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INVESTIGATING ALPHA GENERATION INDIVIDUALS' AWARENESS
TOWARD CLIMATE CHANGE

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

ÖZGÜ ÖZTÜRK

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Approval of the thesis:

**INVESTIGATING ALPHA GENERATION INDIVIDUALS' AWARENESS
TOWARD CLIMATE CHANGE**

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ABSTRACT

INVESTIGATING ALPHA GENERATION INDIVIDUALS' AWARENESS TOWARD CLIMATE CHANGE

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There is an increase in greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), chlorofluorocarbon (CFC), and ozone (O₃) because of rapid population growth and industrialization. The extreme increase in greenhouse gas emissions is causing the world to warm more than normal. The increase in temperature is called global warming. Global climate change occurs as a result of global warming. Alpha generation individuals are seriously affected by climate change, which has become a global problem. According to the results of the research published in the journal Science, individuals of the alpha generation will be exposed to an average of 2.6 times more drought, 3 times more shortages of crops, and 2 times more forest fires than other generations. The report published by UNICEF in August 2020, also shows that 1 billion children were exposed to air pollution and 920 million children were exposed to water scarcity. This study investigates the awareness of the alpha generation individuals in Turkey toward climate change in terms of five dimensions; attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior. In the pilot study, which is the first stage of the study, the Turkish version of the scale was applied to 110 alpha-generation individuals, and validity and reliability studies were conducted. Confirmatory factor analysis

(CFA) results confirmed that the proposed structure had five factors, explaining 57.7% of the total variance. The Cronbach's alpha coefficient of the scale was calculated as 0.723. It was concluded that this value is good and acceptable. In the main group study, which is the second stage of the study, descriptive statistics were used to descriptively interpret the awareness of alpha generation individuals toward climate change, correlation analysis to understand the relationship between the five factors, and two-step cluster analysis to learn the profiles of 295 alpha generation individuals participating in the main study. According to the results of the analysis, it was revealed that Turkish alpha-generation individuals for the problem of climate change were gathered into two groups paralyzed (N=193, 65.4%) and concern activists (N=102, 34.6%). In addition, it has resulted that there was no strong relationship between the knowledge factor and other factors and the 11-year-old girl students were more aware of climate change than the boy students. Environmental education that will be given from an early age can contribute to the increase of students' knowledge about climate change.

Keywords: Alpha Generation, Climate Change

ÖZ

ALFA KUŞAĞI BİREYLERİNİN İKLİM DEĞİŞİKLİĞİNE KARŞI FARKINDALIKLARININ İNCELENMESİ

Öztürk, Özgü

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Hızlı nüfus artışı ve sanayileşme sonunda atmosferdeki karbondioksit (CO₂), metan (CH₄), kloroflorokarbon (CFC) ve ozon (O₃) gibi sera gazlarında artış görülmektedir. Sera gazı emisyonlarındaki aşırı artış, dünya atmosferinin ısınmasına neden olmaktadır. Dünya'da sıcaklık artışına ve bu duruma küresel ısınma denilmektedir. Küresel iklim değişikliği, küresel ısınmanın bir sonucu olarak ortaya çıkmaktadır. Küresel bir sorun haline gelen iklim değişikliğinden alfa kuşağı bireyleri ciddi bir şekilde etkilenmektedir. "Science" dergisinde yayınlanan araştırmanın sonuçlarına göre alfa kuşağı bireyleri diğer kuşaklara göre ortalama 2,6 kat daha fazla kuraklığa, 3 kat daha fazla ürün kıtlığına ve 2 kat daha fazla orman yangınına maruz kalacaktır. UNICEF'in Ağustos 2020'de yayınladığı raporda da 1 milyar çocuğun hava kirliliğine, 920 milyon çocuğun su kıtlığına maruz kaldığını gösteren sonuçlar mevcuttur. Son zamanlarda gezegenimizi etkileyen bu küresel probleme karşı alfa neslinin farkındalığını incelemek için, bu çalışma Türkiye'deki alfa kuşağı bireylerinin iklim değişikliğine karşı farkındalıklarını beş boyut açısından araştırmaktadır. Alina Kuthe ve arkadaşları tarafından geliştirilen "İklim Değişikliği Farkındalığı Ölçeği" tutum, kişisel endişe, bilgi, çarpan etkisi ve iklim dostu davranış hakkında bilgi vermektedir.

Çalışmanın ilk aşaması olan pilot uygulamada ölçeğin Türkçeye çevrilmiş hali 110 alfa kuşağı bireyine uygulanmış, geçerlilik ve güvenilirlik çalışması yapılmıştır. Doğrulayıcı faktör analizi (DFA) sonuçları toplam varyansın %57,7 'ini açıklayan ve önerilen yapının beş faktörlü olduğunu doğrulamıştır. Ölçeğin cronbach alfa katsayısı ise 0,723 olarak hesaplanmış. Bu değerin iyi ve kabul edilebilir olduğu sonucuna varılmıştır. Çalışmanın ikinci aşaması olan ana grup çalışmasın da ise alfa kuşağı bireylerinin iklim değişikliğine karşı farkındalıklarını betimsel olarak yorumlamak için tanımlayıcı istatistik, beş faktör arasındaki ilişkiyi anlamak için korelasyon analizi ve ana çalışmaya katılan 295 alfa kuşağı bireyinin profillerini öğrenmek için ise iki aşamalı kümeleme analizi kullanılmıştır. Analiz sonuçlarına göre, iklim değişikliği sorununa yönelik Türk alfa kuşağı bireyleri felçli (N=193, 65.4%) ve ilgili aktivist (N=102, 34.6%) olmak üzere iki grupta toplandığı ortaya çıktı. Ayrıca bilgi faktörü ile diğer faktörler arasında güçlü bir ilişkinin olmadığı ve 11 yaşındaki kız öğrencilerin iklim değişikliği konusunda diğer öğrencilerden daha bilinçli olduğu sonucuna ulaşıldı. Erken yaşlardan itibaren verilecek olan çevre eğitimiyle öğrencilerin iklim değişikliği ile ilgili bilgi düzeylerinin artmasına katkı sağlanabilir.

Anahtar Kelimeler: Alfa Kuşağı, İklim Değişikliği

To my precious family...

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LIST OF ABBREVIATIONS

ABBREVIATIONS

CCA	: Climate Change Awareness
UNEP	: United Nations Environment Program
A	: Attitude
PC	: Personal Concern
K	: Knowledge
MA	: Multiplicative Action
CFB	: Climate-friendly Behavior
DFA	: Descriptive Factor Analysis
CFA	: Confirmatory Factor Analysis
EFA	: Exploratory Factor Analysis
Gen Z	: Generation Z
Gen Y	: Generation Y
CFC	: Chlorofluorocarbon
CC	: Climate Change
⁰ C	: Degrees Celsius
UNICEF	: United Nations Children's Fund

CHAPTER 1

INTRODUCTION

"You have stolen my dreams and my childhood with your empty words. And yet I'm one of the lucky ones. People are suffering. People are dying. Entire ecosystems are collapsing. We are at the beginning of mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you!"

- Activist Greta Thunberg

Swedish youth activist Greta Thunberg spoke these words at the United Nations Climate Change Action Summit in New York. When she was only 15 years old, she emphasized that the fight against climate change should be started as soon as possible and she started her protests on this issue. She was chosen as the Person of the Year 2019 by Time magazine. Although this study was conducted with alpha generation individuals born in 2011, 2012, and 2013, it starts with the words of Greta Thunberg, who was born in 2003 and is the Z generation. This is because there is no profound difference of opinion and thought between the individuals born in the last years of the Z generation and the individuals born in the first years of the alpha generation. In addition, the views and thoughts of individuals born in the last years of the Z generation can affect the alpha generation. She has influenced many young people from Gen-Z not just alpha generations with her actions and has managed to create public opinion. Millions of young people and adults in Asia, Africa, Europe, Australia, and America have tried to make their voices heard by participating in actions against climate change. But why did so many young people take action? Is climate change really that big of a problem?

1.1. Problem Statement

What is climate change, its causes, and its effects?

The climate is a concept that encompasses the mean state, variability, and extreme limits of the weather (Thornton, P. K., etc, 2014). While the weather changes on daily basis, in normal conditions, climate change is expected to occur over hundreds of thousands or millions of years and it results from natural phenomena such as volcanic eruptions or shifts in the earth's orbit. However, the climate change which we experience today is mainly caused by human activities such as agriculture, deforestation, and burning of fossil fuels, and unlike natural phenomena, these human activities have dramatically accelerated the alteration in the climate. The most significant contributor among these human-induced factors is the use of fossil fuels in energy production (IPCC, 2022). Especially, with the industrial revolution, there has been a significant increase in the consumption of fossil fuels (coal, oil, and natural gas). These fossil fuels release gases such as carbon dioxide, methane, and nitrous oxide which are called greenhouse gases. These greenhouse gases cause the accumulation of heat in the Earth's atmosphere and decrease the permeability of the atmosphere to infrared energy. As a result, the increase in these greenhouse gases leads to climate change and makes humans the main actor of climate change. (Hoegh-Guldberg, O. etc, 2018) As a result of the use of fossil fuels, there is an increase in gases such as carbon dioxide, methane, and nitrous oxide. The increase in the amount of these gases, called greenhouse gases, causes the accumulation of heat in the Earth's atmosphere and a decrease in the permeability of the atmosphere to infrared energy. In this case, it leads to climate change. In short, the most important cause of climate change is humans.

There are a lot of consequences of climate change. Melting of glaciers, rising sea levels, increasing forest fires, increase in world average temperature, and change in precipitation regime can be counted as the consequences of climate change. In order to stop climate change, it is necessary to reduce or completely eliminate greenhouse gas emissions. For this, countries need to take responsibility because

our planet is the living space of all of us. The first important step was taken regarding climate change with the signing of The United Nations Framework Convention on Climate Change in 1992. Within the framework of this contract, the Kyoto Protocol was made, but since this protocol only covers developed countries, no results could be obtained. States have realized the magnitude of the climate change crisis, but have lagged behind in stopping climate change. Between the years 2020-2030, the Paris Agreement was signed on the condition that global warming does not exceed 1.50 °C, but even if the states manage to keep their promises, experts say that the average world temperature will increase by 30 °C in the coming years. Even if the promises made in the Paris Agreement are kept, countries are far from their target for keeping the warming at 1.5 °C and the average temperature on the earth will rise to 2.8 °C warmings (Hoegh-Guldberg, O. etc, 2018). As the measurement taken by the states against the climate crisis is insufficient, this situation has created dissatisfaction among the youth. With their actions, young people emphasize that measures should be taken to stop climate change. In 2018, Greta Thunberg made a great impact with her action and drew attention to the problem of climate change.

There are many causes of climate change, which is a global problem. Carbon footprint and chemical pollution can be counted among the causes of climate change (IPCC,2007). Firstly, people need heating, transportation, lighting, and industrial processes for their vital needs and fossil fuel is used for this. With the use of fossil fuels, the greenhouse gas effect is also increasing. The carbon footprint of the greenhouse gases emitted by an individual, a country, or an organization as a result of their activities is called carbon footprint (Plassmann & Edwards-Jones, 2010). Countries with large populations such as China, America, and India have the largest carbon footprints (GFN, 2017). Secondly, chemical pollution is another cause of climate change. Air, water, soil, and radioactive pollution are sub-titles of chemical pollution. Chemical pollution is defined as the damage to the environment caused by harmful substances that occur as a result of certain activities, are not found in the natural environment, and affect all living organisms living in nature (Environmental Pollution Center, n.d.). Lastly, there are two places

in the atmosphere, the first is found between 19-45 km from the stratosphere and the other is due to ozone deposition in the troposphere. As a result of human-induced effects, ozone accumulation is observed in the troposphere. While chlorofluorocarbon (CFC) gases are effective in the depletion of the ozone layer, the use of CFC was prohibited with the Montreal Protocol signed in 1987. However, other substances other (hydroxyl, nitrogen monoxide, chlorine, and bromine than CFCs) also cause the ozone layer to be depleted. In this case, the sun's rays come directly to the world without being filtered and filtered and trigger climate change. (Young, P.J., etc, 2021)

People, animals, seas, agricultural areas, oceans, waters, and biodiversity have been severely affected by climate change (Shivanna, K.R., 2022). Firstly, as I mentioned above, glaciers are melting rapidly due to the increasing average temperature in the globe. According to National Snow & Ice Data Center (2022) data, the area covered with ice between 1981 and 2010 decreased by 65.00 km² compared to today. Another result of climate change is the increase in the regional temperature which has triggered the rise in the population of insects living in tree bark. This results in trees dying and the oxygen sources diminishing (Pureswaran, 2018; Raffa ,2008; Raffa ,2015). Finally, the increase in the average temperature of the world brings forest fires together and causes droughts and precipitation regime changes (Howard et al., 2016).

Apart from the environmental consequences of climate change, there are also social consequences. According to the climate change risk assessment (CCRA) by UK Government's Department for Environment, Food & Rural Affairs and Environment Agency (2012), health, economy, governance and regulation and social attitudes are social consequences of CC. For example, many plant and animal species suffer as a result of habitat degradation caused by climate change. As a result, many diseases that affect people occur. Biodiversity is a concept that stimulates the tourism of countries and strengthens their economies. As a result of climate change, biodiversity decreases and countries are negatively affected in terms of economy, culture, and tourism. In addition, people may have to migrate

from their regions due to polluted water, air, and soil due to climate change. This change in the distribution of the population brings with it social pressure such as education and housing.

In summary, the consequences of climate change, mostly resulting from man-made activities, have reached a frightening level. Young people are also trying to solve their discomfort on this issue by taking action and creating public opinion. But what about these young people?

Alpha Generation

The alpha generation is the first generation born in the 21st century and it is named after the first letter of the Greek alphabet, alpha, as it represents a new beginning for this century (McCrindle & Fell, 2020). Alpha generation can also be defined as the generation after generation Z (Nagy & Kölcsey, 2017) or the children of generation Y. Alpha generation individuals include individuals born between 2010 and 2024. On the other hand, this study was conducted with first-born alpha-generation individuals. In other words, alpha-generation individuals born in 2011, 2012, and 2013 were included in the study.

The scientific and technological changes that accelerated in 2010 and later are important in understanding the characteristics of the Alpha generation. (Figure 1.1) In 2010, Apple released its first tablet, the iPad. In the same year, the social media application Instagram was launched. In 2011, the first spacecraft landed on the surface of Mars. A year later, the first virtual reality glasses were released. In 2014, water was discovered on the surface of Mars, and humanoid robots were introduced. The following year, Apple introduced its first smartwatch (Figure 1.2) (Time Magazine, 2019).



Figure 1. 1. The Characteristics of Alpha Generation (McCordle, 2021)

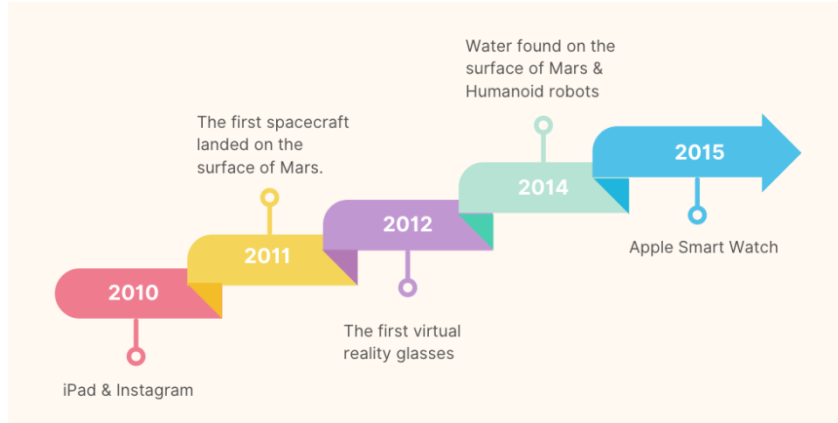


Figure 1. 2. Technological and Scientific Developments Between 2010-2015

In summary, it is necessary to understand what happened in the time period they lived or how technology developed in order to know alpha generation individuals. (Figure 1.1) Although X, Y, and Z generations have witnessed many technological developments, today's technological developments are more. This helped alpha generation individuals to adapt to some characteristics more easily. These features are called 21st-century features. They have 21st-century characteristics such as

analytical thinking and innovation, critical thinking and analysis, the use of technology, monitoring and control, leadership and social influence, and complex problem-solving (Soffel, J. 2016). 21st-century skills and their relationship with the alpha generation are presented to the reader in more detail in the "literature review" chapter. In addition, there are many features that distinguish the alpha generation from other generations. For example, the alpha generation is extremely active, they do not like rules and restrictions, they are interested in wearable technologies, they have an entrepreneurial and self-confident spirit, they do not prefer to do two things at the same time, and lastly, they are concerned with environmental and social issues. This thesis focuses on the alpha generation's interest in social and environmental issues. Social analyst McCrindle (2021) defines generation alpha as the most materially equipped and technologically literate generation to honor the planet! In his book, McCrindle mentioned that alpha-generation individuals are concerned about the environment. At the beginning of this chapter, activist Greta Thunberg's words and actions on climate change were mentioned. Greta Thunberg started a global climate movement and the whole world is aware of it. Greta Thunberg's photos were featured on the cover of Time magazine as "Person of the Year" in 2019 and she was granted the award of 2019 International Children's Peace. The alpha generation, as a generation born into technology, is instantly aware of news, events, and situations in the world. The above-mentioned event also affected the alpha generation deeply and caused them to become sensitive to the environment. Apart from this example, Amnesty International (2019) conducted a survey with the generation (Z generation) individuals taken as an example by the alpha generation individuals, and climate change was ranked first as the most important problem. Another reason why alpha generation individuals attach so much importance to climate change and the environment is that, as mentioned at the beginning of this chapter, climate change is a major problem of this century. The alpha generation is projected to be the generation affected by climate change the most. The results of the studies carried out by scientists support this prediction. There are a lot of scientific studies to show how alpha generation is influenced by CC. The first example, according to the results of the research published in the journal Science, individuals of the alpha generation will be exposed to an average

of 2.6 times more drought, 3 times more shortages of crops, and 2 times more forest fires than other generations. The report published by UNICEF in August 2020, also shows that 1 billion children were exposed to air pollution and 920 million children were exposed to water scarcity. Climate change affects the alpha generation negatively. Another example, according to the report titled " The climate crisis is a child rights crisis" published by UNICEF, the events that will occur with the climate change crisis are divided into 3 groups which named lower-onset changes, sudden and moderately sudden-onset events, and environmental degradation and stresses. (Figure 1.3.) There are two lower-onset changes. Firstly, 920 million children who are over one-third of children globally are currently highly exposed to water scarcity. The consequences are likely to worsen as climate change causes drought, seasonal and interannual variability, water pollution, and resulting in depletion of available water resources. Secondly, over 1 in 4 children globally, approximately 600 million children are exposed to diseases such as malaria and dengue. As the temperature increase caused by climate change continues, it is likely that mosquitoes and the pathogens that transmit these diseases will multiply. Next, there are three sudden and moderately sudden-onset events. Over one-third of children globally are exposed to high levels of heatwaves. As the global average temperatures increase, the number of children affected by the heat is expected to increase as well. Next, 330 million children, 1 in 7 children globally, are currently exposed to riverine flooding as a result of melting glaciers and increasing precipitation. Additionally, sea level rise and increased storm surges are causing 240 million children to be currently exposed to coastal flooding. Lastly, 2 billion children are seriously exposed to air pollution. As the use of fossil fuels is not reduced, the situation will worsen. Next, 815 million children are exposed to lead pollution caused by air, water, and soil pollution. As the use of lead-containing products is not reduced, the situation will worsen. These two examples are given as examples of environmental degradation and stresses.

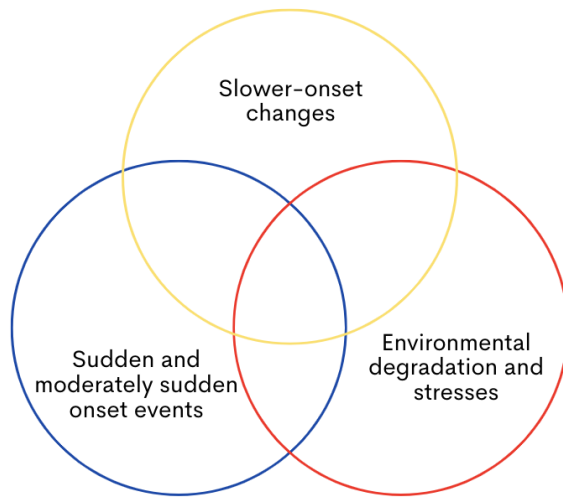


Figure 1. 3. Names of Groups Affected by Climate Change

In summary, since climate change is one of the major problems today and alpha-generation individual is the generation that most could be affected by climate change, this study aims to explore the awareness of alpha-generation in climate change. The reason why studies with young people are mentioned is that since the alpha generation was newly born in 2010, there are not many studies on the alpha generation. Therefore, studies with other generations are included in the literature. For example, the study by Erkiliç and Sultan in 2019 investigated the environmental literacy levels of secondary school students and their attitudes toward the environment. Erkiliç and Sultan (2019) showed that the students had a good attitude toward the environment while they were at a moderate level of environmental literacy. The study by Özcan and Demirel (2019), examined the cognitive structures of secondary school students regarding global warming, acid rain, the greenhouse effect, and the destruction of natural resources. The results indicated the greenhouse effect was the subject on which the students had the least knowledge and the most misconceptions. In the literature review chapter, studies with other generations apart from the alpha generation are explained in more detail. 43 articles from different years were examined and the results were presented to the reader in the literature review chapter. According to the results of the articles, climate change awareness and attitudes of girl students were higher than boy students. In this thesis, the awareness of girl and boy students against climate change was measured and the results were included in the result chapter.

Some of the research results regarding the change in climate change awareness according to gender differences are as follows. According to the results of the survey conducted by the Yale Climate Change Communication Program in 2017, women's rates of believing that climate change will be harmful, agreeing with climate scientists, and worrying about the consequences of climate change were higher than men. Another example, in 2010, the study by McCright, A. M. shows that women are slightly more concerned about climate change than men, and women have more evaluated scientific knowledge about climate change than men. Climate change affects not only all living things but also women. There are a lot of impacts of CC on women. For example, the health impact of climate change affects men and women differently. Women are more affected by effects such as increased exposure to heat, poor air quality, extreme weather events, altered vector-borne disease transmission, reduced water quality, and decreased food security (Sorensen C, etc, 2018). In short, the results of the studies conducted over the years and this thesis study show that gender difference is important in climate change awareness.

In this thesis study, there are other factors examined besides age and gender. These factors were investigated based on the original study by Kuthe et al (2019). Kuthe et al (2019) conducted a study with 13-16 years old young people and used a survey titled CCA. This survey focused on attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior to measure the awareness of alpha-generation individuals toward climate change (Figure 1.4). According to this research, the awareness of Turkish alpha generation individuals about climate change will be tried to be determined by using five factors, and by looking at the relationship between the five factors, suggestions will be made about the courses and subjects in the Turkish education curriculum in case of deficiency.



Figure 1. 4. Five Factors

Five Factors to Measure the Awareness of Turkish Alpha-generation Individuals toward Climate Change

1. Attitude

There are many definitions in the literature of attitude. Some of these are as follows; It is an individual's evaluation of an object that they notice (Pratkani & Greenwald, 1989). Zanna and Rempel (1988) defined attitude as a positive or negative evaluation of an object. Another definition is the evaluation of various objects stored in our minds (Judd etc, 1991). People tend to determine and control their thoughts, feelings, and behaviors towards an idea, event, ideology, institution, or other people, and as a result, they can develop an attitude towards an idea, an event, an ideology, an institution, or other people (Çetin, İ, 2012). Attitude consists of three characteristics: cognitive, emotional, and behavioral. These three features cannot be said to be completely different or exactly the same. They are consistent with each other. After the general definition of the concept of attitude, it is necessary to define the attitude toward the environment, which is also emphasized

in this thesis. People have fears, anger, restlessness, and value judgments caused by environmental problems, and as a result, they have positive or negative thoughts about the environment, which shows their attitude towards the environment (Erten, S, 2005). In this study, students' interests, responsibilities, and locus of control were measured under the concept of attitude (Ernst, Blood, & Beery, 2017; Hines et al., 1986/1987).

In this thesis, this factor is measured by students' sense of responsibility and interest in climate change, the skills of understanding a climate change is an international problem, and the desire of acting to stop climate change. This factor consists of the following questions in this thesis; how interested are you in the topic of climate change, it is my responsibility to act in a climate-friendly manner, I am able to contribute to reducing the degree of climate change, if the international community cooperates, global warming can be limited to + 2–4 °C and I would like to reduce my carbon emissions. The content of the survey is mentioned in more detail in the "method" chapter.

2. Personal Concern

Most people living all over the world are concerned about climate change and its consequences, and studies support this. The Global Attitudes Survey (2015) was applied to people living in America, Asia, and European countries. 54% of the countries surveyed are very concerned about climate change. Of the 40 countries surveyed, 22 countries consider climate change to be a serious problem. Latin American countries such as Brazil, Peru, and Chile are among the countries most concerned about climate change (Pew Research Center, 2015). People's concern about CC increased, and their awareness and behavior also increase (Kiss, E., Balla, D. and Kovács, A.D., 2022) Although the level of concern varies by country, it has been among the subjects examined since 1990. In order to determine the level of concern of people toward climate change, it is necessary to conduct national, international, and individual studies. General concern, individual concern, and

concern about its impact on society show that the concept of concern has three aspects.

In this thesis, too, the personal concern factor measures the level of students' concern about climate change in their own life, their family's life, and the lives of people living in Turkey. While the known scientific knowledge about climate change is directly proportional to the concern about climate change, the lack of concern about climate change is not due to the lack of scientific knowledge. But we still do not seek a definitive conclusion (Kiss, E., Balla, D. and Kovács, A.D., 2022). Individuals who have experienced the consequences of climate change before are more concerned about this problem. Individuals who are concerned about climate change are more likely to feel responsible for the environment. In this thesis, this factor consists of the following questions; concern about my life, the life of my family, and the life of people living in Turkey.

3. Knowledge

Previous research has shown that accurate knowledge about climate change and its causes and consequences is effective in people's behavior toward the environment (Bord et al. 2000; O'Connor et al. 1999). The lack of basic knowledge about climate change and its causes, effects, and solutions can affect people's attitudes toward the environment and their willingness to take action (Lorenzoni et al. 2007). According to another study, studies that measure the public's knowledge about climate show that the public does not have detailed information about climate. (Bostrom et al. 1994; Read et al. 1994; Reynolds et al. 2010). However, despite these studies, some studies argue that people's lack of knowledge about climate change does not actually affect their willingness to take action against the environment (Bulkeley 2000; Dunlap 1998). In other words, having knowledge about climate change does not mean that it will change attitudes and behaviors toward the environment. According to Fietkau and Kessel (1981), a high level of knowledge about the environment does not mean showing positive behavior towards the environment. Apart from the relationship between knowledge and

behavior, the subject of knowledge and concern is also some of the researched topics. The more information people have about climate change, the more concerned they will be about climate change (Semenza et al. 2008).

In this study, there are a lot of questions about climate change, its effects, and its consequences to measure students' knowledge about climate change. In this thesis, this factor consists of the following questions; due to climate change, the temperature will rise in all areas in the world an equal amount, the melting of the glaciers will stop immediately if worldwide CO₂ emissions come to a halt, winter tourism in the Uludağ is not affected by climate change thanks to the use of snow guns and climate change is mainly human-induced.

4. Multiplicative Action

The mean of the "multiplicative" is increasing more and more over time (Cambridge dictionary,2022). In other words, as the change in students' environmental behavior affects their family and friends, it is called multiplicative action. However, as the positive change in the behavior of the individual towards the environment is individual and does not affect anyone, it is called climate-friendly behavior. Studies by Hiramatsu et al., (2014) show that the more awareness of children on environmental issues, the more their behavior changes and they display sensitive behaviors towards the environment. Changes in students' behaviors also cause changes in their families' thoughts and behaviors (Hiramatsu et al., 2014). Behavioral changes in children have also led to behavioral changes in the parents of children.

In this thesis, the questions were asked in order to measure whether the students' high awareness of climate change affects both their families and friends positively. These questions are "I discuss climate change with my friends, I discuss climate change with my family, I try to influence my friends to act in a climate-friendly manner and I try to influence my family to act in a climate-friendly manner."

5. Climate-friendly Behavior

Behaviors such as saving energy, using renewable energy, and choosing environmentally friendly transportation are considered climate-friendly behaviors (Tabi 2013; Motawa and Oladokun 2014; Štreimikienė 2015; Wei et al. 2016; Pothitou et al. 2016; Wakiyama and Kuramochi 2017; Paco and Lavrador 2017; James and Ambrose 2017; Baul et al. 2018). It has been revealed that people who show climate-friendly behavior toward climate change contribute to reducing the carbon emission level (Barr et al. 2011). Individuals concerns and sense of responsibility towards climate change also encourage them to exhibit climate-friendly behavior (Skogen et al. 2018; Austin et al. 2020; Bouman et al. 2020; Boto Garcia and Bucciol 2020; Jakučionytė-Skodienė and Liobikienė 2021). In order to reduce the damage that people have given to the environment, it is necessary to change the behavior of people toward the environment (De Leeuw et al. 2015). A study conducted in Switzerland in 2020 showed a statistically significant correlation between Swiss people's awareness of environmental responsibility and environmentally friendly behavior (Bouman et al. 2020).

In this study, the environmentally friendly behaviors of the students were measured with the questions asked under the title of energy saving, recycling, and sustainability. These questions are I turn down the heating when I am not at home, I try to repair things before I buy something new, before I buy something, I carefully consider whether I need it or not, I prefer to buy things with little packaging, I turn off electrical devices when I do not need them, while taking a shower I do not run the water unnecessarily, I separate waste to promote the sustainable reuse of material resources and I turn off lights when I do not need them.

In summary, although there are studies all over the world on climate change awareness of the alpha generation, the number of studies conducted with this generation is very few in Turkey. Although there are studies investigating students' attitudes, behaviors, etc. towards climate change, there are not many studies,

especially by considering the five factors and clearly specifying the target population. Therefore, this thesis is designed to determine the awareness of the Turkish alpha generation toward climate change and to fill this gap in the literature.

1.2. Purposes of Study and Research Questions

The purpose of the study is to investigate the awareness of alpha generation individuals towards climate change by means of five factors, the relationship between the factors explaining their awareness, and identify the alpha generation as discrete groups as far as awareness toward CC is considered.

1. How aware is the Turkish alpha generation towards climate change?
 - 1.1 What is the level of attitudes of Turkish alpha generation individuals towards climate change?
 - 1.2 What is the level of attitudes of Turkish alpha generation individuals towards climate change according to age and gender?
 - 1.3 What is the level of personal concern of Turkish alpha generation individuals towards climate change?
 - 1.4 What is the level of personal concern of Turkish alpha generation individuals towards climate change according to age and gender?
 - 1.5 What is the level of knowledge of Turkish alpha generation individuals toward climate change?
 - 1.6 What is the level of knowledge of Turkish alpha generation individuals toward climate change according to age and gender?
 - 1.7 How is the multiplicative action of Turkish alpha generation individuals toward climate change?
 - 1.8 How is the multiplicative action of Turkish alpha generation individuals toward climate change according to age and gender?
 - 1.9 How do Turkish alpha-generation individuals exhibit climate-friendly behavior towards climate change?
 - 1.10 How do Turkish alpha-generation individuals exhibit climate-friendly behavior towards climate change according to age and gender?

2. What is the relationship between the factors explaining Turkish alpha generation individuals' awareness toward climate change?
3. What are the trends for climate change awareness of the Turkish alpha generation?

1.3. Significance of Study

This study was carried out to measure the awareness of Turkish alpha generation individuals who will shape the future against climate change, which is one of the biggest problems of today. Alpha generation and climate change concepts are explained in detail in the literature review. While measuring the awareness of alpha generation individuals, five factors (attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior) were used. Five factors are explained in detail in the introduction chapter. It was aimed to determine students' awareness of climate change with these measured factors. According to the results obtained, it is aimed to guide the necessary changes or improvement in climate change education in the secondary school science curriculum and in environmental education in general in Turkey. The results of the study are important because they are a source. Another importance of the study is that there is no previous study to determine the climate change awareness of alpha generation individuals in Turkey thanks to five factors. Studies of awareness of climate change have been conducted with secondary school students both in Turkey and in other countries, but there is no study has been conducted using five factors (attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior) together and directly determining the target population (alpha generation). This situation increases the importance of the study. However, studies on determining the awareness of Gen Y and Gen Z individuals about climate change were carried out both in Turkey and in other countries. Some of the studies are included in the literature review section and explained in detail. It is aimed to determine the following situations thank this study.

1. Determining the negative attitudes of Turkish alpha generation individuals about climate change
2. Determining the concerns of Turkish alpha generation individuals about climate change
3. Determining the knowledge level of Turkish alpha generation individuals about climate change
4. Determining Influencing the family and friends of Turkish alpha generation individuals to raise awareness of the effects of climate change and to find solutions
5. Determining Turkish alpha generation individuals exhibit environmentally friendly behaviors related to climate change

Apart from these specified situations, this thesis aims to determine the change or improvement of the environmental education program in the Turkish education system. According to the data, new objectives can be added to the secondary school science curriculum and the number of environmental lessons can be increased and environmental education can be given outside the school together with the students.

In summary, there is no study that measures the awareness of Turkish alpha-generation individuals toward climate change with five factors. Especially after the pandemic period and while the effects of the pandemic continue, this study revealed the thoughts of the new generations about the environment and closed a gap in the literature.

CHAPTER 2

LITERATURE REVIEW

This chapter consists of three parts. The first part consists of generations in general and specifically alpha generation. As well, 21st-century skills are explained in relationship with generations.

Secondly, the definition of climate change is made and the factors that cause climate change are explained in the context of the instrument used in this thesis.

Scientific research on the awareness of climate change is summarized in the last section emphasizing the dimensions of the instrument used in this research. Research on climate change education and awareness from the year 2000 to the present is given in chronological order in order to evaluate the change of climate change awareness of generations over the years, as well as the developments in the area of related research.

2.1. Generation and Why Generations Matter?

As defining the concept of generation, it is necessary to consider it from a biological and sociological (social) perspective. The biological definition of this word, which is also defined as descendants, in other words, is as follows; The time elapsed between the birth dates of parents and their children.

Social, economic, political, and technological developments in societies lead to some changes in the existing cultural structure, and as a result, individuals' behaviors, value judgments, and perspectives on social problems change. Considering the social, economic, political, and technological developments of the period, the reactions of individuals to similar situations will also show parallelism.

