sustainability

MDPI

Article

Do Teenagers Believe in Anthropogenic Climate Change and Take Action to Tackle It?

Sema Seker [1,†], Elvan Sahin [2,*], Esme Hacıeminoğlu [3] and Sinem Demirci [4]

[1] Sülümenli İsmet Attila Ortaokulu, 03030 Afyonkarahisar, Turkey; sema-zeynep@hotmail.com
[2] Department of Science and Mathematics Education, Faculty of Education, Midde East Technical University, 06800 Ankara, Turkey
[3] Elementary Science Education Department, Faculty of Education, Akdeniz University, 07058 Antalya, Turkey; ehacieminoglu@gmail.com
[4] Statistics, Bailey College of Science and Mathematics, California Polytechnic State University, San Luis Obispo, CA 93407-0405, USA; sdemirci@calpoly.edu
* Correspondence: selvan@metu.edu.tr
† The study is conducted at Necmettin Erbakan University as part of a master's thesis requirement.

Abstract: Regardless of their nationality, all children are unfortunately at risk since nations across the world are not doing enough to reduce the impacts of climate change. However, teenagers in developing countries face more severe challenges as a consequence of climate change. This research portrays teenagers living in a rural area in terms of their awareness, beliefs, attitudes, and actions relevant to climate change. Beliefs regarding climate change are reflected in the context of skepticism about the existence, causes, and impacts of climate change as well as belief in climate change mitigation. We also magnify ecocentrism and anthropocentrism, as a socio-psychological factor, and gender, a demographic variable, when exploring their power as the antecedents of climate change-related actions. The data were gathered from 650 students attending a middle school selected from a rural area located in the inner west region of Türkiye. The results indicated that less than half of the teenagers believed in the notion that something could be done to tackle climate change. According to discriminant analysis, female teenagers tend to believe in climate change more and have stronger ecocentric attitudes compared to males. Furthermore, female teenagers seemed to engage in climate change-related actions more than males. This study provided further evidence on the role of beliefs and attitudes in relation to this issue. To be more specific, teenagers believing that anthropogenic factors lead to climate change and that we, as humans, should therefore do our bit to reduce climate change, also tend to take the necessary actions to combat climate change. Furthermore, these individuals, valuing the natural environment for its own sake, engage in actions for climate change mitigation. By examining the awareness, beliefs, attitudes, and actions of teenagers in rural areas towards climate change, this research underscores the critical role of the quality of formal education in equipping teenagers to effectively engage with climate change issues.

Keywords: teenagers; climate change; beliefs; attitudes; awareness

Citation: Seker, S.; Sahin, E.; Hacıeminoğlu, E.; Demirci, S. Do Teenagers Believe in Anthropogenic Climate Change and Take Action to Tackle It? *Sustainability* **2024**, *16*, 7005. https://doi.org/10.3390/su16167005

Academic Editors: Fanli Jia and Andrei P. Kirilenko

Received: 21 May 2024
Revised: 23 July 2024
Accepted: 6 August 2024
Published: 15 August 2024

1. Introduction

Humans are increasingly influencing the climate, primarily through the burning of fossil fuels, deforestation, urbanization, and changes in vegetation patterns. As supported by the Intergovernmental Panel on Climate Change report (IPCC) [1], most scientists have no doubt that climate change is driven mainly by human activities. As climate change leaves humans and non-human species with new challenges in terms of their survival, the question of how individuals perceive climate change has been extensively addressed in the literature (Poortinga et al., 2019) [2]. This line of inquiry relies on the understanding that climate change awareness, beliefs, attitudes, and perceptions, as well as some demographic variables, can act as determinants of actions for climate change

mitigation (e.g., Corner, Whitmarsh and Xenias, 2012, Hornsey et al., 2016, Lorenzoni, Nicholson-Cole and Whitmarsh, 2007, Onur, Sahin and Tekkaya, 2012) [3–6].

