations in which the questionnaire is administered may have an effect on a study. The data was collected from different teachers from different schools online. Thus, as it might have been difficult to collect the data in similar places given possible variation in the heating/cooling, noise, lighting, and space

opportunities available. Location was considered a threat to the present study because of the nature of the data collection procedure.

Instrumentation is another threat to internal validity. Fraenkel and Wallen (2006) specified that instrumentation threat occurs through instrument decay, data collector characteristics, and data collector bias. Considering instrument decay, all questionnaires were designed in the same format in order to optimize the scoring of the measuring tool and code the variables. Regarding data collector characteristics, all of the data collected online eliminates possible consequences caused by different collectors. Data collector bias was not considered a threat to the present study since the data was gathered online.

3.8.Data Analysis

Preliminary analysis, descriptive statistics, and inferential statistical analysis were carried out using IBM SPSS 24.0 statistical software to examine the present study's data. Firstly, the dataset was screened considering the missing values and outliers. Descriptive statistics were employed to examine the mean, minimum, maximum values, and standard deviation of the variables. Independent sample t-tests and multiple linear regression were employed as inferential statistics to investigate the research questions. Multiple regression is used to examine the predictive ability of a group of independent variables on the dependent variable. It allows a researcher to make comparison between predictor variables and determine the best group of variables predicting the dependent variable (Pallant, 2016). Multiple regression was conducted to find out the determinants of the energy conservation behaviors of early childhood education teachers.

3.9.Threats to External Validity of the Study

External validity has been described as the extent to which the findings of the study can be generalizable to the population (Fraenkel, Wallen & Hyun, 2012). The sampling method enables researchers to make generalizations from a sample to the population (Fraenkel & Wallen, 2006). In the current study, two-stage sampling was used since it is found more convenient regarding the population. For this reason, it is

not advisable to generalize the findings to all early childhood education teachers serving at all public eco and non-eco preschools in Antalya and İstanbul.

3.10. Assumptions of the Study

It is assumed that the participants comprehended the questions and answered them sincerely. Participants completed the instruments under standard conditions and didn't interact with other participants during the administration process. Moreover, it is assumed that the participant teachers' attitudes and behaviors were accurately measured using self-report scales.

3.11. Limitations of the Study

The current study has some limitations. Given it is based on self-reported data, the results may be influenced by social desirability response bias. In order to minimize this bias, environmental attitudes were measured after the evaluation of energy conservation behaviors. The study's findings were restricted to several instruments, including the Energy Conservation Scale and the New Environmental Paradigm Scale, with 270 early childhood education teachers from İstanbul and Antalya. Thus, the sample may not represent the population. As with the other correlational techniques, multiple linear regression doesn't confirm causative relationships between variables.

CHAPTER 4

RESULTS

This chapter presents the results of the preliminary data analysis, descriptive statistics, and multiple linear regression analysis. Regarding the preliminary analysis, data accuracy and missing data were checked. The descriptive statistics were carried out to examine the mean, minimum, maximum values, and standard deviation. The last part covers the results of the independent sample t-test and regression analysis.

4.1.Preliminary Data Analysis

Preliminary data analysis was carried out using IBM SPSS 24.0 statistical software program. Prior to making inferential statistics, data were screened since missing data may affect the results (Pallant, 2016). Frequency analyses were carried out, and no missing value was found.

In order to determine the analysis method to be used, the skewness and kurtosis coefficients of the scores obtained in terms of both general and each demographic variables were examined, and the results are given in Table 4.1.

Table 4.1

Test of Normality

School Type		N	Min	Max	Mean	SD	Skewness		Kurtosis	
		Stat.	Stat.	Stat.	Stat.	Stat.	Stat.	Std. Error	Stat.	Std. Error
eco	ECB	172	14,00	55,00	46,122	8,472	-1,469	,185	2,307	,368
	NEP	172	15,00	75,00	59,704	11,323	-1,503	,185	3,755	,368
	HR	172	6,00	30,00	20,314	6,951	-,422	,185	-,862	,368
	NR	172	6,00	30,00	26,483	5,006	-1,933	,185	4,941	,368
	GL	172	3,00	15,00	12,907	2,471	-1,987	,185	4,615	,368
non-eco	ECB	98	28,00	55,00	46,255	7,130	-,668	,244	-,967	,483
	NEP	98	15,00	75,00	58,459	11,833	-1,381	,244	2,893	,483
	HR	98	6,00	30,00	19,939	6,852	-,499	,244	-,635	,483
	NR	98	6,00	30,00	25,755	5,466	-1,837	,244	3,239	,483
	GL	98	3,00	15,00	12,765	2,600	-1,666	,244	2,841	,483

Note. ECB = the Energy Conservation Behavior Scale; NEP = the New Environmental Paradigm Scale; HR = Human Rules; NR = Nature Rules; GL = Growth Limits.

When Table 4.1 is examined, it is seen that the scores obtained from the Energy Saving Behavior scale, the New Environment Paradigm scale, and its three dimensions show a normal distribution since the skewness and kurtosis values are within the range of acceptable values. Skewness values between -2 and+2 (George & Mallery, 2010) and kurtosis values ranging from -5 to +5 demonstrate that the scores have a normal distribution (Kim, 2013).

As a result of the normality examinations of the scores obtained from the scales, it was decided not to include the following variables in data analysis: age, educational level, and years of teaching experience. The decision was taken to keep them for the descriptive statistics to have a well-rounded picture of the sample. Besides, it was decided to carry out an independent sample t-test and multiple linear regression to examine the contribution of independent variables (environmental attitudes, childhood location, household type, NGO membership, EE and/or ESD course

experience) to the energy conservation behaviors of early childhood education teachers. Different regression analyses were conducted for eco and non-eco groups.

4.2.Descriptive Analysis

In order to answer the first research question, descriptive statistics, mean and standard deviation, were reported. Table 4.2 demonstrates the descriptive analysis of the Energy Conservation Scale and New Environmental Paradigm and its subdimensions for eco and non-eco groups.

Table 4.2

Descriptive Statistics

School Type		N	Mean	Std. Deviation
		Stat.	Stat.	Stat.
eco-school	ECB	172	46,122	8,472
	NEP	172	59,704	11,323
	NEP HR	172	20,314	6,951
	NEP NR	172	26,483	5,006
	NEP GL	172	12,907	2,471
non-eco school	ECB	98	46,255	7,130
	NEP	98	58,459	11,833
	NEP HR	98	19,939	6,852
	NEP NR	98	25,755	5,466
	NEP GL	98	12,765	2,600

Note. ECB = the Energy Conservation Behavior Scale; NEP = the New Environmental Paradigm Scale; HR = Human Rules; NR = Nature Rules; GL = Growth Limits.

As summarized in Table 4.2, the mean score for energy conservation behaviors of early childhood education teachers working in eco-schools was 46.122, while the eco group's mean was 46.255. Teachers working in eco and non-eco preschools did not show considerable differences in energy conservation behavior scores.

The energy conservation behaviors scores of teachers in the eco-group ranged from 14 to 55, and the mean score was 46.122. Thus, it can be inferred that early childhood education teachers had a high level of energy conservation behaviors. On the other hand, the energy conservation behaviors scores of teachers in the non-eco group ranged from 28 to 55, with mean scores of 46.255. Therefore, it can be

inferred that early childhood education teachers serving in non-eco preschools had slightly higher levels of energy conservation behaviors.

When the NEP scores were examined, the NEP scores of ECE teachers in the eco group ranged between 15 to 75, with a mean of 59.704. This means that ECE teachers working in eco-schools have highly positive environmental attitudes. The NEP scale was also examined with its sub-scales of "human rules, "nature rules," and "growth limits." Human Rules scores of ECE teachers ranged from 6 to 30, with a mean score of 20.314. This means that ECE teachers hold views supporting human superiority over nature.

On the other hand, Nature Rules scores of ECE teachers ranged from 6 to 30, with a mean score of 26.483. This shows that ECE teachers hold views supporting the balance of nature. Lastly, ECE teachers Growth Limits scores ranged from 3 to 15, with a mean score of 12.907. This means that ECE teachers mostly believe that there are limits to growth. The scores of ECE teachers in the non-eco group were slightly below teachers in the eco-group.

Table 4.3

Sample Items and Descriptive Statistics for ECB Scale

	M	N *%*	R *%*	S *%*	F *%*	A *%*
I wait until I have a full load before doing my laundry.	4,38	1,1	0,7	14,8	25,6	57,8
I turn off the devices like TV, computer, PlayStation from remote control and also button.	4,18	0,4	11,1	8,9	29,6	50,0
In the winter, I keep the heat on so that I do not have to wear a sweater. *	4,19	1,1	5,6	10,4	39,6	43,3
I use the maximum of natural light.	4,45	0,4	1,9	7,0	33,7	57,0
I switch off the light when I leave the room.	4,70	0,7	11,1	1,9	20,0	76,3

*Note. N=Never, R=Rarely, S=Sometimes, F=Frequently, A=Always, *Items were reverse coded.*

When Table 4.3 was examined, it was seen that 57.8% of early childhood education teachers stated that they always wait until they have a full load before laundry. 50%

of the teachers always turn off devices using remote control and buttons. For the item "In the winter, I keep the heat on so that I do not have to wear a sweater." 43.3% of the participants stated that they always wear their sweaters rather than keeping the heat on. Whereas 76.3% of the teachers always switch off the lights when leaving the room, 20% frequently do so, with the highest mean, 4.70.

Table 4.4

Descriptive Statistics for NEP Scale

Factors	Items	*M*	SD *%*	D *%*	U *%*	A *%*	SA *%*
Human Rules	5. The balance of nature is strong enough to cope with the impacts of modern industrial nations.*	3,44	11,5	15,2	22,6	18,9	31,9
	7. The so-called "ecological crisis" facing humankind has been greatly exaggerated.*	3,56	10,4	17,8	19,6	10,4	41,9
	8. Humans were meant to rule over the rest of nature.*	3,50	10,7	18,1	17,8	16,7	36,7
	9. Humans will eventually learn enough about how nature works to be able to control it.*	3,20	9,6	25,2	24,8	16,3	24,1
	11. Humans have the right to modify the natural environment to suit their needs.*	3,30	8,1	23,7	23,7	19,3	25,2
	12. Human ingenuity will ensure that we do NOT make the earth unlivable.*	3,18	6,7	27,0	27,0	20,4	18,9
	Total scale	3.36					

Table 4.4 (cont'd)

Nature Rules	2. When humans interfere with nature, it often produces disastrous consequences.	4,41	3,0	1,9	11,9	18,1	65,2
	4. Plants and animals have as much right as humans to exist.	4,61	2,2	5,2	0,7	13,3	78,5
	6. Despite our special abilities, humans are still subject to the laws of nature.	4,33	2,6	5,2	8,5	24,1	59,6
	10. If things continue on their present course, we will soon experience a major ecological catastrophe.	4,34	2,6	5,2	8,9	22,6	60,7
	13. Humans are severely abusing the environment.	4,43	2,2	5,6	4,8	21,9	65,6
	15. The balance of nature is very delicate and easily upset.	4,11	2,6	8,1	13,7	27,0	48,5
	Total Scale	4.36					
Growth Limits	1. We are approaching the limit of the number of people the earth can support.	4,39	2,2	0,7	14,1	22,2	60,7
	3. The earth has plenty of natural resources if we just learn how to develop them.*	4,35	2,2	1,9	12,2	26,3	57,4
	14. The earth is like a spaceship with only limited room and resources.	4,12	2,2	2,6	15,6	40,0	39,6
	Total Scale	4.28					

Note. SD: Strongly disagree, D: Disagree, U: Undecided, A: Agree, SA: Strongly agree, M: Mean, *Items were reverse coded

The mean score for the “Human Rules” factor was found to be 3.36 with 1.15 standard deviation, “Nature Rules” to be 4.36 with a standard deviation of .86, and “Growth Limits” to be 4.28 with a standard deviation of .83. Considering the items under the “Human Rules” component, 50.12% of the early childhood education teachers believe that the balance of nature is strong enough to cope with the impacts of modern industrial nations, and more than half of the teachers believe that the so–called ‘‘ecological crisis’’ facing humankind has been greatly exaggerated (50.8%). More than half of the participants (53.4%) believe that humans were meant to rule over the rest of nature. 40.4% of the teachers think that humans will eventually learn enough about how nature works to be able to control it. Almost half of the teachers (44.5%) believe that humans have the right to modify the natural environment to suit their needs. Whereas 39.3% of the participants think that human ingenuity will ensure that we do not make the earth unlivable, 33.7% disagreed with the statement, and 27% were neutral about this item.