Therefore, it is not correct to classify generations by considering the time intervals in which they were born (Gündüz, Ş, 2018). The conditions mentioned above should be taken into account when making the concept of generation. In light of what has been written above, the sociological definition of the concept of generation is as follows; It can be explained as groups that have common values, beliefs, expectations, and behaviors because they were born on certain dates, were affected by common social, political, and economic events in the socialization process, and had similar responsibilities due to conditions (McCrindle & Wolfinger, 2010). Other definitions for the concept of generation are as follows. According to the Dictionary of Philosophy Terms of Turkish Language Institution, it is a group of people who were born in approximately the same years, shared the conditions of the same age, thus similar troubles and destinies, and were responsible for similar duties (TDK,2020).

Another definition is; that they are those who were born at the same historical time and intervals and belong to a certain social group or time periods formed by economic and social movements (Adıgüzel, Batur and Ekşili, 2014). On the other hand, in the philosophy of history and the history of culture, the concept of "generation" is expressed as follows; It is expressed as a group of individuals who unite in new ways in a new understanding and a new sense of life and separate from the old with clear lines.

2.1.1. Classification of Generations

In the literature, different events and turning points such as major political events or threats, socio-economic transitions, industry trends, unemployment rates, famine, and security problems have been effective in the classification of generations (Lamm and Meeks, 2009). In other words, in the classification of generations, there are different factors such as new technologies, changing career and education options, and changing societal values (McCrindle & Wolfinger, 2010) that bring the generations together rather than the date of birth. Today, generations are defined sociologically, not biologically (McCrindle and Wolfinger,

2010). The word, uttered by Aristotle said in, B.C. 350 years, supports this view. “Young people these days are out of control. They eat rudely, are disrespectful to adults, turn against their parents, and annoy their teachers...” Aristotle's discourse shows that the year in which individuals were born does not have much importance in determining the generations.

Looking at the literature, there are currently 6 generations standing (Figure 2.1). In order to better know and understand the alpha generation, it is necessary to look at the remaining 5 generations. The silent generation, baby boom generation, X, Y, Z, and alpha generation are the names of the 6 generations. Now, the definition and characteristics of each generation will be briefly mentioned, the definition and characteristics of the alpha generation will be explained in detail, and this section will be concluded.

Silent Generation: The silent generation is considered to be the generation born before 1945. They are also called the "war generation" because they saw World War II. The typical features of this generation are that they remain silent about social events and cannot express their views openly. In addition, respect for authority, loyalty, hard work, and dedication to social values have been their life philosophies. Some important events of the period can change the behavior and reactions of individuals. Some events may affect our economic situation and political view or change our sensitivity towards the environment. Some important events of that period are as follows; the great depression which was the worst economic downturn in the history of the industrialized world, lasting from 1929 to 1939 (Pells, R. H. and Romer, 2021), World War II is a global war that lasted from 1939 to 1945 (Ünalp, F. R. (2020), Darwin Bombing which was the largest single attack ever mounted by a foreign power on Australia, and finally Charles Kingsford Smith who made the first transpacific flight from the United States to Australia in 1928.

Baby Boomers Generation: After World War II, a population explosion took place and many people were born. Therefore, the generation born after World War II and

between 1965 is called the “baby boomers” generation. Individuation, self-expression, optimism, and the idea of “be here now” are expressed in the idea of the generation (Gorrell, 2008). Being sensitive to the environment, equality between women and men, and fighting against racial discrimination are among the issues that this generation attaches importance to. (Strauss and Howe, 2009). Some important events of that period are as follows; Neil Armstrong who was the first man to walk on the moon.

Generation X: Generation X can be defined as individuals born between 1961 and 1980 (Oblinger etc., 2005). Generation X is also called the transition period. The reason why the X generation is called the transition period; is due to fact that the world started to experience significant changes and transformations in those years (Senbir, 2004). It is a socialist, loyal and idealistic generation. The philosophy of "working to live" defines this generation. Challenger Explodes, Haley’s Comet, Stock Market Crash, Berlin Wall, and Newcastle Earthquake were the most important events of the period. Oil Crisis, Vietnam War, German Labor Migration, 1971 Memorandum, 1980 Coup

Generation Y: Individuals born between 1980-1994 are referred to as Generation Y (Kyles, 2005). Generation X is a bridge generation between generations Y and Z. Generation Y has adopted an internet-oriented lifestyle. It is the generation that accesses information quickly and uses social media effectively. This generation is independent, enterprising, willing to receive feedback, and loves to be free. Some of the events that took place during this period are as follows; the Thredbo Disaster, the Columbine Shooting, the New Millenium, September 11, the Bali Bombing, the Dissolution of the Soviet Union, and the Middle East Wars. When we look at the events, global environmental problems have started to emerge with the increase in the population and the parallel increase in needs. Due to the increasing population and industrialization, global environmental problems will be encountered more in the future, and environmental problems will begin to be among the important events experienced in that time period.

Generation Z: Generation Z can be defined as individuals born between 1995 and 2009 (Oblinger and etc., 2005). Generation Z is intertwined with technology. Changes and transformations in technology have caused individuals in the Z generation to be separated from other generations by the individual characteristics of this generation compared to those in the other generation. Individuals in the Z generation are very individual and fond of their independence. Iraq / Afghanistan war, the Asian Tsunami, GFC, WikiLeaks, and Arab Spring can be considered as the most important events of the period in the world. On the other hand, in Turkey, the Gezi events and the coup attempt are among the important events of the period (Çetin, C. and Karalar, S. ,2016, Coomers, M. D. and DeBard, R. ,2004, Chen, P. and Choi, Y. ,2008, Lancaster, C. L. and Stillman, D., 2002)

The table containing the start and end dates of six different generations according to different researchers is given below. (Table 2.1) In addition, the table containing the start and end dates of the Gen-Y, Gen-Z, and alpha generation used in the thesis is given below. (Table 2.2)

Figure 2. 1. Generations (McCrindle, 2021)

CATEGORY	BUILDERS	BABY BOOMERS	GENERATION X	GENERATION Y	GENERATION Z	GEN ALPHA
Slang terms	We prefer proper English if you please Born: < 1946 Age: 74+	Be cool Peace Groovy Way out Born: 1946-1964 Age: 55-73	Dude Ace Rad As if Wicked Born: 1965-1979 Age: 40-54	Bling Funky Dab Fuzz Whassup? Born: 1980-1994 Age: 25-39	Fam GOAT Slay Yass queen Born: 1995-2009 Age: 10-24	lit yeet hundo oof rn idrc Born: 2010-2024 Age: under 10
Social markers	World War II 1939-1945	Moon landing 1969	Stock market crash 1987	September 11 2001	GFC 2008	Trump / Brexit 2016
Iconic cars	Model T Ford Final, 1927	Ford Mustang 1964	Holden Commodore 1978	Toyota Prius 1997	Tesla Model S 2012	Autonomous vehicles 2020s
Iconic toys	Roller skates	Frisbee	Rubix cube	BMX bike	Folding scooter	Fidget spinner
Music devices	Record player LP, 1948	Audio cassette 1962	Walkman 1979	iPod 2001	Spotify 2008	Smart speakers New
Leadership style L - Leader I - New leaders	Controlling	Directing	Coordinating	Guiding	Empowering	Inspiring
Ideal leader	Commander	Thinker	Doer	Supporter	Collaborator	Co-creator
Learning style	Formal	Structured	Participative	Interactive	Multi-modal	Virtual
Influence/advice	Officials	Experts	Practitioners	Peers	Forums	Chatbots
Marketing	Print (traditional)	Broadcast (mass)	Direct (targeted)	Online (linked)	Digital (social)	In situ (real-time)

Table 2. 1. Chronological Ranking of Generations in the Literature

Researchers	Silent Generation	Baby Boomers	Generation X	Generation Y	Generation Z	Generation Alpha
Howe ve Strauss (2000)	1925-1943	1943-1960	1961-1981	1982-2003		
Lancaster& Stillman, (2002)	1900- 1945	1946- 1964	1965- 1980	1981- 1999		
Oblinger, J. L. and etc.(2005).	1925-1945	1946-1960	1961-1980	1981-1994	1995-2009	
Fleschner (2007)	1925-1945	1946-1964	1965-1980	1981-2000		
Trower (2009)	1925-1945	1946-1964	1965-1980	1981-2000		
Twenge and etc. (2010)	1925-1945	1946-1964	1965-1980	1980-2000		
Zhang and Bonk (2010)	1946 and earlier	1946-1964	1965-1976	1977-1994	1994 and later	
Keleş, (2011)		1946- 1964	1965- 1979	1980- 1999		
McCrinkle and Fell (2020)				1980-1994	1995-2009	2010-2024

Table 2. 2. Chronological Order of Generations based on Thesis

Generations	Time
Generation Y	1980-1994
Generation Z	1995-2009
Alpha Generation	2010-2024

2.1.2. Generation Alpha and Their Status Related to Global Environmental Problems

Alpha generation can be defined as individuals born after 2010 (Reis, 2015). In other words, all the individuals of the alpha generation were born in the 21st century. It is difficult to define a common generation for every society because of the events that each country has experienced in certain periods and the social structures within the country are different. However, this does not apply to the alpha generation. The reason for this is that the alpha generation, as a generation born into technology, is aware of every situation going on in the world every minute. Even if the members of the alpha generation live in other geographies, they can read the same news immediately or show their reactions to the news instantly

via social media. Because of these, it takes its name from this difference, as it will show completely different characteristics from the generations that came before it (McCrindle and Fell, 2020). The name of the generation that came before them is the Z generation, and the letter Z is the last letter in the Latin alphabet. With the thought that the name of the next generation after the Z generation should represent a new beginning for a new century, the first letter of the Greek alphabet, alpha, gave its name to this generation. In other words, it is named alpha, the first letter of the Greek alphabet (McCrindle and Fell, 2020). This population, which is thought to reach 2 million in 5 years based on Robert Hannah, COO (Chief Operating Officer) of Grant Thornton in the UK, is also called the population that will shape the future. The most important element that determines the lifestyle of the alpha generation is technology.

Some characteristics of alpha generation individuals are that hate sharing and want to be the sole owner of everything. They are extremely mobile. They don't care about privacy and share everything on social media. They don't like rules and they don't like all kinds of restrictions and boundaries in their fields (McCrindle and Fell, 2020). They are very interested in wearable devices. They do not like excessive and unnecessary consumption. They have an entrepreneurial spirit. They use social media very well and they care a lot. They get to know the world through social media. They like to be alone. They have a high level of skills to overcome great challenges. It has been concluded that individuals belonging to the alpha generation are individuals who do not know boundaries, does not hesitate to express their thoughts and do not recognize traditional power, authority, and hierarchy structures compared to previous generations (Jha, 2020; McCrindle & Fell, 2020; Barkowitz, 2016; Furia, 2015).

Based on the data of the Turkish Statistical Institute (TUIK), the population of Turkey has reached 83,154,997 people, according to the address-based population registration system data made in 2019. Z generation constitutes 23.28% of these, while 15.4 percent is alpha generation. It means that the Z generation population is 19,361,842 people, while the alpha generation is 12,806,175 people. There are a lot

of differences between Gen Z and alpha generations. For example, the personality traits of individuals, the daily language used, technological tools, job opportunities, and birth dates are different from each other. The difference between alpha generation and Gen-Z is given in the image. (Figure 2.2)

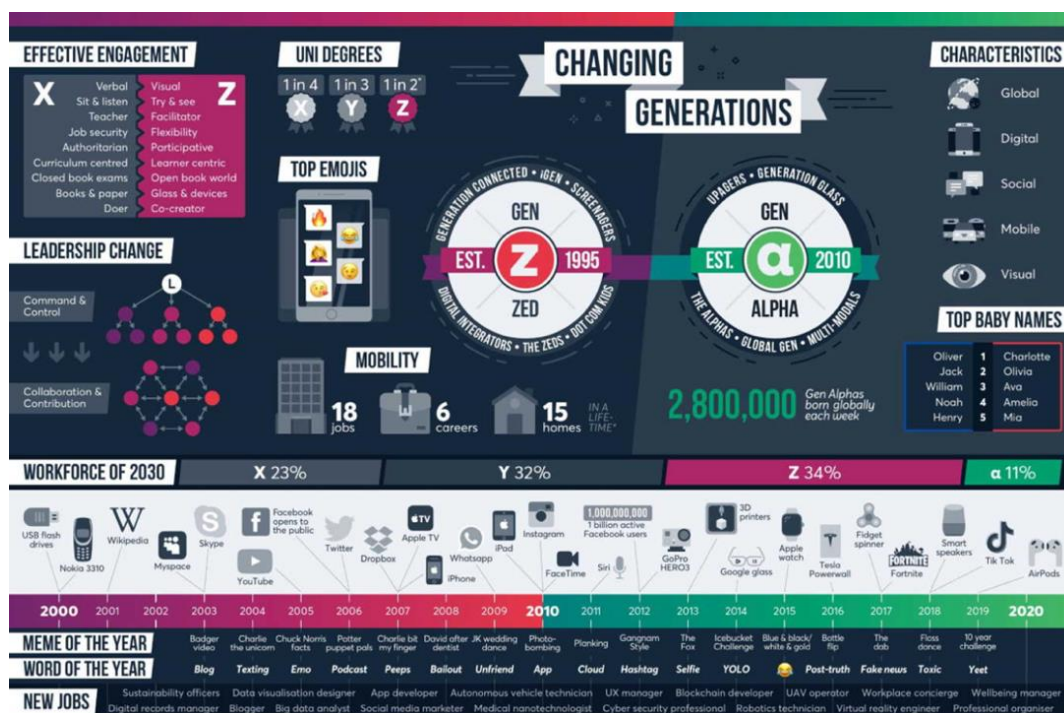


Figure 2. 2. Differences Between Gen Z and Gen Alpha (McCrindle, 2021)

Today, with the widespread use of communication tools, access to information has become very easy. With the developing technology, people have instant access to the information they need. As the generation born in the information age, the Alpha generation has a better chance of accessing any information instantly, due to their dominance over technology, compared to other generations. Although it is a generation born into technology, people living in the 21st century are expected to meet some skills. Mastering technology does not mean mastering 21st-century skills. 21st-century skills, which will be defined below, are expected skills starting from education life and even in business life.

In other words, the characteristics that people living in the information age should have been called "21st-century skills" (Kozikoglu, I., and Altunova, N. 2018).

According to a World Economic Forum report, the ability to cooperate, communicate and solve problems is one of the skills required for today's job purchases (Table 2.3). In 2015, complex problem solving, coordinating with others, people management, critical thinking, negotiation, quality control, service orientation, judgment and decision making, active listening, and creativity are defined as 21st-century skills based on the report (Soffel, J. 2016). On the other hand, World Economic Forum Future of Job Report, in addition to the 21st-century skills determined in 2015, emotional intelligence and cognitive flexibility are mentioned.

Table 2. 3. Top 15 skills for 2025

1	Analytical thinking and innovation
2	Active learning and learning strategies
3	Complex problem-solving
4	Critical thinking and analysis
5	Creativity, originality and initiative
6	Leadership and social influence
7	Technology use, monitoring and control
8	Technology design and programming
9	Resilience, stress tolerance and flexibility
10	Reasoning, problem- solving and ideation
11	Emotional intelligence
12	Troubleshooting and user experience
13	Service orientation
14	System analysis and evaluation
15	Persuasion and negotiation

One of the international organizations, P21 (“Partnership for 21st Century Skills”) has defined the skills that 21st-century people should have. 21st-century skills are discussed under 3 main headings; (1) Learning and renewal skills, (2) Life and career skills and knowledge, and (3) Media and technology skills. Problem-solving

and critical thinking, cooperation and communication, creativity and renewal are learning and renewal skills. While life and career skills consist of flexibility and adaptability, initiative and self-management, social and intercultural skills, leadership and responsibility skills, media and technology skills; information literacy, media literacy, and information, communication, and technology competence (technology literacy) skills. (Boyacı, Ş. D., and Özer, M. 2019). In summary, the alpha generation is faced with some skills due to the age at which they were born and grew up, but it is known that they easily adapt to these skills, which are defined as 21st-century skills. The perspectives, feelings, and emotions of young people in the Z generation, who are known to easily adapt to 21st-century skills, are also important for future generations and a livable world. This is because young people belonging to this generation will be the future teachers, environment ministers, politicians, or presidents. In other words, the perspective of people from the generation that will shape and change the future against global environmental problems is extremely important.

The results of a recent study investigating the emotional, cognitive, and functional responses of children and youth to global climate change and how children and youth perceive the government's response to climate change are as follows. According to the results of the survey, which was applied in 10 countries (Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA) and which included 1000 participants between the ages of 16 and 25 from each country, information about the responses of governments to climate change was collected by looking at the thoughts and feelings of the participants about climate change. First of all, it was revealed that participants in all countries were concerned about the issue of climate change. It was concluded that 59% of the participants were very and extremely worried, and 84% were at least moderately worried. In addition, it was concluded that they had feelings of sadness, anger, powerlessness, helplessness, and guilty. 75% of the participants think that the future is scary (Hickman, C., Marks, E., and etc 2021.) (Figure 2.4 and Figure 2.5) The answers to the research conducted are given in the image. Most of the respondents report negative feelings. (Figure 2.3)

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
I am hesitant to have children											
Yes	3908 (39.1%)	378	432	356	407	473	232	367	422	365	476
No	5700 (57.0%)	579	535	599	531	506	751	578	536	586	499
Prefer not to say	390 (3.9%)	43	33	46	62	21	17	54	42	48	24
Humanity is doomed											
Yes	5566 (55.7%)	510	504	457	740	733	422	480	431	616	673
No	4065 (40.7%)	448	442	492	234	251	557	449	530	357	305
Prefer not to say	366 (3.7%)	41	54	50	26	16	21	71	39	26	22
The future is frightening											
Yes	7549 (75.5%)	725	763	679	804	915	702	738	562	806	855
No	2219 (22.2%)	248	206	283	179	76	289	226	404	170	138
Prefer not to say	231 (2.3%)	27	31	38	16	9	10	36	34	24	6
I won't have access to the same opportunities that my parents had											
Yes	5487 (54.9%)	531	572	439	671	705	493	610	425	537	504
No	4210 (42.1%)	438	396	516	307	282	501	331	539	416	484
Prefer not to say	305 (3.0%)	31	32	45	22	13	6	60	37	47	12
My family's security will be threatened (eg, economic, social, or physical security)											
Yes	5167 (51.7%)	393	483	348	652	769	553	496	296	524	653
No	4516 (45.2%)	566	469	616	321	215	431	440	675	443	340
Prefer not to say	317 (3.2%)	41	48	36	27	16	16	64	29	33	7
The things I most value will be destroyed											
Yes	5483 (54.8%)	470	523	423	692	736	535	450	425	587	642
No	4162 (41.6%)	487	429	539	285	251	457	475	526	370	343
Prefer not to say	357 (3.6%)	43	48	38	24	14	8	76	48	43	15
People have failed to take care of the planet											
Yes	8256 (82.6%)	795	807	780	860	927	757	768	750	889	923
No	1533 (15.3%)	175	165	191	124	64	241	195	220	89	69
Prefer not to say	210 (2.1%)	29	28	29	16	9	2	37	29	22	9
When I try to talk about climate change other people have ignored or dismissed me											
Yes	3928 (39.3%)	355	392	304	597	465	476	238	294	342	465
No	4189 (41.9%)	384	346	393	316	455	379	533	524	475	384
I don't talk to other people about climate change	1884 (18.8%)	262	262	303	87	80	146	229	182	183	150

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "Does climate change make you think any of the following?"

Figure 2. 3. Negative Beliefs about Climate Change and Dismissal (Hickman, C. etc, 2021)

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
Sad											
Yes	6669 (66.7%)	631	641	569	735	909	615	638	536	705	690
No	3152 (31.5%)	345	332	414	256	87	362	338	442	273	303
Prefer not to say	176 (1.8%)	24	27	17	8	3	22	24	22	22	7
Helpless											
Yes	5095 (50.9%)	546	595	462	634	636	438	511	541	327	405
No	4720 (47.2%)	437	381	519	351	356	549	449	444	647	587
Prefer not to say	186 (1.9%)	18	24	19	15	8	13	39	15	26	9
Anxious											
Yes	6181 (61.8%)	599	650	578	640	830	660	501	493	605	625
No	3641 (36.4%)	380	324	405	339	165	331	467	486	372	372
Prefer not to say	180 (1.8%)	21	26	16	21	6	10	32	21	23	4
Afraid											
Yes	6734 (67.3%)	615	644	542	743	897	658	667	536	707	725
No	3111 (31.1%)	364	325	441	246	98	334	309	445	279	270
Prefer not to say	156 (1.6%)	20	31	17	11	5	9	24	19	15	5
Optimistic											
Yes	3089 (30.9%)	253	274	242	456	460	473	227	263	223	218
No	6663 (66.6%)	717	696	731	522	524	512	739	683	763	776
Prefer not to say	250 (2.5%)	30	31	28	23	16	15	34	54	13	6
Angry											
Yes	5685 (56.8%)	553	574	482	623	702	433	604	485	589	640
No	4125 (41.3%)	420	397	494	362	283	558	363	493	400	355
Prefer not to say	192 (1.9%)	26	29	23	16	15	10	34	22	12	5
Guilty											
Yes	5020 (50.2%)	528	506	417	572	744	282	511	434	538	488
No	4793 (47.9%)	447	471	563	408	250	710	461	543	436	504
Prefer not to say	187 (1.9%)	25	23	20	20	6	8	28	23	26	8
Ashamed											
Yes	4562 (45.6%)	514	531	442	495	682	206	480	383	393	436
No	5249 (52.5%)	467	445	534	485	313	772	495	589	592	557
Prefer not to say	191 (1.9%)	18	25	24	20	6	22	26	28	15	7
Hurt											
Yes	4283 (42.8%)	414	445	383	611	781	448	311	250	336	304
No	5496 (55%)	561	524	597	378	212	538	649	717	633	687
Prefer not to say	219 (2.2%)	24	30	20	11	7	14	40	33	31	9
Depressed											
Yes	3864 (38.6%)	365	402	343	532	525	340	224	329	387	417
No	5940 (59.4%)	610	566	635	456	458	648	746	649	598	574
Prefer not to say	198 (2.0%)	25	32	22	13	17	12	31	22	15	9
Despair											
Yes	4418 (44.2%)	410	421	332	520	581	392	492	494	368	408
No	5348 (53.5%)	556	540	636	450	405	598	478	490	611	584
Prefer not to say	233 (2.3%)	33	38	32	30	14	10	30	17	21	8
Grief											
Yes	4151 (41.5%)	353	400	352	549	624	320	452	578	231	292
No	5632 (56.3%)	622	569	621	428	362	667	526	403	739	695
Prefer not to say	216 (2.2%)	25	30	27	23	14	13	22	19	30	13
Powerless											
Yes	5598 (56%)	554	606	482	589	643	426	683	471	577	567
No	4210 (42.1%)	425	371	498	398	350	557	292	505	390	424
Prefer not to say	192 (1.9%)	21	24	20	13	7	16	25	24	33	9
Indifferent											
Yes	2902 (29%)	259	295	261	463	481	305	181	300	150	207
No	6827 (68.3%)	704	654	711	515	502	678	785	664	834	780
Prefer not to say	272 (2.7%)	37	52	29	22	17	17	34	36	16	12

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "Does climate change make you feel any of the following?"

Figure 2. 4. Emotions about Climate Change (Hickman, C. etc, 2021)

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
Taking my concerns seriously enough											
Yes	3003 (30.0%)	265	291	214	426	418	302	273	341	264	209
No	6382 (63.8%)	653	627	699	530	559	672	633	562	677	770
Prefer not to say	617 (6.2%)	82	82	87	45	23	26	94	97	59	22
Doing enough to avoid a climate catastrophe											
Yes	3076 (30.8%)	262	308	242	437	422	363	260	300	283	199
No	6442 (64.4%)	686	625	678	523	559	609	667	644	670	781
Prefer not to say	483 (4.8%)	53	67	80	40	19	28	73	56	47	20
Dismissing people's distress											
Yes	6010 (60.1%)	580	637	586	586	534	580	574	481	648	804
No	3399 (34.0%)	348	291	341	362	427	381	333	447	293	176
Prefer not to say	591 (5.9%)	72	72	73	52	39	40	93	71	59	20
Acting in line with climate science											
Yes	3645 (36.5%)	321	334	278	527	524	398	281	382	379	221
No	5719 (57.2%)	607	589	631	424	448	570	614	523	562	751
Prefer not to say	636 (6.4%)	72	77	90	49	28	33	104	95	60	28
Protecting me, the planet, and/or future generations											
Yes	3306 (33.1%)	314	315	250	490	467	351	273	338	330	178
No	6105 (61.0%)	624	614	674	471	502	617	618	575	616	794
Prefer not to say	591 (5.9%)	63	71	76	40	31	32	109	87	54	28
Can be trusted											
Yes	3126 (31.3%)	278	296	213	505	404	311	234	345	323	217
No	6157 (61.6%)	645	621	676	446	550	642	660	558	607	752
Prefer not to say	718 (7.2%)	77	83	111	49	46	47	106	97	71	31
Lying about the effectiveness of the actions they are taking											
Yes	6437 (64.4%)	613	657	620	674	686	659	582	543	623	780
No	2894 (28.9%)	315	267	291	288	285	284	295	367	305	197
Prefer not to say	669 (6.7%)	72	76	89	38	29	57	123	90	72	23
Failing young people across the world											
Yes	6489 (64.9%)	648	674	630	714	679	644	549	467	694	790
No	2977 (29.8%)	293	265	293	243	298	306	357	468	266	188
Prefer not to say	534 (5.3%)	59	61	77	43	23	51	94	64	40	22
Betraying me and/or future generations											
Yes	5847 (58.5%)	572	595	563	663	563	551	487	462	621	770
No	3467 (34.7%)	347	324	353	288	392	403	388	459	316	197
Prefer not to say	686 (6.9%)	81	81	84	49	45	46	125	79	62	34

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "In relation to climate change I believe that my government is/other governments are...".

Figure 2. 5. Government-related Beliefs (Hickman, C. etc, 2021)

Two important factors have been influential in the alpha generation individuals' awareness of environmental protection and environmental problems and producing solutions, recognizing the problems brought by climate change, and in short, their sensitivity to global environmental problems. First, As mentioned in the book titled "Generation Alpha", written by Mark McCrindle and Ashley Fell (2021), which examined and penned the alpha generation in such detail for the first time, it is known that alpha generation individuals are environmentally sensitive generations. So, how and why did alpha generation individuals become an environmentally sensitive generation? Generation Z, the generation before them, was a generation with significant environmental concerns. We understand that they have the ability

to be leaders and social influence, solve problems and organize and manage other people, which are among the 21st-century skills, from the event that will be mentioned below, which took place in 2019 and made a big impression on the world. The most important and international example of this, is 15-year-old Greta Thunberg from Sweden, instead of going to school, protesting in front of the Swedish parliament, "School boycott for the climate". She was deemed worthy of the International Children's Peace Award in 2019 and was introduced as the person of the year in the magazine named "Time". This movement of Greta left a huge impact and started the global youth climate movement. This action of Greta spread in waves and attracted the attention of the whole world. This situation has been the biggest example in front of the alpha generation. For example, in the survey conducted by Amnesty International to more than 10,000 people, it was revealed that according to the Z generation, climate change is the most important problem of today. After climate change, pollution and terrorism are at the top of the problems. In short, the Z generation's interest in the environment has left an impact on the alpha generation (McCrindle and Fell, 2020). Namely, the alpha generation, which we refer to as the generation born into technology, is instantly aware of everything that is happening in the world, thanks to its easy access to the internet and its skillful use of social media, and instantly reacts to the event and creates a public opinion. In this case, it reveals that they have the skills to benefit from technology, communicate, solve problems, and organize and manage people, which is one of the 21st-century skills.

The second factor is that the Y-generation individuals are the parents of the alpha-generation individuals. According to McCrindle and Fell (2020), Y-generation individuals are born between 1980-1994. The Alpha generation that was born and will be born between the years 2010-2024. When these dates are compared, the parents of generation alpha individuals are generation Y.

Some studies conducted on the Y generation show that Y generation individuals also argue that measures should be taken against global environmental problems or that solutions should be found against climate change. This statement is supported

by some studies. In another survey, according to a study conducted in 2020 with participants aged 18-34, 3 studies measuring climate change anxiety were conducted. Studies have measured psychological responses to climate change. As a result of the studies, it has been revealed that climate change anxiety is especially common among young adults and they are concerned about this issue (Clayton, S., & Karazsia, B. T. 2020) According to the Global 2021 Millennial and Gen Z Survey conducted by the Deloitte company at the time of the pandemic, climate change/environmental protection was the top personal concern of millennials in 2020, at 28%. According to the results of the survey conducted in April 2021, it fell to second place among Y-generation individuals. According to the results of the survey conducted before the pandemic, almost half of the respondents said they thought it was too late to repair the damage caused by climate change. However, according to the survey conducted in 2021, 44% of millennials and 43% of millennials stated that they think it is too late to repair the damage caused by climate change. According to the comments, environmental pollution has decreased due to the quarantine during the pandemic, and encouraging environmental signs have given people hope. In addition, according to the results of the same survey, more than half of Generations Y and Z stated that they fear that leaders in the business world will not take action to prevent climate change and think less about improving the environment. (Figure 2.6)

60% of all respondents fear business will deprioritize combatting climate change in the aftermath of the pandemic



Figure 2. 6. The Concern of Gen Y and Gen Z

According to the Deloitte Global 2021 Millennial and Gen Z Survey conducted in 2021, 22,928 participants from 45 different countries participated, including 14,655 Generation Y and 8,273 Generation Z. Generation Y included in the study includes

those born between 1983-1994. The participants in the Z generation consist of those born between 1995 and 2003. The survey was conducted using an online, self-complete-style interview. As a result of the study, if a comparison is made with last year's survey results, climate change/environmental protection was the most important personal concern of Generation Y. But this year, fears of unemployment took precedence over climate change concerns. In the pre-pandemic survey, half of the respondents thought it difficult to repair the damage done by climate change. But this year (2021), the survey results have dropped to 44% among millennials and 43% from Gen Zs. The reason for this is that nature had the opportunity to renew itself during the pandemic lockdown. In other words, the pandemic lockdown has stoked generations to optimism. Turkey is among the countries where the survey was conducted. (Figure 2.7, Figure 2.8, Figure 2.9 and Figure 2.10)

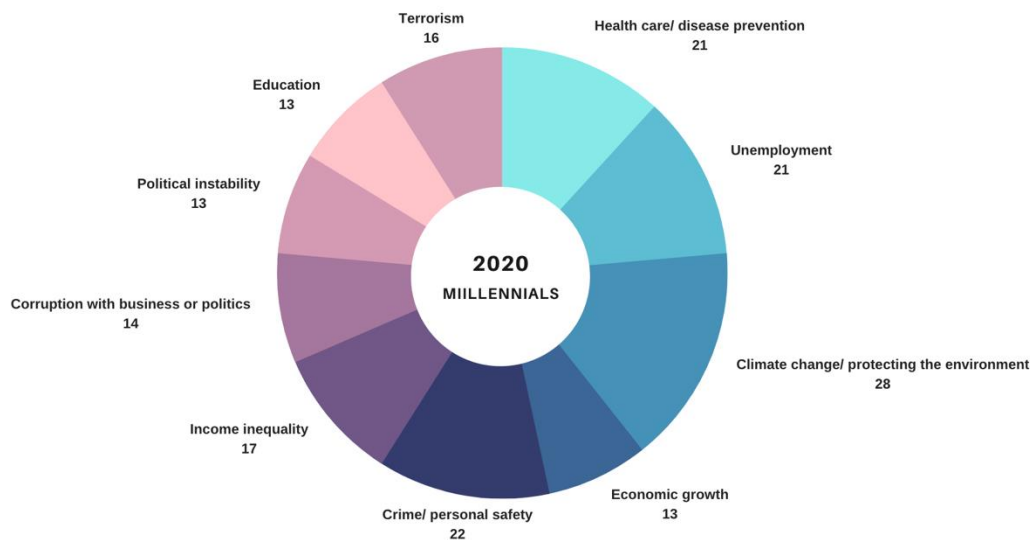


Figure 2. 7. Greatest Personal Concerns for Millennials (%) in 2020

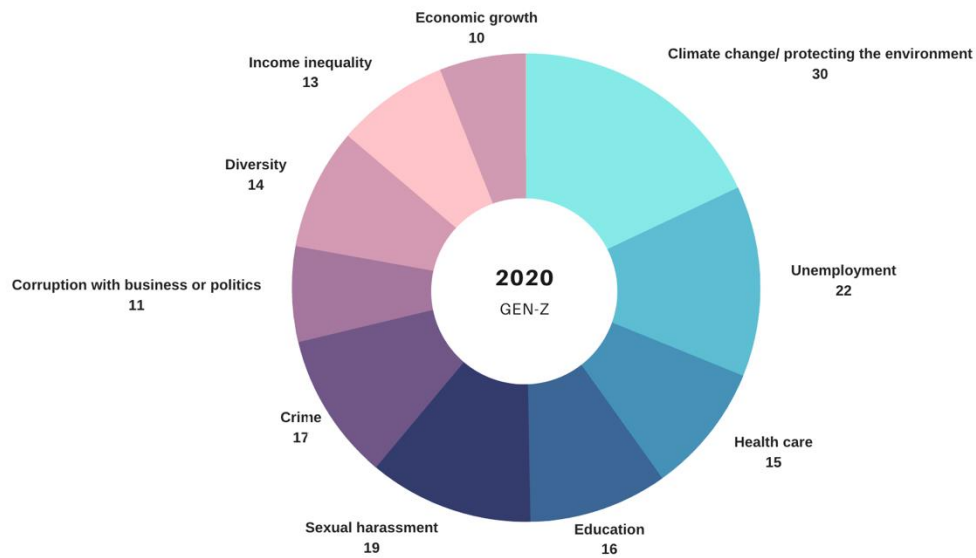


Figure 2. 8. Greatest Personal Concerns for Gen-Z (%) in 2020

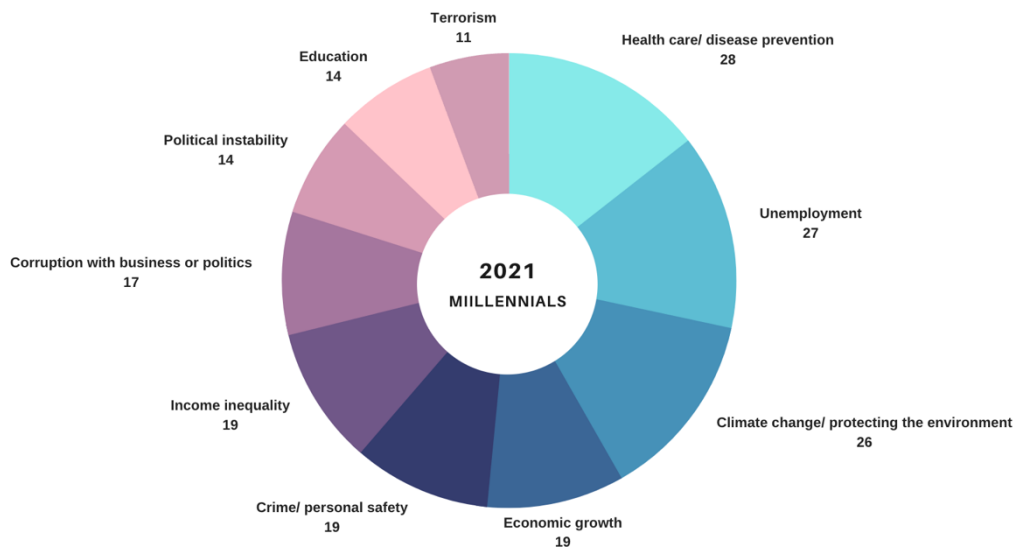


Figure 2. 9. Greatest Personal Concerns for Millennials (%) in 2021

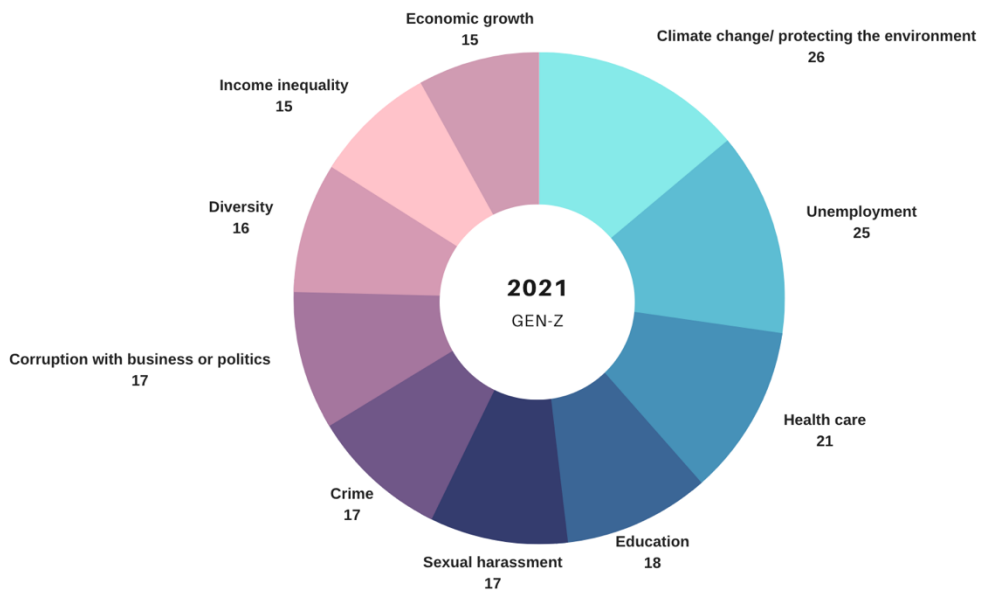


Figure 2. 10. Greatest Personal Concerns for Gen-Z (%) in 2021

According to the Global 2021 Millennial and Gen Z Survey conducted by the Deloitte company at the time of the pandemic, it has been shown that many positive results have emerged regarding the environmental issue. More than two-thirds of millennials and Gen Z agreed with the statement, “Environmental changes during the pandemic (less pollution, cleaner water, etc.) make me more optimistic that climate change can be reversed.” (Figure 2.11) On the contrary, according to the survey conducted by the same institution last year, the Y and Z generations reported that they recycle, use public transportation more, and take measures to change their eating habits and clothing purchases in order to prevent climate change and take precautions against global environmental problems. In short, before the pandemic, people were more pessimistic about environmental problems.