Research on adults' beliefs regarding climate change has been conducted in various cultures and this empirical evidence on climate change beliefs and engagement for action to tackle it has guided policymakers, and shaped recent calls and multilateral landmark agreements such as the Paris Agreement (UNFCCC, 2017) [7] and Climate Change Strategies 2020 (UNEP, 2020) [8]. However, research findings in this area have left us with some contradictions. Sampling UK adults, Whitmarsh (2009) [9] reported that these people tended to detach themselves from the causes and impacts of climate change and had contradictory ideas about the reality and severity of climate change. In a further study (Whitmarsh, 2011) [10], it was stated that the majority in the UK believed climate change was partly caused by human activities. Supported by Poortinga et al. (2011) [11], these people also had a substantial level of uncertainty about whether climate change is really happening or not. However, the research conducted by Poortinga et al. (2011) [11] indicated that skepticism was not widespread in Britain anymore. Examining future science educators' climate change beliefs in Türkiye, Higde, Oztekin, and Sahin (2017) [12] demonstrated that they had no doubt about the reality of anthropogenic climate change but were skeptical about the local impacts of climate change. Similarly, according to a US sample reflecting farmers' beliefs about climate change and accompanying risks, climate change is really happening Arbuckle, Morton, and Hobbs, 2015) [13]. These authors reported a considerable variation in attribution of cause, with only 10% believing climate change is mostly caused by human activities. Slightly more than one third believed that natural changes and human activities are equally responsible for climate change. Furthermore, the proportions of farmers believing there is not enough evidence to determine if it is occurring and whether it is mostly due to natural variation were similar to each other.

Climate change-related attributes reflecting adults' perceptions, beliefs, attitudes, and actions have received much attention in both developed and developing countries. Yet little is known about teenagers' awareness and beliefs regarding this issue which threatens their own future. Recent research (e.g., Nche, Achunike, and Okoli, 2019; Kuthe et al., 2019) [14,15] has acknowledged teenagers' capacities in the battle against climate change but without touching on questions regarding to what extent they are aware of, and how they perceive and act upon, climate change in developing countries. As teenagers are not only 'climate change victims', but also 'climate change actors' (Nche, Achunike, and Okoli, 2019) [15], more research is needed to explore their awareness, attitudes, beliefs, and actions, and to understand how they incorporate these factors when encountering climate change information (Busch, 2021) [16]. This understanding is essential in order to identify the barriers that hinder teenagers from translating climate awareness into meaningful action within their communities.

1.1. The Significance of Understanding Teenagers in Shaping Climate Change Studies

Regardless of their nationality, all children are unfortunately at risk since nations across the world are not doing enough to reduce the impacts of climate change (UNICEF, 2015) [17]. However, teenagers in developing countries face more severe challenges such as poor nutrition, infectious diseases, economic disruption, and air and water pollution as consequences of climate change (Hanna and Oliva, 2016) [18]. Despite the disproportionate impact of climate change on young people, environmentally conscious and empowered children and teenagers have the potential to become pivotal agents of long-term environmental stewardship (UNICEF, 2007) [19] as well as to navigate and respond effectively to the climate crisis. By provBUSiding them with adequate support and protection, they can shift from being passive victims of climate change to climate change actors (Nche, Achunike, and Okoli, 2019) [15]. This transformation is especially achievable through formal education (Busch, 2021) [16] as well as informal learning environments (Trott, 2020) [20], as teenagers are susceptible to misinformation within various communication channels,

including mass and social media. Therefore, equipping students with critical and reliable tools is essential (Busch, 2021) [16].