Considering the items in the “Nature Rules” component, the majority of early childhood education teachers (83.3%) believe that when humans interfere with nature, it often produces disastrous consequences. The vast majority of the participant teachers (91.8%) think that plants and animals have as much right as humans to exist. More than three-quarters of the teachers (83.7%) believe that despite our special abilities, humans are still subject to the laws of nature. Many (83.3%) think that if things continue on their present course, we will soon experience a major ecological catastrophe. A vast majority of the teachers (87.5%) believe that humans are severely abusing the environment. Three-quarters of the early childhood education teachers (75.5%) think that the balance of nature is very delicate and easily upset.

Early childhood education teachers’ responses to “Growth Limits” are as follows. A great majority of the teachers (82.9%) believe that we are approaching the limit of the number of people the earth can support. Many participants (83.7%) believe that the earth has plenty of natural resources if we just learn how to develop them. More than one-quarter of the teachers (79.6%) think the earth is like a spaceship with limited room and resources.

4.3.Inferential Statistics

Independent sample t-test, correlation test, and multiple linear regression were employed as inferential statistics.

4.3.1. The Difference in Energy Conservation Behaviors According to the School Type

Independent samples t-test was conducted to determine whether the scores obtained from the Energy Conservation Behavior Scale differ according to the type of school teachers served in. The results are presented in Table 4.5.

Table 4.5

Energy Conservation Behaviors Scores

	School Type	N	$\bar{X}$	SD	t	*df*	*p*
ECB	Eco	172	46,1221	8,47164	0.131	268	0,896
	Non-Eco	98	46,2551	7,12960			
	Total	270					

***p<.05*

When Table 4.5 is examined, it is seen that the teachers' Energy Saving Behavior (t=0.131, $p>0.05$) scores do not show a statistically significant difference according to school type. In other words, the results demonstrated that teachers working in both eco and non-eco schools had similar energy conservation behaviors.

4.3.2. The Difference Between New Environmental Paradigm Scores According to the School Type

Independent samples t-test was conducted to determine whether the scores obtained from the NEP Scale and its dimensions differ according to the school type. The results are demonstrated in Table 4.6.

Table 4.6

New Environmental Paradigm Scores

	School Type	*N*	$\bar{X}$	*SD*	*t*	*df*	*p*
NEP	Eco	172	59,7035	11,32349	0,854	268	,394
	Non-eco	98	58,4592	11,83318			
	Total						
Humans Rules	Eco	172	20,3140	6,95055	0,429	268	,668
	Non-eco	98	19,9388	6,85162			
	Total						
Nature Rules	Eco	172	26,4826	5,00581	1,110	268	,268
	Non-eco	98	25,7551	5,46604			
	Total						
Growth Limits	Eco	172	12,9070	2,47149	0,444	268	,657
	Non-eco	98	12,7653	2,59977			
	Total						

Note. NEP=New Environmental Paradigm **p<.05

When Table 4.6 is examined, teachers' scores on New Environmental Paradigm (t=0.854, *p*>0.05), Humans Rules (t=0.429, *p*>0.05), Nature Rules (t=1.110, *p*>0.05) and Growth Limits (t=0.444, *p*>0.05) do not show a statistically significant difference between eco and non-eco schools. In other words, based on the results, regardless of school type, teachers had similar levels of environmental attitudes.

4.3.3. The Relationships Between Energy Conservation Behavior and New Environmental Paradigm (NEP)

The results of the correlation test conducted to examine the relationship between the scores obtained from the New Environment Paradigm Scale, its sub-dimensions, and the Energy Conservation Behavior Scale are given in Table 4.7.

Table 4.7

The Relationship Between New Environmental Paradigm and Energy Conservation Behaviors

		ECB
Human Rules	Correlation Coefficient	,355**
	p	,000
	N	270
Nature Rules	Correlation Coefficient	,224**
	p	,000
	N	270
Growth Limits	Correlation Coefficient	,610**
	p	,000
	N	270

***p<.05*

The correlation between teachers' energy conservation behaviors and Human Rules (HR) scores is positively moderate (r=0.355, p<0.05), and the correlation between energy conservation and Nature Rules (NR) is low (r=0.224, p<0.05). There was a relatively high positive relationship between Growth Limits (GL) and energy conservation behaviors (r=0.610, p<0.05). In other words, teachers who think the planet has a carrying capacity were found to be more active in energy conservation.

4.3.4. Factors Influencing Early Childhood Education Teachers' Energy Conservation Behaviors

In order to examine factors influencing teachers' energy conservation behavior, different multiple linear regression analyses were employed for eco and non-eco groups.

4.3.4.1. Factors Influencing Energy Conservation Behaviors of Early Childhood Education Teachers in Eco-Schools

Multiple linear regression modeling was employed to examine the contribution of the New Environmental Paradigm, childhood location, household type, NGO membership, and environmental or ESD course experience to the energy conservation behaviors of early childhood education teachers working in eco-schools. Categorical variables (childhood location, household type, NGO membership, environmental and/or ESD course experience) were dummy-coded

prior to the analysis. The results of the regression analysis are presented in Table 4.8 and Table 4.9.

Table 4.8

Regression Model Summary for Teachers in Eco-Schools

	Sum of Squares	df	R	R^2	F	p
Regression	6199,014	7	0,711	0,505	23,913	,000
Residual	6073,422	164				
Total	12272,436	171				

p<.05

When Table 4.8 is examined, the relationship between the predictor variables and the predicted variable was calculated as .711. This relationship is moderate. Teachers' scores on NEP in total, childhood location, childhood household type, NGO membership, and course experience significantly explained 50.5% of the variance in energy conservation behavior scores (F(7, 171)=23.913, p<0.05).

Table 4.9

Multiple Regression Analysis Predicting Energy Conservation Behaviors

Variables	*B*	*Std. Error*	β	t	p	$r_{partial}$	r_{zero}
Constant	15,343	2,886		5,316	,000		
NEP (HR)	,053	,079	,044	,673	,502	,375	,052
NEP (NR)	-,048	,110	-,028	-,435	,664	,342	-,034
NEP (GL)	2,281	,245	,665	9,302	,000	,688	,588
Childhood Location	-,941	1,342	-,051	-,701	,484	,089	-,055
Household Type	3,258	1,203	,193	2,707	,007	,203	,207
NGO Membership	,336	1,240	,017	,271	,787	,132	,021
Course Experience	,334	,781	,026	,428	,669	,138	,033

Note. NEP = the New Environmental Paradigm Scale; HR = Human Rules; NR = Nature Rules; GL = Growth Limits; Childhood Location Urban House (0), Rural House (1); Childhood Household Type Apartment (0), Detached House (1); NGO Membership No (0), Yes (1), Environmental and/or ESD Course Experience No (0), Yes (1).

When Table 4.9 is examined, it is seen that only Growth Limits scores (t=9.302, p<0.05) and childhood household type (t=2.707, p<0.05) made a statistically

significant contribution to the energy conservation behaviors of teachers working in eco-schools. On the other hand, Human Rules scores (t=0.673, p>0.05), Nature Rules scores (t=-0.435, p>0.05), childhood location (t=-0.701, p>0.05), NGO membership (t=0.271, p>0.05)) and ESD and/or environmental course experience (t=0.428, p>0.05) did not make a significant contribution.

Considering the standardized regression coefficient (β) in the table, the relative order of importance of the predictor variables on the energy conservation behavior scores is as follows: NEP (GL) and childhood household type.

Based on the results of the analysis, the regression equation for the prediction of the energy conservation behaviors of the teachers in the eco-schools is presented below.

ECB = 15,343+ 2,281 NEP (GL) + 3,258 Childhood Household Type

A 1-unit increase in NEP scores causes an increase of 2,281 units in ECB scores. The ECB scores of the early childhood education teachers living in the detached house are 3,258 units higher than the ECB scores of those living in an apartment. In other words, positive environmental attitudes and living in a detached house during childhood years are associated with being more active in energy conservation.

4.3.4.2.Factors Influencing Energy Conservation Behaviors of Early Childhood Education Teachers in Non-Eco Schools

Multiple linear regression modeling was conducted to examine the contribution of the New Environmental Paradigm, childhood location, household type, NGO membership, environmental and/or ESD course experience to the energy conservation behaviors of early childhood education teachers working in eco-schools. Categorical variables (childhood location, household type, NGO membership, environmental and/or ESD course experience) were dummy-coded prior to the analysis. The results of the regression analysis are presented in Table 4.10 and Table 4.11.

Table 4.10

Regression Model Summary for Teachers in Non-eco Schools

	Sum of Squares	df	R	R^2	F	p
Regression	2381,272	7	0,695	0,483	12,009	,000
Residual	2549,350	90				
Total	4930,622	97				

p<.05

When Table 4.10 is examined, the relationship between the predictor variables and the predicted variable was calculated as .695, which is moderate. Teachers' scores on Human Rules, Nature Rules, Growth Limits, childhood location, childhood household type, NGO membership, and course experience significantly accounted for 48.3% of the variance in energy conservation behavior scores ($F(7, 97)=12.009$, $p<0.05$).

Table 4.11

Multiple Regression Analysis Predicting Energy Conservation Behaviors

Variables	B	*Std. Error*	β	t	p	$r_{partial}$	r_{zero}
Constant	25,425	3,122		8,145	,000		
NEP (HR)	,117	,101	,113	1,158	,250	,460	,121
NEP (NR)	-,190	,113	-,145	-1,677	,097	,219	-,174
NEP (GL)	1,802	,274	,657	6,569	,000	,662	,569
Childhood Location	-,346	1,335	-,023	-,259	,796	,009	-,027
Household Type	,227	1,295	,016	,176	,861	,100	,019
NGO Membership	3,128	1,697	,150	1,844	,069	,181	,191
Course Experience	-,133	1,116	-,010	-,120	,905	,067	-,013

Note. NEP = the New Environmental Paradigm Scale; HR = Human Rules; NR = Nature Rules; GL = Growth Limits; Childhood Location Urban House (0), Rural House (1); Childhood Household Type Apartment (0), Detached House (1); NGO Membership, Environmental and/or ESD Course Experience No (0), Yes (1).

Accordingly, Growth Limits scores ($t=6.569$, $p<0.05$) have a significant contribution to the energy conservation behaviors of the teachers working in non-eco schools, but Human Rules scores ($t=1.158$, $p>0.05$), Nature Rules scores ($t=-1.167$, $p>0.05$), childhood location ($t=-0.259$, $p>0.05$), NGO membership ($t=1.844$, $p>0.05$), childhood household type ($t=0.176$, $p<0.05$)) and ESD and/or EE course experience

(t=-0.120, p>0.05) do not make a significant contribution to the ECB of early childhood education teachers.

The regression equation for the prediction of the energy conservation behaviors of the teachers in the non-eco schools is presented below:

ECB = 25,425+ 1,802 NEP (GL)

An increase of 1 unit in NEP scores brings about an increase of 1,802 units in ECB scores. In other words, teachers who are well aware of the planet's carrying capacity were found to be more active in energy conservation.

CHAPTER 5

DISCUSSION

Energy is essential to the livelihoods of modern society and economic advancement (Hinrichs & Kleinbach, 2012); nevertheless, it is mainly derived from the combustion of fossil fuels which have already caused a 1.1 °C increase in global temperature since pre-industrial times. Thus, it is critical to put the energy sector at the center of climate change mitigation efforts (International Energy Agency, 2021). Along with energy efficiency, shifting to renewables, adapting to low emissions technologies, and limiting population growth, behavioral change has been revealed as an effective way to combat climate change (International Energy Agency, 2021, 2022a; Lopes et al., 2012). Hence, it is crucial to explore variables elucidating energy conservation behaviors. In this sense, the current study focused on the two main research interests. The first is to examine the energy conservation behaviors of early childhood education teachers and the predictors of this behavior. The second is to explore energy conservation behaviors and predictor variables across eco and non-eco-learning environments.

This chapter presents the interpretation and discussion of the research findings, implications of the research findings, limitations of the study, and recommendations for future research.