THE PANDEMIC HAS HINTED AT A POTENTIALLY BRIGHTER FUTURE FOR THE CLIMATE

% Who strongly/ tend to agree with the statement, ‘‘The environmental changes during the pandemic make me more optimistic’’

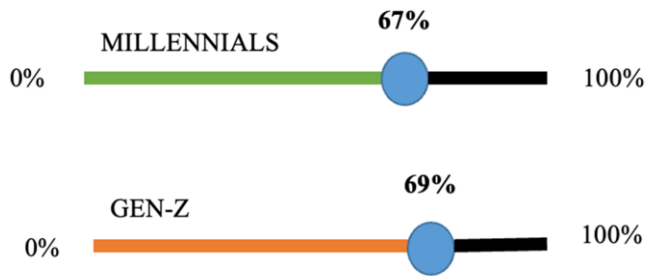


Figure 2. 11. Comparison of The Emotional States of the Gen Y and Gen Z

One of the countries included in the survey applied above is Turkey. In the survey, which includes 45 countries around the world, there are 14.600 Y generation and 8.200 Z generation. A total of 22.928 people attended. Looking at the results in Turkey, 26% of Generation Y individuals have concerns about climate change and environmental protection. When we look worldwide, we have the same concern as Turkey. (Figure 2.12) On the other hand, while Z-generation individuals living in Turkey are not in the top three places to be worried about climate change and environmental protection, it is the first place for Z-generation individuals to be concerned about climate change and environmental protection. (Figure 2.13)

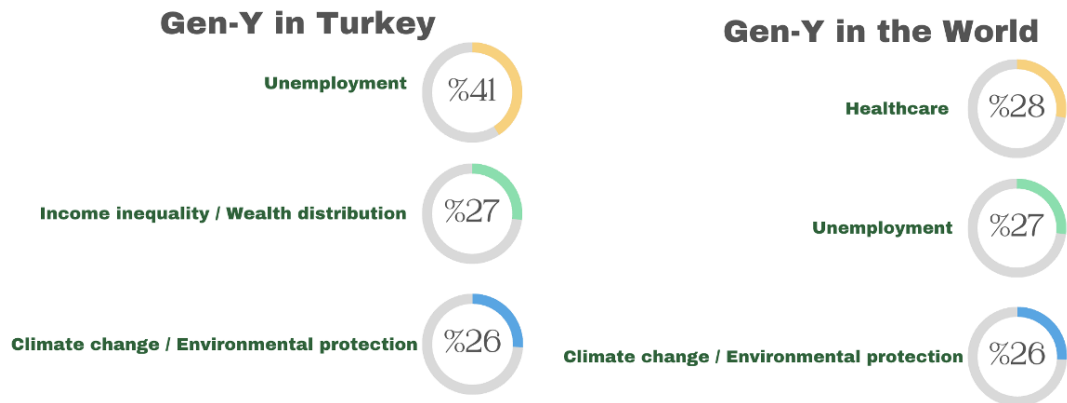


Figure 2. 12. Concerns of Generation Y in Turkey and in the World

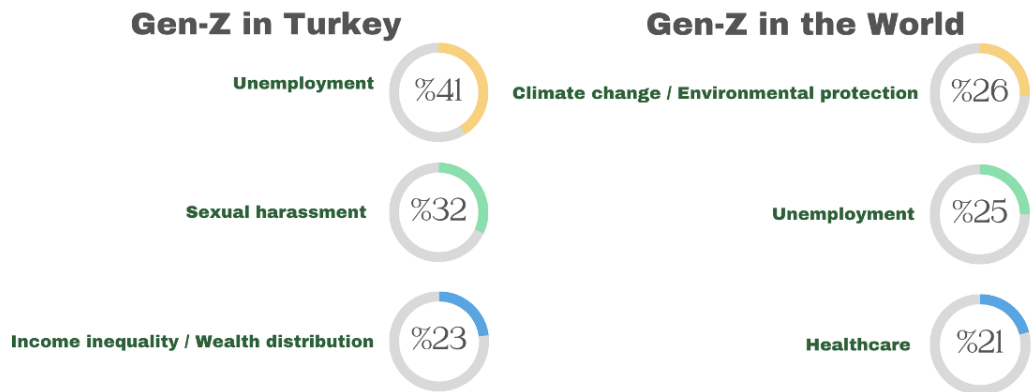


Figure 2. 13. Concerns of Generation Z in Turkey and in the World

According to a survey conducted in 2020, 51 percent of millennials living in Turkey answered that they absolutely agree with the statement “We have already passed the threshold of turning back and it is too late to repair the damage” regarding the environment. Considering the worldwide, it has the same result as Turkey. (Figure 2.14) On the other hand, according to the survey conducted in 2021, Y-generation individuals living in Turkey agreed with the same question at a rate of 48%, while the Z-generation participated at a rate of 43%. If we look at the worldwide percentages, according to the survey conducted in 2021, Y generation individuals around the world agreed with the same question at 44%, while Generation Z agreed at 43%. When asked in 2021, "The environmental changes seen during the pandemic make me optimistic that climate change will be

reversed", the Y generation individuals in Turkey responded by 67%, while the Z generation individuals responded at the rate of 72%. Generation Y individuals worldwide participated at the rate of 66% and generation Z individuals at the rate of 68%. (Figure 2.15)

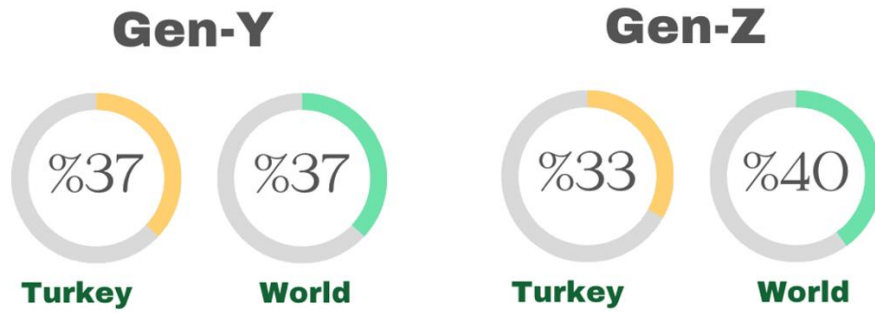


Figure 2. 14. Beliefs of Generations Y and Z toward Solving Climate Change Problems After the Pandemic

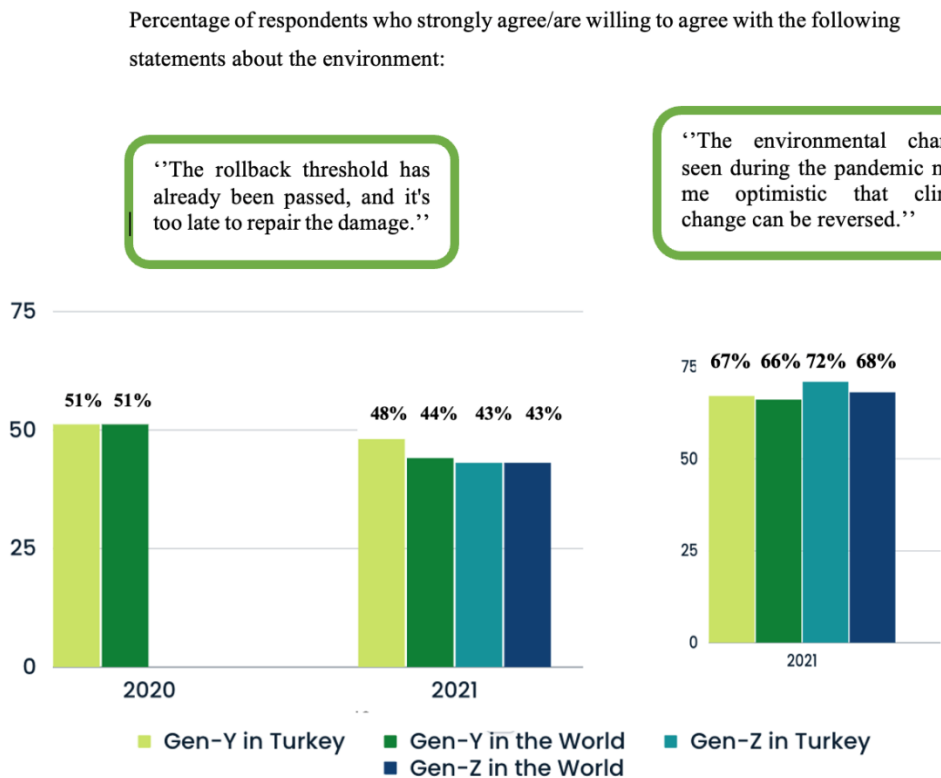


Figure 2. 15. Environmental Concerns of Y and Z Generations Individuals in Turkey and in the World

According to another study conducted in Balıkesir, Turkey, a survey was conducted to measure the "Environmental Behavior" levels of individuals from the X, Y, and Z generations. A total of 559 people, including 394 secondary school students and 165 adults, participated in the survey (Gıcıır, B. etc, 2020).

The data of the study, which was carried out to determine the environmental behavior of the individuals of the X, Y, and Z generations, are given in the table below. (Table 2.4)

Percentage of respondents who strongly agree/are willing to agree with the following statements about the environment:

Table 2. 4. Environmental Behavior Scores of the Sample Group

	N	The lowest	The highest	X
X Generation	90	2.20	4.60	3.25
Y Generation	75	2.20	4.60	3.25
Z Generation	394	1	4.75	3.10
Environmental Behavior Scores	559	1	4.75	3.20

According to the survey, while the average of the X generation was high in 16 questions, the average of the Y generation in 2 questions and the Z generation in a single question was high. (Table 2.5)

Table 2. 5. Average Scores of Environmental Behavior Levels of Individuals of X, Y, Z Generations (GıCır, B. etc, 2020)

ÇEVRE DAVRANIŞINA YÖNELİK İFADELER	X Kuşığı	Y Kuşığı	Z Kuşığı	\bar{X}
1.Çevresel sorunları yetkililere bildiririm.	3.36	3.29	2.75	3.13
2.Gazete ve plastik şişe gibi atıkları geri dönüşüm toplama noktalarına götürürüm.	4.09	3.76	3.56	3.80
3.Medyaya çevresel sorunlar hakkında mektuplar gönderirim.	1.62	1.59	1.63	1.61
4.Depozitosu olan meşrubat şişelerini geri veririm.	3.99	3.57	3.24	3.60
5.Kullanılmış kâğıtları müsvedde kâğıdı olarak yeniden kullanırım.	4.36	4.15	3.74	4.08
6.Daha önceden alışveriş poşeti olarak kullanılmış naylon poşetleri tekrar kullanırım.	4.60	4.56	4.35	4.50
7.“Çevre dostu” ürünleri satın alırım (ozon dostu spreyler, geri dönüşüm paketi olan ürünler ve ekonomik boy ürünler).	4.10	3.63	3.42	3.72
8.Halka açık yerlerin korunması ve temizlenmesi için kampanyalara katılırım.	2.82	2.44	2.21	2.49
9.Kullanılmayan elektrikli cihazları ve ışıkları kapatarak enerji tasarrufu sağlarım.	4.69	4.59	4.39	4.56
10.Evde su tasarrufu yaparım (dişlerimi fırçalarken veya bulaşıkları yıkarken musluğu kapatırım vb.).	4.58	4.52	4.40	4.50
11.Halka açık alanlara çöp atan veya çevreye zarar veren insanları uyarırım.	3.80	3.91	3.21	3.64
12.İnsanların, halka açık yerlere attıkları çöpleri toplayıp çöp kutusuna atarım.	3.44	3.44	3.08	3.32
13.Kullanılmış pilleri çöp kutusu yerine piller için uygun toplama kutularına koyarım.	4.32	3.88	3.53	3.91
14.Odadan çıkarken klima vb. cihazları açık bırakırım.	4.20	4.45	4.15	4.27
15.Dışarıdayken kuş seslerini, hayvanları ve çiçekleri fark ederim.	4.52	4.41	4.31	4.41
16.Çevre kirliliğini önlemek için düzenlenen kampanyalarda görev alırım.	2.30	2.07	2.12	2.16
17.Bir çevre organizasyonunda aktif olarak görev alırım.	1.92	1.91	1.88	1.90
18.Günlük gazete veya dergilerdeki çevre konularıyla ilgili makaleleri okurum.	3.47	2.93	2.36	2.92
19.Çevre ve doğa ile ilgili televizyon programlarını izlerim.	3.67	3.48	2.93	3.36
20.Doğa yürüyüşü ve geziler yaparım.	3.33	3.21	3.05	3.20

In summary, studies show that Generation Y individuals are not insensitive to environmental problems, are aware of the measures to be taken to prevent climate change, and are concerned about global environmental problems. Be so sensitive to the environment, the children raised by a generation will be like them.

2.2. Climate Change as a Global Environmental Problem

The concept called climate is actually a system, and this climate system is a complex system consisting of the atmosphere, snow, rain, oceans, and living things. This system can be affected by internal and external factors and be exposed

to change. Solar radiation is the biggest power source of this system and the change in the radiation balance causes climate change. All of these factors have occurred from natural events, that is, they are not human-induced factors. For millions of years, the climate system has undergone deterioration due to natural events, and this is extremely natural. However, the climate change mentioned today is very different from the natural process mentioned above. Global climate change, which has become one of the biggest problems of our time, is mostly human-induced (IPCC, 1994).

As a result of the rising industrialization with the world wars and the following cold war period, the resources of the earth were unconsciously consumed and the natural environment was rapidly destroyed (Yapıcı, 2003). Due to population growth and technological developments, people did not only meet their basic needs; but tried to meet their unlimited demands by using limited resources. In this process, the use of natural resources and the increase in the amount of waste caused many environmental problems to arise. Due to the rapid population growth, the need for food has increased and fertile agricultural areas have been destroyed for the sake of urbanization in order to meet the increasing needs, and the problem of unplanned urbanization in cities with migration to cities has accelerated the deterioration of the natural balance (Akgün, Duruk, & Tokur, 2017). The source of global warming is the excessive increase in emissions of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), chlorofluorocarbon (CFC), and ozone (O₃) released as a result of human activities. Some of the long-wave ground radiation emitted from the Earth's hot surface is absorbed by the many natural greenhouse gases in the upper atmosphere before escaping into space and then being released again. With this feature, natural greenhouse gases make the world livable by adjusting the earth's natural temperature balance. However, the excessive increase in greenhouse gas emissions causes the earth to warm more than normal. The source of this increase is 49% energy use, 24% industry, 14% deforestation, and 13% agricultural activities (Türkeş et al., 2000). Yapıcı, Akgün and Türkeş's studies show that; after the industrial revolution, the negative effects of humans on the climate continue to increase. Deforestation, fossil fuel use, rapid population

growth, unplanned urbanization, unconscious agricultural activities, improper land use, unnecessary energy consumption, and the release of gases such as methane and carbon dioxide into the atmosphere are the main causes of global warming. To define global warming in one sentence, as a result of the greenhouse effect of gases such as methane, carbon dioxide, and carbon monoxide released into the atmosphere by humans, the temperature increases on the Earth, and this situation is called global warming. Global climate change occurs as a result of global warming. Just like Türkeş, according to Çepel (2008) and McKinney and Schoch (2003), global warming is one of the most important environmental problems faced by human beings today. Global warming is the process of artificially increasing the temperature in the parts of the atmosphere close to the earth and in the solid part of the earth as a result of the increase of some gases in the atmosphere, which is defined as "greenhouse gases" as a result of various activities of humans. Global warming occurs as a result of the increase in the situation expressed as the greenhouse effect.

Droughts, floods, and severe hurricanes occur more frequently on our planet, which is affected by global climate change. Rising sea levels, increasing acidity in the oceans, melting glaciers and desertification can be counted among the effects of climate change. In order to reduce the devastating effects of climate change, it is necessary to keep the temperature increase on earth constant at 20 °C. Otherwise, we may face worse scenarios in the future. All living things are affected by the consequences of climate change. Plants and animals are in danger of extinction. People's health and lives are at serious risk.

There are some solutions to reduce the effects of climate change. First, Doughnut Economic Model can be applied. In 2012, the Sustainable Development conference organized by the United Nations explained how to make a sustainable movement. Social bases and environmental limits include comprehensive and sustainable economic development.

In addition to these, individual solutions to climate change can be brought. Recycling, energy saving, and reducing carbon emissions are among the solutions to be done individually. One of the most important solutions is the use of renewable energy sources. Solar energy, bioenergy, geothermal energy, ocean energy, and wind energy are examples of renewable energy sources. For example, making new products from recovered materials can reduce emissions because it requires fewer raw resources and less energy. Another example is that people should prefer trains and buses instead of planes or public transport or bicycles instead of a private car. Next, as people reduce food waste, we can reduce the need for land and resources used to produce food, as well as the greenhouse gases released in the process.

2.3. The Attitude of Different Generations towards Environmental Problems

In this part, studies on environmental problems and attitudes towards the environment from 2000 to the present are included. Environmental problems are a very general title and can be explained under sub-titles such as desertification, reduction of biological diversity, deforestation, acid rain, air, water, and soil pollution, hazardous wastes, depletion of natural resources, sea and ocean pollution, and acidification of the oceans. However, in this study, climate change was mentioned without mentioning so many sub-titles.

These studies carried out over a 22-year period, shed light on determining the attitudes of alpha-generation individuals toward climate change. The studies were carried out with university, high school, secondary school, and primary school students. Thus, these studies conducted in the past years show the attitudes of different generations toward environmental problems. Studies carried out from 2000 to the present are given in chronological order and data from different age groups are interpreted.

In the year 2000, the study realized by Pooley and O'Conner (2000) concluded that, contrary to environmental education programs that believe that environmental

behavior changes with the increase in environmental knowledge, this study aims to explain environmental attitudes based on cognitive and affective bases. This conclusion was important to lead both education professionals and researchers to investigate new educational approaches for developing environmental attitudes. There years after, Şama (2003) conducted research aiming to determine the environmental attitudes of students. As a result, the author concluded that attitudes vary according to gender, grade level, and income level of their families. At the end of the study, while the attitude scores of the female students were higher than the male students, the students with a middle-income level had higher attitude scores than the students with a low-income level. Since than these factors have been used as the ones affecting the attitude toward environmental problems. Accordingly, another study conducted in the same year aimed to investigate the views of 439 university students on the environment. The study examined whether gender, age, and education programs make a difference as far as environmental awareness is concerned. A questionnaire consisting of 24 questions was applied to the students. It was revealed that the gender factor created a significant difference. Female students were more aware of the environment than male students. There was no significant difference in age factor. However, according to the programs they studied, there were differences in environmental awareness (Çabuk and Karacaoğlu, 2003). Four years after these studies, a study was conducted to measure the participation of secondary school students in sustainable consumption practices. The study was carried out with the participation of 306 students living in the Malaysian state of Johor. The data were collected by applying a survey. The questionnaire used consists of factors such as demographics, environmental information sources, environmental concepts, environmental knowledge, environmental awareness and concern, sustainable consumption behaviors, and nature-related activities. At the end of the research, it was revealed that the students noticed environmental problems but were interested in them at a moderate level. According to the students, there are 3 important environmental problems. These are air, water, and noise pollution (Said, Yahaya, and Ahmedun 2007). In this thesis, only two of the studies on environmental problems and attitudes toward the environment in 2008 were included. A study was conducted with 1140 students

selected from 18 primary schools located in the urban areas of Ankara. The aim of the study is to determine the environmental knowledge and attitudes of primary school students, as well as the effects of sociodemographic variables on environmental knowledge and attitudes, and the relationship of environmentally friendly behaviors with knowledge, behavioral intention, and environmental effects. Data were collected from the students by applying the Environmental Attitude, Knowledge Scale, and Locus of Control scale. At the end of the research, it was determined that the knowledge level of the students was low. It has been revealed that female students have more positive attitudes toward the environment than male students (Alp, Ertepinar, Tekkaya and Yılmaz 2008). Another study was conducted with 1118 students selected from six primary schools in Bursa. This study was conducted to determine the environmental attitudes and knowledge of 1118 students in the 6th, 7th, and 8th grades in Bursa. Data were collected using the Environmental Knowledge Test and Environmental Attitude Scale. At the end of the study, it was revealed that the environmental knowledge of the students was very low and the socio-economic status of the students did not affect their environmental attitudes and knowledge. It was concluded that girl students' environmental attitudes and knowledge were higher than boy students (Atasoy and Ertürk 2008). "Environmental Attitude Scale" was applied in two separate studies conducted in 2019. The first of the studies, in which the "Environmental Attitude Scale" was applied, was conducted with 554 university students in order to investigate the attitudes and sensitivities of university students studying in different academic fields towards environmental problems and the factors affecting them. School, class, gender, age, place of residence for the longest time, and father It has been revealed that the profession affects the results of the research. It has been revealed that 85.3% of the students are sensitive to environmental problems. At the end of the study, it was suggested that universities and environmental organizations cooperate to organize activities and thus increase students' awareness of environmental problems (Ek, Kılıç, Öğdüm,düz, & Şeker 2009). The other study is that university students' attitudes towards the environment were examined in terms of different variables. "Environmental Attitude Scale" was used in the study conducted on 355 students. The scale consists of "Environmental Behavior" and

"Environmental Thinking" subscales. In addition to this scale, personal information such as gender, class, and place of residence for the longest period of time was obtained from the students. According to the research, it has been revealed that female students' attitudes toward the environment are more positive than male students. The students living in the city center were more sensitive to the environment than the students living in rural areas. The students who took the environment course emphasized that the content of this course was weak and that this course should be taught by practice rather than theoretically (Akillı and Yurtcan 2009). In addition to these two studies, a study was conducted by Demirbaş and Pektaş in 2009. The aim of this study is to investigate primary school students' level of recognition of basic concepts related to environmental problems. A total of 85 students from the 6th, 7th, and 8th grades were studied. Open-ended questions were asked to determine the awareness of the students about environmental problems, examine their prior knowledge, and measure their sensitivity to the environment. As a result of the research, it has been revealed that they are more aware of environmental problems caused by environmental pollution, air pollution, and waste. It has been observed that they give wrong answers on issues such as the greenhouse effect, global warming, and climate change. They responded more accurately to environmental problems that they frequently encountered in their daily lives. It has been revealed that students have some misconceptions about the subject. However, it was concluded that the environmental awareness levels of the students were sufficient. One year after these studies, another study was conducted using the "Environmental Attitude Scale". In 2010, a 21-item "Environmental Attitude Scale" and a 23-item "Environmental Risk Perception Scale" were applied to 424 volunteer university students and tried to measure how sensitive the students were to environmental problems and environmental risks. It has been observed that male students' environmental sensitivity is lower than female students, and as the education level of the mother increases, the sensitivity level of the students also increases. Finally, it was concluded that as the grade levels of male students increased, their sensitivity toward the environment also increased (Sam, Gürsakal, and Sam 2010). Next, Degirmenci (2012) aimed to examine the attitudes of primary school students

towards the environment in terms of different variables, and for this, the "Environmental Attitude Scale" was applied to a total of 114 students consisting of 6th, 7th, and 8th-grade students. The scale consists of 4 sub-dimensions: population growth, energy saving, environmental problems, and nuclear energy. In addition to the environmental attitude scale, a personal information form was also applied to the students. At the end of the research, while boy students' environmental sensitivity was lower than girl students, 6th and 7th-grade students' environmental sensitivity was also lower than 8th-grade students. The students whose mothers graduated from higher education were more sensitive to the environment than those whose mothers were high school or primary school, graduates. Then, three studies conducted in 2018 are included. Firstly, this study was conducted to determine the mental models of 185 seventh-grade students about global warming. The data were collected with the "Global Warming Survey". The survey consists of open-ended questions. When the mental models of the students were examined, it was revealed that 97.3% had knowledge about the subject of global warming. But it turns out that very few of them have mastered the correct mental model of global warming. At the end of the study, it was suggested that more detailed information and visuals on global warming issues should be included in the curriculum (Emli and Afacan, 2013). Secondly, Kaygusuz (2013) conducted a study to investigate the opinions of 360 fourth-grade students in Manisa on the subject of environment. Data were collected from the students with a 5-point Likert-type "The scale of Environmental Opinions" consisting of 30 questions. In the research, the gender and socio-economic levels of the students were also examined. At the end of the research, it was seen that there was no significant difference in the views on the environment according to the gender factor. It has been concluded that the students with a high level of education from their parents have a positive view of the environment compared to the students with a low level of education from their parents. It has been concluded that students living in rural areas have more negative views of the environment than students living in district centers. In addition, it has been revealed that the professions of the students' parents create a significant difference in the students' views on the environment. The most important positive opinion about the environmental issue came from the students whose mother is a civil

servant and whose father is retired. Last, the aim of Özdemir and Arık's study is to investigate the relationship between secondary school students' self-esteem levels and their attitudes towards sustainable environments according to gender and grade levels. "Coopersmith Self-Esteem Scale" and "Sustainable Environmental Education Attitude Scale" were used as data collection tools. At the end of the research, while the students' self-esteem levels and attitudes towards the environment did not make a significant difference according to gender when the grade levels were examined, the self-esteem levels and environmental attitudes of the 8th-grade students were higher than the other groups. Next year, in a study conducted by Bodzin, A.M. and Fu, Q. (2014) they examined the relationship between the geospatial curriculum approach in order to improve the understanding of climate change science and students' climate change knowledge and success in terms of teacher and student factors. 12 science teachers and 956 eighth grade students participated in the study. While collecting the data, the knowledge of both teachers and students was consulted with the help of pre-test and post-test, and they also measured teachers' Geospatial Science-Technological Pedagogical Content Knowledge. At the end of the study, students' understanding of climate change science was not related to teachers' knowledge of climate change or Geospatial Science-Technological Pedagogical Content Knowledge. It was concluded that the geospatial curriculum approach effectively supports the science curriculum approach. Another study is that 868 eighth-grade students' understanding of climate change was investigated from personal and social aspects. Data were collected with a questionnaire containing multiple-choice items and open-ended questions. According to the results of the research, it was revealed that the students did not fully know the differences between the concepts of weather and climate. It has been determined that the students' knowledge about greenhouse gases and how greenhouse gases affect climate change is deficient (Alec M. Bodzin, David Anastasio, Dork Sahagian, Tamara Peffer, Christopher Dempsey & Roxann Steelman 2014). Studies conducted in 2015 focused on the subject of "environmental attitude". The first study is that Önder (2015) used the "Environmental Attitude Scale" developed by Atasoy (2005) to examine primary school students' environmental attitudes according to different variables. These

different variables mentioned are gender, whether the house they live in has a garden, whether they have a pet at home, whether there is a club in their school and whether they participate in club activities at their school, whether they participate in the environment or scout camp, and whether they plant saplings. Data were collected from 543 eighth-grade students. According to the results of the research, it was found that the environmental attitudes of the girl students were higher than the boy students and the students who participated in the club activities had more positive attitudes toward the environment than the students who did not participate in the club activities. In addition, whether the students live in a house with a garden or not, whether they have a pet or not, whether or not they have a club in their school, or whether they planted saplings or not, did not cause a significant difference in environmental attitude scores. The second study in 2015, the aim of the study was to determine the environmental knowledge and attitude levels of 6th, 7th, and 8th-grade students and to determine the effect of environmental education on students' environmental knowledge and attitude levels. The "Children's Attitudes and Knowledge towards the Environment" scale developed by Leeming et al. was applied to 841 students. While determining the environmental knowledge and attitude levels of the students, class levels, gender, parental education levels, and school variables were taken into account. At the end of the research, it was revealed that female students' attitudes towards the environment were more positive than male students, and as the education level of their parents increased, students' awareness of environmental issues increased. While the students' attitudes towards the environment were high, it was concluded that their environmental knowledge level was not sufficient. It has been determined that the environmental education given is not sufficient (Gök and Afyon, 2015). And finally, the aim of third study, which was conducted in the United States, was to measure students' beliefs about the environment by focusing on climate change. The data were collected through the "Climate Change Attitude Survey". The questionnaire consists of 15 Likert-type attitude items. 1576 secondary school students participated in the survey. Thanks to the study, the changes between the students' prior knowledge and their knowledge after the subject were measured. In addition, the environmental beliefs of girl and boy students and the difference in belief

between schools in the city and the schools in the countryside were compared (Christensen, R., & Knezek, G. 2015). After a year, a study was conducted on the environmental behavior of secondary school students. The aim of this study by Demirel is to examine the environmental behaviors of secondary school students in terms of grade level and gender. “Environmentally Focused Behavior Measurement Tool” developed by Yavuz (2006) was applied to 90 students and the data were collected in this way. As a result of the research, no significant difference was found in the environmental behaviors of the students according to grade level and gender. The study ended with the recommendation of informing the students about the news in the written and visual media about environmental problems such as climate change and global warming (Demirel, 2016). Additionally, in 2017, research was conducted on the environmental knowledge levels and environmental attitudes of 604 eighth-grade students. It was examined whether gender and socio-economic level had an effect on environmental knowledge and environmental attitude. At the end of the research, it was determined that girl students had more environmental knowledge and attitude than boy students. The environmental knowledge of the students with good socio-economic status was found to be higher than the environmental knowledge of the students whose socio-economic status was not good. However, it was concluded that socioeconomic level had no effect on attitude (Sönmez and Yerlikaya, 2017). The aim of another study conducted in the same year is to investigate how students' interest in climate change will increase with education. Data were collected from seventh-grade students aged 12 and 13. 308 secondary school students participated in the study. First, before the students were given training on climate change, their prior knowledge was checked via a pre-test, and then the post-test was applied after the training on climate change was given. At the end of this two-week pilot study, it was determined that students' interest and knowledge about climate change increased through education (Carman, J., Zint, M. and Ibanez, I. 2017). It was continued by mentioning three studies conducted in 2018. The first study was conducted to determine the knowledge of secondary school students in Indonesia about climate change. Living areas were classified by sampling technique. 3 living areas have been determined. These are the urban fringe zone, urban-rural fringe zone, and rural-urban fringe

zone. Schools were determined from each area of life and students were selected accordingly. According to the data results, students living in urban have a higher understanding of global warming than students living in other regions. 35% of the students stated that global warming is the result of human activities (Dewi and Khoirunisa, 2018). Then, a second study was conducted to find out what kind of questions are asked to 16-19 years of students about climate change. In this way, this study has been a guide for educators on how to apply the issue of climate change. 355 open-ended questions asked to 16-19 years of international students were analyzed by qualitative content analysis. As a result of the analysis, when the questions about climate change were examined, it was revealed that all of the students were interested in climate change. However, it has emerged that there are great differences in the areas of interest related to the issue of climate change. As a result, it is among the suggestions that education should be handled with multidisciplinary approaches while providing climate change education (Sakari Tolppanen & Maija Aksela 2018). Finally, Şeker (2018) conducted this study to investigate the attitudes and behaviors of 7th and 8th-grade students toward sustainable development and climate change. 651 students participated in the study. Data were collected by applying the "environmentally friendly behavior survey", "environmental attitude survey" and "uncertainty beliefs survey". In addition, a descriptive survey model was applied to the study. As a result of the analysis, the attitudes of boy students toward the environment were lower than that of girl students. While the students have an ecocentric attitude as an attitude, they adopt an anthropocentric attitude as a behavior. It is among the suggestions that environmental education should be given at a very young age and should be included in all levels of education in order to give students an anthropocentric attitude. Additionally, details of many studies carried out in the following year are given. First of all, in the study conducted by Aktaş (2019), the 2018-2019 primary education program was analyzed in terms of climate change and sustainable environmental education. In addition, this study was conducted to determine how well the 2018-2019 primary education program met the UNDP 2030 sustainable development goals. The study was carried out with the document review method.