To equip teenagers and foster their action in tackling climate change, it is essential to disclose the important constructs behind developing climate-friendly actions. As pointed out in previous studies (e.g., Izadpanahi, Elkadi, and Tucker, 2017, Prati, Albanesi, and Pietrantoni, 2017) [21,22], environmental education has a special focus on the development of teenagers' awareness, beliefs, attitudes, and actions regarding climate change. Members of this special target group will be active players in a climate-friendly society (Kuthe et al., 2019) [14] that requires to be well equipped to understand the complexity of climate change. Environmental education in relation to a key issue, climate change should adapt current programs in terms of its rationale, content, and teaching approaches to the existing conditions of teenagers (Zaval and Cornwell, 2017) [23]. In this respect, it becomes inevitable to pay attention to the awareness, beliefs, and attitudes of teenagers, which have the potential to shape their engagement in climate-friendly actions. Knowledge of an audiences, especially teenagers, constitutes a key aspect of environmental education and should be taken into consideration in designing climate change education in formal and informal settings.

Furthermore, in their systematic review of social psychological literature, Tam, Leung, and Clayton (2021) [24] emphasized that there are some gaps in the context of the climate change literature, including a lack of evidence from non-Western, developing, and non-democratic societies, reliance on young samples, and a lack of attention to some crucial outcome variables. Hence, our study aims to offer valuable insights into the levels of climate change awareness, attitudes, beliefs, and actions among teenagers—key actors in climate change—in a non-Western developing country, to better understand the nature of these critical variables while paying attention to individual-level factors notably socio-psychological and demographic variables. This endeavor seeks to deepen our understanding of these critical variables, with a focus on socio-psychological and demographic factors. We believe that further empirical evidence in this research area is essential for environmental and sustainability educators while raising climate change awareness of teenagers who could be regarded as future decisionmakers.

1.2. Socio-Psychological and Demographic Factors in Relation to Climate Change

Doubt about the reality and impacts of anthropogenic climate change has been demonstrated to be a significant barrier to active engagement (e.g., Corner, Whitmarsh, and Xenias, 2012; Islam, Barnes, and Toma, 2013) [3,25]. Whitmarsh (2008) [26] showed that skepticism was positively related to behaviors regarding public transportation and had a significant negative influence on domestic energy conservation behaviors pertinent to climate change. Considering the significant predictors of actions taken to tackle climate change, a more recent study by Herman (2015) [27] examined the relationship among secondary school students' perceptions about global warming science, gender as a demographic factor, and the willingness to mitigate global warming with respect to five distinct actions. This research revealed that perceptions about the validity of science claims were more powerful in predicting the willingness to engage in mitigating actions compared to gender.

Pro-environmental behaviors, and actions representing acquired or learned behaviors (Sia, Hungerford, and Tomera 1985/1986) [28] consistently capture the interest of environmental education scholars. Numerous studies have been conducted to explore the underlying mechanisms in order to promote environmentally and climate-friendly behaviors (e.g., Hines, Hungerford, and Tomera, 1987; Jensen, 2002; Kollmuss and Agyeman, 2002; Steg et al., 2014; Hermans and Korhonen, 2017) [29–33]. Kollmuss and Agyeman (2002) [32] defines pro-environmental behavior as characterized by a deliberate effort to mitigate the negative consequences of one's actions on both the natural and built world such as reducing/changing their consumption habits, producing less waste, and using/choosing environmentally friendly products. In a recent study focusing on secondary school students' actions, Hermans and Korhonen (2017) [29] found that these students demonstrated a will-

ingness to combat climate change by reducing their electricity consumption and engaging in reuse and recycling practices. Similarly, Chhokar et al. (2011) [34] found that young people are inclined to turn off lights and electronic devices when not in use to mitigate their impact on climate change. However, they show reluctance toward actions such as reducing meat consumption, limiting clothing purchases, and using public transportation.

Our knowledge about how awareness of climate change is experienced by teenagers and children is quite limited (Léger-Goodes et al., 2022) [35]. In terms of raising awareness and its sources, Ozdem et al. (2014) [36] conducted a study and found that the students' primary sources of information pertaining to climate change were television and school. Similarly, Rickinson (2001) [37] claimed that media and school are significant agents in perceiving environmental consequences and climate change. As teenagers are susceptible to misinformation within various communication channels (Busch, 2021) [16], these sources of information should emphasize empirical evidence from scientific research as they are key to raising awareness about climate change (Leiserowitz, Maibach, Roser-Renouf, Smith, and Dawson, 2013) [38], especially the awareness of teenagers.