5.1. Energy Conservation Behaviors and Environmental Attitudes of Early Childhood Education Teachers Working in Eco and Non-eco Preschools

Early childhood education teachers in the present study were found to be highly active in energy conservation. Those working at eco-preschools did not exhibit more energy conservation behaviors than their counterparts in non-eco preschools. This result is surprising since relevant literature provides evidence that the whole-school

approach brought about some positive changes regarding energy and water consumption and raised teachers' awareness about sustainability (Henderson & Tilbury, 2004). Sevinc Kayıhan and Tönük (2013) reported that eco-schools had no relevant awareness and economical use of energy in indoor and outdoor settings. The findings of the present study might be related to this unawareness.

Early childhood education teachers had a significant positive environmental attitude. Some studies reported the same results. Şahin (2013) conducted a study with 512 preservice teachers from different departments, including early childhood education, elementary science education, and elementary mathematics education programs, to explore their energy conservation behavior using Value-Belief-Norm Theory. She reported that pre-service teachers had positive environmental attitudes. Similarly, Ateş (2019) investigated the ecological worldviews, personal norms, fundamental values, and self-identities of in-service and pre-service science teachers and middle school students. Based on the CFA and EFA results, after removing two items from the revised NEP scale, the scale included two parts: human-based view (7 items) and nature-based view (8 items). In-service science teachers had more nature-based views than human-based views. This result is particularly important since positive environmental attitudes and behaviors embedded in inquiry-based learning provide children with opportunities to foster their understanding of sustainability (Sageidet et al., 2019).

Early childhood education teachers working at eco and non-eco preschools have highly positive environmental attitudes. That is to say, regardless of the school type, early childhood education teachers hold similar positive environmental attitudes. This result is surprising since an eco-school learning environment aims to transform people's attitudes, beliefs, perceptions, and behaviors with its focus on creating environmentally aware and sustainability-minded generations through active learning and engagement (EU GCCA, 2018).

When the sub-dimension of the NEP scale was examined, it was found that early childhood education teachers had average scores regarding the nature rules dimension. However, they had high scores for nature rules and growth limits. In other words, even though they have highly positive attitudes regarding nature's rules

and growth limits, they have moderate attitudes about human rules. That is, early childhood education teachers are prone to consider humans superior to nature. Albrecht et al. (1982) argued that some elements of the NEP scale might be entirely accepted by many people, whereas others may not. This situation is a significant indicator of the various environmental program possibilities and its embrace of a program for that population. In this sense, early childhood education teachers can be provided with environmental education programs where they can question their ideas about the human-nature relationship.

The correlation test was conducted to explore the association between energy conservation behaviors and environmental attitudes. The results revealed a moderate positive relationship between teachers' total NEP scores and their energy conservation behaviors. The association between environmental attitudes and pro-environmental behaviors was reported by various studies in the literature (Barr et al., 2001; Kaiser et al., 1999; Kuhn & Jackson, 1989; Negev et al., 2008; Tonglet et al., 2004; Tuncer et al., 2005; Vining & Ebreo, 1992) including energy conservation behaviors (Abrahamse & Steg, 2009; Martinsson et al., 2011; Şahin, 2013; Von Borgstede et al., 2013). For instance, Kuhn and Jackson (1989) collected data from 662 individuals for the first study in 1984 and 403 individuals for the second study in 1986 in Canada to explore people's environmental attitudes and their association with their energy preferences. They used the NEP scale to examine the sample's environmental attitudes. They determined two dimensions for the NEP scale: ecocentrism and techno-centrism. The former entails that nature's interest should be placed over humans. The latter believes in the power of technology to solve ecological problems. The results demonstrated that preferences for conservation and renewable energy were highest for the ecocentrists. In the Turkish context, Şahin's study (2013) showed that environmental attitudes have an explanatory ability for pre-service teachers' feelings of responsibility for energy saving and their awareness of the consequences of energy consumption. On the contrary, Ozaki (2011) conducted a study with university faculty and administration staff to investigate the factors for consumers' pro-environmental innovation adaptation. Data was collected through focus group discussions, questionnaires, and semi-structured interviews. They concluded that positive environmental attitudes do not necessarily translate into behavior. Similarly, Siero et al. (1996) asserted that behavioral change could occur

without any corresponding change in attitudes. Moreover, although positive environmental attitudes may foster sustainable practices, they do not necessarily result in a reduction in energy consumption. This is called the “attitude-action gap” (Frederiks et al., 2015).

5.2. Predictors of Early Childhood Education Teachers’ Energy Conservation Behaviors in Eco and Non-Eco Preschools

Multiple linear regression analysis was performed to investigate the possible predictors of energy conservation behaviors of early childhood education teachers serving at eco and non-eco preschools. The results showed that energy conservation behaviors of teachers in both eco and non-eco groups were positively and significantly associated with growth limits. That is, teachers who subscribe to the attitude that the planet has a carrying capacity with limited resources are more active in energy conservation. Individuals who agree with the spaceship metaphor can act accordingly to use limited resources efficiently. This is not surprising since the growth limits dimension (including items 1, 3, 14) is most important in forming respondents’ overall NEP score (Ntanos et al., 2019). That is, respondents’ beliefs regarding natural resource depletion have more significance in determining their total NEP scores. Besides, considering that energy is a natural resource, it is not surprising that teachers aware of the carrying capacity and limited natural resources are more cautious about using energy. Several researchers reported similar results. For instance, Gadenne et al. (2011) gathered data from 218 customers in Australia in order to explore whether there is a relationship between environmental attitudes, beliefs, and energy conservation. They used the NEP scale to measure environmental beliefs. Two dimensions of NEP emerged: “environmental limits” and “environmental adaptation.” Consumers worried about growth restrictions were found to be more likely to take more proactive measures to prevent environmental degradation by lowering their emission footprint. In Englis and Phillips' research (2013) with 1400 American consumers, Growth Limits had no significant relationship with pro-environmental behavior, even though Human Rules and Nature Rules had. These contradictory findings might be related to the responsiveness of NEP items to individual information about the severity of environmental issues and personal experiences with environmental issues (Dunlap et al., 2000).

Different from the non-eco group, childhood house types of early childhood education teachers in the eco group are significantly associated with their energy conservation behaviors. In other words, teachers that spent their childhood in detached homes were found to be more active in energy conservation. In this sense, it may be concluded that childhood experiences have a significant influence on energy conservation behaviors. Many studies pointed out childhood household type as an indicator of childhood nature experiences (Chawla, 1999; Palmer, 1998; Palmer & Suggate, 1996; Sward, 1999). In this sense, the relevant literature stresses the positive association between nature connection and conservation behaviors (Hughes et al., 2018; Otto & Pensini, 2017; Roczen et al., 2014). Engagement in activities like walking, camping, fishing, and playing in nature-rich areas during childhood is positively associated with later pro-environmental attitudes and behaviors (Wells & Lekies, 2006). Kahriman Öztürk and Olgan (2016) reported that early childhood education teachers who lived in detached houses during their childhood years performed better regarding their views on the significance of Education for Sustainable Development. As this study highlighted, childhood nature experiences are also associated with views and beliefs. According to the results of the present study, childhood household type did not significantly contribute to predicting the energy conservation behavior of early childhood education teachers in non-eco schools. This finding might be related to the current educational environment. The school environment is one of several contexts that systematically affect people's attitudes and behavior (Kals & Müller, 2012). Eco-schools enable educators and students to incorporate sustainability principles into daily life (UNESCO, 2018). Thus, this learning environment may create an opportunity for educators to translate their positive views and attitudes into behaviors or actions.

Significant Life Experiences (childhood location, NGO membership) and pre-service or in-service course experience in environmental education and/or education for sustainable development did not significantly contribute to explaining the energy conservation behavior of early childhood education teachers in both eco and non-eco preschool settings. These findings are surprising since the relationship between childhood nature experiences and environmentally friendly behaviors was well-documented in the literature (Chawla, 1998; Palmer, 1998; Tanner, 1980; Wells &

Lekies, 2006). However, childhood location was not linked with pre-service early childhood education teachers' education for sustainable development (ESD) self-efficacy beliefs in Köklü Yaylacı and Olgan's research (2021). Similarly, Kahriman-Pamuk and Olgan (2020) reported that childhood location was not closely linked to ESD practices in eco and non-eco preschools. The literature also provides evidence of a relationship between environmentally sound behaviors and NGO membership (Goldman et al., 2006; Hsu, 2009; Li & Chen, 2015). In the Turkish context, Kahriman-Pamuk and Olgan (2020) have reported that involvement with NGOs is a predictor of early childhood education teachers' ESD practices in eco-schools. However, NGO membership was not found to be associated with teachers' self-efficacy beliefs regarding ESD (Köklü Yaylacı & Olgan, 2021). Palmer's cross-cultural study (1995) regarding environmental-friendly actions and background variables could justify the contradictory findings about Significant Life Experiences. She underscored that various countries' social, cultural, and economic contexts and sampling issues could lead to conflicting research findings. Lastly, although the current study did not find a significant contribution of course experience to energy conservation behavior, some studies documented a positive association between course experience and environment-friendly attitudes and behaviors (Barata et al., 2017; Pe'er et al., 2007; Tuncer, 2008). For instance, Barata et al. (2017) reported that teenagers who took environmental education save more energy. On the other hand, Wells and Lekies' (2006) research findings regarding the EE or/and ESD course experience overlap with the current study. These contradictory findings can be attributed to knowledge alone not being a sufficient antecedent of pro-environmental behaviors (Hungerford & Volk, 1990). Besides, the present study might have been focused in a relatively structured way on environmental education and/or education for sustainable development instead of more hands-on and engaging modes which may have more potential to engender long-lasting effects (Wells & Lekies, 2006). As specified by Rickinson (2001), it is challenging to predict positive consequences of environmental education owing to the scarcity of particular details regarding the type of environmental education people received.

5.3. Implications

The current study sought to determine early childhood education teachers' energy conservation behaviors at eco and non-eco preschools and their predictors. The results of this study have some significant implications for policymakers, educators, and researchers interested in climate mitigation and energy-related issues, and energy conservation.

In the present study, the validity and reliability of the Energy Conservation Behavior Scale and the New Environmental Paradigm Scale were satisfied for early childhood education teachers. Researchers interested in energy conservation and environmental attitudes can use the scales. Furthermore, to the best of the researcher's knowledge, the relevant literature presents limited studies about energy conservation in early childhood. This study may attract other researchers' attention to this issue so that, finally, the early childhood community can take part in energy conservation and energy issues as a part of ESD. Thereby, a big step in fighting against climate change will have been taken.

Regardless of the school type, early childhood education teachers were found to be highly active in energy conservation. When we consider that eco-school learning environments aim to transfer people's attitudes and behaviors through the combined effect of learning and action, this finding contradicts the relevant literature. This result raises questions about the effectiveness of the eco-school programs. Although they have physical facilities, they might have failed to incorporate all the sustainability principles into their daily life. Therefore, the eco-school programs might be supervised or monitored more efficiently to bring some environmental gains.

Although early childhood education teachers had highly positive attitudes regarding nature rules and growth limits, they had moderate levels of attitudes regarding human rules. This finding demonstrated that early childhood education teachers subscribed to anthropocentric attitudes. More than half of the teachers thought that "Humans were meant to rule over the rest of nature." and "The so-called "ecological crisis" facing humankind has been greatly exaggerated." Besides, most teachers

agreed with the statement, "Humans will eventually learn enough about how nature works to be able to control it." "Humans have the right to modify the natural environment to suit their needs." One quarter remained undecided. Early childhood education teachers consciously or subconsciously transmit their attitudes, values, and beliefs to children via their daily and educational practices. Since the early years are foundational in the formation of dispositions about ways of being, knowing, doing, and relating, as well as in the establishment of many attitudes, values, behavior, and thinking which may become permanent (Pramling Samuelsson & Kaga, 2008), it is crucial to provide pre-service and in-service early childhood educators with environmental education programs where they can challenge their thoughts about the human relationship with the environment. Thereby, early childhood education teachers' environmental attitudes may become centered on ecocentrism.