When the examinations were completed, the course named sustainable environmental education was not found among the compulsory courses. However, it has been seen that climate change and sustainable environmental education are given under different unit titles in Life Science, Science, and Social Studies courses. Examining the success of the students in the Science course, it was found that it was 41.67% in the 3rd grade, 32.61% in the 4th grade, 22.22% in the 5th grade, and 8.47% in the 6th grade. At the end of the study, it was concluded that some of the objectives of sustainable development and some of the achievements of Life Science, Science, Social Studies, History of Revolution, and Kemalism courses were similar. The aim of the second study carried out by Erkılıç and Sultan in 2019 is to determine the environmental literacy levels of secondary school students and their attitudes towards the environment. 1331 students participated in the study and the data were collected with both qualitative and quantitative methods. In addition, the personal information form was also suitable for the students. At the end of the research, it was revealed that while the students were at a medium level of environmental literacy, they had a good attitude toward the environment. While the class level and gender did not make a significant difference in the results, academic achievement, educational status of parents, education at BİLSEM, monthly income, hearing the word environmental literacy, talking and discussing environmental problems in the family, and sources of information about environmental pollution and trusting scientists to solve environmental problems made a difference in the results. Next, a study aiming to determine the causes of global climate change, the solutions to climate change, and high school students' views on climate change were conducted in 2019. A total of 249 students from the ninth and tenth grades participated in the study. Data were collected from the students by applying the "Global Climate Change Survey". The content of the questions in the survey are as follows; The definition of climate change, the causes and effects of climate change, the levels of concern caused by climate change, and the questions about preventing and combating climate change. At the end of the analyses, almost half of the students could not define the concept of climate change. When the definitions made by the remaining students were examined, it was seen that they were not scientific. Misconceptions about climate change have

been encountered. Most of the students stated that they were concerned about the problems created by global climate change. Finally, it has been revealed that the students do not have sufficient knowledge about climate change, its causes and effects, and measures to be taken against climate change. According to the results, increasing recycling practices is one of the suggestions in the study (Atik and Doğan, 2019). Lastly, the study by Özcan and Demirel (2019) aimed to investigate the cognitive structures of secondary school students regarding global warming, acid rain, the greenhouse effect, and the destruction of natural resources. The study was conducted with 150 students in the sixth, seventh, and eighth grades. Drawings were used while determining cognitive structures. The data were analyzed by content analysis. At the end of the research, the greenhouse effect was the subject in which the students had the least knowledge and the most misconceptions. It is among the suggestions that environmental problems and environmental concepts should be addressed more in science and other courses, and that teachers and curriculum development experts should pay more attention to this issue. As we approach the current year, this section has been concluded by mentioning one study conducted in 2020, three studies conducted in 2021, and finally one study conducted in 2022. In 2020, Barak and Gönençgil (2020) wanted to compare the secondary school curricula of the countries with high scores in the 2015 PISA exam and the curricula of Turkey in terms of climate, climate change, and global warming. The document analysis method was used in the research. Countries that provide education with an interdisciplinary approach in accordance with climate change education are Germany, the USA, Australia, Canada, Spain, the Republic of South Africa (GAC), and Turkey. However, Sweden provides climate change education with a disciplinary approach. In addition, climate change education is provided in Finland, Sweden, Spain, Canada, Germany, and GAC countries by integrating local elements. In the USA, UK, and Turkey, the situation is the opposite. These countries only give the subjects superficially. Next year, the aim of the first research is to reveal the views of secondary school students about global warming. The study by Kılıçoğlu, G. and Akkaya Yılmaz, M. (2021) was conducted with 90 secondary school students. Data were collected by interviewing students. At the end of the research, it was revealed that secondary school students

learned about global warming and climate change not only from the lessons but also through the internet, television, and their families. According to the data obtained at the end of the study, the students expressed global warming as an increase in temperature, and it was revealed that the students had a partially correct perception of global warming. It has been stated that even if the students do not know the concept of global warming and climate change, they have an idea about it. Suggestions were given about the need to teach environmental issues, especially from a young age, and to increase students' environmental literacy levels (Kılıçoğlu, G. & Akkaya Yılmaz, M. 2021).

Then, the aim of the second study, conducted in the Appalachian region of the USA in 2021, is to explore students' understanding of weather, climate, and climate change. Data were collected by applying a survey to 47 students between the ages of 12 and 14. A survey consisting of weather and climate questions developed by Boon (2009) was applied. At the end of the study, although the students learned the differences between the concepts of climate and weather, it was revealed that this difference was forgotten over time. Although the students mastered the basic concepts of the greenhouse effect at the end of the study, a decrease was observed over time (Cartwright, Tina J. & Hemler, Deb and Magee, Paula A. 2021). Finally, the aim of the third study by Ratinen (2021) is to look at reducing or adapting to climate change from the perspective of children. The reason for choosing such a topic is that there are few studies that have previously included the skills of mitigating or adapting to the problems caused by climate change. Data were collected by applying an online survey of 950 students. As a result of the analysis, it has been revealed that the students are aware of climate change and the problems it has brought, but they have a high level of hope for reducing climate change or adapting to the problems brought by climate change. Current year, the aim of the research conducted by Daşgın (2022) is to determine the written argumentation levels of 5th and 8th-grade students on environmental issues. Data were collected from 62 students with an easily accessible sampling method. While collecting data, 3 argumentation scenarios were written and open-ended questions were prepared about these scenarios. Open-ended questions consist of "air pollution, water

pollution, soil pollution, and global climate change". In the analysis, the "Argumentation Leveling Model" was used. At the end of the research, it was revealed that the increase in grade level and education level did not make any difference in the level of argumentation.

2.4. Summary of Literature

The awareness of the alpha generation, which will shape the future, about climate change, which is one of the biggest problems of our time, is an undeniable fact. In this study, a detailed literature search was conducted in order to give the readers the connection between alpha generation and climate change awareness. (Figure 2.16) In this chapter, a detailed definition of the alpha generation is given, this generation's mastery of 21st-century skills is mentioned, and climate change and its causes, one of today's problems, are given. Scientific research on climate change awareness, which has been done with different generations from past to present, is included.

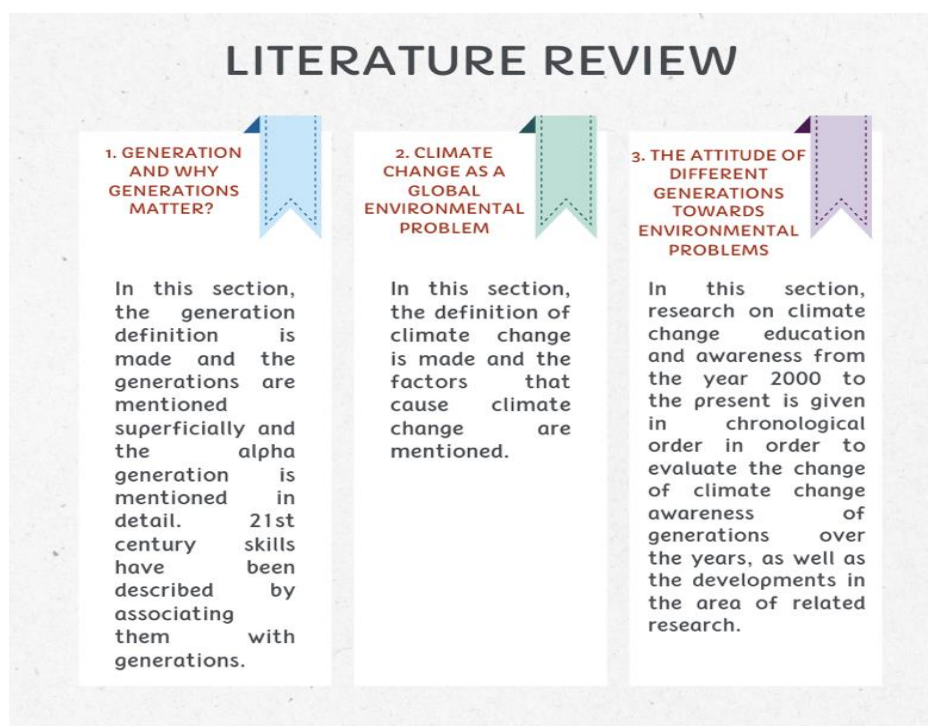


Figure 2. 16. Summary of Literature Review

The research between the years 2000-2022 were reviewed in this thesis. Depending on the assumption that climate change education has been launched beginning from the year 2000. Accordingly, only 43 of the studies on climate change awareness since 2000 are included in this chapter. The table below summarizes the number of studies reviewed in the context of this thesis (Table 2.6)

Table 2. 6. The Research Reviewed Between 2000 and 2022

Year	The Number of Researches
2000-2005	3
2006-2010	7
2011-2015	9
2016-2022	24
Total	43

As it can be understood from the table above (Table 2.6), only 3 of the studies on local and national global environmental problems between 2000-2005 were included in this study. While 7 studies conducted between 2006-2011 were used, 9 studies were included between 2011-2015. In the years 2016-2022, 24 studies are included. From the 2000s to the present, 43 studies on the change in the awareness of individuals on climate change have been examined and the results have been presented to the reader. Examination of the studies also contributed to the interpretation of the results of this study. According to 43 studies reviewed, awareness of climate change varies according to demographic characteristics. For example, female students at all age levels are more sensitive and aware of the environment than male students. In addition, the economic situation or educational status of the students' families changes the awareness of the students toward the environment. The places where the students live () are also a factor that changes their sensitivity towards the environment. Another result from the examination of the studies conducted in different years is that the students' knowledge about the environment (climate change, its causes, and effects, greenhouse effect, environmental pollution, ozone layer, etc.) is insufficient.

CHAPTER 3

METHOD

This section contains detailed explanations of the methodology of the research. The method will be discussed in nine chapters. The research will start with the design and continue by introducing the participants. Then, detailed information will be given about the attitude scale used, and data collection and analysis processes will be presented. Findings regarding the validity and reliability of the scale used will be shared and threats to internal validity will be mentioned. Finally, the assumptions and limitations of the research will be mentioned.

3.1. Research Design

Considering the purpose and research question of this study, it was concluded that a quantitative study is the most appropriate. It was decided that the descriptive research design was the most appropriate among the four different types of research designs commonly used in quantitative research. While the quantitative research method offers a set of methods for the systematic investigation of social phenomena using statistical or numerical data, this research method has been preferred because it assumes that the phenomena that are studied and that involve measurement can be measured (Watson, R. 2015). The reason why descriptive research design is preferred is that it is the method used when describing the facts, characteristics, or interests of a particular population in order to describe data systematically and accurately (Dulock, H. L. 1993).

This research is carried out to determine the awareness of Turkish alpha-generation individuals towards climate change. The data in the research were collected by the survey method. With this measurement tool, data collection from a large population

is provided quickly and easily. These are survey studies that collect large amounts of data to identify samples and populations (Hallberg. 2008).

3.2. Population and Sample

The target population of the research was determined as all alpha-generation individuals studying in public schools in Turkey, and the accessible population was determined as alpha-generation students studying in two public schools in Çankaya a district of Ankara. (Figure 3.1) Two different samples were created for validity and reliability studies in the research. A pilot study consisting of 110 children and the main application study consisting of 295 children were created. 110 alpha generation individuals studying at a public school in Ankara in the 2021-2022 academic year constitute the pilot study group. The main sample group consists of 295 alpha generation individuals.

The population of the research consists of alpha-generation individuals living in Ankara. It was determined that the convenience selection method was the best method. This is because of the size of the target population. Since it is not possible to test the general population, namely alpha-generation individuals living in Turkey, such a method has been preferred. It was decided that the best way to reach the target audience was the convenience selection method since data collection was easy and accessible, and time-cost savings were considered (Battaglia, M. P.,2008).

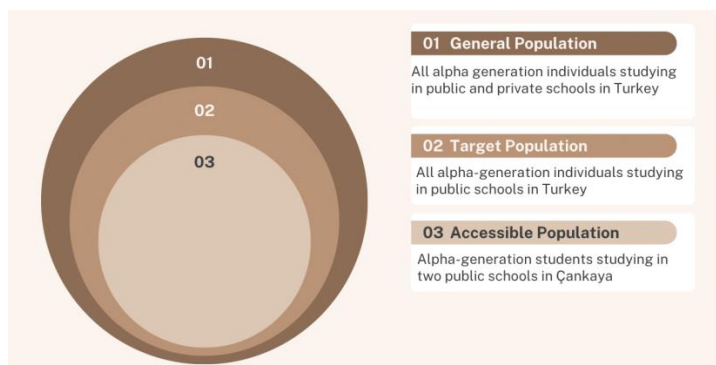


Figure 3. 1. General, Target, and Accessible Population

As is given in Table 3.1. below, the number of alpha-generation individuals reached for the main study is 295, where 151 of them are boys and 144 are girls. Based on ages, there were 41 students at age 10, 126 at age 11, and finally 128 at age 12 (Table 3.1)

Table 3. 1. Sample Characteristics for the Main Study

MAIN STUDY				
Gender				
	Total	Boys	Girls	
No of students	295	151	144	
Age				
	Total	10 years old	11 years old	12 years old
No of students	295	41	126	128

As is given in Table 3.2 below, the total number of alpha-generation individuals in the Çankaya district reached for this thesis is 21278. The total number of alpha generations of both pilot and the main group is 405 students. When the total number of students in Çankaya is compared to the number of students studied, 1.9 % is obtained. (Table 3.2)

Table 3. 2. Percent of Alpha Generation Individuals Reached in This Thesis

	No of alpha generation individuals
Total number of alpha generation student in Çankaya district	21278
Total number of alpha generation student of this study	405
% of alpha generation in Çankaya district reached	1.9

3.3. Instrument

The answer to the research questions of this research has been sought by applying the instrument titled ‘‘Climate Change Awareness’’ (CCA) to the generation of alpha in Ankara, Turkey.

The survey measures the awareness of Turkish alpha-generation individuals toward climate change. The original survey was developed by Alina Kuthe, Lars Keller, Annemarie Körfgen, Hans Stötter, Anna Oberrauch, and Karl-Michael Höferl (2019). The implementation, however, was realized with 13-16-year-old students in Germany and Austria. However, the study was conducted with alpha-generation individuals aged 10, 11, and 12 years in this thesis. As is given in Table 3.3. below, the number of alpha generation individuals reached for the pilot study is 110, where 60 of them are boys and 50 are girls. According to their ages, there were 3 students at age 10, 49 at age 11, and 58 at age 12. (Table 3.3)

Table 3. 3. Sample Characteristics for the Pilot Study

PILOT STUDY				
Gender				
	Total	Boys	Girls	
No of students	110	60	50	
Age				
	Total	10 years old	11 years old	12 years old
No of students	110	3	49	58

The awareness of climate change has been tried to be explained by considering the factors of attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior. While explaining these factors, an understanding that includes cognitive, affective, and positive aspects has been adopted. As mentioned also in the Introduction chapter of this thesis, attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior factors constitute ‘‘Climate Change Awareness’’ (CCA). Each factor is explained in detail below;

Attitude: Students' sense of responsibility and interest in climate change, their ability to understand that climate change is an international problem, their desire to take action to stop climate change, and their internal locus of control are measured by this factor. Increasing positive attitudes may develop pro-environmental behaviors. (Kollmuss & Agyeman, 2002).

Personal Concern: It is a factor that measures students' anxiety about how much their own life, the life of their families, and the lives of people in the country they live in are affected by climate change. The more concerned students are about climate change, the more likely they are to engage in climate-friendly behavior and engage in climate-friendly action in their present and future lives (Boyes & Stanisstreet, 2012; Metag et al., 2015).

Knowledge: It is a factor that measures students' knowledge about climate change, its causes, and its consequences. To create a climate-friendly society, knowledge about climate change is the right proportion (Hines, Hungerford, & Tomera, 1986/1987; Kollmuss & Agyeman, 2002; Metag et al., 2015). The more information you have about climate change and its causes and effects, the more accurate your environmental decision-making ability (Taber & Taylor, 2009). This factor is a foundation for climate literacy.

Multiplicative action: Climate change awareness among young people affects both their families and friends. While students affect their friends and families with their climate-friendly behaviors, they influence each other for climate change literacy (Alina Kuthe, etc, 2019).

Climate-friendly Behavior: It is a factor that measures how often students turn off electrical devices when they are not needed, prefers to buy small packages, try to repair something before buying something new, do not waste water unnecessarily while showering, and recycle for reducing footprint (Alina Kuthe, etc, 2019). Changing your behavior in daily life means changing your habits. For example, choosing an electric car over a fossil fuel car or choosing public transportation

instead of using a private car is a climate-friendly behavior and an important step towards creating a climate-friendly society.

Accordingly, the survey consists of 26 items of closed-ended questions. (See Appendix D). A five-point Likert scale was used in the survey. Demographic elements such as age and gender were also included in the survey. Five different factors were included in the survey to determine the awareness of alpha-generation individuals toward climate change. Attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior are the names of these factors. The Likert scale was applied for each factor, but it was graded with different names. For the first question of the ‘attitude’ factor, the lowest grade (very uninterested) is 1 point, while the highest grade (very interested) is 5 points. For the other questions of the ‘attitude’ factor, 1 point represents the expression "I totally disagree", while the expression "I totally agree" is 5 points. For the ‘personal concern’ factor, it was rated as “not affected at all (1) and very affected (5)”. The ‘knowledge’ factor was graded as "wrong answer (1) and correct answer (5)". The ‘multiplicative action’ factor was graded as "never (1) and always (5)". Finally, the factor of ‘climate-friendly behavior’ is rated in the same way as the factor of actions that have a ‘multiplicative action’ (Table 3.4)

Table 3. 4. Description of the CCA

	No of items	Content
Demographic Questions	2	Gender and Age
Dimensions	24	Attitude, Personal Concern, Knowledge, Multiplicative Action, Climate-friendly Behavior

Table 3.4. (cont'd)

Attitude	5	This factor measures criteria such as interest in climate change, responsibility, and locus of control. An individual with a positive attitude towards the environment makes it behavior and knows that person is responsible for the environment. In this case, too, person feels that his behavior is the locus of control over the problem of climate change (Ernst, Blood, & Beery, 2017; Hines et al., 1986/1987).
How interested are you in the topic “climate change?”		
It is my responsibility to act in a climate-friendly manner.		
I am able to contribute to reducing the degree of climate change.		
If the international community cooperates, global warming can be limited to + 2–4 °C.		
I would like to reduce my carbon emissions.		
Personal Concern	3	Measuring how worried individuals feel about climate change. Anxious individuals who feel climate change and its effects on their lives are more likely to participate in climate-related actions than people who do not feel climate change and its effects on their lives (Boyes & Stanisstreet, 2012; Metag et al., 2015).
my life		
life of my family		
the life of people living in Turkey		
Knowledge	4	To measure students' knowledge about climate change, its causes and consequences. Thanks to the information about climate change, the person also has the ability to make informed decisions about the environment (Taber & Taylor, 2009).
Due to climate change, the temperature will rise in all areas in the world an equal amount.		
The melting of the glaciers will stop immediately if worldwide CO ₂ emissions come to a halt.		
Winter tourism in the Uludağ is not affected by climate change thanks to the use of snow guns.		
Climate change is mainly human induced.		

Table 3.4. (cont'd)

Multiplicative Action	4	This factor was used to measure how often students discussed climate change with their friends or family or exhibited environmentally friendly behaviors. According to Hiramatsu, Kurisu, Nakamura, Teraki, and Hanaki (2014), it has been observed that young individuals influence their families and friends in displaying climate change awareness and environmentally friendly behaviors.
I discuss climate change with my friends.		
I discuss climate change with my family.		
I try to influence my friends to act in a climate-friendly manner.		
I try to influence my family to act in a climate-friendly manner.	7	The environmental behavior change of young people plays an important role in creating a climate-friendly society (Corner et al., 2015; Metag et al., 2015). This factor measures how often students exhibit environmentally friendly behaviors.
Climate-friendly Behavior		
I turn down the heating when I am not at home.		
I try to repair things before I buy something new.		
Before I buy something, I carefully consider whether I need it or not.		
I prefer to buy things with little packaging.		
I turn off electrical devices when I do not need them.		
While taking a shower I do not run the water unnecessarily.		
I separate waste to promote the sustainable reuse of material resources.		
I turn off lights when I do not need them.		

- The “attitude” factor in the survey includes affective, behavioral, and cognitive components such as those used in Fishbein and Ajzen (2010), Kraus (1995), Eilam and Trop (2012). Different beliefs such as interest in

climate change, willingness to take action against climate change, and acting in a climate-friendly way constitute the ‘attitude’ factor in the survey. There are 5 items under the attitude factor.

- The ‘personal concern’ factor consists of 3 items. Anxieties of individuals about their own life, family life, and people in Turkey, the country where they live, constitute this factor.
- The ‘knowledge’ factor consists of 4 items. The causes and effects of climate change were measured with these 4 items.
- The 4-item factor of actions with a ‘multiplicative action’ measures how often alpha generation individuals talk to their families and friends about climate change or climate-friendly behaviors, and how often they exhibit climate-friendly behaviors.
- Finally, the ‘climate-friendly behavior’ factor consists of 8 items. It measures the actions taken to reduce the personal carbon footprints of alpha individuals and the most frequent occurrence of these actions.

3.4. Procedures

The 5 main steps in implementing the research are given in Figure 3.2



Figure 3. 2. Steps of Research Procedure

3.4.1. Instrument Adaptation/Expert Opinion

Any scale needs to be adapted appropriately to use it in a different culture instead of the original language, the scale needs to be both culturally and linguistically

equitable. If this condition is not provided, there may be differences that may affect the validity and reliability (Çapık, C., Gözüm, S. & Aksayan, S. 2018). For all these reasons, first of all, the survey to be applied to alpha generation individuals was translated into Turkish and adapted to Turkish conditions by the researcher, and the adapted version was revised by 3 people working at Middle East Technical University and Ağrı İbrahim Çeçen University, whose fields of expertise are related to the environmental education, to adapt it to the language and context. The revisions were done as a result of the revision process ending up with the latest version of the instrument. The revisions, on the other hand, contained changes related to, for example, the geography, and position of Turkey: (Table 3.5)

Table 3. 5. Revised Questions

Item no	The Question on the Original Scale	The Question on the Revised Scale
8	The life of people living in Europe	The life of people living in Turkey
11	Winter tourism in the alps is not affected by climate change thanks to the use of snow guns.	Winter tourism in the Uludağ is not affected by climate change thanks to the use of snow guns.

3.4.2. Ethical Approval

After obtaining ethical permission from the Ethics Committee of the Middle East Technical University Human Subjects. (See Appendix A), the survey was made ready for implementation. A parent approval form was prepared based on the voluntary participation of the students in the research (See Appendix B). Before participating in the survey, the students were informed and the information that the data will be kept confidential and will not be shared with anyone is on the first page of the survey (see Appendix C)

3.4.3. Pilot Implementation

A pilot study was conducted with 110 alpha-generation individuals in June 2022 to test the measurement tool. The data collected as a result of the questionnaires given to the pilot group were transferred to the SPSS program. The reliability of the data was checked. Then, in September-October 2022, a total of 295 students participated in the survey. Pilot group and main group data were collected face to face. The applied questionnaire takes 20-25 minutes.

3.4.4. Testing the Instrument

Testing the CCA instrument was realized by using the data collected during the pilot implementation step. The analysis consists of EFA, CFA, and Reliability Analysis (Figure 3.3)

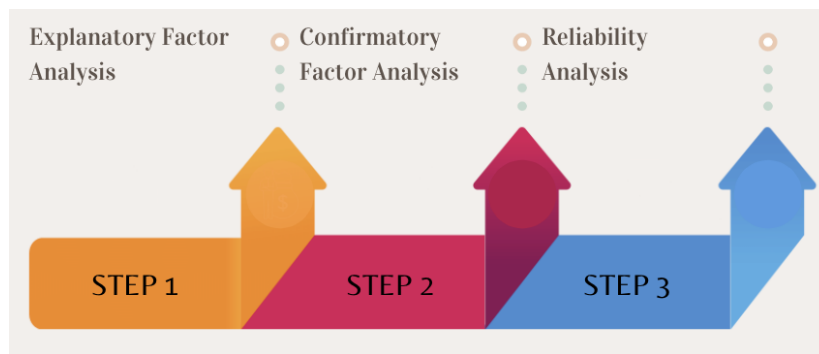


Figure 3. 3. An Overview of Steps in the Pilot Study

A survey consisting of 26 closed-ended questions was applied to 110 students in the state secondary school in the Çankaya in Ankara. Exploratory factor analysis was used while analyzing the pilot group. EFA was preferred because it is one of the multivariate statistical methods that aim to discover conceptually significant and relatively few latent variables based on linear relationships between a large number of observed variables (Çelik, E. 2018). EFA was used because it gave better results in multiple models (Aluja & Garcia, et al., 2005). In this study, EFA was used because there were five factors in the survey. EFA was used to check the validity and reliability of the pilot application.

Missing data control was provided before EFA was performed. Then, as in the original survey, questions named K3 and CFB6 were reverse-scored because they contained negative statements. Negatively worded questions in the survey were checked and corrected with reverse data entry. According to Preacher and MacCallum (2002), it was stated that the number of 100-250 participants was sufficient for the pilot application, and the pilot application was carried out with 110 students in the thesis. KMO and Bartlett's Tests were performed together with EFA analysis. Field (2000) also stated that 0.50 should be the lower limit for the Kaiser-Meyer-Olkin test. Since the value obtained according to this test is above .70, it has been ensured that validity has been achieved. In addition, Cronbach's alpha value was also checked and the result was above .70 (Büyüköztürk, Ş. 2010). stated that a factor load value of .70 and above would be sufficient. Thus, the reliability of the analysis was also tested. After EFA, CFA was applied and after all the reliability of the pilot study was tested by looking at the alpha value.

Internal Validity and Reliability Issues of Instruments

The original questionnaire was administered in Germany and Austria in 2019 by Alina Kuthe, Lars Keller, Annemarie Körfgen, Hans Stötter, Anna Oberrauch, and Karl-Michael Höferl. Since the original language of the questionnaire is English, it should be adapted to Turkish. It is also important to determine its validity and reliability. Because the questionnaire used in the research should be suitable for the language and culture of the country in which it is applied (Aksoy and Özsoyer, 2007). The validity and reliability of the survey were checked by conducting a pilot study. A pilot study can also be considered a preliminary study. It is a study designed to test the actions that need to be taken before interpreting the main group data and to identify the risks we will encounter. EFA analysis was performed first for the pilot study. EFA analysis was needed to check the fit of the questionnaire with the sub-parameters. EFA is a multivariate statistic for obtaining a small number of identifiable significant variables from a large number of variables measuring the same construct (Büyüköztürk, 2002). In short, EFA is used to reveal some new structures by making use of the relationships between variables. Then,

KMO and Bartlett's Tests were applied and Cronbach's alpha coefficient was checked for reliability and validity. (Table 3.6)

Table 3. 6. KMO and Bartlett's Test Statistics in Pilot Group

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.707
Bartlett's Test of Sphericity	Approx. Chi	744.40
	df	276
	Sig.	<.001

There are tests applied before constructs are extracted to examine the adequacy of the sample and the relevance of the data (Laura J. Burton and Stephanie M. Mazerolle 2011). Kaiser-Meyer-Olkin test and Bartlett's test of Sphericity are one of them. As can be seen in the table above, the KMO coefficient was .707. Field (2000) also stated that 0.50 should be the lower limit for the Kaiser-Meyer-Olkin test. Bartlett's test of Sphericity was < .001. Along with this test, it shows that the correlation matrix of the variables in the dataset is separated from the identity matrix. The reason for this is that the resulting value fits the criterion ($p < 0.05$).

Exploratory Factor Analysis in the Pilot Study

The purpose of factor analysis is to develop, improve and evaluate scales (Williams, Brown et al. 2010). Exploratory factor analysis under the title of factor analysis is the most widely used and applied statistical approach in studies related to the field of education. Exploratory factor analysis is used to reduce the number of variables, evaluate the multicollinearity between factors, and understand construct validity (Pett, Lackey, et al. 2003; Thompson 2004). The values mentioned in Table 3.4 were made to look at the normal distribution. The following table was obtained as a result of the studies carried out for factor analysis (Table 3.7) in the SPSS program for the pilot application. First, the 'extraction' section is looked at under the "Communalities" heading in this table. The extraction value of

the items must be greater than 0.3 so that the items are suitable for factor analysis (Tabachnick and Fidell ,2001).

Table 3. 7. First Step for Factor Analysis (Communalities)

Communalities	
	Extraction
Attitude1	.567
Attitude2	.647
Attitude3	.535
Attitude4	.667
Attitude5	.692
Personal Concern1	.758
Personal Concern2	.811
Personal Concern3	.748
Knowledge1	.658
Knowledge2	.507
Knowledge3re	.551
Knowledge4	.709
Multiplicative Action1	.679
Multiplicative Action2	.664
Multiplicative Action3	.696
Multiplicative Action4	.622
Climate-friendly Behavior1	.619
Climate-friendly Behavior2	.658
Climate-friendly Behavior3	.716
Climate-friendly Behavior4	.626
Climate-friendly Behavior5	.683
Climate-friendly Behavior 6re	.590
Climate-friendly Behavior7	.564
Climate-friendly Behavior8	.600

After the “Communalities” control is provided, the "Total Variance Explained" part is checked. Since there are 8 factors with an extraction total value over 1, it is concluded that there is an 8-factor structure. (Table 3.8) However, by looking at the Component Matrix section (Table 3.9), the association of the values is checked. If there is an associated value in the table, the associated values are deleted and the data is recalculated, thus obtaining the actual factor number.

Table 3. 8. Total Variance Explained

Component	Total	Initial Eigenvalues % of Variance	Cumulative %	Extraction Total	Sum of Squared % of Variance	Loading Cumulative %
1	4.854	20.227	20.227	4.854	20.227	20.227
2	2.392	9.966	30.193	2.392	9.966	30.193
3	1.804	7.517	37.710	1.804	7.517	37.710
4	1.654	6.893	44.603	1.654	6.893	44.603
5	1.422	5.927	50.530	1.422	5.927	50.530
6	1.289	5.372	55.902	1.289	5.372	55.902
7	1.136	4.734	60.636	1.136	4.734	60.636
8	1.040	4.332	64.968	1.040	4.332	64.968

Although there are a total of 24 components, the extraction total value of 8 components is 1 and above 1, so the CCA survey is defined as 8-factor. However, the original version of the survey consisted of 5 factors, and therefore factor analysis was performed again by removing the components A4, PC2, CFB1, CFB2, CFB3, CFB5, and CFB6. The reason for removing these components A4, PC2, CFB1, CFB2, CFB3, CFB5 and CFB6 is given below. (Table 3.9)

Table 3. 9. Component Matrix^a

	1	2	3	4	5	6	7	8
Attitude1	.691	-.018	-.070	.103	-.089	-.056	-.207	.138
Attitude2	.562	.178	-.116	.205	-.048	.200	-.194	.404
Attitude3	.589	-.148	.117	.303	-.172	-.072	-.025	-.156
Attitude4	.394	-.100	.195	.399	.304	.042	.457	.011
Attitude5	.566	-.002	.021	.348	.243	.147	.173	-.374
PersonalConcern1	.197	-.418	.676	-.141	.230	.056	.046	.097
PersonalConcern2	.170	-.549	.522	-.131	.345	.181	.109	.168
PersonalConcern3	.321	-.099	-.128	-.177	-.321	-.200	.632	.214
Knowledge1	.106	.098	-.049	.498	.345	-.379	-.097	.376
Knowledge2	.189	.056	-.476	.157	.357	.299	-.008	-.006
Knowledge3re	-.134	.619	-.110	-.023	.350	-.063	.099	.023
Knowledge4	.111	-.013	.315	.453	-.542	-.046	-.097	-.296
MultiplicativeAction1	.519	-.362	-.141	-.203	.181	-.272	-.239	-.233
MultiplicativeAction2	.613	-.382	-.154	-.117	-.197	.106	-.106	.207
MultiplicativeAction3	.676	-.199	-.335	-.188	-.106	-.042	.190	-.046
MultiplicativeAction4	.638	-.177	-.257	-.228	.055	.051	.006	-.244
ClimatefriendlyBehavior1	.185	.280	.461	-.121	-.053	-.517	-.078	-.049
ClimatefriendlyBehavior2	.375	.207	.197	-.285	-.209	.433	-.148	.319
ClimatefriendlyBehavior3	.242	.514	.259	-.517	.065	.134	.027	-.187
ClimatefriendlyBehavior4	.688	.206	-.114	-.131	-.056	-.256	.104	.004
ClimatefriendlyBehavior5	.428	.473	.167	.107	.065	.424	.013	-.232
ClimatefriendlyBehavior6re	-.418	-.439	-.043	.286	-.235	.281	-.048	-.056
ClimatefriendlyBehavior7	.598	.143	.168	.104	.088	-.103	-.404	.015
ClimatefriendlyBehavior8	.236	.483	.191	.239	-.295	.078	.252	.159

When Table 3.9 is examined, A4, PC2, CFB1, CFB2, CFB3, CFB5 and CFB6 values are acquaintance values. When finding acquaintance values, the two largest numbers, whether negative or positive, are selected and 0.1 is added to the smallest number. If the larger number of the two selected numbers is between the smaller number with 0.1 added and its own value, it is expressed as an acquaintance value. The numbers painted in gray in the table represent the large and small values, while those painted in yellow represent the factor to be removed from the table. After

subtracting the mentioned values, the KMO coefficient was .762, and Bartlett's Sphericity test was $< .001$ (Table 3.10)

Table 3. 10. KMO and Bartlett's Test of Sphericity Values After Component Matrix

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.762
Bartlett's Test of Sphericity	Approx. Chi	446.966
	df	136
	Sig.	<.001

After ensuring the accuracy of the KMO coefficient and Bartlett's test of Sphericity, "Total Variance Explained" was re-examined and 5 factors above 1 value were determined. In summary, the scale consists of 5 factors as in the original survey. (Table 3.11)

Table 3. 11. Total Variance Explained After New Factor Analysis

Component	Total	Initial Eigenvalue	Cumulative %	Extraction Total	Sums of Squared % of Variance	Loading Cumulative %	Rotation Sums of Squared Loadings ^a Total
1	4.297	25.274	25.274	4.297	25.274	25.274	4.039
2	1.699	9.991	35.265	1.699	9.991	35.265	1.691
3	1.520	8.942	44.206	1.520	8.942	44.206	1.973
4	1.250	7.352	51.558	1.250	7.352	51.558	1.476
5	1.048	6.165	57.723	1.048	6.165	57.723	1.520

Confirmatory Factor Analysis in the Pilot Study

The validity of the structure, which was determined to consist of 5 factors by exploratory factor analysis, and the goodness of fit statistics of the pilot study's data set were examined. For this, confirmatory factor analysis was applied using IBM SPSS Amos 26.0 program.