Associations between human attitudes, worldviews, climate change perceptions, and behaviors have also attracted attention (e.g., Hornsey et al., 2016; van der Linden, 2014) [4,39]. Considerable amount of research (e.g., Grendstad and Wollebaek, 1998; Thompson and Barton, 1994; De Groot and Steg, 2007; Sahin, Alper, Oztekin, 2021) [40–43] has resulted in Eckersley's theory of green political thought proposing anthropocentric and ecocentric dimensions but little is known about how anthropocentrism and ecocentrism effects in climate change-related attributes (see Gagnon, Thompson, and Barton 1994 [41] for a comprehensive description of anthropocentrism and ecocentrism). According to Gagnon, Thomson and Barton (1994) [41], while ecocentrism represents motives according to which nature has an intrinsic value and that this is sufficient for it to warrant protection, anthropocentrism reflects valuing nature due to the material or physical benefits it can provide to humans. These authors asserted that an anthropocentric individual would be less inclined to protect the environment when other human-centered attitudes interfere. On the other hand, ecocentric individuals would engage in pro-environmental actions even though these actions required some sacrifice in terms of the material quality of life. Research has consistently shown that attitudes and worldviews underlying nature-centered concern are positively related to climate change risk perceptions and intentions to act (Van der Linden, 2014) [39]. In Whitmarsh's (2005) research [44], people with stronger pro-environmental attitudes were found to be significantly more likely to consider climate change a salient risk and to take action in response to it. The link between attitudes and climate skepticism was also demonstrated by the study by Poortinga et al. (2011) [11] and those endorsing strong pro-environmental attitudes were found to be less skeptical about the seriousness of climate change, while those expressing weak environmental attitudes tended to be uncertain concerning the reality and severity of climate change. Considering Eckersley's theory underlying anthropocentric and ecocentric dimensions, evidence provided by Higde, Oztekin, and Sahin (2017) [12] indicated anthropocentric attitudes made a significant contribution to skepticism about the reality of climate change. Moreover, ecocentrism and anthropocentrism were found to be among the significant predictors of actions for climate change mitigation but in opposite directions.

Alongside skeptical beliefs, the concept of belief as a general construct has been a central focus of research within environmental education. Broadly speaking, belief is defined as a representation of individuals' understanding of an object or concept, linking it to a particular attribute that may be true or false (Fishbein and Ajzen, 1975) [45]. Fishbein and Ajzen categorize beliefs as (1) formed through direct experiences (descriptive beliefs); (2) inferred from direct experiences (inferential beliefs); and (3) acquired from external sources like media, lectures, or peers (informational beliefs). In environmental and sustainability education, it is known that beliefs have the potential to interfere with learning (Pooley and O'Connor, 2000; Brownlee, Powell and Hallo, 2013) [46,47] and can shape students' beliefs, attitudes, and behaviors (Nespor, 1987; Bloom and Ellis, 2009) [48,49]. In

one a previous climate change education studies, Deshiana, Sriyanti, and Ismet (2022) [50] found that 95.7% of the young people from high schools in a province of Indonesia believe in climate change mitigation and tend to engage in actions to reduce the effects of climate change. In other previous studies examining teenagers' beliefs (e.g., Li and Monroe, 2017; Igu et al., 2023; Pandve, Deshmukh, Pandve, and Patil; 2009) [51–53], it was consistently reported that teenagers believe that climate change exists, that there is a need to reduce the impacts of climate change, and in the concept of a personal contribution to combat climate change.