Childhood household type, one of the significant life experiences variables, was found to significantly predict the energy conservation behaviors of early childhood education teachers in the eco group, not the non-eco group. This may mean that childhood nature experiences are associated with adult environmental commitments. Considering the role of nature-rich places in pro-environmental behaviors, today's children and future teachers may be provided with an opportunity to spend time in nature-rich settings. However, birds and several other species continue to have their habitats destroyed, increasing the likelihood that they may go extinct. The main reason is closely related to building dams and hydroelectric power plants to meet people's needs for energy (Şahin, 2013). However, it might be better to let people interact with nature where they can question the human-nature relationship, limited resources, and how to use them efficiently.

Even though the current study did not find a significant contribution of environmental education (EE) and/or ESD course experience, some studies documented a positive link between environmental education and environmental attitudes and behaviors (Barata et al., 2017; Clark & Finley, 2007; Frederiks et al., 2015; Hsu, 2004, 2009; Pe'er et al., 2007; Tuncer, 2008). People's energy conservation behaviors may be reduced if they cannot see the connection between energy saving and environmental gains (Palma-Oliveira & Gaspar, 2004). Thus, environmental education and education for sustainable development courses might

be provided to early childhood education teachers to promote these behaviors. EE and ESD courses have the potential to promote the ecological self-identity formation of people (Barata et al., 2017). When people voluntarily engage in behaviors, they come to the conclusion that the behavior reflects their inner selves. Thereby, the behavior becomes long-lasting (Cialdini, 2001). When we consider that teachers' attitudes, skills, and knowledge have an effect on children's learning experiences (Williams et al., 2016), pre-service and in-service early childhood education teachers should be provided with EE and ESD courses to form their ecological self-identity and reflect this into their daily and educational practices in school settings.

NGO membership, one of the SLE variables, was not found to be a significant predictor variable for the energy conservation behaviors of teachers in both settings. Although eco-schools work with NGOs, NGO membership did not make any significant contributions to their energy-saving behaviors. This implies that NGOs may consider focusing on energy issues, their effect on climate change, and how to save energy.

This thesis sought to contribute to the ECEfS literature by examining energy conservation and its predictors across eco and non-eco preschools. In order to reorient early childhood education for a sustainable future, coordinators of educators, instructors, coordinators of teacher training programs, teachers, and principals may take these variables into account.

5.4. Limitations and Recommendations for Future Research

Even though the current study contributed to early childhood education for sustainability literature, it has some limitations, as do the other research studies, which should be considered for further studies. Firstly, the present study relied on self-reported data to measure behavior. Although it was assumed that the participant teachers completed the instruments sincerely, relying on the self-reported measure can sometimes cause misleading results. That is, participants may have a tendency to give socially desirable answers. Besides, self-reported data reflect participants' beliefs and perceptions of their behavior instead of their actual behavior. Individuals' perceptions of energy conservation and consumption are liable to

misconceptions (Sütterlin et al., 2011). That is, people might misinterpret their energy consumption and energy conservation patterns. For this reason, it is impossible to draw a conclusion about the actual energy conservation behaviors of participants depending on the present study's result. Hence, further studies may consider focusing on the actual behaviors through observation. Besides, future research can use mixed method design to examine teachers' energy conservation behaviors deeply. On the other hand, the New Environmental Paradigm Scale is also susceptible to social desirability bias and is restricted to people's explicit attitudes (Scott et al., 2016). However, people also have implicit attitudes they are unaware of (Greenwald & Banaji, 1995). Future studies can also measure implicit attitudes. Moreover, self-reported data make researchers likely to overestimate the association between behavior and attitude (Martinsson et al., 2011). However, many studies reported a high overlap between reported and actual behavior (Whitehead, 2005).

This study focused on the energy conservation behaviors of early childhood education teachers. Even though teachers' understanding of the concept of sustainable development, their belief regarding the significance of education for sustainable development and the potential of education to affect sustainability issues, and their image of a sustainable world have the utmost importance (Panatsa & Malandrakis, 2018), children's agency in their own learning should be taken into account. Early childhood education for sustainability also places a strong priority on young children's agency and active engagement in educational practices (Pramling Samuelsson & Kaga, 2008). Young children have the highest potential to participate in a worldwide change over time (Elliott & Davis, 2009). Hence, future studies may consider investigating the energy conservation behavior of young children and the reflection of teachers' energy conservation behavior on children.

In the present study, early childhood education teachers were found to be highly active in energy conservation regardless of the school type. Future studies can focus on the factors behind this similarity. Moreover, future studies can consider gender and income variables since some studies reported a positive link between energy consumption and lower income levels (Frederiks et al., 2015; Martinsson et al., 2011; Sütterlin et al., 2011) as well as gender (Gonzalez et al., 2020; Şahin, 2016). Low-income households have more incentives to conserve energy due to the ongoing rise

in energy prices than high-income households (Martinsson et al., 2011). On the other hand, females feel more responsible about energy-related issues such as global warming and exhaustion of energy sources than males (Dumciuviene et al., 2019).

This study was conducted in İstanbul and Antalya. Therefore, it is not possible to generalize all the findings across Türkiye. Future studies can collect data in different cities and regions to get more generalizable findings. Besides, cross-cultural studies can be carried out to see the current state of the kindergartens and their members regarding energy conservation across various cultures.

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APPENDICES

A. SAMPLE ITEMS FROM DATA COLLECTION INSTRUMENTS

Sürdürülebilir Enerji Kullanımı Anketi

I. Kişisel Bilgiler

1. Cinsiyetiniz: ❑Kadın ❑ Erkek

2. Yaşınız:

3. Eğitim Durumunuz:

❑ Meslek Lisesi

❑ Ön lisans

❑ 4 yıllık (lisans)

❑ Yüksek lisans/Doktora

4. Meslekteki hizmet yılınız:

5. Çalıştığınız okul eko-okul mu? ❑Evet ❑Hayır

6. Çocukken yaşadığınız yeri nasıl tanımlarsınız?

❑ Köy

❑ Şehir

7. Çocukken yaşadığınız konut tipini nasıl tanımlarsınız?

❑ Müstakil Ev

❑ Apartman Dairesi

8. Çevresel ya da sosyal konularla alakalı herhangi bir sivil toplum kuruluşuna üye misiniz?

❑ Evet

❑ Hayır

9. Üniversitede veya sonrasında, çevre konuları ile ilgili bir eğitim aldınız mı veya çalıştaya katıldınız mı?

❑ Evet

❑ Hayır

10. Üniversitede veya sonrasında, "Sürdürülebilir Kalkınma için Eğitim (SKE)" ile bir eğitim aldınız mı, çalıştaya katıldınız mı?

❑ Evet

❑ Hayır

II. Enerji Kullanımı

Aşağıda enerji kullanımı ile ilgili bazı davranışlar bulunmaktadır. Bu davranışları yaşamınızda hangi sıklıkla gerçekleştirdiğinizi verilen ölçüte göre belirtiniz. **[Hiçbir zaman (1) – Her zaman (5)]**	Hiçbir zaman (1)	Nadiren (2)	Bazen (3)	Çoğunlukla (4)	Her zaman (5)
Odadan çıkan en son kişiysem ışıkları kapatırım.	☐	☐	☐	☐	☐
Kış aylarında, kalın giyinmektense ilave ısıtıcı çalıştırırım.	☐	☐	☐	☐	☐
Çamaşır makinesini düşük sıcaklıkta ve önyıkamasız çalıştırırım.	☐	☐	☐	☐	☐
TV, PlayStation, müzik seti gibi aletleri kumandanın yanı sıra düğmesinden de kapatırım.	☐	☐	☐	☐	☐

III. Çevreye Yönelik İnançlar

Aşağıda belirtilen ifadelere yönelik görüşlerinizi belirtiniz. **[Kesinlikle Katılmıyorum (1)–Kesinlikle Katılıyorum (5)]**	Kesinlikle Katılmıyorum (1)	Katılmıyorum (2)	Kararsızım (3)	Katılıyorum (4)	Kesinlikle Katılıyorum (5)
Dünyanın yaşamını destekleyebileceği insan sayısının sınırına yaklaşıyoruz.	☐	☐	☐	☐	☐
İnsanların olduğu kadar bitki ve hayvanların da yaşamaya hakkı vardır.	☐	☐	☐	☐	☐
İnsanlığın karşı karşıya olduğu sözde "ekolojik kriz" çok abartılıyor.	☐	☐	☐	☐	☐
Eğer her şey bugünkü gibi devam ederse, yakında büyük bir çevre felaketi yaşayacağız.	☐	☐	☐	☐	☐
İnsanlar ihtiyaçlarına uygun olacak şekilde doğal çevreyi (doğayı) değiştirme hakkına sahiptir.	☐	☐	☐	☐	☐
İnsan zekâsı dünyanın yaşanmaz hale gelmesini engelleyecektir.	☐	☐	☐	☐	☐
Yeryüzü, sınırlı alan ve kaynaklar açısından bir uzay gemisine benzer.	☐	☐	☐	☐	☐
Doğanın dengesi çok hassastır ve çabuk bozulabilir.	☐	☐	☐	☐	☐

B. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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Sayı: 28620816 /

24 Mayıs 2021

Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Refika OLGAN

Danışmanlığını yürüttüğünüz Elif Düzgün'ün "Eko ve Eko Olmayan Okullarda Hizmet Veren Okul Öncesi Öğretmenlerinin Enerji Tasarrufu Davranışlarının Olası Yordayıcılarının Karşılaştırılması" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **241-ODTU-2021** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Dr.Öğretim Üyesi Şerife SEVİNÇ
İAEK Başkan Vekili

C. TURKISH SUMMARY / TÜRKÇE ÖZET

EKO VE EKO OLMAYAN OKULLARDAKİ OKUL ÖNCESİ ÖĞRETMENLERİNİN ÖZ BİLDİRİMLERİNE DAYALI ENERJİ TASARRUFU DAVRANIŞLARI

GİRİŞ

Ekolojik krizlerin kökeni, Baskın Sosyal Paradigmanın (BSP) (Shafer, 2006) temel bileşenleri olarak kabul edilen modern endüstriyel toplumun değerlerine, inançlarına ve ideolojilerine dayanmaktadır (Cotgrove, 1982; Dunlap & Van Liere, 1984). Bu dünya görüşü; insanın doğa üzerindeki üstünlüğüne, sınırsız kaynaklara, sürekli ekonomik gelişmeye ve ekolojik sorunları çözmek için bilime ve gelişen teknolojiye olan inançla tanımlanır (Albrecht ve diğerleri, 1982). Bu görüş "insan kuralları"na dayanır. Bu görüşe göre, insanlar doğadan üstündür ve doğal kaynakları kendi çıkarları için azami ölçüde kullanabilirler, ekonomik büyüme her zaman mümkün ve yararlıdır (Scott vd., 2016). Ancak doğanın kendi kuralları ve sınırları vardır (Dunlap ve diğerleri, 2000). Daha spesifik olarak, kaynak kullanımı ve ekonomik büyüme için doğal sınırlar mevcuttur, insanlar doğanın bir parçasıdır ve ekolojik krizler mümkündür. Bu görüş ise spektrumun diğer tarafındaki Yeni Çevresel Paradigma dünya görüşünü yansıtır (Pe'er ve diğerleri, 2007). İnsanın doğa üzerindeki hakimiyeti, doğal kaynakların yıllar boyunca sömürülmesi ve "bırakınız yapsınlar" (laisser-faire) hükümet politikaları, gezegen için gerçekleşmesi çok yakın bir ekolojik çatışma riski yaratmıştır (Scott ve diğerleri, 2016; Shafer, 2006).

Dünya; pandemiler, su ve hava kirliliği, iklim değişikliği ve enerji kaynaklarının yetersizliği gibi birçok sorunla karşı karşıya kaldı (Gore, 2006). Davis Attenborough iklim değişikliğini "modern insanın karşılaştığı en büyük güvenlik tehdidi" olarak nitelendirmiştir (United Nations, 2021, para. 2). Enerji sektörü, halihazırda küresel

ortalama sıcaklığı 1 °C arttıran emisyonların yaklaşık %75'inden sorumludur. Bu nedenle iklim değişikliği ile mücadelenin merkezinde yer almalıdır (International Energy Agency, 2021).