For model fit, CMIN, CMIN/DF, CFI, and RMSEA values are usually checked. The data relating to the confirmatory factor analysis results are given in the table below. (Table 3.12)

Table 3. 12. Fit Index Values for the Validity Study

FIT MEASURE	MODEL VALUES
DF (sd)	242
CMIN	345,435
CMIN/DF	1,427
P VALUE	.000
RMSEA	.063
CFI	.806

Looking at the values in the table, DF (sd) value is 242, CMIN value is 345,435 and P value is .000. CMIN/DF value between 0 and 3 means that there is no problem (Sümer, 2000). As can be seen from the table, the CMIN/DF (x^2 / df) value has increased to 1.427. The RMSEA value is set at .063. There is no problem as it is between $0 \leq RMSEA \leq 0.08$ values (Hooper et al. 2008). Finally, The CFI that should be between $.90 \leq CFI \leq 1.00$ (Tabachnick and Fidell, 2007) was .806. The CFI value is very close to the range of values it should be, but not within that range.

The hypothesis model was obtained with the IBM SPSS Amos 26.0 program. It is assumed that the items will be loaded onto the factors. (Figure 3.4)

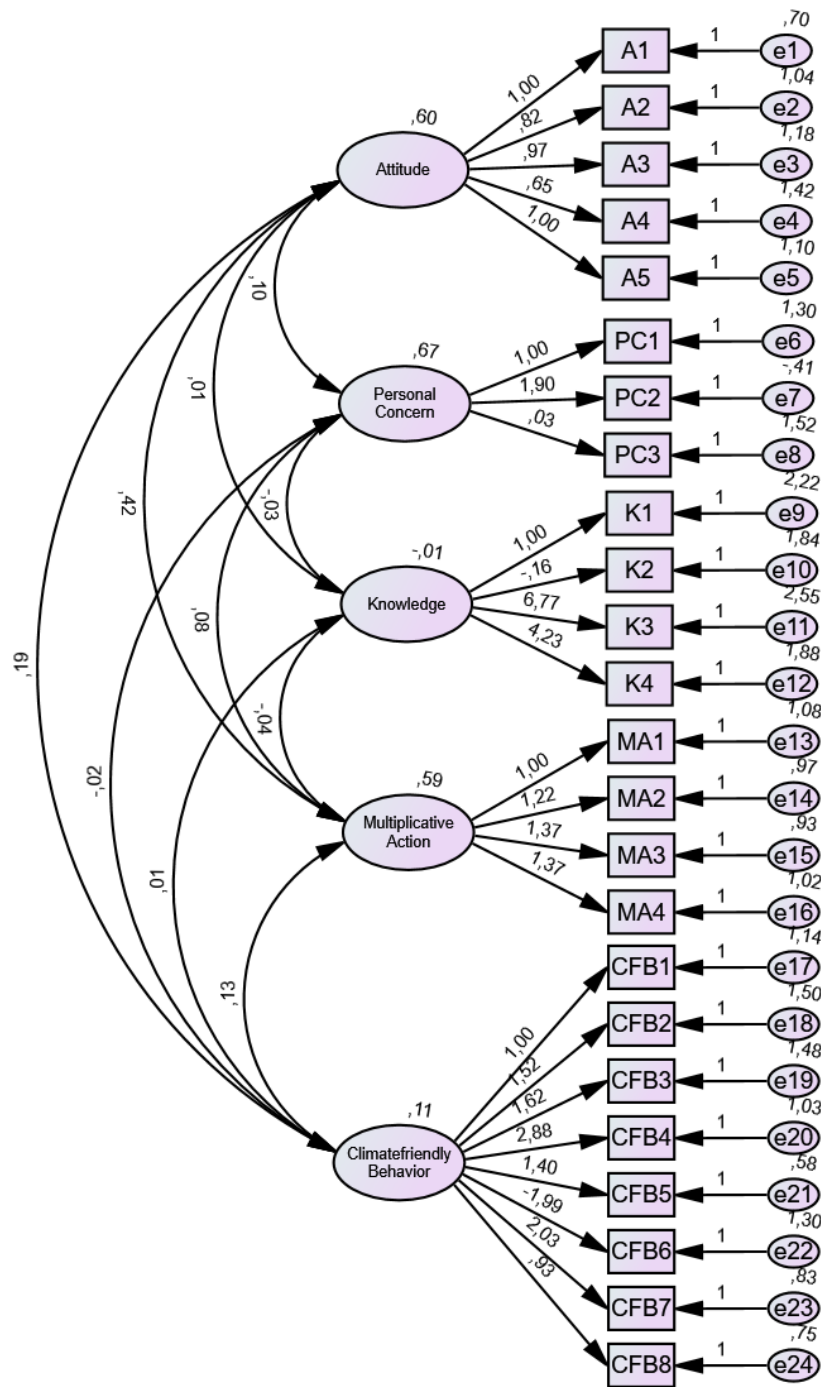


Figure 3. 4. Confirmatory Factor Analysis with Factor Loadings

Reliability Analyses in the Pilot Study

Since a 5-point Likert-type scale with 24 questions was used in the study, Cronbach's alpha coefficient was used to determine internal consistency. Cronbach's alpha coefficient value was found to be .723. (Table 3.13) Cronbach's alpha value was also checked and the result was above .70 (Büyüköztürk, Ş. 2002).

Table 3. 13. The Reliability of the Pilot Group

Cronbach's Alpha	.723
N of items	24

After looking at Cronbach's Alpha value, the Item -Total Statistics section should be looked at. (Table 3.14) "Corrected Item-Total Correlation" and "Cronbach's Alpha if Item Deleted" sections should be checked. For negative results in the "Corrected Item-Total Correlation" section, the "Inter-Item Correlation Matrix" section is checked. According to the 'Corrected Item-Total Correlation' section, the negative values are K3re and CFB6re. These values are also checked in the "Inter-Item Correlation Matrix" section and it is decided whether the K3re and CFB6re values should be deleted. We can find the correlations of the expressions with each other from the "Inter-Item Correlation Matrix" section. CFB6re has a negative value with all correlations. Although the K3re value does not have all correlations, it has a negative value with some correlations. (Table 3.15) This shows that these two values are opposite expressions. K3re and CFB6re expressions do not need to be deleted because " When we look at "Cronbach's Alpha if Item Deleted" section if we remove both expressions, the "Cronbach's Alpha" value remains above .70.

Table 3. 14. Item – Total Statistics

	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Attitude1	.541	.696
Attitude2	.471	.700
Attitude3	.491	.697
Attitude4	.350	.708
Attitude5	.520	.694
Personal Concern1	.183	.721
Personal Concern2	.156	.723
Personal Concern3	.224	.717
Knowledge1	.054	.732
Knowledge2	.108	.727
Knowledge3re	-.155	.747
Knowledge4	.072	.729
Multiplicative Action1	.374	.706
Multiplicative Action2	.482	.697
Multiplicative Action3	.497	.695
Multiplicative Action4	.473	.696
Climate-friendly Behavior1	.158	.721
Climate-friendly Behavior2	.286	.713
Climate-friendly Behavior3	.131	.725
Climate-friendly Behavior4	.545	.691
Climate-friendly Behavior5	.359	.711
Climate-friendly Behavior 6re	-.373	.760
Climate-friendly Behavior7	.498	.699
Climate-friendly Behavior8	.192	.719

Table 3. 15 Inter Item Correlation Matrix

Inter-Item Correlation Matrix															
	PC3	K1	K2	K3re	K4	MA1	MA2	MA3	MA4	CFB1	CFB2	CFB3	CFB4	CFB5	CFB6re
A1	.157	.064	.094	-.117	.085	.319	.425	.363	.291	.078	.222	.043	.506	.177	-.245
A2	.109	.162	.268	.029	.116	.128	.306	.302	.249	.019	.266	.071	.305	.288	-.223
A3	.134	.102	.020	-.191	.243	.240	.306	.319	.375	.086	.094	-.023	.310	.163	-.107
A4	.126	.208	.052	-.050	.072	.110	.144	.208	.116	-.014	.025	-.050	.218	.199	-.106
A5	.113	.106	.226	.064	.170	.257	.229	.244	.335	.027	.094	.066	.264	.333	-.122
PC1	.036	-.038	-.158	-.220	.061	.191	.158	.025	.066	.156	.053	.071	-.038	.036	-.030
PC2	.031	-.051	-.043	-.251	-.090	.150	.172	.038	.096	.040	.101	-.032	-.033	-.073	.082
PC3	1.000	-.086	.044	-.084	.047	.068	.223	.374	.166	.081	.109	.025	.305	-.092	-.126
K1	-.086	1.000	.077	.069	-.018	.013	-.019	-.006	-.033	.084	-.103	-.174	.078	-.002	-.117
K2	.044	.077	1.000	.081	-.115	.073	.069	.188	.133	-.138	-.030	-.025	.048	.143	-.056
K3re	-.084	.069	.081	1.000	-.222	-.149	-.286	-.252	-.104	.095	.000	.194	.060	.082	-.162
K4	.047	-.018	-.115	-.222	1.000	-.055	-.003	-.035	-.080	.160	.020	-.055	.011	.079	.124
MA1	.068	.013	.073	-.149	-.055	1.000	.450	.406	.463	.099	.002	-.006	.305	-.015	-.153
MA2	.223	-.019	.069	-.286	-.003	.450	1.000	.470	.488	-.057	.291	-.045	.299	.008	-.018
MA3	.374	-.006	.188	-.252	-.035	.406	.470	1.000	.553	-.003	.159	.063	.518	.201	-.213
MA4	.166	-.033	.133	-.104	-.080	.463	.488	.553	1.000	-.036	.137	.149	.339	.182	-.233
CFB1	.081	.084	-.138	.095	.160	.099	-.057	-.003	-.036	1.000	.078	.233	.208	.097	-.242
CFB2	.109	-.103	-.030	.000	.020	.002	.291	.159	.137	.078	1.000	.321	.199	.288	-.144
CFB3	.025	-.174	-.025	.194	-.055	-.006	-.045	.063	.149	.233	.321	1.000	.254	.338	-.422
CFB4	.305	.078	.048	.060	.011	.305	.299	.518	.339	.208	.199	.254	1.000	.296	-.348
CFB5	-.092	-.002	.143	.082	.079	-.015	.008	.201	.182	.097	.288	.338	.296	1.000	-.215
CFB6re	-.126	-.117	-.056	-.162	.124	-.153	-.018	-.213	-.233	-.242	-.144	-.422	-.348	-.215	1.000
CFB7	.015	.146	.077	-.004	.131	.277	.266	.213	.236	.223	.262	.158	.385	.294	-.276
CFB8	.099	.073	-.095	.185	.138	-.149	.103	-.015	.033	.169	.136	.157	.140	.361	-.175

3.4.5. Main Study Implementation

After the validity analysis of the CCA, a scale was provided, and data screening was performed. Then, descriptive statistical analysis was performed. Negative statements were reversed before starting the descriptive analysis. Along with the descriptive analysis, the frequencies of the age distributions and genders of the students are given and shown in the table. Then, the frequency distributions of the students' answers and the average of their distributions are given. For each factor mean, median, mode, and standard deviation are calculated and presented to the reader with tables and figures. After the descriptive analysis, confirmatory factor analysis was performed. To answer the second research question, Pearson's correlation was performed after CFA. With this analysis, the relationship between the five factors was found and shown with tables and visuals. Cluster analysis was conducted to answer the last research question. With the cluster analysis, two groups were obtained and students with similar responses were identified. In the last step, the ANOVA test was applied to determine the validity of the cluster analysis

3.5. External Validity

Depending on the explanation in the literature for external validity; It is the degree of generalizability of the results obtained at the end of the study (Fraenkel & Wallen, 2006); the population in the study consists of alpha-generation individuals studying at public secondary schools in Çankaya. Students were selected by convenience sampling, and public secondary school students represent the target population. Research results cannot be generalized for alpha-generation individuals in Turkey. However, it provides guidance for further studies.

3.6. Threats to Internal Validity

Internal validity is defined as “observed differences on the dependent variable are directly related to the independent variable, not due to some other intended variable” (Fraenkel & Wallen, 2006). There are multiple factors that affect internal validity. The pandemic may have affected the results of the research, because students' attitudes and feelings toward climate change may have changed with the pandemic. Then, since the researcher's prejudice would affect the results of the study, the researcher approached the students at an equal distance and showed the same attitude to each student. In order not to be affected by the results, the researcher did not take the names of the students and did not talk to the students. Apart from this, students were prevented from communicating or exchanging ideas with each other. Thus, according to the results, the reliability of the findings was not compromised. Participants were convenience selected and internal validity was ensured considering that they represented the population (alpha-generation individuals living in Turkey) to be examined. Since the research was conducted in a public school located in the Çankaya district of Ankara, the capital city of Turkey, it may not reflect the attitudes of the students in other provinces of Turkey, because the socio-economic level, education level, and environmental attitudes of the parents of the students in the region where the research was conducted were more developed than those living in other regions. Next, since the surveys are

administered face to face, the questions asked were answered immediately and information about the survey was given instantly.

3.7. Assumptions and Limitations

Assumptions

There are certain requirements to enable and conduct research, but these may not always be proven. In this case, limitations are made and there are expressions that are considered correct to comply with these limitations. These statements are called assumptions (Simon & Goes, 2013).

1. The students answered the survey questions correctly and honestly.
2. The students were not affected by other students while answering the survey.
3. The characteristics of the research sample (Alpha generation individuals in public schools in the Çankaya district.) represented the population.

Limitations

In writing the thesis, no matter how well the researcher constructs his thesis or how well it is executed, there may be situations that develop beyond the researcher's control and affect the results. These are indicated as constraints (Simon & Goes ,2013).

1. The research sample is limited to alpha-generation individuals in only two public schools in Ankara, Turkey in the 2022-2023 academic year. The results obtained from different provinces or private schools may be different. Thus, the research results are limited to the population.

2. A 26-question survey may not be sufficient to measure students' awareness of climate change.
3. Response range is limited as the questionnaire forces students to give a specific answer.
4. The questionnaire is limited to the text as students are often guided on how to complete or respond to the questionnaire.
5. The questionnaire is limited in reliability and validity.

CHAPTER 4

RESULTS

This chapter consists of six parts. The first part consists of a preliminary analysis (data screening). Before starting the analysis of the main group, negative items were coded in reverse, just as it was done in the pilot group. Secondly, a confirmatory factor analysis of the scale was made. At the end of the CFA, descriptive statistical analysis was made. The gender and age distributions of the students are shown both in the table and on the graph. The percentages of students answering each item are presented in detail. Mean, median, mode, and SD were calculated. Next, Pearson's correlation was made and the relationship between the factors was examined. Finally, cluster analysis was performed to bring together groups or objects with similar characteristics and an ANOVA study was conducted to show the validity of the cluster analysis. (Figure 4.1)

The analysis has been realized in 6 steps as shown below.

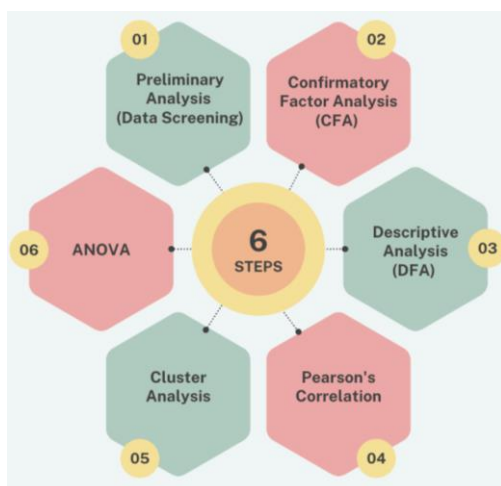


Figure 4. 1. An Overview of Steps in Awareness of Alpha Generation toward Climate Change

4.1. Awareness of Alpha Generation toward Climate Change: Preliminary Analysis (Data Screening)

The variables used in the survey were named attitude (A1, A2, A3, A4, A5), personal concern (PC1, PC2, PC3), knowledge (K1, K2, K3, K4), multiplicative action (MA1, MA2, MA3, MA4), and climate-friendly behavior (CFA1, CFB2, CFB3, CFB4, CFB5, CFB6, CFB7, CFB8). All variables were measured with a 5-point Likert-type scale. Therefore, there is no need to calculate the z-score. According to the results of the factor analysis at the end of the pilot application, it was decided to exclude some items from the survey. The decision of the removal process is explained in detail in the "Method" chapter. The values extracted from the survey are as follows; A4, PC2, CFB1, CFB2, CFB3, CFB5, CFB6re. The final version of the survey consists of 17 questions and it was applied in the main group study.

4.2. Awareness of Alpha Generation toward Climate Change: Confirmatory Factor Analysis (CFA) of the Main Study

The validity of the structure, which was determined to consist of 5 factors by exploratory factor analysis, and the goodness of fit statistics of the main study's data set were examined. For this, confirmatory factor analysis was applied using IMB SPSS Amos 26.0 program.

The goodness of fit test is used to test the fit between the model and the data. While doing this, either all of the goodness-of-fit tests can be used together, or several of them can be used (Schumacker 2006). For model fit, CMIN, CMIN/DF, CFI, and RMSEA values are usually checked. The data relating to the confirmatory factor analysis results are given in the table below. (Table 4.1)

Table 4. 1. Fit Index Values for the Validity Study

FIT MEASURE	MODEL VALUES
DF (sd)	109
CMIN	137,747
CMIN/DF	1,264
P VALUE	.033
RMSEA	.030
CFI	.825

Looking at the values in the table, DF (sd) value is 109, the CMIN value is 137,747, and the P value is .033. CMIN/DF value between 0 and 3 means that there is no problem (Sümer, 2000). As can be seen from the table, the CMIN/DF (χ^2 / df) value has increased to 1.264. The RMSEA value is set at .03. There is no problem as it is between $0 \leq RMSEA \leq 0.08$ values (Hooper et al. 2008). Finally, The CFI that should be between $.90 \leq CFI \leq 1.00$ (Tabachnick and Fidell, 2007) was .825. The CFI value is very close to the range of values it should be, but not within that range. For this, some changes can be made, provided that they are not too much, by looking at the "Modification Indices" section. (Table 4.8) In the study, since the sample value is 295, that is, it is more than 50, instead of χ^2 test statistics, χ^2 / df statistics can be looked at. Accordingly, the problem does not appear as χ^2 / df is between the specified values. Thus, the validity of the 5-factor structure was ensured with CFA.

The hypothesis model was obtained with the IBM SPSS Amos 26.0 program. It is assumed that the items will be loaded onto the factors. (Figure 4.2)

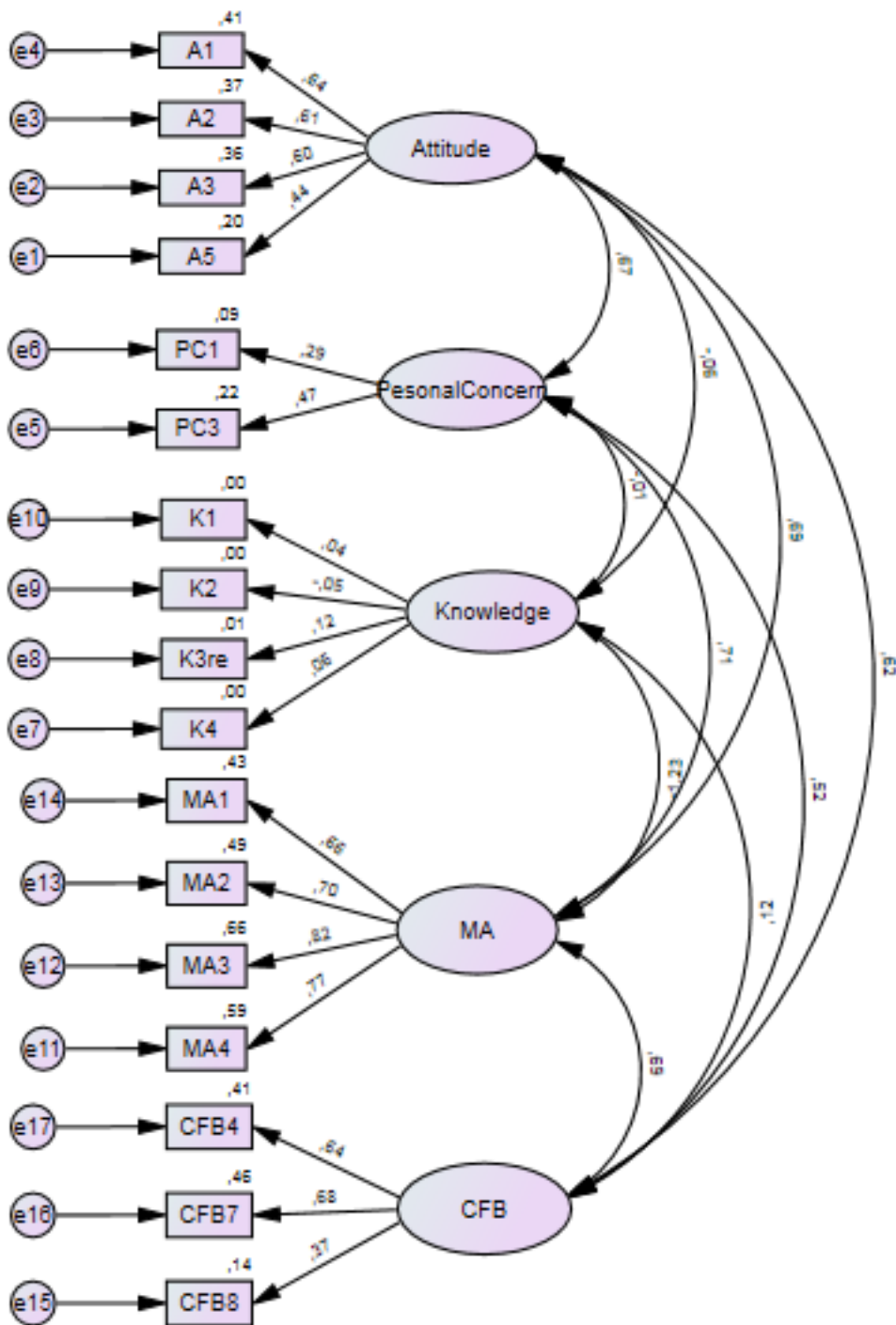


Figure 4. 2. The AMOS Diagram of Model

Since the CFI value was not within the desired value range, it was concluded that a correlation would be established between e14 and e15, e12 and e13, e1 and e9 values by looking at the "Covariances" values under the title of "Modification Indices". Thus, there will be an improvement in the CFI value. (Table 4.2)

Table 4. 2 Covariances

Covariances		
	M.I.	Par Change
e14 <--> e15	5.730	-,112
e13 <--> e14	5.513	,134
e12 <--> e13	8.421	-,176
e9 <--> e16	4.832	,186
e3 <--> e14	5.947	-,142
e1 <--> e9	6.900	,240

A covariances connection was established between e14 and e15, e12 and e13, e1 and e9 values. The values after the connection are established are given in the table below. (Table 4.3)

Table 4. 3 Fit Index Values After Covariances

FIT MEASURE	DF	CMIN	CMIN/DF	CFI	RMSEA
MODEL VALUES	106	113,642	1.072	.953	0.16

When the table is examined, the CFI value is .953 and it is within the required value range ($.90 \leq CFI \leq 1.00$) (Tabachnick and Fidell, 2007).

The AMOS diagram that emerges after the covariances are made is given below. (Figure 4.3)

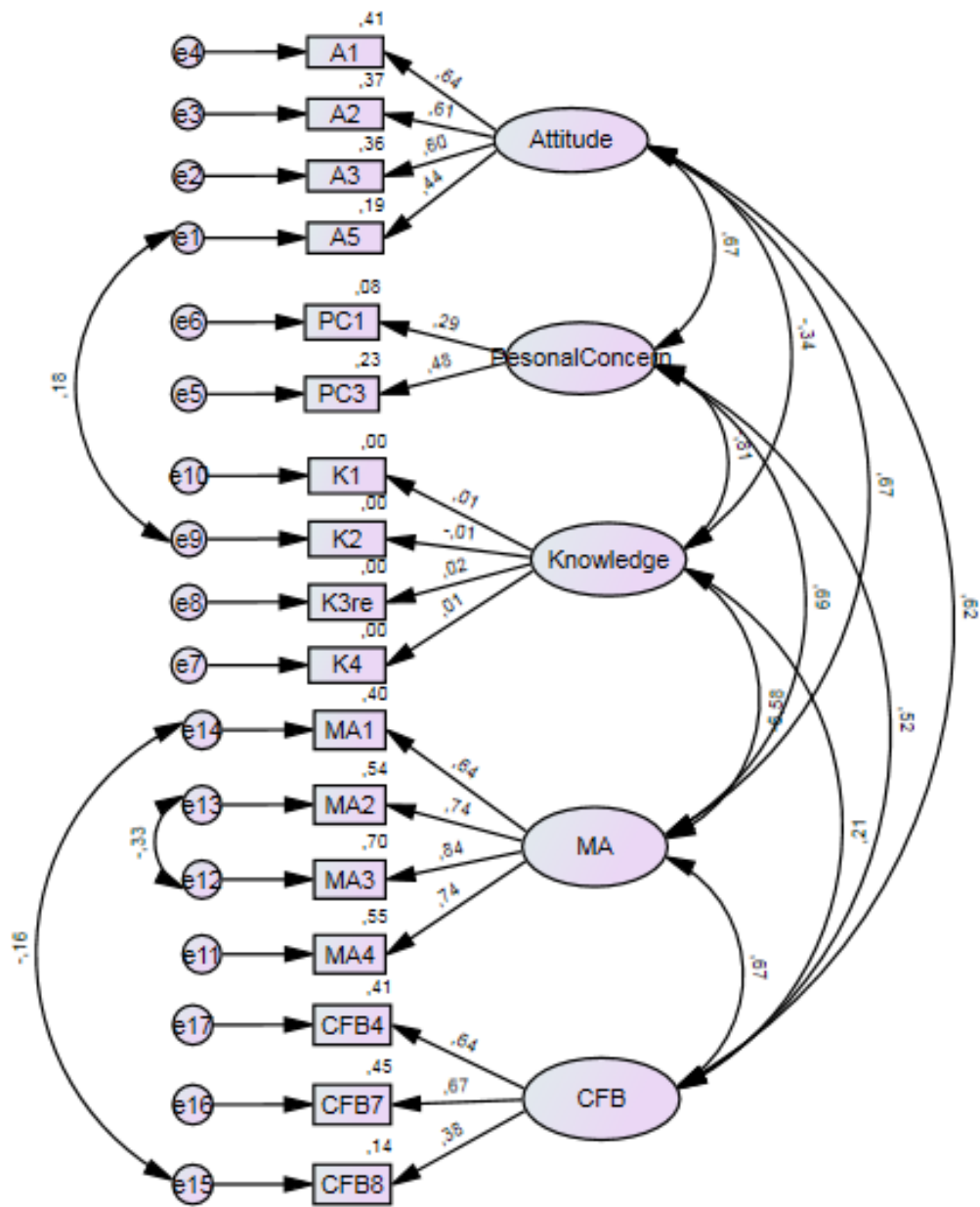


Figure 4. 3. The AMOS Diagram of Model After Covariances

As a result, awareness of alpha generation towards climate change has been explained by 5 factors, the factors being, attitude, personal concern, knowledge, multiplicative action and climate-friendly behavior.

4.3. Awareness of Alpha Generation toward Climate Change: Descriptive Analysis (DFA) of the Main Study

The revised CCA was implemented for 295 alpha-generation students to measure their awareness towards climate change. 48.6% of the students are girl students and 51.4% are boy students. The distribution of boy and girl students is shown in the table (Table 4.4) and graph (Figure 4.4) below.

Table 4. 4. Gender Analysis for Main Group

Gender	Percent (%)
Girl	48.6
Boy	51.4

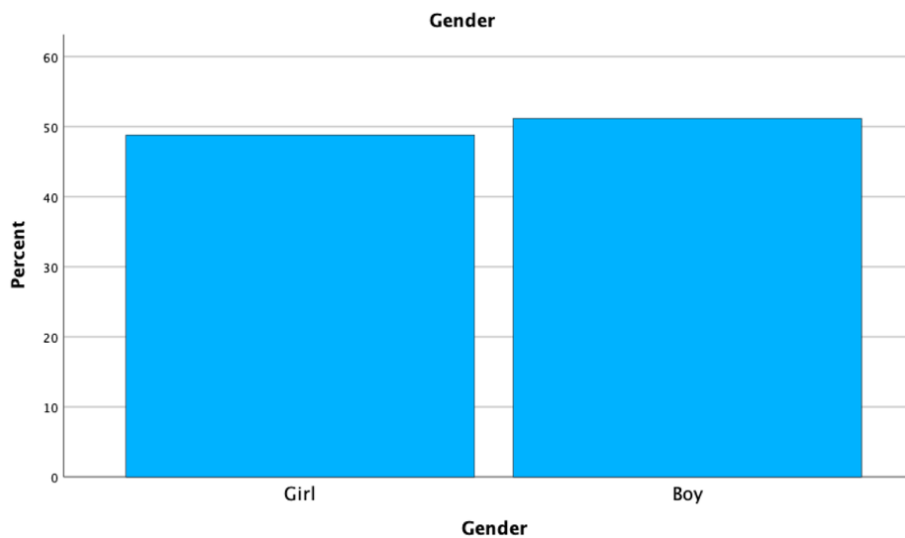


Figure 4. 4. The Bar Graph of Gender in the Main Group

As the research was conducted with individuals of the alpha generation, it was necessary to work with students born in 2010 and later. Therefore, data were

collected from students aged 10, 11, and 12. 13.9% of students are 10 years old, 42.6% are 11 years old, and finally, 43.5% are 12 years old. The age distribution of students is shown in the table (Table 4.5) and graph (Figure 4.5) below.

Table 4. 5. Age Analysis for Main Group

Age	Percent (%)
10	13.9
11	42.6
12	43.5

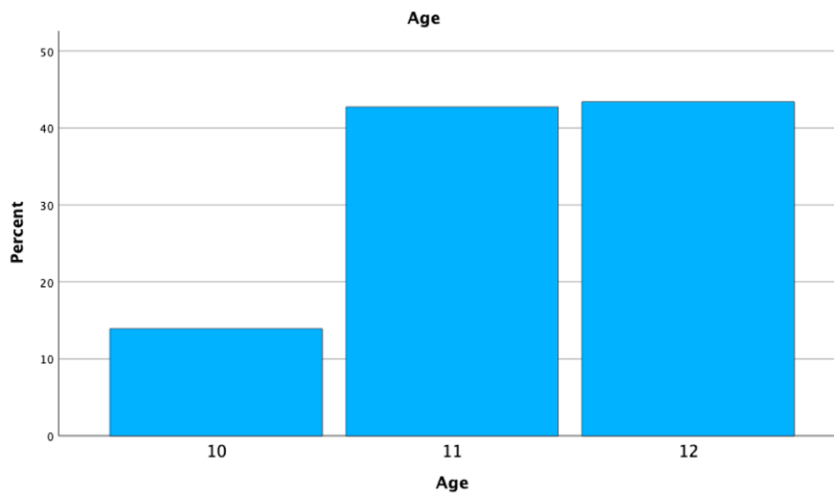


Figure 4. 5. The Bar Graph of Age in the Main Group

In order to answer the research question "How aware is the alpha generation of climate change?", a descriptive analysis was carried out using the SPSS 25.0 program. The survey consists of 17 questions in total, 1 of which are a negative statement. A negative statement is a reverse coded to obtain a consistent result. The frequency distribution of the items is given in Table 4.6 below.

Table 4. 6. Awareness of Alpha Generation toward Climate Change – Results of Descriptive Analysis

	Frequency					M	SD
	Very <i>uninterested</i> (1) %	(2) %	(3) %	(4) %	Very <i>interested</i> (5) %		
ATTITUDE							
A1: How interested are you in the topic “climate change”?	8.1	10.8	38.2	24.3	18.2	3.33	1.14
	I totally disagree (1) %	(2) %	(3) %	(4) %	I totally agree (5) %	M	SD
A2: It is my responsibility to act in a climate-friendly manner.	5.4	8.8	14.5	20.9	50.0	4.01	1.22
A3: I am able to contribute to reducing the degree of climate change.	9.5	16.9	22.3	24.3	26.7	3.42	1.30
A5: I would like to reduce my carbon emissions.	9.1	8.1	18.2	19.9	44.3	3.82	1.32
PERSONAL CONCERN							
	Not affected (1) %	(2) %	(3) %	(4) %	Very affected (5) %	M	SD
PC1: My life	18.2	22.0	20.3	17.9	21.3	3.02	1.41
PC3: The life of people living in Turkey	6.8	5.7	20.9	25.0	41.2	3.88	1.20

Table 4.6 (Cont'd)

KNOWLEDGE

	Wrong answer (1) %	(2) %	(3) %	(4) %	Right answer (5) %	M	SD
K1: Due to climate change, temperature will rise in all areas in the world an equal amount.	61.5	7.8	13.9	6.1	10.5	1.95	1.39
K2: The melting of the glaciers will stop immediately if worldwide CO ₂ -emissions come to a halt.	16.9	16.2	27.4	12.5	26.7	3.1	1.42
K3: Winter tourism in the alps is not affected by climate change thanks to the use of snow guns.	27.4	11.1	22.6	10.8	27.7	3.00	1.56
K4: Climate change is mainly human induced.	9.8	8.4	10.8	16.2	54.4	3.97	1.37

MULTIPLICATIVE ACTION

	Never (1) %	(2) %	(3) %	(4) %	Always (5) %	M	SD
MA1: I discuss climate change with my friends.	35.8	28.7	19.9	7.4	7.8	2.22	1.23
MA2: I discuss climate change with my family.	30.1	23.6	15.2	18.9	11.8	2.58	1.39
MA3: I try to influence my friends to act in a climate-friendly manner.	23.3	18.9	22.3	17.2	17.9	2.87	1.41

Table 4.6 (Cont'd)

MA4: I try to influence my family to act in a climate-friendly manner.	23.3	16.2	20.3	14.9	25.0	3.02	1.50
<i>CLIMATE-FRIENDLY BEHAVIOR</i>							
CFB4: I prefer to buy things with little packaging.	23.3	20.6	27.7	14.5	13.5	2.74	1.33
CFB7: I separate waste to promote the sustainable reuse of material resources.	11.5	15.2	25.0	25.7	22.3	3.32	1.29
CFB8: I turn off lights when I do not need them.	2.7	1.4	7.8	11.5	76.4	4.57	0.89

The percentages of answering each question in the survey are given in Table 4.6 and the results are explained in detail below.