Among the individual-level factors, prior research has considered gender as a demographic variable and reported its explanatory power in terms of climate change-related attributes. Although no consistent pattern on gender differences has appeared, in general, compared to men, females were reported to perceive climate change as more threatening and harmful, expressed more concern about global warming and took part in actions against climate change (e.g., Gifford and Comeau, 2011; van der Linden, 2014; Deshiana, Sriyanti, and Ismet, 2022; Shi et al., 2016) [39,50,54,55], were less skeptical about anthropogenic climate change (e.g., Upham et al., 2009; Whitmarsh, 2011) [10,56] and were less likely to be uncertain about the reality of climate change (Whitmarsh, 2005) [44]. On the other hand, in their research examining university students' perceptions about climate change, Haq and Ahmed (2020) [57] have recently revealed that males had stronger belief in the anthropogenic nature of climate change and perceived an increase in temperature. Similarly, it was previously reported in the Eurobarometer survey (2008) [58] that females seemed to have no opinion pertinent to this issue, and believe that climate change is exaggerated while CO_2 emissions only have a marginal effect on climate change. No significant gender differences with respect to skepticism about climate change were reported for adults and secondary school students (e.g., Herman, 2015; Poortinga, Spence, Whitmarsh, Capstick and Pidgeon, 2011; Whitmarsh, 2011) [10,11,27]. Such inconclusive findings encouraged us to consider gender, along with ecocentric and anthropocentric environmental attitudes in understanding the nature of climate change issues among Turkish teenagers.

1.3. Aims of This Research

In this research study, we intend to clarify the extent of climate change awareness, actions, and beliefs for Turkish teenagers living in a rural area. Beliefs regarding climate change are reflected in the context of two dimensions; namely, skepticism about the existence, causes, and impacts of climate change as well as belief in climate change mitigation. We also magnify ecocentrism and anthropocentrism as socio-psychological factors and gender, a demographic variable, when exploring their power as the antecedents of climate change-related actions. This research was carried out with inspiration from a meta-analysis of the demographic and psychological correlates of belief in climate change (Hornsey et al., 2016) [4] leaving us with some gaps with regard to some psychological and demographic factors for teenagers in the context of climate change. The significance of this study lies in its focus on rural teenagers, a group facing disparities compared to their urban peers in terms of access to resources and the quality of the formal education system available to them (Johnson et al., 2014; Iruka et al., 2020; TEDMEM, 2021) [59–61]. Teenagers in rural areas may hold different beliefs and engage in different actions when addressing climate change due to their unique relationship with their environment and limited access to resources, including information on climate change. Therefore, understanding the underlying mechanisms of their climate-friendly behaviors provides valuable insights for developing effective education policies and facilitating relevant actions among teenagers.

1.4. Study Context

It is important to elaborate on the context where this study was conducted. The Mediterranean basin, which includes Türkiye, is defined as one of the most sensitive regions to the adverse effects of climate change. According to the Report of the Network of Mediterranean Experts on Environment and Climate Change (MedECC, 2020) [62], the

Mediterranean region is experiencing a 20% greater increase in temperature compared to other regions in the world. According to recent scientific evidence (IPCC, 2022) [1], Türkiye is one of the most vulnerable countries to extreme weather events in Europe. Climate change poses significant risks to people, the economy, and infrastructure due to coastal and inland flooding, even if emissions are significantly reduced. Furthermore, the rapid increase in water temperatures will affect marine biodiversity and cause a dramatic decrease in fish species.

This study took place in a rural area—those with a population 20,000 or less—(OECD, 2020 [63] located in the inner west region, the mountainous countryside inland from the Aegean coast in Türkiye. This rural area where the study was conducted has a humid subtropical climate and the basin has an annual average total rainfall of 436.8 mm and an annual average temperature of 11.2 °C (State Meteorological Service, as cited in Saplıoğlu, 2012 [64]). The hottest periods are July and August, with average temperatures of 22.1 °C and 22.0 °C, respectively, while the coldest period is January with an average temperature of 0.3 °C as stated, agriculture and livestock define the economy of the area. Saplıoğlu [64] investigated the impact of climate change on rainfall and temperatures in this rural area and reported that a positive trend was identified in June and July, with an increase of 0.011 and 0.0127 °C, respectively, and an annual decrease of 0.725 mm in rainfall on an annual basis.