İklim değişikliyle mücadele çabalarının başarılı olabilmesi için ulusal ve uluslararası düzeyde politikaların geliştirilmesi, yeşil teknolojilere adaptasyon sağlanması ve finansal kaynaklar gereklidir. Ancak bütün bunlar küresel iklim değişikliği ve sürdürülebilir kalkınmanın zorluklarını ele almak için yeterli değildir (International Energy Agency, 2022b; Nolet, 2009). Sera gazı emisyonları antropojenik eylemlerle bağlantılı olduğundan (Barker ve diğerleri, 2017), bireylerin tutumları, inançları ve davranışları bu küresel tehditle mücadelede önemlidir (UNESCO, 2016). Bu bağlamda, sera gazı emisyonlarının azaltılmasında ve iklim değişikliğiyle mücadelede enerji tasarrufu davranışları önemlidir (Von Borgstede vd., 2013).

Erken çocukluk dönemi, enerji tasarrufu davranışları ve enerji bilinci dahil olmak üzere çevre dostu davranışların kazanılmasında özellikle önemlidir (Didonet, 2008; Dumciuviene ve diğerleri, 2019; UNESCO, 2008), çünkü çocukların ilerleyen yıllarda kalıcı hale gelebilecek görüşleri, değerleri, tutumları ve davranışları bu dönemde şekillenmeye başlar (Didonet, 2008; Pramling Samuelsson & Kaga, 2008; UNESCO, 2008). Ayrıca, çocuklar iklim değişikliğinin uzun süreli etkilerine karşı oldukça savunmasızdır (Clark ve diğerleri, 2020). Çocukların kendilerini etkileyen konulara dahil olma (United States, 1989) ve sağlıklı, sürdürülebilir bir çevrede yaşama hakları vardır (United Nations Human Rights Council, 2022). Çocukların bu haklarına erişmesi için Sürdürülebilirlik için Erken Çocukluk Eğitimi (ECEfS), erken çocukluk eğitimi kontekstinde sürdürülebilirlik konuları, sorunları ve deneyimleri hakkında kapsayıcı ve dönüştürücü bir eğitim olarak kabul edilmektedir (Davis, 2022). Bununla birlikte, sürdürülebilirliğin günlük eğitim uygulamalarına başarılı bir şekilde entegre edilmesi, öğretmenlerin yeterlilikleri ile yakından ilgilidir (Samuelsson ve Park, 2017).

Öğretmenler, çocukların öğrenme süreçlerini şekillendirmede birincil aktörlerden biridir (Ärlemalm-Hagsér & Sandberg, 2011). Bu anlamda, öğretmenler, çocukların çevresel tutum ve inançlarının şekillenmesinde kritik bir rol oynamaktadır. Farkındalık ve bilgi sahibi öğretmenler, çocuklara sorgusuz kabul edilen inanç ve

uygulamaları sorgulama fırsatı sağlayabilir (Pramling Samuelsson & Kaga, 2008, s. 14). Ayrıca, çocuklar çevrelerindeki insanları gözlemleyerek öğrendikleri için (Bandura, 1977b) öğretmenler rol model olurlar (Hedefalk ve diğerleri, 2015; Sandberg & Ärlemalm-Hagsér, 2011). Bu yüzden öğretmenlerin söylemleri ve eylemleri arasındaki tutarlılık, çocuklara daha anlamlı deneyimler sağlar. Enerji bilincinin oluşması için en iyi dönemin çocukluk dönemi olduğu düşünüldüğünde, (Dumciuviene vd., 2019), okul öncesi öğretmenleri sürdürülebilir bir gelecek inşa etmek için çocuklara çevresel, ekonomik, sosyal ve kültürel açıdan bilinçli vatandaşlar olmaları için rehberlik edebilirler. (Cincera ve diğerleri, 2017). Bu bağlamda, yeşil okullar veya eko-okullar gibi sürdürülebilir öğrenme ortamları, öğretmenlerin sürdürülebilirlik ilkelerini günlük yaşamlarına dahil etmelerine olanak tanır (UNESCO, 2017).

Eko-okullar programı, Uluslararası Çevre Eğitim Vakfı tarafından yürütülen sürdürülebilir gelişmeyi ve ekolojik farkındalığı arttırmayı amaçlayan bir programdır (FEE Eco-Schools, 2019a). Türkiye'de Eko-Okullar programı 1995 yılından beri Türkiye Çevre Eğitimi Vakfı tarafından yürütülmektedir (TÜRÇEV, n.d.). Programın amacı, okulun bütün üyelerini kapsayan bütüncül bir yaklaşımla sürdürülebilirliği teşvik etmektir (FEE Eco-Schools, 2019b). Alan yazında bütüncül okul yaklaşımının, kaynak yönetimi (örn. enerji, su, atık azaltma) ve çocuklar ile öğretmenlerin sürdürülebilirlik konusundaki farkındalık düzeylerini arttırması gibi bazı olumlu değişimler getirdiği ifade edilmiştir (Henderson & Tilbury, 2004). “Yeşil” müfredatın, okul kültürünün, öğretmen ve akran modellemesinin ve okul yönetiminin bireylerin enerji tasarrufu davranışlarının artmasını teşvik ettiği (Jorgenson vd., 2019) göz önünde bulundurularak bu çalışma, eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışları ile bu davranışların yordayıcılarını incelemeyi ve karşılaştırmayı amaçlamıştır.

Okul Öncesi Öğretmenlerinin Enerji Tasarrufu Davranışlarının Olası Yordayıcıları

Tanner (1980) tarafından başlatılan “Etkin Yaşam Deneyimleri,” çocukluktaki doğa deneyimleri ile yetişkinlerin “çevresel bağlılığı” arasındaki ilişkiyi çeşitli demografik değişkenler aracılığıyla inceleme girişimidir. Birçok çalışmanın sonucuna göre,

çocukluk dönemindeki doğa deneyimi, yetişkin rol modelleri, çevre örgütlerine katılım ve olumsuz çevresel deneyimler (Barratt Hacking vd., 2020; Chawla ve Derr, 2012; Chawla, 1999; D'Amore & Chawla, 2020; Hsu, 2009; Palmer & Suggate, 1996; Wells & Lekies, 2012) insanların çevre dostu davranışları üzerinde etkiye sahiptir. Bu anlamda, "Etkin Yaşam Deneyimler"inin okul öncesi öğretmenlerinin enerji tasarrufu davranışları üzerinde de etkisi olabileceği düşünülmektedir.

Çocukluk yıllarındaki dış mekan deneyimleri, ilerleyen yıllarda çevresel kaygılara dönüşebilecek doğa sevgisi ile ilişkilendirilmiştir (Tanner, 1980). Aslında çocukluk dönemindeki olumlu doğa deneyimleri, çevre yanlısı davranışların kazanılması için gereklidir (Hsu, 2009; Monroe, 2003; Wells & Lekies, 2006). Buna paralel olarak Hsu (2009), kırsal alanlar gibi doğa ile temas kurulabilecek yerlerde yetişen insanların çevre dostu davranışları benimseme olasılıklarının daha yüksek olduğunu vurgulamıştır. Aksine, kentsel alanlar gibi doğayla temas etme fırsatının olmadığı bölgelerde yetişen insanların çevresel eylemlerde bulunma olasılıkları daha düşüktür. Ayrıca doğayla bağlantı puanı yüksek olan çocuk ve ergenler, enerji tasarrufu ve geri dönüşüm gibi korumacı davranışları daha fazla sergilemektedirler (Hughes vd., 2018; Otto ve Pensini, 2017; Roczen vd., 2014). Çocukluk yıllarında doğa ile etkileşim, ilerleyen yıllardaki çevresel bağlılıkla en sık ilişkilendirilen deneyimdir (D'Amore & Chawla, 2020). Bu bağlamda, çocukluk dönemi, doğa ile duygusal bir bağ kurmak için bir başlangıç zamanı olarak kabul edilir, ki bu bağ koruma eylemlerine yönelik toplumsal değişimi getirme potansiyeline sahiptir (Chawla, 2020).

Sivil Toplum Kuruluşlarına (STK'lar) katılım, "Etkin Yaşam Deneyimler"indeki değişkenlerden biridir. Gündem 21'de, STK'ların yerel yenilik ve eylemin kaynağı olduğu ve sürdürülebilir bir topluma ulaşmak için STK'ların katılımının önemli olduğu ele alınmıştır (UNCED, 1992). Çok sayıda araştırma, STK üyeliğini çevresel yükümlülükle ilişkilendirmiştir (Chawla, 1999; Chawla & Derr, 2012; Chawla, 1998). Okul öncesi öğretmenlerinin enerji tasarrufu davranışları ile ilişkisini araştırmak için, STK'lara üyelik durumu mevcut çalışmaya bir değişken olarak dahil edilmiştir.,

Çevresel tutum, Abrahamse ve Steg (2009) tarafından "finansal maliyetler, çaba ya

da zaman gibi çeşitli maliyet ve faydaların baskınlığına bağlı olarak bir kişinin bir davranışı olumlu ya da olumsuz olarak değerlendirme derecesi" olarak tanımlanmaktadır. (s.712). Hines ve ark. (1987), tutumların davranışlarla ilişkili olduğu sonucuna varmıştır. Tutumlar, çevresel davranışların güçlü bir yordayıcısı olarak kabul edilir (Kaiser ve diğerleri, 1999). Başka bir deyişle, tutumlar ve değerler, bilginin çevresel davranışlara dönüşmesini teşvik etmede kritik öneme sahiptir (Pe'er ve diğerleri, 2007).

Okul öncesi öğretmenlerinin çevre eğitimi, doğa eğitimi ve SKE anlayışlarının eğitim uygulamaları üzerinde etkisi vardır (Inoue vd., 2016). İlgili alan yazın göz önüne alındığında, bazı araştırmalar çevre eğitimi veya SKE ile ilgili bir ders alma ile bireylerin çevresel tutum, davranış ve SKE'ya yönelik öz-yeterlik inançları arasındaki ilişkiyi vurgulamıştır (Evans vd., 2012; Hsu, 2009; Köklü Yaylacı ve Olgan , 2021; Li ve Chen, 2015).

Amaç ve Araştırma Soruları

Yukarıda belirtilen hususlar göz önüne alındığında, bu çalışma eko ve eko olmayan anaokullarında hizmet veren okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını ve bu davranışların olası yordayıcılarını, çocukken yaşanılan yer ve konut türü, çevresel tutumlar (insanların kuralları, doğanın kuralları, büyüme sınırları), STK'ya üyelik durumu, karşılaştırmayı amaçlamıştır. Bu çalışmada, eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışları ve bu davranışların olası yordayıcılarını araştırılmış ve karşılaştırılmıştır. Bu temelde, mevcut çalışmada aşağıdaki araştırma soruları ele alınmıştır:

1. Eko ve eko olmayan okullarda hizmet veren okul öncesi öğretmenlerinin enerji tasarrufu davranışları ve çevreye yönelik inançları nasıldır?
   a. Eko ve eko olmayan okullarda hizmet veren okul öncesi öğretmenlerinin enerji tasarruf davranışları arasında anlamlı bir fark var mı?
   b. Eko ve eko olmayan okullarda hizmet veren okul öncesi öğretmenlerinin çevresel tutumları arasında anlamlı bir fark var mı?
2. Öğretmenler ile ilgili değişkenler [çocukken yaşanılan yer ve hane türü, çevresel tutumlar (insanların kuralları, doğanın kuralları, büyüme sınırları), STK'ya üyelik

durumu] eko ve eko olmayan okullarda hizmet veren okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını ne derece yordamaktadır?

YÖNTEM

Bu çalışmada araştırma sorularına yanıt aramak amacıyla, karşılaştırma ve kesitsel tarama deseni kullanılmıştır. Pilot çalışma için İstanbul ve Antalya şehirlerinde devlet anaokullarında görev yapan 80 okul öncesi öğretmeninden, ana çalışma için ise 270 öğretmenden veri toplanmıştır. Örneklem belirlemede küme rastgele örnekleme yöntemi kullanılmıştır. Ana çalışmanın örnekleminin genel özellikleri Şekil 1'de verilmiştir.