Attitude

Most of the alpha generation students (38.2 %) agreed that ‘‘ How interested are you in the topic climate change?’’ While alpha-generation individuals (24.3 %) marked the option ‘‘ interested’’, alpha-generation individuals (18.2 %) marked the option ‘‘ very interested’’. On the other hand, alpha generation individuals (8.1%) marked the ‘‘very uninterested’’. Secondly, fifty percent of the alpha generation individuals of this study strongly agreed on ‘‘ It is my responsibility to act in a climate-friendly manner.’’ While alpha generation individuals (20.9 %) marked ‘‘agree’’, 14.5 percent of alpha individuals think that they cannot decide whether it is their responsibility to act climate-friendly. However, alpha generation individuals (8.8 %) marked ‘‘disagree’’. 5.4 % of the alpha generation individuals of this study strongly disagreed with ‘‘ It is my responsibility to act in a climate-friendly manner.’’ In the third item of attitude, the percentages of answers to the questions are close to each other. Among the three items of dimension, the one

alpha generation individuals agreed mostly (26.7 %) is, “I am able to contribute to reducing the degree of climate change.” While alpha generation individuals (24.3 %) marked “agree”, 16.9 % alpha generation individuals marked “disagree” and 9.5 % alpha generation individuals marked “strongly disagree”. 22.3 percent of alpha individuals appear to be undecided as to whether they can contribute to reducing the degree of climate change. Lastly, most of the alpha generation students (44.3 %) agreed that “I would like to reduce my carbon emissions.” While alpha generation individuals (19.9 %) marked “agree”, 8.1 % of alpha generation individuals marked “disagree” and 9.1 % alpha generation individuals marked “strongly disagree”. 18.2 % of alpha generation individuals marked “undecided”.

Personal Concern

The answers to the first question “my life” about the personal concern factor are very close to each other. 18.2 % of the alpha generation thinks that climate change is not affecting their own lives. On the other hand, 21.3 % of the alpha generation thinks that climate change is seriously affecting their own lives. While 22.0 % of the alpha generation thinks that climate change is affecting their own lives to a small extent, 17.9 % of the alpha generation is marked “affected”. Alpha generation individuals (20.9 %) marked “undecided”. Next, among the 2 items of this dimension, the one alpha-generation individuals agreed mostly (41.2 %) is, “the life of people living in Turkey”. While alpha-generation individuals (25.0 %) marked “affected”, 6.8 % of alpha-generation individuals marked “not affected”. 5.7 % of alpha generation individuals think that people living in Turkey would be affected by climate change to a small extent. However, alpha generation individuals (20.9 %) marked “undecided”.

Knowledge

54.4 % of the alpha generation individuals answered the question that related to “climate change is mainly human-induced” correctly. However, the percentage

answering the question related to “due to climate change, the temperature will rise in all areas in the world an equal amount” was 10.5 %. For the first item, most of the alpha generation students (61.5 %) are not correct that “due to climate change, the temperature will rise in all areas in the world an equal amount”. While 7.8% of alpha-generation individuals marked “partially wrong answer”, alpha generation individuals (6.1 %) marked “partially right answer”. 13.9 percent of alpha-generation individuals are unsure whether the answer is correct or not. Next, 27.4 % of alpha generation individuals were undecided on the question of “the melting of the glaciers will stop immediately if worldwide CO₂-emissions come to a halt.”. While 26.7 % of the alpha-generation individuals answered the question related correctly, alpha-generation individuals (12.5 %) marked “partially right answer”. Conversely, alpha generation individuals (16.2 % and 16.9 %) marked “partially wrong answer” and “the wrong answer” respectively. For the third item of knowledge factor, 27.7 % of the alpha generation individuals answered the question that related to “winter tourism in the alps is not affected by climate change thanks to the use of snow guns.” correctly but 10.8 % of the alpha generation individuals marked “partially right answer”. On the other hand, 27.4 % of the alpha generation individuals answered the question that related to “winter tourism in the alps is not affected by climate change thanks to the use of snow guns.” incorrectly but 11.1 % of the alpha generation individuals marked “partially wrong answer”. Next, 22.6 % of alpha-generation individuals were undecided on the question. Lastly, most of the alpha-generation students (54.4 %) corrected that “climate change is mainly human-induced?” and 16.2 % of alpha-generation individuals think partially correctly that climate change is mainly human-induced. Then, alpha-generation individuals (9.8% and 8.4%) marked “wrong answer” and “partially wrong answer” respectively. 10.8 % of alpha-generation individuals were undecided on the question.

Multiplicative Action

The multiplicative action factor has a higher percentage of answering questions as "never" compared to other factors. Firstly, 35.8 % of the alpha generation

individuals answered " never" the question related to "I discuss climate change with my friends." On the other hand, 7.8 % of alpha generation individuals answered "always" the first question. The alpha-generation individuals (19.9 %) were undecided on the question. Additionally, alpha-generation individuals (28.7 %) stated that they hardly ever discussed climate change with their friends and alpha-generation individuals (7.4 %) stated that they usually discuss climate change with their friends. For the second question, most of the alpha-generation students (30.1 %) disagreed that "I discuss climate change with my family." However, 11.8 % of alpha-generation individuals answered "always" the second question. While 18.9 % of alpha-generation students stated that they usually discussed climate change with their families, alpha-generation individuals (23.6 %) stated that they hardly ever discussed climate change with their families. 15.2 % of alpha-generation individuals were undecided on the question. After the second question for this factor, alpha-generation individuals (23.3 %) answered "never" the question that related to "I try to influence my friends to act in a climate-friendly manner but 17.9 % of alpha-generation individuals answered "always". Alpha generation individuals (22.3 %) marked " undecided". While 18.9 % of alpha generation students marked "hardly ever", 17.2 % of them marked " usually". Finally, the percentages of the answers given by the alpha generation students to the last question "I am trying to persuade my family to act climate friendly" of the multiplicative action factor are very close to each other, but there are also differences. Most of the alpha generation students 25.0 %) agreed that " I try to influence my family to act in a climate-friendly manner". However, 23.3 % of alpha-generation individuals answered "never". Alpha-generation students (14.9 %) stated that they usually try to influence their families to act in a climate-friendly manner but alpha-generation students (16.2 %) stated that they hardly ever try to influence their families to act in a climate-friendly manner. 20.3 % of alpha generations were undecided on the question.

Climate-friendly Behavior

For four questions of the climate-friendly behavior factor, 13.5 % of the alpha generation individuals answered " always" the question that is related to "I prefer to buy things with little packaging " However, 23.3 % of the alpha generation individuals answered " never" the question. While alpha generation individuals (20.6 %) students marked "hardly ever", 14.5 % of them marked " usually". Most of the alpha generation students (27.7 %) were undecided on this question. Another result of this factor, 25.7% of the alpha generation individuals of this study usually agree on "I separate waste to promote the sustainable reuse of material resources." However, alpha-generation individuals (22.3 %) answered " always" the question. While 11.5 % of alpha-generation students marked "never", 15.2 % of them stated that they rarely prefer to buy things with little packaging. 25 % of alpha generations were undecided on the question. Lastly, 76.4 % of the alpha generation individuals answered "always" the question that is related to "I turn off lights when I do not need them" but 2.7 % of them marked "never". Although 1.4 percent of alpha generation individuals answered the question "I turn off the lights when I don't need them" rarely, 11.5 percent of the students answered the question "always". Alpha generations (7.8%) were undecided on the question.

Table 4. 7. Descriptive Statistics for Factors

	Attitude	Personal Concern	Knowledge	Multiplicative Action	Climate-friendly Behavior
Mean	3.65	3.45	3.02	2.67	3.54
Median	3.75	3.50	3.00	2.50	3.66
Mode	4.00	3.00	3.00	1.00	3.67
Std. Deviation	0.86	0.96	0.73	1.08	0.86

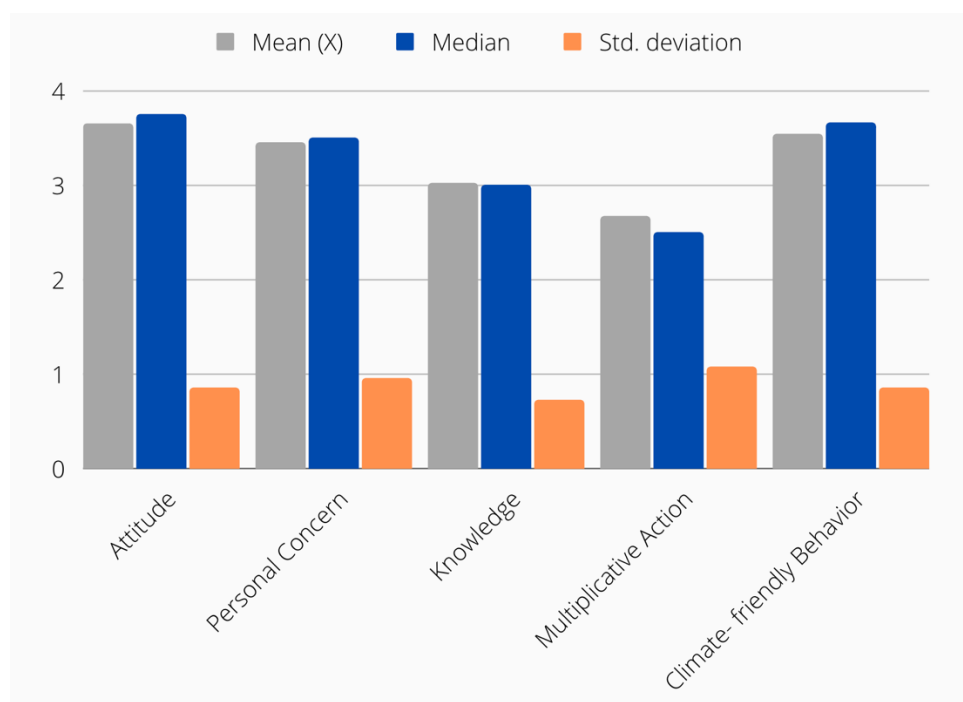


Figure 4. 6. Descriptive Statistics for Factors in Graph

When Table 4.7 is examined, while multiplicative action has the lowest value of mean ($X= 2.67$), the attitude has the highest value of mean ($X= 3.65$). Alpha generation individuals' attitude, interest, and responsibility levels towards climate

change ($X= 3.65$, $SD= 0.86$) were higher than other factors, while the multiplicative action factor ($X=2.67$, $SD=1.08$) was lower. This means; students do not discuss climate change with their friends and families very often, and alpha-generation individuals cannot influence their friends and family to exhibit climate-friendly behaviors. After the attitude factor, the climate-friendly behavior factor ($X= 3.54$, $SD=0.86$) has the second highest value. In other words, alpha-generation individuals have started to turn off electrical devices they do not need, not to waste water unnecessarily, or to use resources sustainably. Finally, when we look at table 4.4, the knowledge factor ($X=3.02$, $SD=1.08$) was found to be average. Students do not fully know climate change, its cause, and the consequences of climate change. Statistical values are visualized in the chart below. (Figure 4.6)

4.4. Awareness of Alpha Generation towards Climate Change According to Age and Gender to Answer the First Research Question

Table 4. 8. Awareness of Alpha Generation Individuals towards Climate Change According to Age and Gender in Attitude Factor

Factor	Age	Mean (X)	Median	Std. Deviation (ss)
Attitude	10	3.44	3.50	0.797
	11	3.71	3.75	0.86
	12	3.65	3.75	0.87
	Gender	Mean (X)	Median	Std. Deviation (ss)
	Girl	3.70	3.75	0.83
	Boy	3.59	3.75	0.88

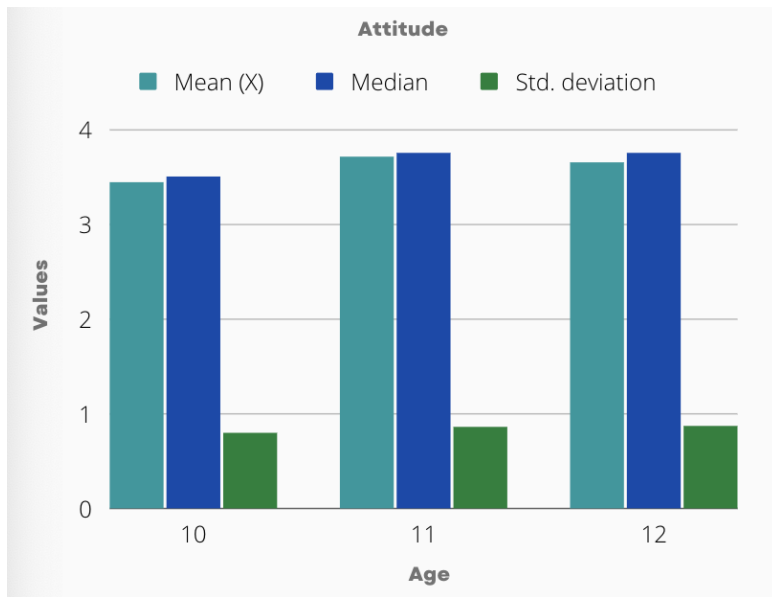


Figure 4. 7. Distribution of Attitude Factor by Age in Chart

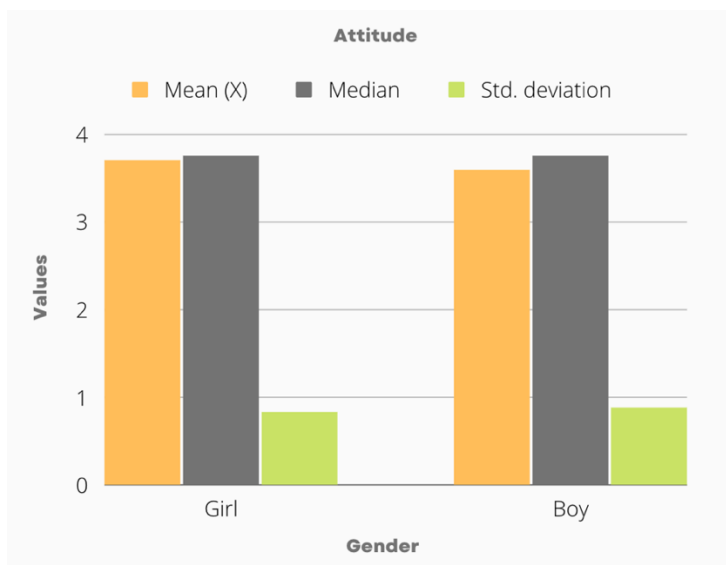


Figure 4. 8. Distribution of Attitude Factor by Gender in Chart

When Table 4.8 is examined, the attitudes of alpha generation individuals towards climate change show a difference according to age and gender. The action factor value of 11-year-old students ($X= 3.71$, $SD=0.86$) was more positive than the action factor value of students aged 10 and 12, respectively ($X= 3.44$, $SD=0.79$) ($X=3.65$, $SD=0.87$). Additionally, the attitude of girl students ($X= 3.70$, $SD=0.83$)

is more positive than the attitude of boy students ($X=3.59$, $SD=0.88$). Statistical values are visualized in the chart below. (Figure 4.7 & Figure 4.8)

Personal Concern

Table 4. 9. Awareness of Alpha Generation Individuals towards Climate Change According to Age and Gender in Personal Concern Factor

Factor	Age	Mean (X)	Median	Std. Deviation (ss)
Personal Concern	10	3.19	3.00	1.03
	11	3.56	3.50	0.92
	12	3.42	3.50	0.98
	Gender	Mean (X)	Median	Std. Deviation (ss)
	Girl	3.54	3.50	0.99
	Boy	3.36	3.00	0.93

When Table 4.9 is examined, the personal concern value of the 11-year-old students was ($X= 3.56$, $SD=0.92$), while the personal concern value of the 10- and 12-year-old students was ($X= 3.19$, $SD=1.03$) ($X= 3.42$, $SD=0.98$), respectively. Additionally, girl students' personal concerns ($X= 3.54$, $SD= 0.99$) are higher than boy students ($X= 3.36$, $SD=0.93$). Statistical values are visualized in the chart below. (Figure 4.9 & Figure 4.10)

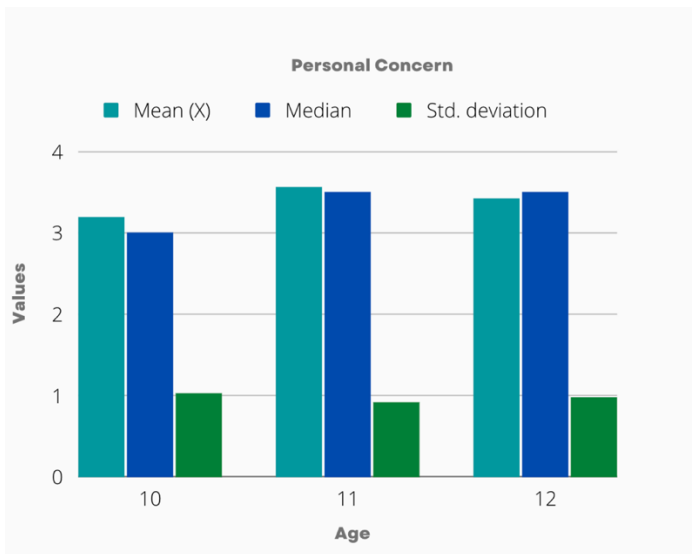


Figure 4. 9. Distribution of Personal Concern Factor by Age in Chart

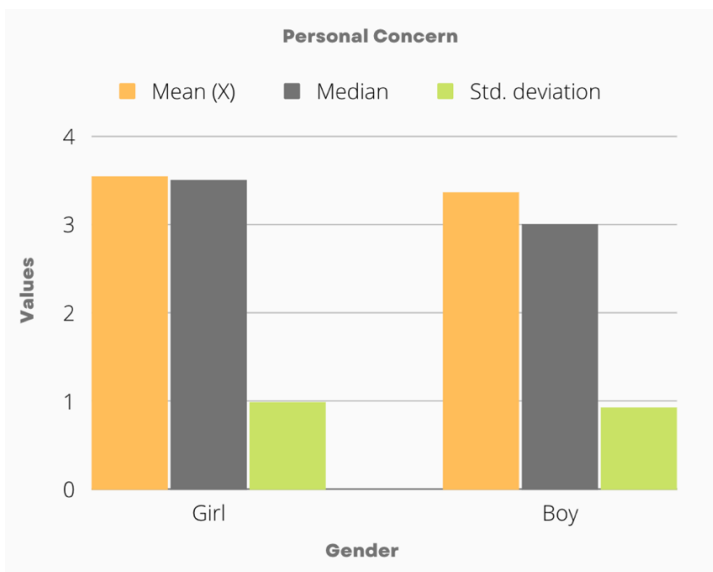


Figure 4. 10. Distribution of Personal Concern Factor by Gender in Chart

Knowledge

Table 4. 10. Awareness of Alpha Generation Individuals towards Climate Change According to Age and Gender in Knowledge Factor

Factor	Age	Mean (X)	Median	Std. Deviation (ss)
Knowledge	10	2.95	3.00	0.84
	11	3.10	3.12	0.75
	12	2.96	3.00	0.66
	Gender	Mean (X)	Median	Std. Deviation (ss)
	Girl	3.05	3.00	0.68
	Boy	2.99	3.00	0.77

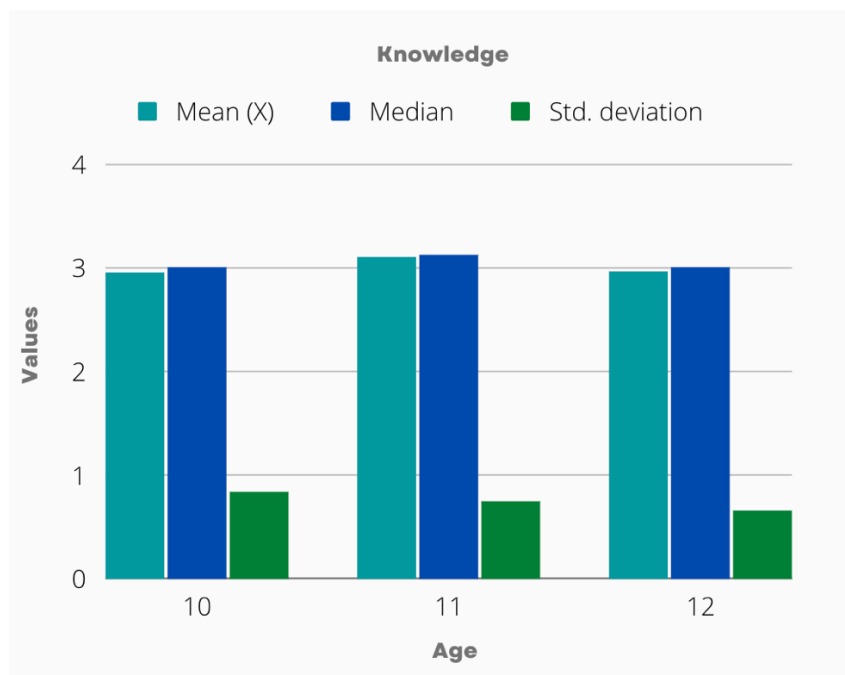


Figure 4. 11. Distribution of Knowledge Factor by Age in Chart

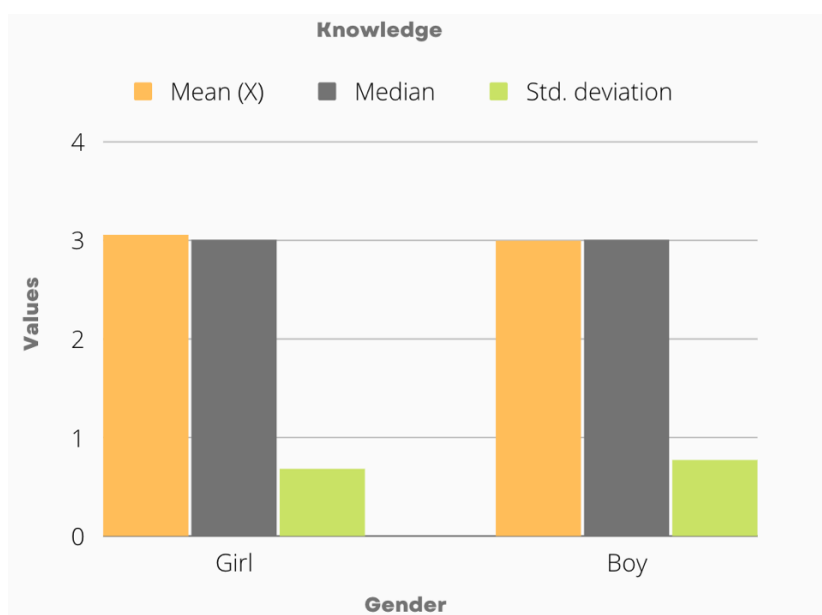


Figure 4. 12. Distribution of Knowledge Factor by Gender in Chart

The knowledge values of the students aged 10 and 12, respectively ($X=2.95$, $SD=0.84$) ($X=2.96$, $SD=0.66$) are more negative than the knowledge values of the 11-year-old students ($X=3.10$, $SD= 0.75$). (Table 4.10) Boy students' knowledge about climate change ($X= 2.99$, $SD=0.77$) is more negative than girl students' ($X=3.05$, $SD=0.68$) knowledge about climate change. Statistical values are visualized in the chart below. (Figure 4.11 & Figure 4.12)

Multiplicative Action

Table 4. 11. Awareness of Alpha Generation Individuals towards Climate Change According to Age and Gender in Multiplicative Action Factor

Factor	Age	Mean (X)	Median	Std. Deviation (ss)
Multiplicative Action	10	2.38	2.25	1.07
	11	2.87	2.75	1.10
	12	2.57	2.50	1.04
	Gender	Mean (X)	Median	Std. Deviation (ss)
	Girl	2.93	3.00	1.12
	Boy	2.43	2.50	0.99

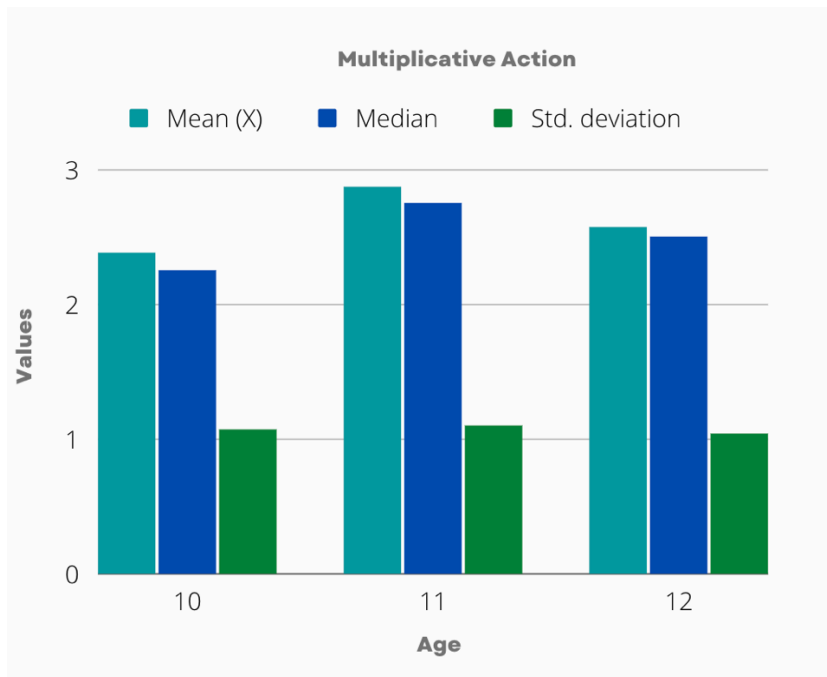


Figure 4. 13. Distribution of Multiplicative Action Factor by Age in Chart

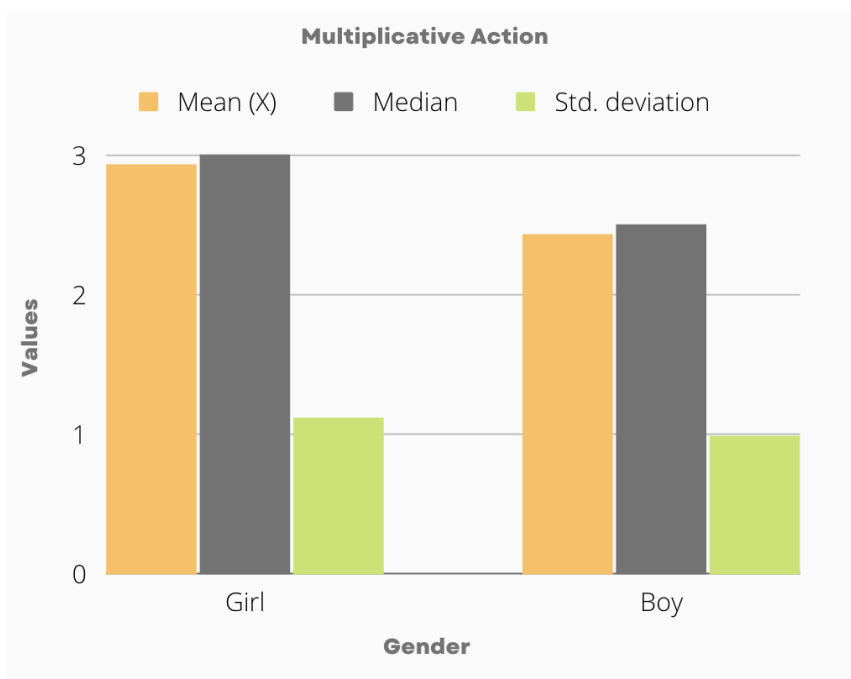


Figure 4. 14. Distribution of Multiplicative Action Factor by Gender in Chart

Boy students' multiplicative action about climate change ($X= 2.43$, $SD=0.99$) is more negative than girl students' ($X=2,93$, $SD=1,12$) multiplicative action about climate change. Although the multiplicative action values of the students are close

to each other, the multiplicative action values of the 11-year-old students ($X= 2.87$, $SD=1.10$) are more positive than the other age groups. (Table 4.11) Statistical values are visualized in the chart below. (Figure 13 & Figure 14)

Climate-friendly Behavior

Table 4. 12. Awareness of Alpha Generation Individuals towards Climate Change According to Age and Gender in Climate-friendly Behavior Factor

Factor	Age	Mean (X)	Median	Std. Deviation (ss)
Climate-friendly Behavior	10	3.54	3.33	0.91
	11	3.60	3.66	0.84
	12	3.48	3.66	0.86
	Gender	Mean (X)	Median	Std. Deviation (ss)
	Girl	3.61	3.66	0.86
	Boy	3.48	3.66	0.85

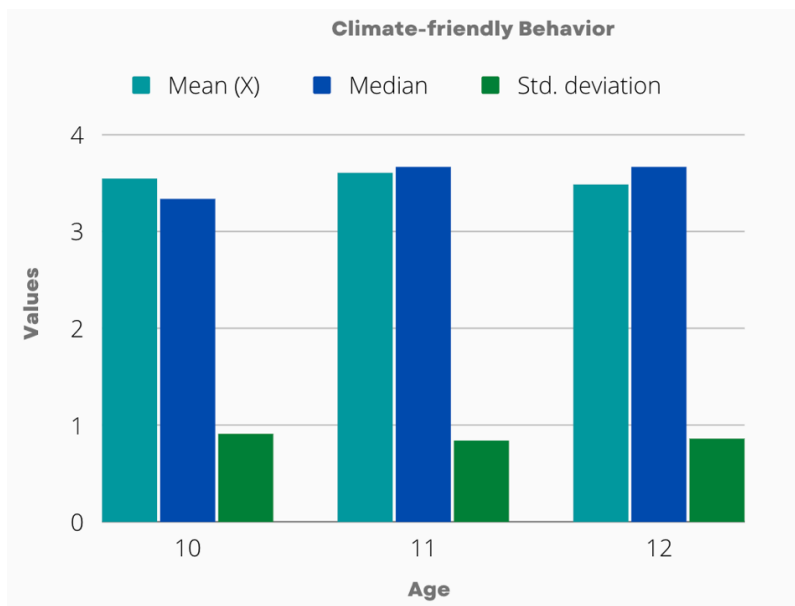


Figure 4. 15. Distribution of Climate-friendly Behavior Factor by Age in Chart

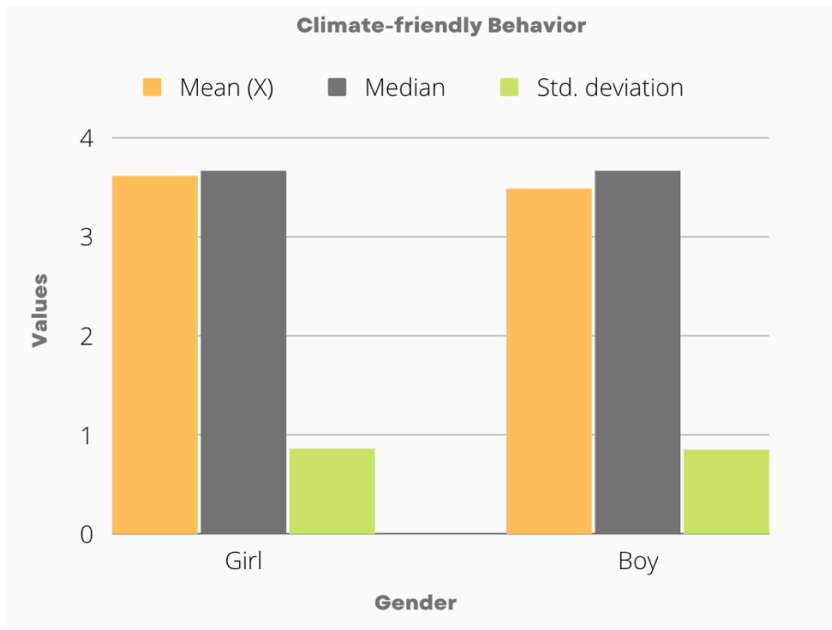


Figure 4. 16. Distribution of Climate-friendly Behavior Factor by Gender in Chart

Boy students' climate-friendly behavior toward climate change ($X= 3.48$, $SD=0.85$) is more negative than girl students' ($X=3.61$, $SD=0.86$) about climate-friendly behavior towards climate change. (Table 4.12) Although the values of the students are close to each other in the climate-friendly behavior factor, as in the multiple action value, the values of the 11-year-old students ($X= 3.60$, $SD= 0.91$) were more positive than the other age groups. Statistical values are visualized in the chart below. (Figure 15 & Figure 16)

In summary, in each factor, the values of 11-year-old students are more positive than the values of 10- and 12-year-old students. The X value in each factor of the girl students was more positive than the X value in each factor of the boy students.

4.5. Awareness of Alpha Generation toward Climate Change: Pearson Correlation of the Main Study to Answer the Second Research Question

Pearson Correlation analysis was conducted to find an answer to one of the research questions, "What is the relationship between the factors explaining alpha generation individuals' awareness toward CC?". The relations of all factors with

each other were examined one by one. Pearson correlation is an analysis that provides information about the relationship between variables and factors, and the direction and severity of this relationship. Pearson correlation coefficient analyses in this study were based on the values in the table below (Kilic, S. (2012). (Table 4.13)

Table 4. 13. Pearson Correlation Coefficient and Interpretation of Relationship Strength

Pearson correlation coefficient (r)	Strength
Greater than 0.5	Strong
Between 0.3 and 0.5	Moderate
Between 0 and 0.3	Weak
0.00	Neutral

Pearson Correlation analysis was used to determine the relationship between attitude and personal concern. The obtained findings are shown in Table 4.14.