2. Materials and Method

2.1. Participants and Design

The design of the study is based on associational research. This study involved 650 participants, with 58.8% seventh- and 41.2% eighth-grade students from a total of 13 public middle schools located in rural areas of a province in the inner west region of the country Türkiye—a developing country. The rural areas in the study were determined by taking into account some characteristics such as parents' education level as well as their incomes, and the distance of the rural area from the city center. Most participants were female (53.0%; 42.9% male). However, 4.1% of the participants did not label their gender. The mean age of the students was 13.6 years. The relevant grade levels were chosen because they are in the final years of middle school education. In addition, towards the end of the middle school years, the education programs include more learning outcomes related to climate change issues compared to other grade levels. The first author of the study administered the survey to the students. The return rate of the completed data collection instruments was almost 95% at each data collection site. When examining individual surveys item by item, while the lowest item response rate was almost 97% (630), the highest item response rate was 100% (650).

2.2. Instruments

In this study, the data were collected by administration of a survey assessing demographic information, awareness, actions, and beliefs regarding climate change, and attitudes toward the environment.

2.2.1. Teenagers' Awareness of Climate Change Survey

This measuring tool included 5 questions with categorical answers on the participants' awareness of climate change which was prepared and used in previous research studies (e.g., Higde, Oztekin, and Sahin, 2017; Whitmarsh, 2008) [12,26] to investigate individuals' awareness of climate change. It aimed to assess their familiarity with the issue of climate change in general and their source of information.

2.2.2. Actions on Climate Change Scale

The Actions on Climate Change Scale, which covered 14 items on a five-point rating scale (from always = 5 to never = 1), was used to determine actions that the teenagers have engaged in to mitigate climate change in their daily activities. This scale was prepared of

and used in previous research studies (e.g., Higde, Oztekin, and Sahin, 2017; Whitmarsh, 2008) [12,26] to investigate to what extent individuals demonstrated the simple things that they could do in their daily life to mitigate climate change. Regarding the internal consistency of the scale, Cronbach's alpha was calculated as 0.81.

2.2.3. Ecocentric and Anthropocentric Attitudes toward the Environment Scale

The Attitudes toward the Environment Scale, previously developed by Gagnon, Thompson, and Barton (1994) [41]. It was used to assess the teenagers' ecocentric and anthropocentric worldviews in the present study. This instrument was adapted into Turkish by Onur, Sahin, and Tekkaya [6] and included a total of 23 items on a five-point Likert-type scale representing ecocentric (10 items) and anthropocentric (13 items) motives. The internal consistency of the dimensions was assessed by calculating Cronbach's alpha: 0.75 for ecocentrism, and 0.83 for anthropocentrism. These values reflected an acceptable measure of internal consistency for two endpoints of environmental attitudes. The factor-loading scores were found to be greater than 0.30, ranging from 0.68 to 0.41 for the first factor reflecting 'ecocentrism' and ranging from 0.62 to 0.35 for the second factor representing 'anthropocentrism'.

2.2.4. Beliefs Regarding Climate Change

This scale consisted of 20 items on a five-point Likert-type scale, ranging from "5 = strongly agree" to "1 = strongly disagree" and previously adapted into Turkish) by Higde and Oztekin (2013) [65] to assess pre-service science teachers' beliefs about the reality of anthropogenic climate change. It was originally developed by Whitmarsh (2005) [44] to assess the extent of public skepticism about the reality of anthropogenic climate change. The 'Beliefs regarding Climate Change Scale' was composed of two factors; namely, the belief in climate change dimension represented by 12 items and the skepticism dimension reflected by 8 items. Cronbach's alpha was calculated for the internal consistency of the dimensions: 0.83 for belief in climate change and 0.69 for skepticism. The factor-loading scores were found to be greater than 0.30; ranging from 0.75 to 0.38 for the first factor representing 'beliefs in climate change' and ranging from 0.63 to 0.44 for the second factor reflecting 'skepticism'. The first factor, assessing belief in climate change, gives an idea about the extent to which individuals see climate change as relevant to them and they then carry out some actions to influence climate change. On the other hand, the factor on skepticism includes some items about the rejection of the human effect on climate change. The instrument was translated and adapted into Turkish by Higde and Oztekin (2013) [65].