Şekil 1

Ana Çalışma Örnekleminin Demografik Özellikleri

Demografik	Grup	Sıklık (f)	Yüzde (%)
Cinsiyet	Erkek	18	6.7%
	Kadın	252	93.3%
Eğitim	Önlisans Derecesi	18	6.7%
	Lisans Derecesi	226	83.7%
	Lisansüstü Derece	26	9.6%
Okul Türü	Eko Okul	172	63.7%
	Eko Olmayan Okul	98	36.3%
Çocukluk Lokasyonu	Kırsal Alan	87	32.2%
	Kentsel Alan	183	67.8%
Çocukluk Ev Tipi	Müstakil Ev	138	51.1%
	Apartman	132	48.9%
STK Üyeliği	Evet	51	18.9%
	Hayır	219	81.1%
Çevre Eğitimi Dersi	Evet	119	44.1%
	Hayır	151	55.9%
SKE Dersi	Evet	21	7.8%
	Hayır	249	92.2%

Şekil 2

Ana Çalışma Örnekleminin Yaş ve Deneyim Yılı (N = 270)

	N	*Min.*	*Mak.*	*Ort.*	*SS*
Yaş	270	20	59	34,86	7,60
Deneyim Yılı	270	1	34	10,85	7,07

Veri Toplama Araçları

Araştırma verileri üç araç ile toplanmıştır: Demografik Bilgi Ölçeği, Enerji Kullanım Anketi, Yeni Çevresel Paradigma Ölçeği. Demografik Bilgi Formu aracılığıyla katılımcıların cinsiyeti, yaşı, eğitim seviyesi, okul türü, meslekteki hizmet yılı, çocuklukta yaşanılan yer ve ev tipi, STK üyeliği, Çevre Eğitimi ve/veya SKE ders ya da kurs tecrübeleri hakkında bilgi toplanmıştır. Enerji Kullanım Anketi, Ibtissem (2010) tarafından geliştirilmiş 11 sorudan oluşan, katılımcıların günlük elektrik ve doğal gaz kullanımına odaklanan 5'li Likert tipi bir ölçektir. Ölçek, Türkçe'ye Şahin (2013) tarafından adapte edilmiştir. Öğretmenlerin çevresel tutumlarını ölçmek için revize edilmiş Yeni Çevresel Paradigma (Dunlap et al., 2000) ölçeği kullanılmıştır. Bu ölçek 15 sorudan oluşmaktadır ve katılımcıların soruları 5'li skalada "Tamamen katılıyorum." ve "Kesinlikle katılmıyorum." arasında puanlamaları beklenmektedir.

Verilerin Analizi

Çalışmada toplanan verileri analiz etmek için SPSS 24.0 ve LISREL 8.8 (Jöreskog & Sörbom, 2006) programları kullanılmılştır. Yapı geçerliliğini test etmek için SPSS kullanılarak açımlayıcı faktör analizi, LISREL kullanılarak doğrulayıcı faktör analizi yapılmıştır. Tanımlayıcı ve çıkarımsal istatistikleri SPSS programı aracılığıyla yapılmıştır.

Geçerlik ve Güvenirlik Analizi

Enerji Kullanım Anketi ve Yeni Çevresel Paradigma Ölçeği'nin yapı geçerliliğini doğrulamak için faktör analizi yapılmıştır. Açımlayıcı faktör analizi sonuçlarına göre Enerji Kullanım anketi tek boyutlu çıkmıştır. Tek faktörlü yapı doğrulayıcı faktör analizi ile test edilmiş ve Cronbach Alpha .93 bulunarak yapı geçerliliği sağlanmıştır. Açımlayıcı faktör analizi sonuçlarına göre Yeni Çevresel Paradigma Ölçeği'nin "İnsanların Kuralları," "Doğanın Kuralları" ve "Büyüme Sınırları" olmak üzere üç boyuttan oluştuğu görülmüştür. Doğrulayıcı faktör analizi ile üç boyutlu yapı test edilmiş ve Cronbach Alpha değerleri .90'dan yüksek bulunduğundan yapı geçerliliği sağlanmıştır.

Çalışmanın Sayıltıları

Katılımcıların soruları anladıkları ve içtenlikle yanıtladıkları varsayılmaktadır. Katılımcılar, araçları standart koşullarda tamamlamış ve uygulama sürecinde diğer katılımcılarla etkileşime girmemişlerdir. Ayrıca öğretmenlerin tutum ve davranışlarının özbildirim ölçekleri kullanılarak doğru bir şekilde ölçüldüğü varsayılmaktadır.

BULGULAR

Araştırma sonuçlarına göre, okul öncesi öğretmenlerinin enerji tasarrufunda aktif olduğu bulunmuştur (Ort.= 46,17, SS=7.99). Eko okullarda hizmet veren ve vermeyen okul öncesi öğretmenlerinin enerji tasarrufu davranışları anlamlı bir farklılık göstermemiştir. Diğer bir deyişle, eko okullarda çalışan öğretmenler, eko okullarda çalışmayan meslektaşlarından daha fazla enerji tasarrufu davranışı sergilememişlerdir.

Okul öncesi öğretmenlerinin yüksek düzeyde olumlu çevresel tutuma sahip oldukları bulunmuştur (Ort=3.95, SS=.76). Öğretmenlerin çevresel tutumlarının okul tipine göre istatistiki olarak anlamlı bir fark göstermediği bulunmuştur. NEP'in alt boyutları incelendiğinde, öğretmenlerin "Doğanın Kuralları" (Ort.=4.36) ve "Büyüme Limitleri"nde (Ort.=4.28) yüksek puan alırken, "İnsanların Kuralları" (Ort.=3.36) alt boyutunda ortalama puan aldığı bulunmuştur. Bu bulgu, okul öncesi öğretmenlerinin insanları doğanın parçası olarak görmekten ziyade doğadan üstün gördükleri şeklinde yorumlanabilir.

Çıkarımsal Analiz Bulguları

Eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışlarının olası yordayıcılarını araştırmak için çoklu doğrusal regresyon analizi yapılmıştır. Sonuçlar, hem eko hem de eko olmayan gruplardaki

öğretmenlerin enerji tasarrufu davranışlarının "Büyüme Limitleri" ile pozitif ve anlamlı bir şekilde ilişkili olduğunu göstermiştir. Yani, gezegenin sınırlı kaynaklara sahip bir taşıma kapasitesinin olduğunun bilincinde olan öğretmenlerin enerji tasarrufu konusunda daha aktif oldukları bulunmuştur.

Eko olmayan gruptan farklı olarak, eko gruptaki okul öncesi öğretmenlerinin çocuklukta yaşanılan ev tipleri, enerji tasarrufu davranışlarıyla önemli ölçüde ilişkilidir. Diğer bir deyişle, çocukluklarını müstakil evde geçiren öğretmenlerin enerji tasarrufu konusunda daha aktif oldukları görülmüştür. Bu çalışmanın sonuçlarına göre, çocukluktaki ev tipi, eko olmayan okullardaki okul öncesi öğretmenlerinin enerji tasarrufu davranışını yordamada önemli bir katkı sağlamamıştır.

Çevre eğitimi ve/veya sürdürülebilir kalkınma için eğitim (SKE) konusunda hizmet öncesi veya hizmet içi kurs deneyimi ve diğer "Etkin Yaşam Deneyimleri" değişkenleri (çocukluk lokasyonu, STK üyeliği) hem eko hem de eko olmayan anaokullarındaki okul öncesi öğretmenlerinin enerji tasarrufu davranışını açıklamaya önemli bir katkıda bulunmamıştır.

TARTIŞMA

Eko ve Eko Olmayan Anaokullarında Çalışan Okul Öncesi Öğretmenlerinin Enerji Tasarrufu Davranışları ve Çevresel Tutumları

Bu çalışmada okul öncesi öğretmenlerinin enerji tasarrufu konusunda oldukça aktif oldukları bulunmuştur. Eko-anaokullarında çalışan öğretmenler, eko-olmayan anaokullarındaki meslektaşlarına nazaran daha fazla enerji tasarrufu davranışı sergilememiştir. Bu sonuç şaşırtıcıdır, çünkü ilgili alan yazında bütüncül okul yaklaşımının enerji ve su tüketimini azalttığına ve öğretmenlerin sürdürülebilirlik konusunda farkındalığını artırdığına dair kanıtlar sunulmaktadır (Henderson ve Tilbury, 2004). Diğer taraftan, Sevinç Kayıhan ve Tönük (2013), eko-okullarda, iç ve dış mekanlarda enerjinin ekonomik kullanımı ile ilgili farkındalığın olmadığını

bildirmiştir. Bu bulgu, söz konusu bilinçsizlikle ilgili olabilir.

Okul öncesi öğretmenlerinin, yüksek düzeyde olumlu çevresel tutuma sahip oldukları bulunmuştur. Alan yazındaki bazı çalışmaların sonuçları bu bulgu ile örtüşmektedir. Şahin (2013), Değer-İnanç-Norm Teorisini kullanarak öğretmen adaylarınıın enerji tasarrufu davranışlarını araştırmak için okul öncesi, ilköğretim fen eğitimi ve ilköğretim matematik eğitimi programları da dahil olmak üzere farklı bölümlerden 512 öğretmen adayı ile bir çalışma yürütmüştür. Öğretmen adaylarının olumlu çevresel tutumlara sahip olduğunu belirtmiştir. Benzer şekilde Ateş (2019), hizmet içi ve hizmet öncesi fen bilgisi öğretmenlerinin ve ortaokul öğrencilerinin ekolojik dünya görüşlerini, kişisel normlarını, temel değerlerini ve öz kimliklerini araştırmıştır. DFA ve AFA sonuçlarına göre, revize edilmiş NEP ölçeğinden iki madde çıkarıldıktan sonra ölçek, insan temelli görüş (7 madde) ve doğa temelli görüş (8 madde) olmak üzere iki alt boyuta ayrılmıştır. Hizmet içi fen bilgisi öğretmenlerinin, insan temelli görüşlerden fazla doğa temelli görüşlere sahip olduğu bulunmuştur. Öğretmenlerin olumlu çevresel tutumlara sahip olması önem arz etmektedir, çünkü sorgulamaya dayalı öğrenmeye eşlik eden olumlu çevresel tutumlar ve davranışlar, çocuklara sürdürülebilirlik anlayışlarını geliştirme fırsatları sunar (Sageidet ve diğerleri, 2019).

Eko ve eko olmayan anaokullarında çalışan okul öncesi öğretmenlerinin yüksek düzeyde olumlu çevresel tutumlara sahip olduğu bulunmuştur. Yani, okul türü ne olursa olsun, okul öncesi öğretmenleri benzer olumlu çevresel tutumlara sahiptir. Bu sonuç şaşırtıcıdır çünkü eko-okul öğrenme ortamı, aktif öğrenme ve katılım yoluyla çevreye duyarlı ve sürdürülebilirlik odaklı nesiller yetiştirmek için insanların tutumlarını, inançlarını, algılarını ve davranışlarını dönüştürmeyi amaçlar (EU GCCA, 2018).

NEP ölçeğinin alt boyutu incelendiğinde, okul öncesi öğretmenlerinin “Doğanın Kuralları” ve “Büyüme Sınırları” boyutundan yüksek puan almalarına karşın, “İnsanların Kuralları” boyutunda ortalama puanlara sahip oldukları görülmüştür. Diğer bir deyişle, öğretmenlerin “Doğanın Kuralları” ve “Büyüme Sınırları” konusunda oldukça olumlu tutumlara sahip olmalarına rağmen, “İnsanların Kuralları” konusunda orta düzeyde tutumlara sahip oldukları bulunmuştur. Bu bulgu

okul öncesi öğretmenlerinin insanı doğadan üstün görme eğiliminde oldukları şeklinde yorumlanabilir. Albrecht ve ark. (1982) NEP ölçeğinin bazı unsurlarının bazı kişilerce tamamen kabul edilebileceğini, diğerlerinin ise kabul edilmeyebileceğini tartışmıştır. Bu durum, o nüfusa yönelik çeşitli çevresel program olanaklarının ve bunların o nüfusça kabul edilmesinin önemli bir göstergesidir. Bu anlamda, okul öncesi öğretmenlerine insan-doğa ilişkisine ilişkin düşüncelerini sorgulayabilecekleri çevre eğitimi programları sağlanabilir.