Table 4. 14. The Relationship Between Attitude and Personal Concern

		Av_PC
Av_A	Pearson Correlation (r)	,273**
	Sig. (2-tailed)	,000
	N	295

** The correlation is significant at the $p < 0.01$ level.

There was a weak, positive ($r=0.273$), and significant ($p < 0.05$) relationship between attitude and personal concern. This relationship is shown in Figure 4.17

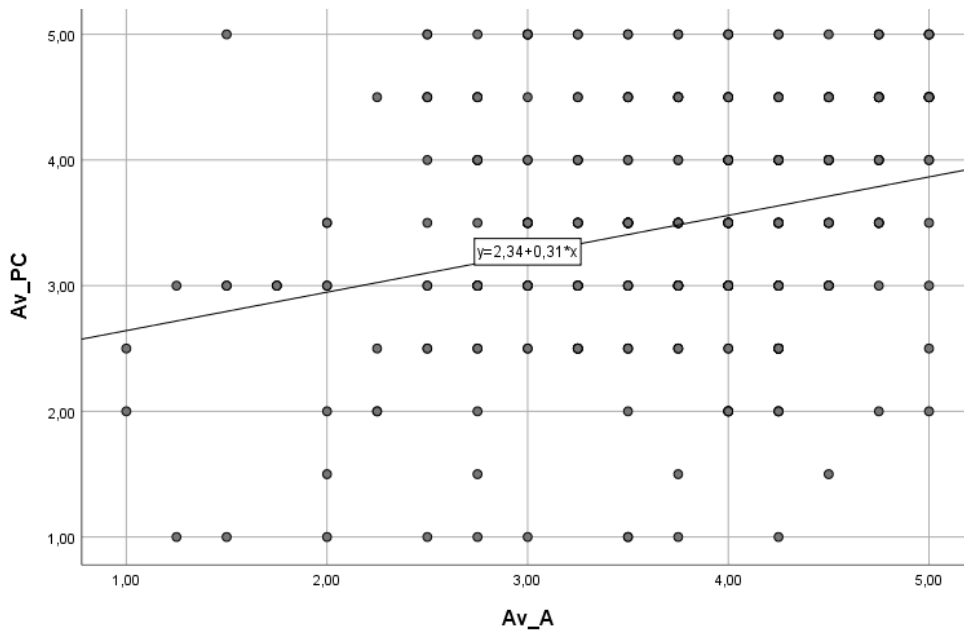


Figure 4. 17. Relationship Between Attitude and Personal Concern in Graph

Pearson Correlation analysis was used to determine the relationship between attitude and knowledge. The obtained findings are shown in Table 4.15.

Table 4. 15 The Relationship Between Attitude and Knowledge

		Av_K
Av_A	Pearson Correlation (r)	,110
	Sig. (2-tailed)	,060
	N	295

** The correlation is significant at the $p < 0.01$ level.

There was a weak, positive ($r=0.110$), and non-significant ($p > 0.05$) relationship between attitude and knowledge. This relationship is shown in Figure 4.18

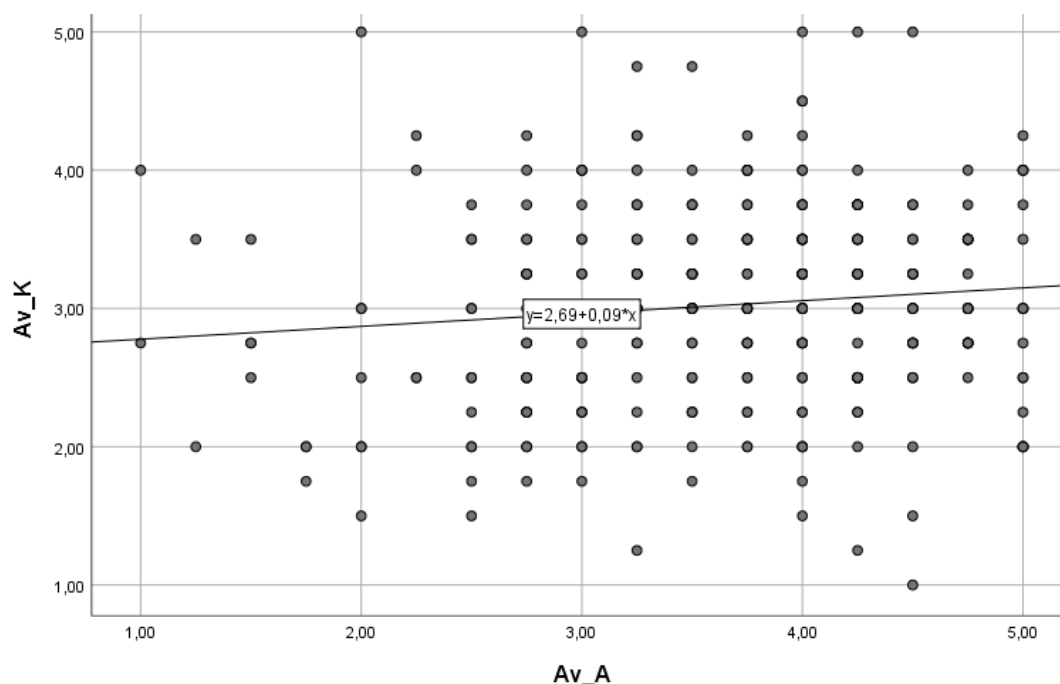


Figure 4. 18. Relationship Between Attitude and Knowledge in Graph

Pearson Correlation analysis was used to determine the relationship between attitude and multiplicative action. The obtained findings are shown in Table 4.16.

Table 4. 16. The Relationship Between Attitude and Multiplicative Action

		Av_MA
Av_A	Pearson Correlation (r)	,488**
	Sig. (2-tailed)	,000
	N	295

** The correlation is significant at the $p < 0.01$ level.

A moderately positive ($r=0.488$) and significant ($p < 0.05$) correlation was found between attitude and multiplicative action. The explained variance by the variables on each other is 23.81%. In other words, 23.81% of multiplicative action may be due to attitude. The explained variance is expressed as what percentage of the variability observed in one of the variables or factors is explained by the other variable. It is denoted by R^2 (Pearson Correlation²) and since in this example, the

R-value is 0.488, squaring it gives a value of 0.2381. This relationship is shown in Figure 4.19

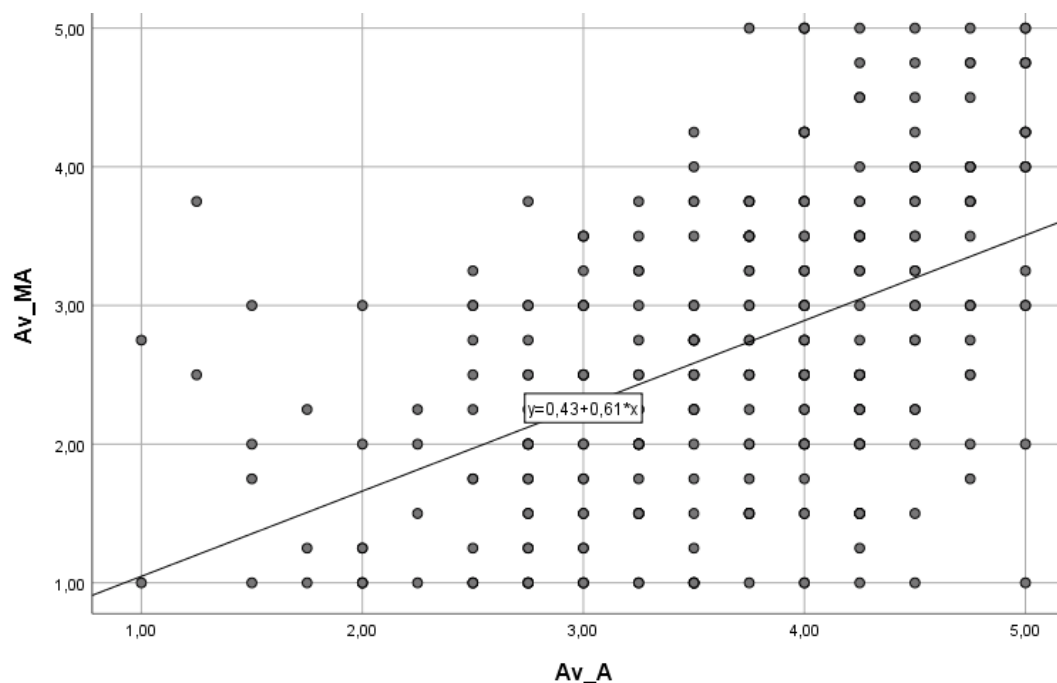


Figure 4. 19. Relationship Between Attitude and Multiplicative Action in Graph

Pearson Correlation analysis was used to determine the relationship between attitude and climate-friendly behavior. The obtained findings are shown in Table 4.17.

Table 4. 17. Relationship Between Attitude and Climate-friendly Behavior

		Av_CFB
Av_A	Pearson Correlation (r)	,383**
	Sig. (2-tailed)	,000
	N	295

** The correlation is significant at the $p < 0.01$ level.

A moderately positive ($r=0.383$) and significant ($p < 0.05$) correlation was found between attitude and climate-friendly behavior. The explained variance by the variables on each other is 14.66%. In other words, 14,66 % of climate-friendly

behavior may be due to attitude. The explained variance is expressed as what percentage of the variability observed in one of the variables or factors is explained by the other variable. It is denoted by R^2 (Pearson Correlation²) and since in this example, the R-value is 0,383, squaring it gives a value of 0,1466. This relationship is shown in Figure 4.20

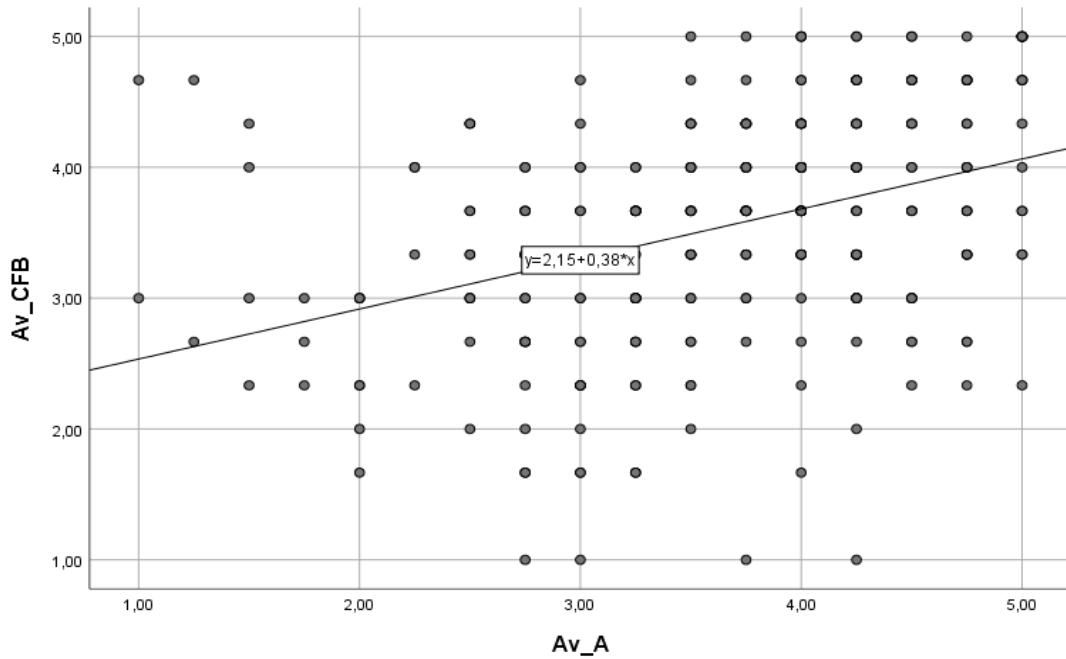


Figure 4. 20. Relationship Between Attitude and Climate-friendly Behavior in Graph

Pearson Correlation analysis was used to determine the relationship between personal concern and knowledge. The obtained findings are shown in Table 4.18.

Table 4. 18. The Relationship Between Personal Concern and Knowledge

		Av_K
Av_PC	Pearson Correlation (r)	,012
	Sig. (2-tailed)	,832
	N	295

** The correlation is significant at the $p < 0.01$ level.

A ntr and positive ($r=0.012$) and non-significant ($p >0.05$) relationship was found between personal concern and knowledge. This relationship is shown in Figure 4.21

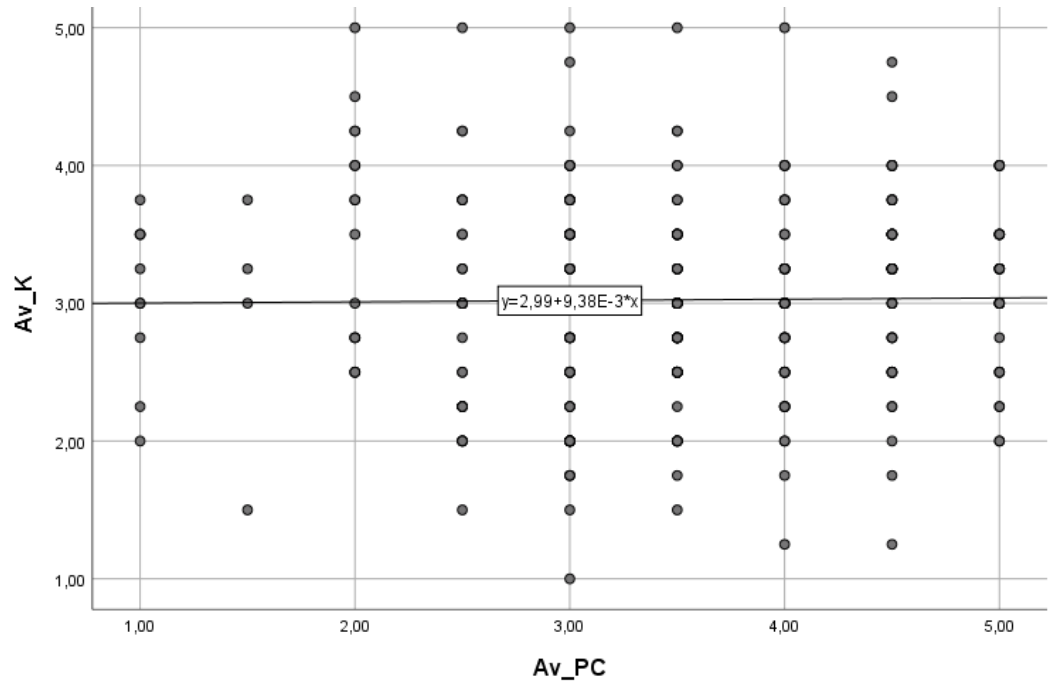


Figure 4. 21. Relationship Between Personal Concern and Knowledge in Graph

In Table 4.19, the results of the relationship between personal concern and multiplicative action factors are given.

Table 4. 19. The Relationship Between Personal Concern and Multiplicative Action

		Av_MA
Av_PC	Pearson Correlation (r)	,325**
	Sig. (2-tailed)	,000
	N	295

** The correlation is significant at the $p < 0.01$ level.

A moderately positive ($r=0.325$) and significant ($p < 0.05$) correlation was found between personal concern and multiplicative action. The variance explained by the

variables on each other is 10,56%. In other words, multiplicative action may be caused by personal anxiety 10.56%. The R-value is 0,325, squaring it gives a value of 0,1056. This relationship is shown in Figure 4.22

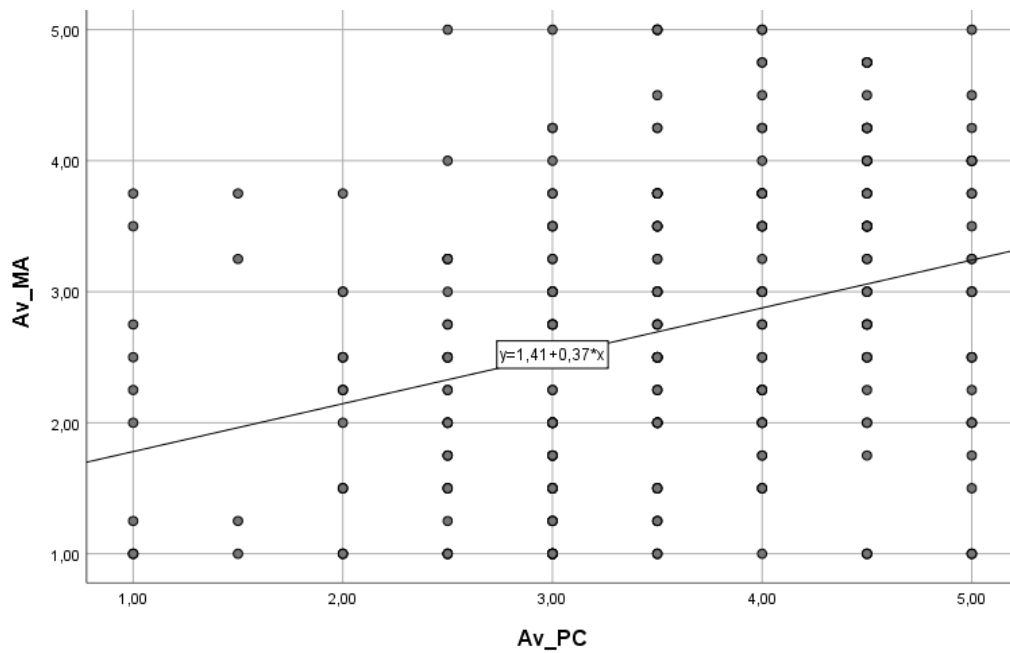


Figure 4. 22. Relationship Between Personal Concern and Multiplicative Action in Graph

Pearson Correlation analysis was used to determine the relationship between personal concern and climate-friendly behavior. The obtained findings are shown in Table 4.20

Table 4. 20. The Relationship Between Personal Concern and Climate-friendly Behavior

		Av_CFB
Av_PC	Pearson Correlation (r)	,192 ^{**}
	Sig. (2-tailed)	,001
	N	295

** The correlation is significant at the $p < 0.01$ level.

A weak positive ($r=0.192$) and significant ($p < 0.05$) relationship was found between personal concern and climate-friendly behavior. This relationship is shown in Figure 4.23

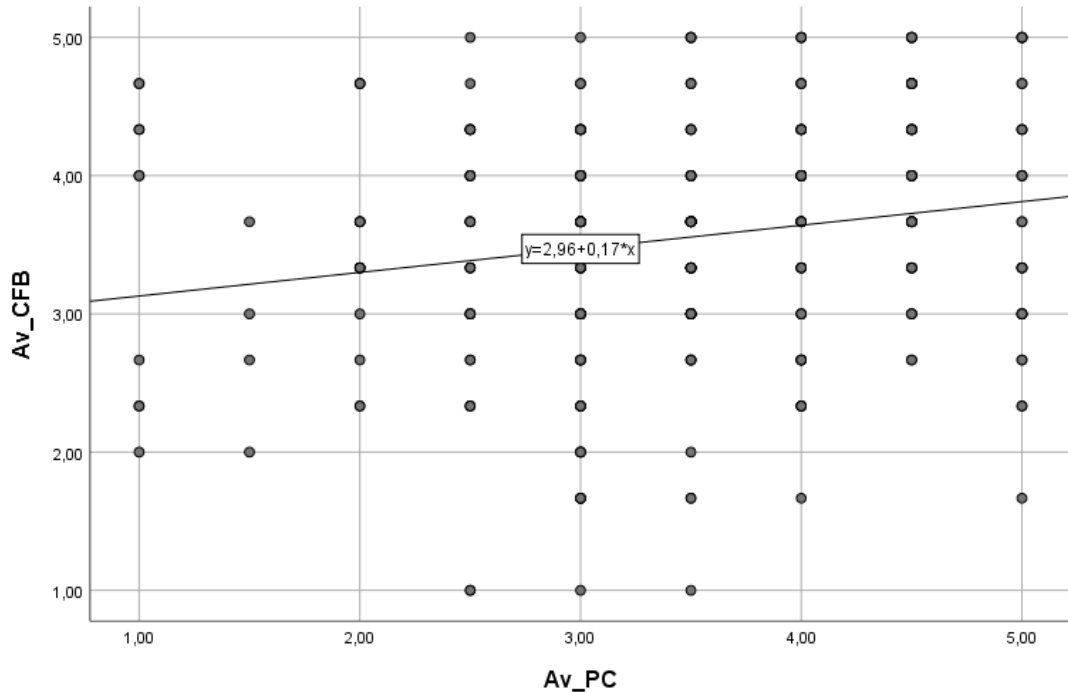


Figure 4. 23. Relationship Between Personal Concern and Climate-friendly Behavior in Graph

Pearson Correlation analysis was used to determine the relationship between knowledge and multiplicative action. The obtained findings are shown in Table 4.21

Table 4. 21. The Relationship Between Knowledge and Multiplicative Action

		Av_MA
Av_K	Pearson Correlation (r)	-,059
	Sig. (2-tailed)	,311
	N	295

** The correlation is significant at the $p < 0.01$ level.

A weakly negative ($r=-0.059$) and non-significant ($p > 0.05$) relationship was found between knowledge and multiplicative action. This relationship is shown in Figure 4.24

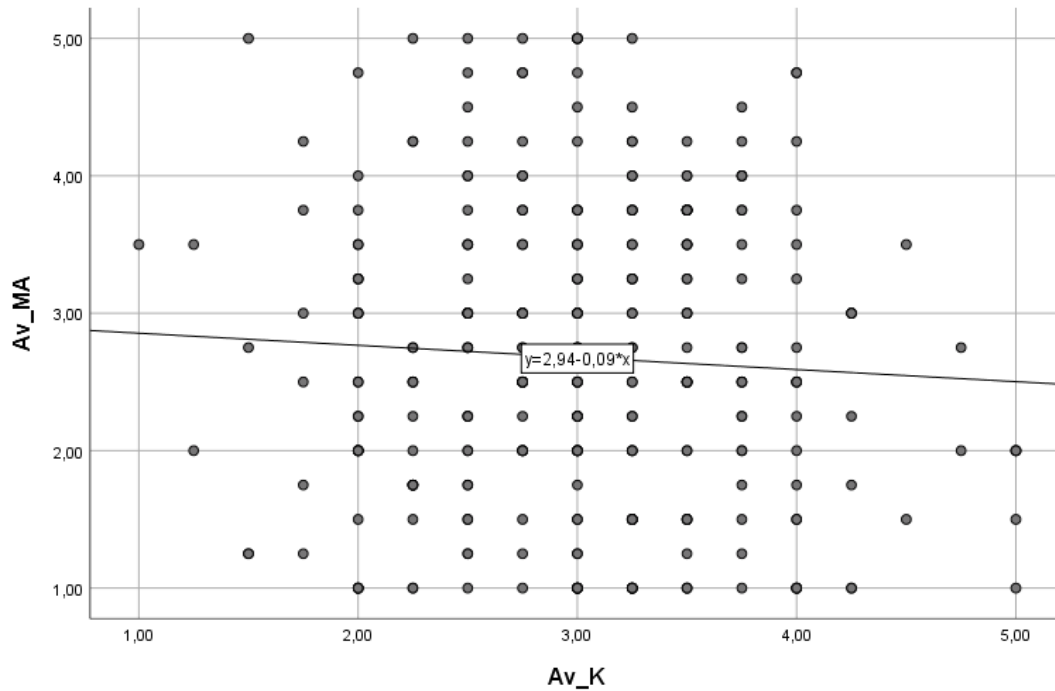


Figure 4. 24. Relationship Between Knowledge and Multiplicative Action in Graph

Pearson Correlation analysis was used to determine the relationship between knowledge and climate-friendly behavior. The obtained findings are shown in Table 4.22

Table 4. 22. Relationship Between Knowledge and Climate-friendly Behavior

		Av_CFB
Av_K	Pearson Correlation (r)	,067
	Sig. (2-tailed)	,251
	N	295

** The correlation is significant at the $p < 0.01$ level.

A weakly positive ($r=-0.067$) and non-significant ($p > 0.05$) relationship was found between knowledge and climate-friendly behavior. This relationship is shown in Figure 4.25

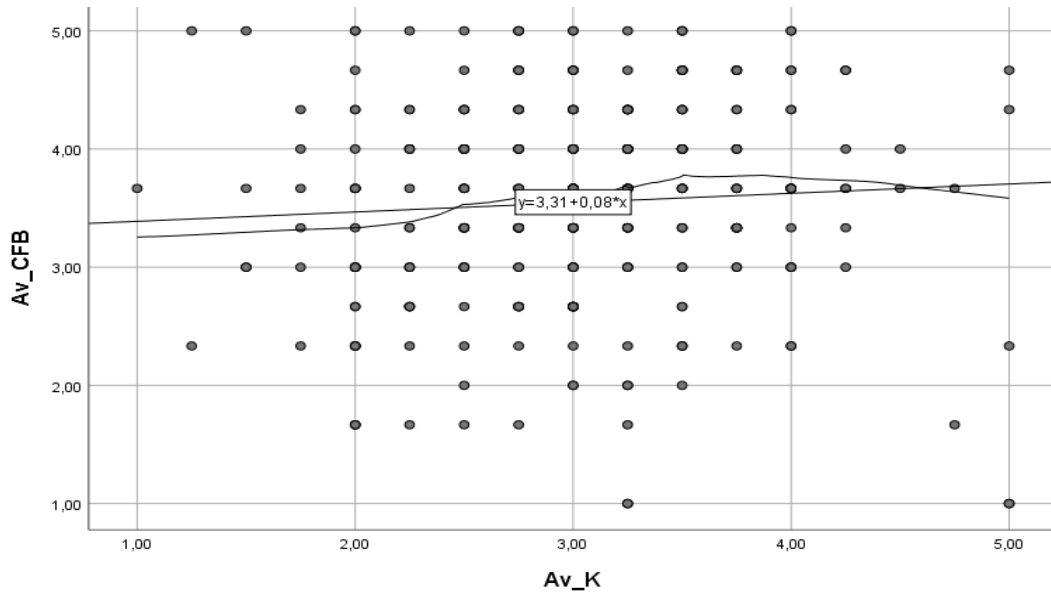


Figure 4. 25. Relationship Between Knowledge and Climate-friendly Behavior in Graph

Pearson Correlation analysis was used to determine the relationship between multiplicative action and climate-friendly behavior. The obtained findings are shown in Table 4.23

Table 4. 23. Multiplicative Action and Climate-friendly Behavior

		Av_CFB
Av_MA	Pearson Correlation (r)	,461 ^{**}
	Sig. (2-tailed)	,000
	N	295

** The correlation is significant at the $p < 0.01$ level.

A moderately positive ($r=0.461$) and significant ($p < 0.05$) correlation was found between multiplicative action and climate-friendly behavior. The variance explained by the variables on each other is 21.25%. That is, climate-friendly

behavior may be due to the multiplicative action of 21.25%. the R-value is 0,461 squaring it gives a value of 0.1730. This relationship is shown in Figure 4.26

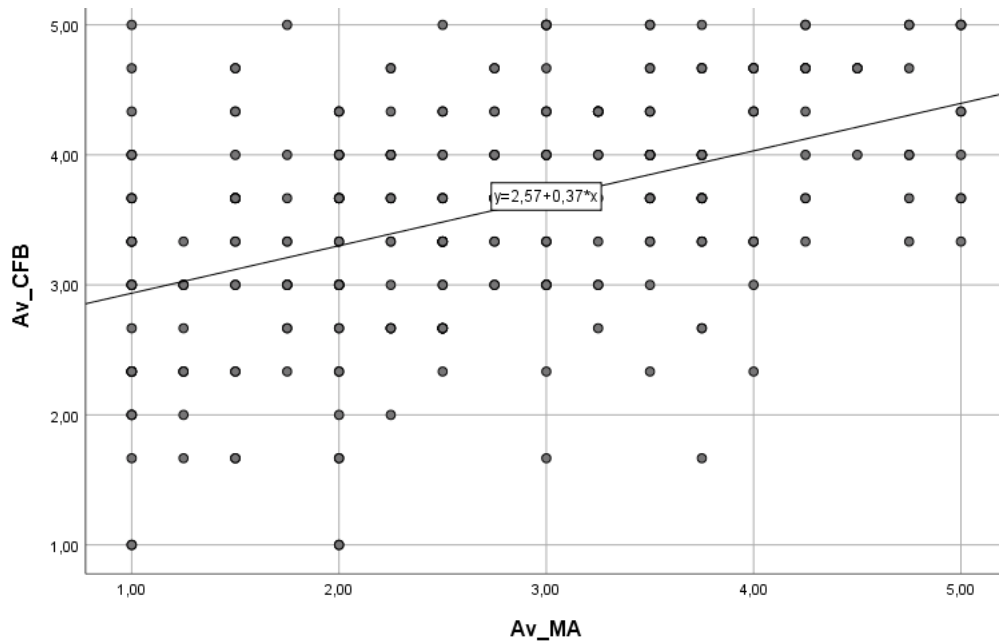


Figure 4. 26. Relationship Between Multiplicative Action and Climate-friendly Behavior in Graph

The relationship between the factors was determined as a result of Pearson's correlation analysis. By making use of the figures, the relationship between the factors, respectively, was tried to be explained. Firstly, as a result of the analysis, the relationship between the attitude factor and other factors is explained in the image below. (Figure 4.27)

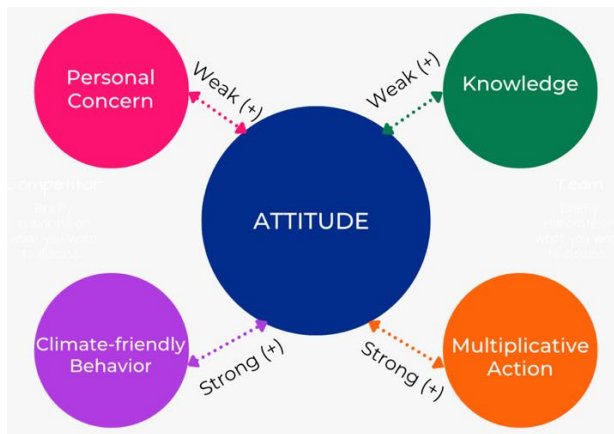


Figure 4. 27. The Relationship Between the Attitude Factor and Other Factors

Secondly, the relationship between the personal concern factor and other factors is shown in the image. (Figure 4.28)

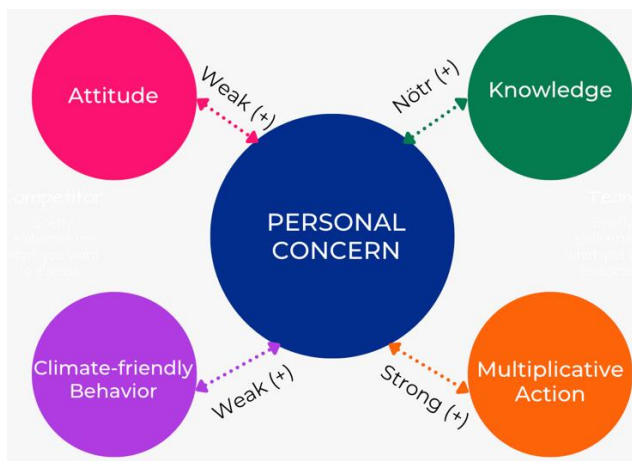


Figure 4. 28. The Relationship Between the Personal Concern Factor and Other Factors

Next, the relationship between the knowledge factor and other factors is shown in the image (Figure 4.29)

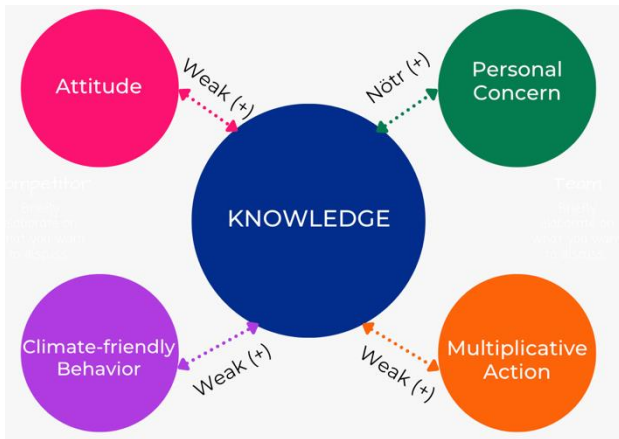


Figure 4. 29. The Relationship Between the Knowledge Factor and Other Factors

Then, the relationship between the multiplicative action factor and other factors is shown in the image (Figure 4.30)

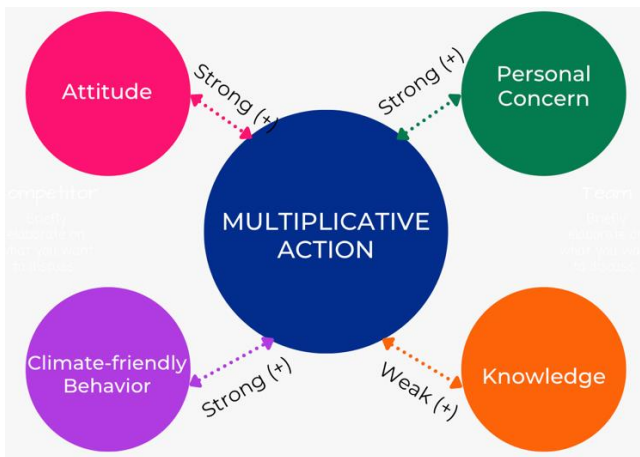


Figure 4. 30. The Relationship Between the Multiplicative Action Factor and Other Factors

Finally, the relationship between the climate-friendly behavior factor and other factors is shown in the image (Figure 4.31)

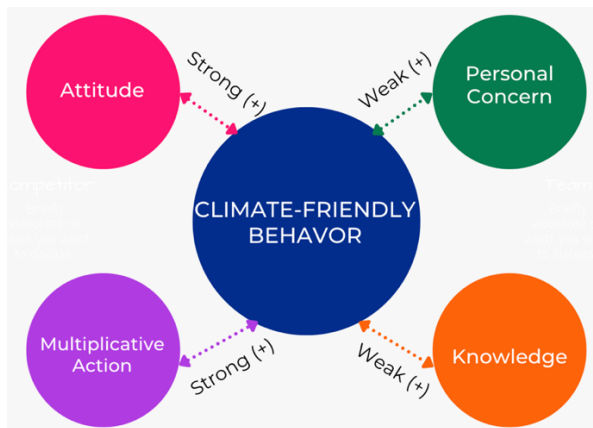


Figure 4. 31. The Relationship Between the Climate-friendly Behavior Factor and Other Factors

In summary, the attitude factor is moderately positively correlated with the climate-friendly behavior factor and multiplicative action factor, while the multiplicative action factor is moderately positively correlated with the personal concern factor and climate-friendly behavior factor. This relationship is given in the figure below. (Figure 4.32)

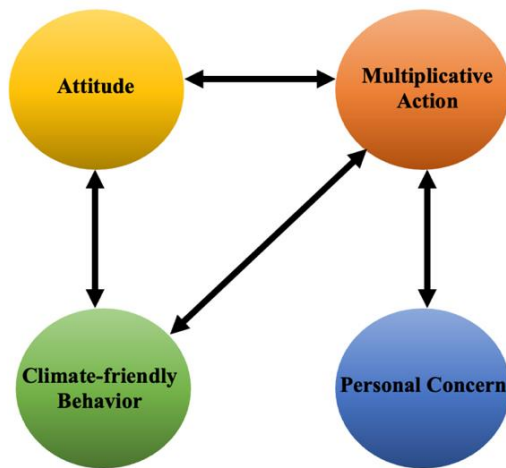


Figure 4. 32. Relationship Between Factors Defining Alpha Generation’s Awareness toward Climate Change

4.6. The Trends for Climate Change Awareness of the Turkish Alpha Generation: Cluster Analysis of the Main Study to Answer the Third Research Question

Cluster analysis is one of the multivariate statistical analysis methods. Cluster analysis is used to identify groups or classes with similar characteristics. This study was carried out to collect the answers of alpha generation individuals to the CCA scale in the same group according to their similarities. The Ward and Kmeans method of two-stage clustering was used. Automatic or manual determination of the appropriate number of clusters is one of the important features of this analysis (Ceylan et al., 2017). With this method, it is aimed to define the profiles of alpha-generation individuals toward climate change. 295 students participated in the main group study and since the sample size was larger than 200, a sufficient sample size was reached for cluster analysis (Tevdovski, 2009). Cluster analysis was performed to see whether the groups were homogeneously distributed within themselves. Looking at figure 4.33, if the cluster quality is close to fair or good, the groups are homogeneously distributed. The silhouette measure of cohesion and separation value above 0.2 is an indicator of fair quality grouping between clusters and is acceptable (Norusis, 2011). In addition, while the part expressed with inputs in the model summary section represents the number of factors in the CCA survey, clusters represent the number of clusters found in the study. (Figure 4.33)

Model Summary

Algorithm	TwoStep
Inputs	5
Clusters	2

Cluster Quality

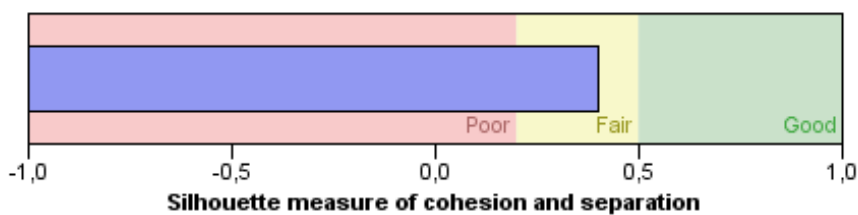


Figure 4. 33. Summary of Model and Cluster Quality

The groups were separated by the Two-Step Cluster Method and two groups were obtained as a result of the analysis. The sizes of the groups obtained are shown in the image below. (Figure 4.34)

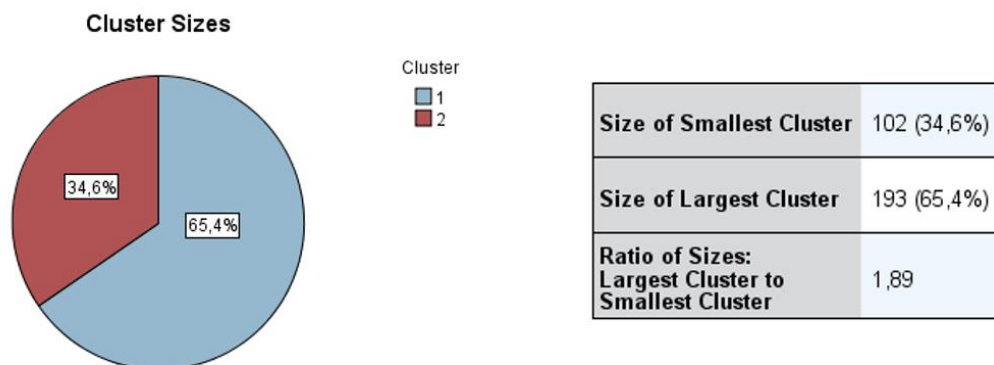
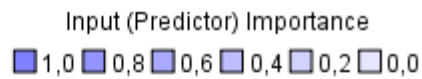


Figure 4. 34. Cluster Sizes Obtained by Two-Step Cluster Method

The awareness of alpha generation individuals against climate change is divided into two clusters. The first cluster consisted of 102 students (34.6%), and the second cluster consisted of 193 students (65.4%). Detailed information of the clusters is given in the image below. (Figure 4.35)



Cluster	1	2
Label		
Description		
Size	65,4% (193)	34,6% (102)
Inputs	Av_MA 2,11	Av_MA 3,75
	Av_A 3,31	Av_A 4,30
	Av_CFB 3,22	Av_CFB 4,18
	Av_PC 3,15	Av_PC 4,02
	Av_K 3,00	Av_K 3,07

Figure 4. 35. Mean Score of Clusters and Profiles

CLUSTER 1 was named PARALYZED. The biggest group (N=193, 65.4%), the paralyzed are those who do not behave in a climate-friendly manner in their everyday lives. (Av_CFB=3.22) While they feel concerned about climate change, they neither engage in multiplicative action (Av_MA=2.11) nor act in a climate-friendly behavior. (Av_CFB=3.22) The paralyzed don't want to change their behavior towards climate change because they think nothing is helping. The values related to the groups are given in the table below. (Table 4.24)

CLUSTER 2 was named CONCERN ACTIVIST. In the smallest group (N=102, 34.6%), concerned activists' knowledge levels are lower than other factors. (Av_K= 3.07) Concern activists have the highest concern (Av_PC=4,02) about climate change and multiplicative action (Av_MA=3.75). However, concerned activist does not know a lot of pieces of information about climate change, its causes, and its effects. Concerned activist sees themselves as taking an active role in creating a climate-friendly world. The values related to the groups are given in the table below. (Table 4.24)

Table 4. 24. The Two Clusters and Their Characteristics in the Five Different Dimensions.