2.3. Data Collecting Procedure

Initially, approval for administration of the survey was obtained from the Provincial Directorate of National Education through the university. Later, permission was obtained from each school principal and the parents of the students. The first author of the study administered the data collection tools in a classroom environment. To minimize measurement error and potential factors that might threaten the internal validity of the study, the application process of the instruments in each class followed the same administrative procedure. Before collecting the data, the researcher explained the purpose of the study to the students in their classroom. The researcher informed the students that their participation was voluntary, and their responses would not affect their grades. Students were reminded not to write their names and surnames on the instruments. Random numbers were assigned to each form to protect participant's anonymity. One class hour was given to the students to complete the instruments. During the implementation process, there was no situation that could cause different emotions and demoralize the students.

2.4. Data Analysis

Descriptive statistics were used to determine the teenagers' awareness of climate change issues, their belief in climate change, and their skepticism about the reality of

climate change. A discriminant analysis was carried out to reveal the discriminating power of gender in terms of climate change-related attributes. A multiple regression analysis was conducted to evaluate how much variance in teenagers' climate change-related actions can be explained by the linear combination of predictor variables. All statistical analysis was carried out by using IBM SPSS Statistics (Version 22.0).

3. Results

3.1. Teenagers' Awareness of Climate Change

The teenagers were asked to reply to various questions to reveal their awareness of the climate change issue. It was found that almost all of the participants had heard of 'climate change' before. The data showed that, pertinent to climate change, school (41.8%) and television (32.9%) constituted the major information sources of the teenagers. On the other hand, passive media (e.g., radio, newspaper, the internet) and friends (5.3%) and family (5.1%) were not considered as frequently as school and television was.

Less than half of them (41.4%) believed that there are things that can be done to tackle climate change, and supported the notion that responsibility belongs to environmental organizations, everyone, at both the national and international levels, or individuals, groups, and society as a whole. See Table 1 for details.

Table 1. Teenagers' Awareness of Climate Change.

Survey Question	Response Categories and Percentage of Responses			
Have You Heard of "Climate Change"?	Yes (93.7%)	No (6.3%)		
Where have you heard about climate change?	Television (32.9%)	Radio (0.7%)	Newspaper (1.4%)	Internet (7.23%)
	Friends (5.3%)	Family (5.1%)	School (41.8%)	Others (5.57%)
Do you think anything can be done to reduce the effect of climate change?	Yes (42.6%)	No (23.4%)	Don't know (34.0%)	
Do you think anything can be done to tackle climate change?	Yes (41.4%)	No (24.4%)	Don't know (34.2%)	
Who do you think should have the main responsibility for tackling climate change?	International organizations (37.6%)	National government (48.8%)	Local government (42.8%)	Business, Industry (48.3%)
	Individuals (57.8%)	All people (57.9%)	Environmental organizations (60.2%)	

3.2. Actions on Climate Change

The results of descriptive statistics analysis showed that the teenagers engage in actions against climate change with moderate levels (M = 3.34, St D = 0.68). According to Table 2, representing the frequency distributions for each response, using less energy and water, and recycling the relevant materials were among the actions more commonly undertaken by these individuals. On the other hand, reading publications that focus on environmental issues and encouraging others to take action on behalf of the environment did not seem to be among the actions many teenagers do frequently. Similarly, it was found that these young people engage in moderate levels of actions reflecting green purchasing such as having locally produced foods or products in reusable or recyclable packages.

Table 2. Frequency Distributions regarding Actions on Climate Change and Corresponding Item Means and Standard Deviations.