Enerji tasarrufu davranışları ile çevresel tutumlar arasındaki ilişkiyi araştırmak için korelasyon testi yapılmıştır. Sonuçlar, öğretmenlerin toplam NEP puanları ile enerji tasarrufu davranışları arasında orta düzeyde pozitif bir ilişki olduğunu göstermiştir. Çevresel tutumlar ile, enerji tasarrufu davranışları dahil olmak üzere (Abrahamse & Steg, 2009; Martinsson vd., 2011; Şahin, 2013; Von Borgstede vd., 2013), çevre yanlısı davranışlar arasındaki ilişki, literatürdeki çeşitli araştırmalarda rapor edilmiştir (Barr ve diğerleri, 2001; Kaiser ve diğerleri, 1999; Kuhn ve Jackson, 1989; Negev ve diğerleri, 2008; Tonglet ve diğerleri, 2004; Tuncer vd., 2005; Vining & Ebreo, 1992). Örneğin, Kuhn ve Jackson (1989), insanların çevresel tutumlarını ve bu tutumların kişilerin enerji tercihleriyle ilişkilerini araştırmak amacıyla 1984'teki ilk çalışma için 662 kişiden ve 1986'daki ikinci çalışma için 403 kişiden veri toplamıştır. Katılımcıların çevresel tutumlarını ölçmek için NEP ölçeğini kullanılmıştır. NEP ölçeği için iki boyut belirlenmiştir: eko-merkezcilik ve tekno-merkezcilik. İlki, doğanın çıkarlarının insanların çıkarlarından öncelikli olduğunu savunurken ikincisi ise, teknolojinin gücü sayesinde ekolojik sorunların çözülebileceğini savunur. Sonuçlar, tasarruf ve yenilenebilir enerji tercihlerinin eko-merkezciler için en yüksek olduğunu göstermiştir. Şahin'in (2013) çalışması, çevresel tutumların, öğretmen adaylarının enerji tasarrufuna yönelik sorumluluk duygularını ve enerji tüketiminin sonuçlarına ilişkin farkındalıklarını açıklayıcı bir güce sahip olduğunu göstermiştir. Aksine, Ozaki (2011), tüketicilerin çevre yanlısı inovasyon adaptasyonuna yönelik faktörleri araştırmak için üniversite öğretim üyeleri ve idari personeli ile bir çalışma yürütmüştür. Veriler, odak grup görüşmeleri, anketler ve yarı yapılandırılmış görüşmeler yoluyla toplanmıştır. Araştırmacılar, olumlu çevresel tutumların illaki davranışa dönüşmediği sonucuna varmışlardır. Benzer şekilde, Siero ve ark. (1996), davranış değişikliğinin, tutumlarda herhangi bir değişiklik olmadan gerçekleşebileceğini belirtmişlerdir.

Eko ve Eko Olmayan Anaokullarında Erken Çocukluk Öğretmenlerinin Enerji Tasarrufu Davranışlarının Yordayıcıları

Eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışlarının olası yordayıcılarını araştırmak için çoklu doğrusal regresyon analizi yapılmıştır. Sonuçlar, hem eko hem de eko olmayan gruplardaki öğretmenlerin enerji tasarrufu davranışlarının "Büyüme Limitleri" ile pozitif ve anlamlı bir şekilde ilişkili olduğunu göstermiştir. Yani, gezegenin sınırlı kaynaklara sahip bir taşıma kapasitesinin bulunduğu görüşünü benimseyen öğretmenlerin enerji tasarrufu konusunda daha aktif oldukları bulunmuştur. "Büyüme Sınırları" boyutunun (1, 3, 14. maddeler) genel NEP puanını oluşturmada en önemli boyut olduğu göz önüne alındığında bu sonuç şaşırtıcı değildir (Ntanos ve diğerleri, 2019). Yani, katılımcıların doğal kaynakların tükenmesine ilişkin inançları, toplam NEP puanlarını belirlemede daha fazla öneme sahiptir. Ayrıca, enerjinin doğal bir kaynak olduğu düşünüldüğünde, gezegenin taşıma kapasitesinin ve sınırlı doğal kaynakların farkında olan öğretmenlerin enerji kullanımı konusunda daha dikkatli olmaları şaşırtıcı değildir. Birkaç araştırmacı da benzer sonuçları bildirmiştir. Örneğin, Gadenne ve ark. (2011), çevresel tutumlar, inançlar ve enerji tasarrufu arasında bir ilişki olup olmadığını araştırmak için Avustralya'daki 218 tüketiciden veri toplamıştır. Çevresel inançları ölçmek için NEP ölçeğini kullanılmıştır. Analizler sonucu NEP iki boyutlu olarak bulunmuştur: "Çevresel Sınırlar" ve "Çevresel Uyum". Büyüme sınırları konusunda endişelenen tüketicilerin, emisyon ayak izlerini düşürerek çevresel bozulmayı önlemek için daha proaktif önlemler alma olasılıklarının daha yüksek olduğu bulunmuştur. Englis ve Phillips'in 1400 Amerikalı tüketiciyle yaptığı araştırmada (2013), "İnsanların Kuralları" ve "Doğanın Kuralları"nın çevre yanlısı davranışlarla anlamlı bir ilişkisi olmasına rağmen, "Büyüme Sınırları"nın çevre yanlısı davranışla anlamlı bir ilişkisi olmadığı saptanmıştır. Bu çelişkili bulgular, NEP maddelerinin çevresel sorunların ciddiyeti hakkındaki bireysel bilgilere ve çevresel sorunlarla ilgili kişisel deneyimlere hassas olmasıyla ilgili olabilir (Dunlap ve diğerleri, 2000).

Eko olmayan gruptan farklı olarak, eko gruptaki okul öncesi öğretmenlerinin çocuklukta yaşanılan ev tiplerinin, enerji tasarrufu davranışlarıyla önemli ölçüde

ilişkili olduğu belirlenmiştir. Diğer bir deyişle, çocukluklarını müstakil evde geçiren öğretmenlerin enerji tasarrufu konusunda daha aktif oldukları görülmüştür. Bu anlamda, çocukluk dönemindeki doğa deneyimlerinin enerji tasarrufu davranışları üzerinde önemli bir role sahip olduğu sonucu çıkarılabilir. Pek çok araştırma, çocukluktaki ev tipininin o dönemdeki doğa deneyimlerinin bir göstergesi olduğunu vurgulamıştır (Chawla, 1999; J. Palmer, 1998; Palmer & Suggate, 1996; Sward, 1999). Bu anlamda, ilgili alan yazını doğayla bağlantı ve çevreyi koruma/tasarruf davranışları arasındaki pozitif ilişkiyi vurgulamaktadır (Hughes vd., 2018; Otto ve Pensini, 2017; Roczen vd., 2014). Çocukluk döneminde yürüyüş, kamp yapma, balık tutma ve doğa ile iç içe alanlarda oynama gibi etkinliklere katılım, ilerleyen yıllardaki çevre yanlısı tutum ve davranışlarla pozitif olarak ilişkilendirilmiştir (Wells ve Lekies, 2006). Kahriman Öztürk ve Olgan (2016), çocukluk yıllarında müstakil evde yaşayan okul öncesi öğretmenlerinin SKE'nin önemine ilişkin görüşlerinde daha yüksek performans gösterdiklerini bildirmişlerdir. Bu çalışmanın vurguladığı gibi, çocukluktaki doğa deneyimleri görüşler ve inançlarla da ilintilidir. Bu araştırmanın sonuçlarına göre, çocuklukta yaşanılan ev tipi, eko olmayan okullardaki okul öncesi öğretmenlerinin enerji tasarrufu davranışını tahmin etmeye anlamlı bir katkı sağlamamıştır. Bu bulgu mevcut eğitim ortamı ile ilgili olabilir. Okul ortamı, insanların tutum ve davranışlarını sistematik olarak etkileyen birkaç bağlamdan biridir (Kals ve Müller, 2012). Eko-okullar, eğitimcilerin ve öğrencilerin sürdürülebilirlik ilkelerini günlük yaşamlarına dahil etmelerine olanak sağlar (UNESCO, 2018). Böylece, bu öğrenme ortamları, eğitimcilerin olumlu görüş ve tutumlarını davranış veya eylemlere dönüştürmeleri için bir fırsat yaratabilir.

Etkin Yaşam Deneyimleri (çocuklukta yaşanılan yer, STK üyeliği) ve çevre eğitimi ve/veya SKE ile ilgili hizmet öncesi veya hizmet içi kurs deneyimi her iki okul türünde hizmet veren okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını açıklamaya istatistiksel olarak anlamlı katkıda bulunmamıştır. Bu bulgular şaşırtıcıdır çünkü çocukluktaki doğa deneyimleri ile çevre dostu davranışlar arasındaki ilişki alan yazında iyi bir şekilde belgelenmiştir (Chawla, 1998; Palmer, 1998; Tanner, 1980; Wells & Lekies, 2006). Bununla birlikte, Köklü-Yaylacı ve Olgan'ın araştırmasında (2021), çocuklukta yaşanılan yerin, hizmet öncesi okul öncesi öğretmenlerinin SKE öz-yeterlilik inançlarıyla bağlantılı olmadığı bulunmuştur. Benzer şekilde Kahriman-Pamuk ve Olgan (2020), çocuklukta

yaşanılan yerin eko ve eko olmayan anaokullarındaki öğretmenlerin SKE uygulamalarıyla bağlantılı olmadığını bildirmiştir. Ayrıca ilgili alan yazın çevreye duyarlı davranışlar ile STK üyeliği arasında bir ilişki olduğuna dair kanıtlar sunmaktadır (Goldman ve diğerleri, 2006; Hsu, 2009; Li & Chen, 2015). Kahriman-Pamuk ve Olgan (2020), STK'ların eko-okullardaki okul öncesi öğretmenlerinin SKE uygulamalarının bir yordayıcısı olduğunu bildirmişlerdir. Aksine, STK üyeliğinin öğretmenlerin SKE ile ilgili öz-yeterlik inançları ile ilişkili olmadığı bulunmuştur (Köklü Yaylacı ve Olgan, 2021). Etkin Yaşam Deneyimleri hakkındaki çelişkili bulgular, Palmer'ın çevre dostu eylemler ve arka plan değişkenleri ile ilgili kültürler arası çalışması (1995) ile açıklanabilir. Çeşitli ülkelerin sosyal, kültürel ve ekonomik kontekstlerinin ve örneklem konularının çelişkili araştırma bulgularına yol açabileceği vurgulanmıştır. Son olarak, mevcut çalışmada ders deneyiminin enerji tasarrufu davranışına katkısı anlamlı bulunmasa da, bazı çalışmalar ders deneyimi ile çevre dostu tutum ve davranışlar arasında pozitif bir ilişki olduğunu belgelemiştir (Barata vd., 2017; Pe'er vd. , 2007; Tuncer, 2008). Örneğin, Barata ve ark. (2017), çevre eğitimi alan gençlerin daha fazla enerji tasarrufu yaptığını bildirmiştir. Öte yandan, Wells ve Lekies'in (2006) çevre eğitimi ve/veya SKE ders deneyimine ilişkin araştırma bulguları mevcut çalışma ile örtüşmektedir. Bu çelişkili bulgular, bilginin tek başına çevre yanlısı davranışların öncülü olmamasına bağlanabilir (Hungerford & Volk, 1990). Ayrıca, bu çalışma, daha kalıcı olma potansiyeline sahip ilgi çekici ve uygulamalı eğitimlerden ziyade, nispeten yapılandırılmış çevre eğitimi ve/veya SKE üzerine odaklanmış olabilir (Wells & Lekies, 2006). Rickinson (2001) tarafından belirtildiği gibi, insanların aldığı çevre eğitiminin türüne ilişkin ayrıntıların sınırlılığı nedeniyle çevre eğitiminin olumlu sonuçlarını tahmin etmek zordur.

Çıkarımlar

Bu çalışma, eko ve eko olmayan anaokullarında görev yapan okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını ve bu davranışların yordayıcılarını belirlemeye odaklanmıştır. Bu çalışmanın sonuçları, iklim değişikliği ile mücadele, enerji ile ilgili konular ve enerji tasarrufu ile ilgilenen politikacılar, eğitimciler ve araştırmacılar için bazı önemli çıkarımları içermektedir.

Bu çalışmada, Enerji Tasarrufu Davranışı Ölçeği ve Yeni Çevresel Paradigma Ölçeği'nin okul öncesi öğretmenleri için geçerlilik ve güvenirliği sağlanmıştır. Enerji tasarrufu ve çevresel tutumlarla ilgilenen araştırmacılar ölçekleri kullanabilirler. Ayrıca, araştırmacının bilgisi dahilinde, ilgili literatür erken çocukluk döneminde enerji tasarrufu ile ilgili sınırlı sayıda çalışma sunmaktadır. Bu çalışma, diğer araştırmacıların dikkatini bu konuya çekebilir, böylece erken çocukluk topluluğu SKE'nin bir parçası olarak enerji tasarrufu ve enerji konularında aktif hale gelebilirler. Böylece iklim değişikliği ile mücadelede büyük bir adım atılmış olacaktır.