	Clusters	
	The Paralyzed	The Concerned Activists
N (% of the Sample)	193 (65,4%)	102 (34.6%)
Attitude	3.31	4.30
Personal Concern	3.15	4.02
Knowledge	3.00	3.07
Multiplicative Action	2.11	3.75
Climate-friendly Behavior	3.22	4.18

When obtaining two clusters, multiplicative action (1.0) and attitude (0.5) are the two most important factors. According to Tkaczynski (2016), if the predictive significance value is below 0.2, the variables or factors do not mean anything for the cluster. In this case, the knowledge factor has no meaning in cluster formation. All these analysis results are given in the image below. (Figure 4.36)

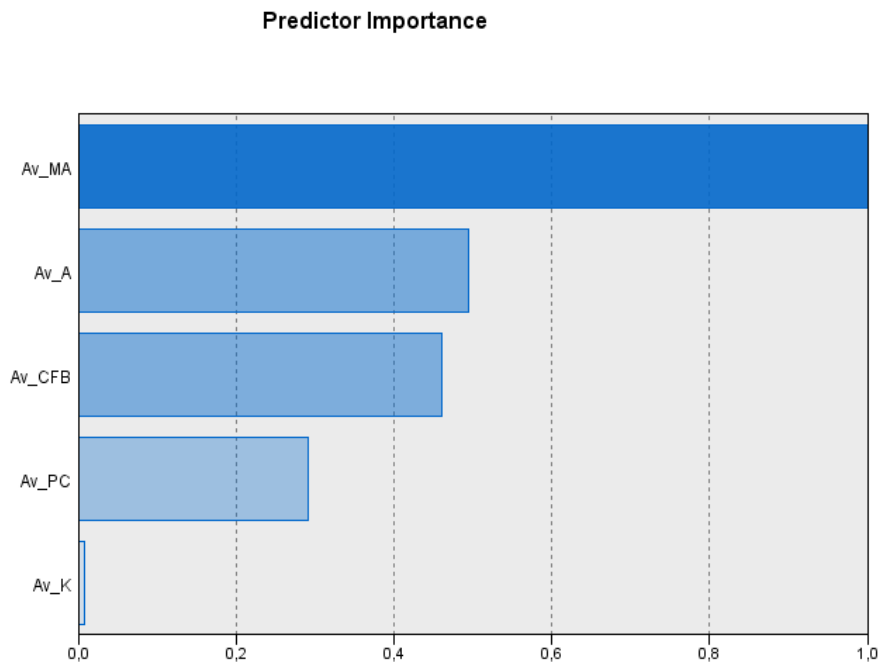


Figure 4. 36. Importance of Predictor Variables

4.7. Twostep Cluster Validation: ANOVA

ANOVA test was performed for the statistical analysis of the variables determined for two different clusters. The ANOVA results for the two-step cluster analysis are given in the table below. (Table 4. 25)

Table 4. 25. ANOVA Results for Twostep Cluster Analysis

	F	Sig.
Av_Attitude	143,550	,000
Av_Personal Concern	64,833	,000
Av_Knowledge	1,435	,232
Av_Multiplicative Action	380,169	,000
Av_Climate-friendly Behavior	103,110	,000

According to ANOVA test results, the difference between attitude, personal concern, multiplicative action, and climate-friendly behavior factors is statistically significant. This is because the significant alpha value is $p < 0.05$.

CHAPTER 5

DISCUSSION

The "Climate Change Awareness" (CCA) scale was applied to alpha-generation individuals studying in two public secondary schools in Ankara, Turkey. The scale consists of five factors. These factors are attitude, personal concern, knowledge, multiplicative action, and climate-friendly behavior. In this study, the relationship between the factors was examined and it was also understood which group the alpha generation individuals belong to according to their climate change awareness levels.

According to the analysis results, 48.6% of the students are girl students and 51.4% are boy students. Age, another demographic characteristic, was distributed as follows. 13.9% of students are 10 years old, 42.6% are 11 years old, and finally, 43.5% are 12 years old. The first discussion is that the age and gender of the alpha-generation individuals affect the results obtained. For example, students aged 11 are more aware of climate change than students aged 10 and 12 in terms of each factor. On the other hand, the differences between girl students and boy students are also noteworthy. Awareness of girl students about climate change is higher than boy students in terms of all factors. Previous studies support this result. For example, the research conducted by Atasoy and Ertürk (2008) was carried out to determine the attitudes and knowledge of 1118 students studying in the 6th, 7th, and 8th grades in Bursa. According to the results of the analysis, it was concluded that the environmental attitudes and knowledge of female students were higher than that of male students. Another example, a study was conducted by Sönmez and Yerlikaya (2017) on the environmental knowledge levels and attitudes of 604 eighth-grade students, and as a result of the research, it was determined that female students had more environmental knowledge and attitudes than male students.

Secondly, considering the relationship analysis between the factors in the scale, while the knowledge factor does not have a strong relationship with attitude, climate-friendly behavior, and multiplicative action factor, it is not related to the personal concern factor. Apart from this result, the attitude factor has a weak relationship with the knowledge factor and personal concern factor, while it has a strong relationship with the climate-friendly behavior factor and multiplicative action factor. While the personal concern factor has a weak relationship with the attitude factor and climate-friendly behavior factor, it has a strong relationship with the multiplicative action factor. Lastly, the multiplicative action factor and climate-friendly behavior factor have a strong relationship.

The last discussion is that according to the results of the cluster analysis, 65.4% of the alpha-generation individuals were paralyzed, while 34.6% were concerned activists. In other words, although most alpha individuals are concerned about climate change, they do nothing about it. While they do not engage in climate-friendly behaviors, they also do not exhibit multiplicative action (Alina Kuthe,2019). The reason for this is that they think that any behavior or action they will take toward climate change will not stop climate change. Perhaps their sense of self-efficacy should be strengthened, which will make them aware of the behaviors or actions that they can perform individually (Anderson, 2012). This group does not have full knowledge of climate change, its effects, and its causes. Training on this subject will increase students' self-efficacy and encourage them to exhibit climate-friendly behaviors. On the other hand, 34.6% of alpha-generation individuals are called concerned activists. So, they are the group most concerned about climate change and they don't know much about climate change, its causes, and its effects, just like the paralyzed group. This group is aware of the problem and they want to take action. The level of knowledge of this group is low. But they think that they play an active role in creating a climate-friendly world because they exhibit climate-friendly behaviors and exhibit multiplicative actions. In short, according to the results of the study, 34.6% of alpha-generation individuals have a high awareness of climate change. As the level of knowledge of alpha generation individuals on climate change increases, it is predicted that their attitude towards

climate change will increase. The reason for the low level of knowledge is that the primary school curriculum contains insufficient information on climate change. As we look at the primary school curriculum in Turkey, it is seen that the issues related to climate change, its causes and effects, and global environmental problems are given little or no place. As we look at the primary school curriculum in Turkey, it is seen that there is no separate field called science. Concepts related to science lessons are given under the name of life science lessons at primary school 1st and 2nd grade levels. The achievements related to climate change and environmental problems in the current primary school curriculum in Turkey (from 1st to 5th grade) are given in the table below. (Table 5.1)

Table 5. 1. The Objective of Climate Change (Grade from 1 to 5)

1st grade	
HB 1.6. Life in Nature	HB 1.6.4. Be sensitive about keeping nature and its environment clean. (Emphasis is placed on doing what is necessary to keep nature and the environment clean, and warning the people around in this regard within the framework of courtesy rules.)
	HB 1.6.5. Distinguish the materials that can be recycled. (Emphasis is placed on materials such as plastic, paper, batteries, vegetable oil and glass.)
2nd grade	
HB 2.6. Life in Nature	HB.2.6.3. Gives examples of the effects of natural elements in the immediate environment on human life. (The positive and negative effects of the natural elements (climatic conditions, landforms, soil fertility, water resources, etc.) in the immediate environment on people are discussed.)
	HB.2.6.4. It contributes to the recycling of consumed materials. (Reuse areas of materials such as plastic, paper, batteries and glass are exemplified. Inappropriate disposal/destruction of vegetable oil is exemplified, and attention is drawn to the damage that may occur in nature and in daily life.)

Table 5.1. (cont'd)

3rd grade	
F.3.6.2. Me and My Environment	3.6.2.1. Recognizes the environment in which s/he lives.
	3.6.2.2. S/he takes an active role in cleaning of the environment he lives in.
	3.6.2.3. Explain the differences between natural and artificial environment.
	3.6.2.4. Designs an artificial environment.
	3.6.2.5. Realizes the importance of the natural environment for living things.
	3.6.2.6. Suggests solutions by researching to protect the natural environment.
4th grade	
F.4.6.1. Conscious consumers	F.4.6.1.1. Pays attention to be economical in the use of resources
	F.4.6.1.2. Realizes the importance of resources and recycling necessary for life.

As the table above is examined, knowledge about climate change, its effects and causes are very scarce in the Turkish primary school curriculum. With this information given for 4 years, it is not possible for students to have a comprehensive knowledge of climate change, its effects and causes. Since the age group in which the research was conducted is 10, 11 and 12, the knowledge that the 10-year-old Turkish alpha generation has learned about climate change for 4 years is given in the table. According to the analysis results, the knowledge values of the students aged 10 and 12, respectively ($X=2.95$, $SD=0.84$) ($X=2.96$, $SD=0.66$) are more negative than the knowledge values of the 11-year-old students ($X=3.10$, $SD=0.75$). The reason for the low level of knowledge about climate change in the 10-year-old Turkish alpha generation is the lack of comprehensive information about climate change, its effects and its causes in the primary school curriculum.

On the other hand, 11-year-old and 12-year-old Turkish alpha-generation individuals have some knowledge about climate change in the secondary school

science curriculum. Turkish secondary school science curriculum is given in the table below. (Table 5.2)

Table 5. 2. The Objective of Climate Change (5th grade and 6th grade)

5th grade	
F.5.6.2. Human and Environment Relationship	F.5.6.2.1. Express the importance of interaction between human and environment.
	F.5.6.2.2. It offers suggestions for the solution of an environmental problem in its immediate surroundings or in our country.
	F.5.6.2.3. It makes inferences about environmental problems that may occur in the future as a result of human activities.
	F.5.6.2.4. Discusses the benefits and harm situations in human-environment interaction on examples.
6th grade	
F.6.4.4. Fuels	F.6.4.4.1. Classifies fuels as solid, liquid and gaseous fuels and gives examples of commonly used fuels.
	F.6.4.4.2. Discusses the effects of the use of different types of fuels for heating purposes on humans and the environment.

As can be seen from the table, the secondary school science curriculum has more information about climate change, its effects, and consequences than the primary school curriculum. Turkish alpha generation individuals aged 11 and 12 are learning the subjects in Table 5.2. In other words, the reason why the 10-year-old alpha generation individual has less knowledge about climate change than the 11- and 12-year-old alpha generation individual is that these subjects are not included in the primary school curriculum. This statement is supported by the analysis results. The knowledge values of the students aged 10 and 12, respectively ($X=2.95$, $SD=0.84$) ($X=2.96$, $SD=0.66$) are more negative than the knowledge values of the 11-year-old students ($X=3.10$, $SD = 0.75$). In summary, knowledge about climate change, its effects, and its consequences should be given at the

primary school level. However, despite all the information given, it is still not possible to fully learn information about climate change, its effects, and its consequences. The information given remains theoretical, while teaching the concept of climate change, practical training should be preferred rather than theoretical knowledge. As can be seen in the table, climate change and global environmental problems are included in only one unit or one subject of a unit at each grade level. These important issues are explained to the students only theoretically and cannot be put into practice. For example, environmental education lessons are taught in the classroom rather than in the school garden or green areas near the school. Students' lack of knowledge about the environment and climate change also reduces their attitudes toward the environment. Studies also support this situation. Positive attitude, people tend to change their behavior in a positive way (Ernst, Blood, & Beery, 2017; Hines et al., 1986/1987). More space should be allocated to applied environmental education courses in the secondary school curriculum. In addition, environmental training or climate change awareness programs can be provided through the media, as alpha-generation individuals actively use social media (Corner et al., 2015; Moser, 2010; Özdem, Dal, Öztürk, Sönmez, and Alper ,2014). Increasing the knowledge level of the new generation (alpha generation) on climate change and global environmental problems means that their attitudes towards climate change also increase. Considering the relationship analysis between the factors in the scale, the above-mentioned situation is supported. According to the results of the analysis, the more the students' attitudes toward climate change, the stronger their desire to engage in climate-friendly behaviors and the desire to create a multiplicative action. In other words, the greater the desire to engage in climate-friendly behavior, the greater the desire to create a multiplicative action. Additionally, there is a strong relationship between multiplicative action and attitude and climate-friendly behavior. Then, there is a strong correlation between concern about climate change and a multiplicative action. (Figure 5.1) On the other hand, students' lack of knowledge about climate change negatively affects their attitudes toward the environment, their climate-friendly behavior, and their multiplicative action. In other words,

there is a very weak relationship between the knowledge factor and attitude, climate-friendly behavior, and multiplicative action. (Figure 5.2)

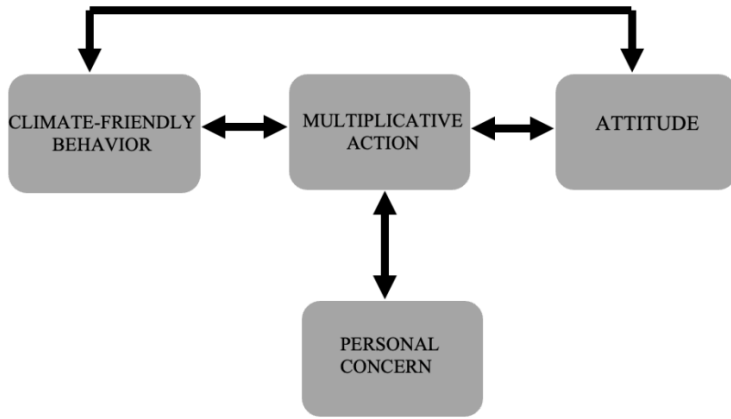


Figure 5. 1. Strongly Correlated Factors and Relationships between Factors

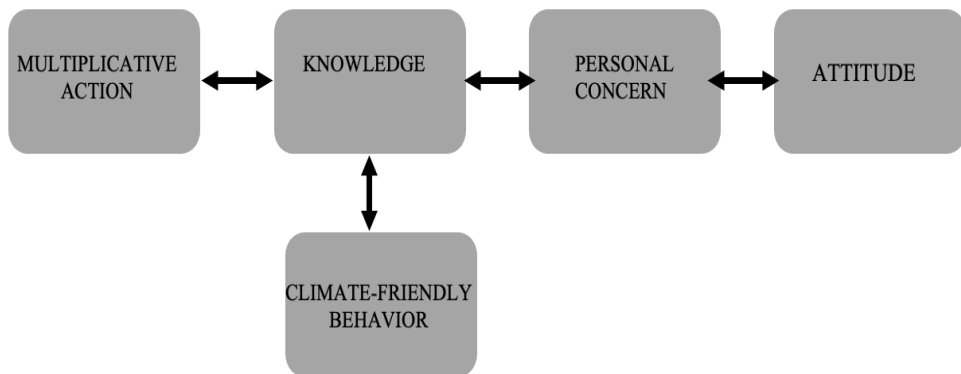


Figure 5. 2. Weakly Correlated Factors and Relationships between Factors

In the summary, it was revealed that alpha-generation individuals toward the climate change problem were gathered in two groups paralyzed and concerned activist groups. In addition, it was concluded that there was no strong relationship between the knowledge factor and other factors. In addition, 11-year-old girl students are more aware of climate change than other students.

Limitations and Recommendations

Limitations should be taken into account when evaluating the analysis results of the study. The sample of the research was determined as alpha generation students studying in only two public schools in the Çankaya district of Ankara and the study was conducted with 295 students. The number of samples is not sufficient, more students can be reached in further studies. The sample was not randomly selected, which is one of the limitations. In addition, different results could have been obtained had this study been conducted outside of the Çankaya district or in a different city in Turkey. In future studies, students studying in both private and public schools may be preferred to investigate climate change awareness of alpha generation individuals. More detailed results can be obtained with such a different sample.

There are a few suggestions to guide future studies after this study;

1. In this study, only demographic characteristics of alpha generation individuals such as age and gender were determined. In future studies, the educational status of the families of alpha generation individuals and their perspectives on environmental problems and climate change should be determined. Thus, it can be examined whether their families have a role in the awareness of alpha generation individuals against climate change.
2. At the end of this study, it has been revealed that alpha-generation individuals lack of knowledge about climate change, its effects, and its consequences. In future studies, a course containing comprehensive and accurate information about climate change can be taught to students and these lessons can be transferred to students over a certain period of time. Thus, the climate-friendly behaviors, attitudes, and concerns towards the environment of the alpha generation, whose information deficiencies have been completed, can also be measured with the developed scale. Thus, it can be understood whether the reason why alpha generation individuals do

not develop their attitudes towards climate change or do not exhibit climate-friendly behaviors is really due to a lack of knowledge.

3. The last and most important recommendation is that Turkish alpha generation individuals should be taught issues related to climate change from an early age. Turkish alpha generation individuals should be able to access information about climate change, its causes and consequences at primary school level, not at secondary school level. Another suggestion is that elective climate change courses can be offered to students of all age groups.

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APPENDICES

A. Approval of Metu Human Subjects Ethics Committee

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER



ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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Konu: Değerlendirme Sonucu

21 EKİM 2022

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr.Gaye TEKSÖZ

Danışmanlığını yürüttüğünüz Özgü ÖZTÜRK'ün "Alfa Kuşağı Bireylerinin İklim Değişikliğine Karşı Bakış Açısını Belirleme" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay 0535-ODTÜİAEK-2022 protokol numarası ile onaylanmıştır.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Sibel KAZAK BERUMENT
Başkan

Doç. Dr. İ.Semih AKÇOMAK
Üye

Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

Dr. Öğretim Üyesi Şerife SEVİNÇ
Üye

Dr. Öğretim Üyesi Murat Perit ÇAKIR
Üye

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
Üye

Dr. Öğretim Üyesi A. Emre TURGUT
Üye

B. The Form of the Parent Approval

Veli Onay Formu

Sevgili Anne/Baba,

Bu çalışma Orta Doğu Teknik Üniversitesi yüksek lisans öğrencisi Özgü ÖZTÜRK tarafından yürütülmektedir.

Bu çalışmanın amacı nedir? Çalışmanın amacı alfa kuşağı bireylerinin iklim değişikliğine karşı farkındalığını incelemektir.

Çocuğunuzun katılımcı olarak ne yapmasını istiyoruz? : Bu amaç doğrultusunda, çocuğunuzdan anketi yapmasını isteyeceğiz ve cevaplarını puanlayacak biçimde toplayacağız. Sizden çocuğunuzun katılımcı olmasıyla ilgili izin istediğimiz gibi, çalışmaya başlamadan çocuğunuzdan da sözlü olarak katılımıyla ilgili rızası mutlaka alınacak.

Çocuğunuzdan alınan bilgiler ne amaçla ve nasıl kullanılacak?: Çocuğunuzdan alacağımız cevaplar tamamen gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir. Elde edilecek bilgiler sadece bilimsel amaçla kullanılacak, çocuğunuzun ya da sizin ismi ve kimlik bilgileriniz, hiçbir şekilde kimseyle paylaşılmayacaktır.

Çocuğunuz ya da siz çalışmayı yarıda kesmek isterseniz ne yapmalısınız?: Katılım sırasında sorulan sorulardan ya da herhangi bir uygulama ile ilgili başka bir nedenden ötürü çocuğunuz kendisini rahatsız hissettiğini belirtirse, ya da kendi belirtmese de araştırmacı çocuğunuzun rahatsız olduğunu öngörürse, çalışmaya sorular tamamlanmadan ve derhal son verilecektir.

Bu çalışmayla ilgili daha fazla bilgi almak isterseniz: Çalışmaya katılımınızın sonrasında, bu çalışmayla ilgili sorularınız yazılı biçimde cevaplandırılacaktır. Çalışma hakkında daha fazla bilgi almak için Matematik ve Fen Bilimleri Eğitimi Bölümü Fen Bilimleri Eğitimi Programı yüksek lisans öğrencisi Özgü ÖZTÜRK ile (e-posta: e186763@metu.edu.tr) ile iletişim kurabilirsiniz. Bu çalışmaya katılımınız için şimdiden teşekkür ederiz.

Yukarıdaki bilgileri okudum ve çocuğumun bu çalışmada yer almasını onaylıyorum (Lütfen alttaki iki seçenekten birini işaretleyiniz).

Evet onaylıyorum___

Hayır, onaylamıyorum___

Annenin adı-soyadı: _____

Bugünün Tarihi: _____

Çocuğunuzun adı soyadı ve doğum tarihi: _____

(Formu doldurup imzaladıktan sonra araştırmacıya ulaştırınız).

C. The form of Volunteer Participation for Student

Değerli Katılımcı,

Bu anket, Alfa kuşağı bireylerinin iklim değişikliğine karşı farkındalığını incelemek için hazırlanmıştır. Anketi cevaplandırmayı kabul ederseniz, sizden beklenen, ankette yer alan bir dizi soruyu derecelendirme ölçeği üzerinde yanıtmanızdır. Bu anketi cevaplandırma süresi ortalama olarak 25 dakika sürmektedir. Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Ankette, sizden kimlik veya kurum belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak, sadece araştırmacılar tarafından değerlendirilecektir. Anket genel olarak 5 ana maddeden oluşmaktadır. Tutum, Kişisel Endişe, Bilgi, Çarpan Etkisi Yapan Eylemler ve İklim Dostu Davranış ana başlıklarından oluşmaktadır. Her bir ana başlığın altında yer alan soruları size uygun bir şekilde cevaplandırmanız ve ilgili kutucuğu işaretlemeniz beklenmektedir.

1. Cinsiyet : Kız Erkek
2. Yaş: 10 11 12

D. Scale for determining the awareness of alpha generation individuals to climate change (Turkish Version)

Değerli Katılımcı,

Bu anket, Alfa kuşağı bireylerinin iklim değişikliğine karşı farkındalığını incelemek için hazırlanmıştır. Anketi cevaplandırmayı kabul ederseniz, sizden beklenen, ankette yer alan bir dizi soruyu derecelendirme ölçeği üzerinde yanıtlamanızdır. Bu anketi cevaplandırma süresi ortalama olarak 25 dakika sürmektedir. Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Ankette, sizden kimlik veya kurum belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak, sadece araştırmacılar tarafından değerlendirilecektir. Anket genel olarak 5 ana maddeden oluşmaktadır. Tutum, Kişisel Endişe, Bilgi, Çarpan Etkisi Yapan Eylemler ve İklim Dostu Davranış ana başlıklarından oluşmaktadır. Her bir ana başlığın altında yer alan soruları size uygun bir şekilde cevaplandırmanız ve ilgili kutucuğu işaretlemeniz beklenmektedir.

1. Cinsiyet : Kız Erkek
2. Yaş: 10 11 12

F

Tutum: İlgi, Sorumluluk, Kontrol Odağı					
(Madde 1: 1= Çok İlgisiz 5=Çok İlgili; Madde 2-5: 1=Hiç Katılmıyorum, 5= Tamamen Katılıyorum)					
Derece (1-5)	Çok ilgisizim (1)	(2)	(3)	(4)	Çok ilgiliyim (5)
3.“İklim değişikliği” konusu ile ne kadar ilgilisiniz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derece (1-5)	Hiç katılmıyorum (1)	(2)	(3)	(4)	Tamamen katılıyorum (5)
4.İklim dostu bir şekilde hareket etmek benim sorumluluğumda ya da benim sorumluluğumdur.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.İklim değişikliğinin etkilerinin azaltılmasına katkıda bulunabilirim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.Eğer uluslararası toplum iş birliği içinde olursa küresel ısınma (sıcaklık artışı) +2 ile +4 derece arasında sınırlandırılabilir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.Karbon salınımı azaltmaya istekliyim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kişisel Endişe (Sizce aşağıdaki alanlar iklim değişikliğinden ne ölçüde etkileniyor?)					
Derece (1-5)	Hiç etkilemedi (1)	(2)	(3)	(4)	Çok etkiledi (5)
8.Kendi hayatım	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.Ailemin hayatı	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.Türkiye’de yaşayan insanların hayatı	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bilgi (İklim değişikliğinin nedenleri ve etkileri hakkında sizce aşağıdaki ifadeler doğru mu yanlış mı?)					
Derece (1-5)	Yanlış cevap (1)	(2)	(3)	(4)	Doğru cevap (5)
11.İklim değişikliği nedeniyle dünyanın her yerinde sıcaklık artışı eşit olacaktır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.Dünya çapında CO ₂ emisyonlarının artışı durursa, buzulların erimesi de derhal duracaktır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.Uludağ’da kış turizmi, kar tabancalarının kullanılması sayesinde iklim değişikliğinden etkilenmez .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.İklim değişikliği esas olarak insan kaynaklıdır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Çarpan Etkisi Yapan Eylemler (Aşağıdaki ifadeler sizin için ne sıklıkla geçerlidir?)					
Derece (1-5)	Asla (1)	(2)	(3)	(4)	Her zaman (5)
15.İklim değişikliğini arkadaşlarımla tartışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.İklim değişikliğini ailemle tartışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.Arkadaşlarımı iklim dostu davranmaları için etkilemeye çalışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.Ailemi iklim dostu davranmaları için etkilemeye çalışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

İklim Dostu Davranış (Aşağıdaki ifadeler sizin için ne sıklıkla geçerli?) / Climate-friendly Behavior (How often do the following statements apply to you?)					
Derece (1-5)	Asla (1)	(2)	(3)	(4)	Her zaman (5)
19.Evde olmadığımında kaloriferi ya da ısıtıcıyı kapatırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.Yeni bir şey satın almadan önce bir şeyleri onarmaya çalışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.Bir şey satın almadan önce, ona ihtiyacım olup olmadığını dikkatlice düşünürüm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22.Az ambalaj içeren ürünler satın almayı tercih ederim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23.İhtiyacım olmadığında elektrikli cihazları kapatırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24.Duş alırken suyu gereksiz yere akıtmam.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25.Kaynakların sürdürülebilir bir şekilde yeniden kullanımını teşvik etmek için atıkları ayırırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.İhtiyacım olmadığında ışıkları kapatırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

E. Scale for determining the awareness of alpha generation individuals to climate change (Original version)

Table 1. Items used in the study.

Attitude: Interest, Responsibility, Locus of Control

(item 1: 1 = very uninterested, 6 = very interested; items 2-5: 1 = I totally disagree, 6 = I totally agree)

1. How interested are you in the topic "climate change"?
2. It is my responsibility to act in a climate-friendly manner.
3. I am able to contribute to reducing the degree of climate change.
4. If the international community cooperates, global warming can be limited to + 2–4 °C.
5. I would like to reduce my carbon emissions.

Personal Concern

In your opinion, to what extent are the following areas affected by climate change?

(all items: 1 = not affected at all, 6 = very affected)

1. ...my life
2. ...the life of my family
3. ...the life of people living in Europe

Knowledge

about causes and effects of climate change In your opinion, are the following statements right or wrong?

(all items: mean correct score 1 = wrong answer, 6 = right answer)

1. Due to climate change, temperature will rise in all areas in the world an equal amount.
2. The melting of the glaciers will stop immediately if worldwide CO₂-emissions come to a halt.
3. Winter tourism in the Alps is not affected by climate change thanks to the use of snow guns.
4. Climate change is mainly human induced.

Multiplicative Action

How often do the following statements apply to you?

(all items: 1 = never, 6 = always)

1. I discuss climate change with my friends.
2. I discuss climate change with my family.
3. I try to influence my friends to act in a climate-friendly manner.
4. I try to influence my family to act in a climate-friendly manner.

Climate-friendly Behavior

How often do the following statements apply to you?

(all items: 1 = never, 6 = always)

1. I turn down the heating when I am not at home.
2. I try to repair things before I buy something new.
3. Before I buy something, I carefully consider whether I need it or not.
4. I prefer to buy things with little packaging.
5. I turn off electrical devices when I do not need them.
6. While taking a shower I do not run the water unnecessarily.
7. I separate waste to promote the sustainable reuse of material resources.
8. I turn off lights when I do not need them.

F. The Permission of Use Image

I.

▼ Permission to use images on McCrindle website


Kimden: McCrindle Info

Tarih: 26-09-2022 (03:57:19 +03)

Kime: e186763@metu.edu.tr

▶ İleti Günlüğü

Metin (7 KB)  

 Kişisel gizliliğiniz korunması için resimlerin gösterilmesi engellenmiştir.
Resimler Gösterilsin mi?

Hello Özgü,

Thank you for your email and interest in Generation Alpha. We are thrilled to hear you have found Mark McCrindle's research helpful as you research them.

We are more than happy for you to use the images and resources in your paper, please simply reference them and credit them to McCrindle.

Kind regards,
Dee

Dee Elnar
Admin Assistant

II.

▼ Re: THESIS STUDY / PERMISSION (TURKEY)

Kimden: Caroline Hickman

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▶ İleti Günlüğü

Metin (8 KB)  

You are very welcome to use these with referencing to the original paper

Good luck with your thesis

best wishes

Caroline

Office Hours: 9-11am Wednesdays.
E mail to book an appointment time. By zoom or phone 07809442444

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III.

▼ Re: Tez için Görsel ve Tablo Kullanım Onay Izni

Kimden: Barkın Gicir


Tarih: 07-10-2022 (15:40:51 +03)

Kime: ozturk.ozgu@metu.edu.tr

▶ İleti Günlüğü

 Yeni penerede aç

 Diğer Seçenekler ▼

Metin (1 KB)  

Merhaba Özgü Hanım,
Makalemizdeki tabloyu gerekli atıf ve referansları yaptıktan sonra kaynakçaya ekleyerek kullanmanızda sakınca yoktur. Araştırmanızda başarılar dileriz.

İyi çalışmalar
Barkın Gicir