Okul türünden bağımsız olarak, okul öncesi öğretmenlerinin enerji tasarrufu konusunda oldukça aktif oldukları bulunmuştur. Eko-okul öğrenme ortamlarının, öğrenme ve uygulamanın birleşik etkisiyle insanların tutum ve davranışlarını değiştirmeyi amaçladığı düşünüldüğünde, bu bulgu ilgili literatürle çelişmektedir. Bu sonuç, eko-okul programlarının etkinliği hakkında soruları gündeme getirmektedir. Eko-okullar fiziki imkanlara sahip olmalarına rağmen, sürdürülebilirlik ilkelerinin tamamını günlük yaşamlarına dahil edememiş olabilirler. Bu nedenle, eko-okul programları bazı çevresel kazanımlar sağlamak için daha verimli bir şekilde denetlenebilir veya izlenebilir.

Okul öncesi öğretmenlerinin, “Doğanın Kuralları” ve “Büyüme Sınırları” konusunda oldukça olumlu tutumlara sahip olmalarına rağmen, “İnsanların Kuralları”na ilişkin orta düzeyde tutumlara sahip oldukları bulunmuştur. Bu bulgu, okul öncesi öğretmenlerinin insanmerkezci tutumları benimsediğini göstermiştir (Dunlap & Van Liere, 1978). Öğretmenlerin yarısından fazlası, “İnsanlar doğanın kendileri dışında kalan kısmına hükmetme eğilimindedir.”ve "İnsanlığın karşı karşıya olduğu sözde ‘ekolojik kriz’ çok abartılıyor." cümlelerine katıldıklarını açıklamışlardır. Ayrıca öğretmenlerin çoğunluğu “İnsanlar eninde sonunda doğanın düzenini onu kontrol edebilecek kadar öğreneceklerdir” ve “İnsanlar ihtiyaçlarına uygun olacak şekilde doğal çevreyi (doğayı) değiştirme hakkına sahiptir.” ifadelerin katılırken, dörtte biri kararsız kalmıştır. Okul öncesi öğretmenleri tutumlarını, değerlerini ve inançlarını bilinçli ya da bilinçsiz olarak günlük ve eğitsel uygulamaları yoluyla çocuklara aktarırlar (Salonen ve Tast, 2013). İlk yıllar; olma, bilme, yapma ve ilişki kurma biçimlerine ilişkin eğilimlerin oluşumunda (Ritchie, 2021) ve ileriki yıllarda kalıcı

hale gelebilen (Pramling Samuelsson ve Kaga, 2008) birçok tutum, değer, davranış ve düşüncenin oluşturulmasında (Siraj-Blatchford ve ark., 2010) önemli olduğundan, hizmet öncesi ve hizmet içi okul öncesi öğretmenlerinin, insan-çevre ilişkisi hakkındaki düşüncelerini sorgulayabilecekleri çevre eğitimi programlarının sağlanması gereklidir. Böylece, okul öncesi öğretmenlerinin çevresel tutumları eko-merkezcilik eksenine kayabilir.

Etkin Yaşam Deneyimleri değişkenlerinden biri olan çocuklukta yaşanılan ev tipi değişkeninin, sadece eko gruptaki okul öncesi öğretmenlerinin enerji tasarrufu davranışlarını önemli ölçüde yordadığı bulunmuştur. Bu sonuç, çocukluktaki doğa deneyimlerinin yetişkinlerin çevresel taahhütleriyle ilişkili olduğu anlamına gelmektedir. Doğa açısından zengin yerlerin çevre yanlısı davranışlar üzerindeki rolü göz önüne alındığında, bugünün çocuklarına ve geleceğin öğretmenlerine doğa açısından zengin ortamlarda zaman geçirme fırsatı sunulmalıdır. Fakat kuşlar ve diğer bazı türlerin yaşam alanları yok edilmeye devam ediliyor ve bu da soylarının tükenme olasılığını artırıyor. Bunun temel nedeni, insanların enerji ihtiyacını karşılamak için baraj ve hidroelektrik santrallerin yapılmasıyla yakından ilgilidir (Şahin, 2013). Ancak insanların, insan-doğa ilişkisini, sınırlı kaynakları ve bunları nasıl verimli kullanacaklarını sorgulabilmeleri için doğa ile etkileşim içinde olabilecekleri fırsatlar yaratmak daha yararlı olabilir.

Mevcut çalışmada, ÇE ve/veya SKE kurs deneyiminin enerji tasarrufuna anlamlı bir katkısı bulunmasa da, bazı çalışmalar çevre eğitimi ile çevresel tutum ve davranışlar arasında pozitif bir bağlantı olduğunu belgelemiştir (Barata ve diğerleri, 2017; Clark & Finley, 2007; Frederiks ve diğerleri, 2015; Hsu, 2004, 2009; Pe'er ve diğerleri, 2007; Tuncer, 2008). Enerji tasarrufu ile çevresel kazanımlar arasındaki bağlantıyı göremezlerse insanların enerji tasarrufu davranışları azalabilir (Palma-Oliveira & Gaspar, 2004). Okul öncesi öğretmenlerine bu davranışların kazandırılması için çevre eğitimi ve sürdürülebilir kalkınmaya yönelik eğitimler sağlanmalıdır. ÇE ve SKE kursları, insanların ekolojik öz kimlik oluşumunu teşvik etme potansiyeline sahiptir (Barata ve diğerleri, 2017). İnsanlar gönüllü olarak davranışlarda bulunduklarında, davranışın içsel benliklerini yansıttığı sonucuna varırlar. Böylece davranış kalıcı hale gelir (Cialdini, 2001). Öğretmenlerin tutum, beceri ve bilgilerinin çocukların öğrenme deneyimleri üzerindeki etkisi düşünüldüğünde

(Williams vd., 2016), hizmet öncesi ve hizmet içi okul öncesi öğretmenlerine ekolojik öz kimliklerini şekillendirmeleri ve bunu okul ortamlarındaki günlük ve eğitsel uygulamalarına yansıtmaları için ÇE ve SKE kursları verilmesi önerilmektedir.

Etkin Yaşam Deneyimleri değişkenlerinden biri olan STK üyeliği, her iki okul türünde de öğretmenlerin enerji tasarrufu davranışlarını açıklamada anlamlı bir yordayıcı değişken olarak bulunmamıştır. Eko-okullar STK'lar ile işbirliği yapmasına rağmen, STK üyeliği enerji tasarrufu davranışlarını açıklamada anlamlı bir katkı sağlamamıştır. Bu bulgu, STK'ların enerji konularına, bunların iklim değişikliği üzerindeki etkilerine ve enerji tasarrufunun nasıl yapılacağına odaklanmayı dikkate almaları gerekebileceği anlamına gelmektedir.

Çalışmanın Sınırlılıkları ve Gelecekteki Araştırmalar İçin Öneriler

Bu çalışma, sürdürülebilirlik için erken çocukluk eğitimi literatürüne katkıda bulunsa da, daha sonraki araştırmalar için dikkate alınması gereken bazı sınırlılıkları barındırmaktadır. İlk olarak, bu çalışmanın verileri özbildirim ölçekleri vasıtasıyla toplanmıştır. Katılımcı öğretmenlerin ölçekleri içtenlikle doldurdukları varsayılmakla birlikte, özbildirim ölçeğine güvenmek bazen yanıltıcı sonuçlara neden olabilmektedir. Yani, katılımcılar sosyal olarak arzu edilen cevaplar verme eğiliminde olabilirler. Ayrıca, öz-bildirime dayalı veriler, katılımcıların gerçek davranışları yerine davranışlarına ilişkin inançlarını ve algılarını yansıtır. Bireylerin enerji tasarrufu ve tüketimine ilişkin algıları yanılgılara duyarlıdır (Sütterlin ve diğerleri, 2011). Yani, insanlar enerji tüketimi ve enerji tasarrufu örüntülerini yanlış yorumlayabilirler. Bu nedenle mevcut çalışmanın sonuçlarına dayanarak katılımcıların gerçek enerji tasarrufu davranışları hakkında bir sonuca varmak mümkün değildir. Dolayısıyla, daha sonraki çalışmalar gözlem yoluyla gerçek davranışlara odaklanmayı dikkate almalıdır. Ayrıca, gelecekteki araştırmalar, öğretmenlerin enerji tasarrufu davranışlarını derinlemesine incelemek için karma yöntem tasarımını kullanabilir. Öte yandan, Yeni Çevresel Paradigma Ölçeği de sosyal istenirlik yanlılığına duyarlıdır ve insanların açık tutumlarıyla sınırlıdır (Scott vd., 2016). Ancak insanların farkında olmadıkları örtük tutumları da vardır (Greenwald & Banaji, 1995). Gelecekteki çalışmalar örtük tutumları da ölçebilirler.

Dahası, birçok çalışma bildirilen ve gerçek davranış arasında yüksek bir örtüşme olduğunu bildirmiş olsa da (Whitehead, 2005), özbildirim ölçeğinden elde edilen veriler davranış ve tutumlar arasındaki ilişkinin var olandan daha güçlü olduğu yönünde çıkarım yapılmasına sebep olabilir (Martinsson ve diğerleri, 2011).

Bu çalışma, okul öncesi öğretmenlerinin enerji tasarrufu davranışlarına odaklanmıştır. Öğretmenlerin sürdürülebilir kalkınma kavramını anlamaları, sürdürülebilir kalkınma için eğitimin önemine, eğitimin sürdürülebilir bir gelecek inşa etme potansiyeline olan inançları ve sürdürülebilir bir dünya imajı son derece önemli olmasına rağmen (Panatsa ve Malandrakis, 2018), çocukların kendi öğrenmelerindeki temsiliyeti dikkate alınmalıdır. Sürdürülebilirlik için erken çocukluk eğitimi, çocukların temsiliyetine ve eğitim uygulamalarına aktif katılımına öncelik verir (Pramling Samuelsson & Kaga, 2008). Çocuklar, dünya çapındaki değişimin parçası olma konusunda en yüksek potansiyele sahip olan gruptur (Elliott & Davis, 2009). Bu nedenle, gelecekteki araştırmalar, küçük çocukların enerji tasarrufu davranışlarına ve öğretmenlerin enerji tasarrufu davranışlarının çocuklardaki yansımasına odaklanabilirler.

Bu çalışmada, okul öncesi öğretmenlerinin okul türünden bağımsız olarak enerji tasarrufu konusunda oldukça aktif oldukları bulunmuştur. Gelecekteki çalışmalar bu benzerliğin arkasındaki faktörlere odaklanabilir. Ayrıca, bazı çalışmalar enerji tüketimi ile düşük gelir düzeyleri (Frederiks ve diğerleri, 2015; Martinsson ve diğerleri, 2011; Sütterlin ve diğerleri, 2011) ve cinsiyet (Gonzalez ve diğerleri, 2020; Şahin, 2016) arasında pozitif bir bağlantı bildirdiğinden gelecekteki çalışmalar cinsiyet ve gelir değişkenlerini çalışmaya dahil etmeyi göz önünde bulundurabilirler. Yani, düşük gelirli hanehalkları, enerji fiyatlarında devam eden artış nedeniyle yüksek gelirli hanehalklarına göre enerji tasarrufu için daha fazla teşvike sahiptir (Martinsson ve diğerleri, 2011). Öte yandan, küresel ısınma ve enerji kaynaklarının tükenmesi gibi enerji ile ilgili konularda kadınlar erkeklere göre daha fazla sorumluluk hissetmektedirler (Dumciuviene vd., 2019).

Bu çalışma İstanbul ve Antalya'da yapılmıştır. Bu nedenle bulguları Türkiye'nin bütün bölgelerine genellemek mümkün değildir. Gelecekteki çalışmalar, daha genellebilir bulgular elde etmek için farklı şehir ve bölgelerden veri toplayabilirler.

Ayrıca farklı kültürlerde enerji tasarrufu konusunda anaokullarının ve okul üyelerinin mevcut durumunu görmek için kültürler arası çalışmalar yapılabilir.

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TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English): Early Childhood Education Teachers' Self-Reported Energy Conservation Behaviors Among Eco and Non-Eco Preschools

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