Items	Always	Frequently	Sometimes	Rarely	Never	M	St D
I choose to walk or cycle rather than take a motor vehicle.	32.0	23.3	18.7	13.1	12.8	3.48	1.38
I deliberately purchase food produced locally rather than imported products.	19.8	25.9	32.1	16.7	5.6	3.37	1.14
I donated money to national non-governmental organizations to contribute to environmental protection.	9.9	10.1	16.5	16.8	46.7	2.19	1.37
I purchase products in reusable or recyclable packages.	19.7	26.2	29.6	16.6	8.0	3.32	1.19
I avoid buying from a company which shows disregard for the environment.	22.9	21.9	27.1	18.7	9.5	3.30	1.26
I warned people not to use water and energy if not necessary.	18.2	21.7	32.5	18.3	9.3	3.21	1.20
I recycle glass bottles, aluminum cans, paper.	27.9	24.6	26.0	14.1	7.4	3.51	1.23
I try to use less energy (electricity, water, etc.).	33.5	26.8	23.1	11.5	5.1	3.71	1.18
I turn off lights I am not using.	50.9	19.5	13.9	9.7	6.0	3.99	1.25
I make an effort to use less water when brushing my teeth or bathing.	39.3	23.2	20.1	11.1	6.2	3.78	1.24
I took steps to protect plants (i.e., watering trees and flowers).	29.4	19.8	23.2	9.8	17.8	3.33	1.44
I choose to read publications that focus on environmental issues.	18.7	19.2	29.0	16.8	16.2	3.07	1.32
I encourage people involved in a destructive environmental behavior to stop that activity.	22.6	21.5	29.2	18.0	8.8	3.31	1.24
I encourage others to take an action on behalf of the environment.	21.6	17.4	28.2	18.1	14.7	3.13	1.33
Total Scale						3.34	0.68

(Note: M—mean, St D—standard deviation).

3.3. Do Teenagers Believe in Climate Change?

In this study, the teenagers revealed their level of agreement to statements on belief in climate change (see Table 3). The mean score was calculated as 3.45 on a scale of 1–5 (StD = 0.78). In terms of the causes of climate change, more than half of the teenagers pointed out pollution from industry as a major reason among others. However, these teenagers seemed to have different ideas about the role of modern life on climate change. According to the findings, only half of the teenagers agree that the effects of climate change are likely to be catastrophic (52.7%) and radical changes to society are needed to tackle climate change (51.2%). In addition, 56.3% of teenagers had a belief in the notion that people should be made to reduce their energy consumption if it reduces climate change. When it comes to the association between leaving the lights on in their own home and climate change, a relatively large percentage of the teenagers were undecided (34%).

Table 3. Frequency Distributions for Belief in Climate Change Statements and Corresponding Item Means and Standard Deviations.

Items	SA	A	U	D	SD	M	St D
We can all do our bit to reduce the effects of climate change.	39.3	22.7	17.1	7.2	13.7	3.66	1.40
Climate change is inevitable because of the way modern society works.	17.1	26.5	33.7	15.2	7.5	3.30	1.14
People should be made to reduce their energy consumption if it reduces climate change.	25.1	31.2	19.8	12.2	11.7	3.45	1.30
I would only do my bit to reduce climate change if everyone else did as well.	39.3	28.5	13.3	7.9	11.1	3.77	1.33
The government should encourage people to look after the environment	40.2	20.6	12.7	8.8	17.7	3.56	1.51
Developing countries should take most of the blame for climate change.	31.9	29.4	18.4	9.1	11.1	3.61	1.31
Radical changes to society are needed to tackle climate change.	22.5	28.7	25.9	12.9	10.1	3.40	1.24
If I come across information about climate change I will tend to look at it.	23.1	27.4	22.8	16.5	10.3	3.36	1.28
Leaving the lights on in my home adds to climate change.	19.1	17.9	34	16.5	12.5	3.14	1.26
Climate change is a consequence of modern life.	19.9	27.9	25.6	15.3	11.4	3.29	1.26
The effects of climate change are likely to be catastrophic.	24.9	27.8	22.7	15.2	9.3	3.43	1.26
Pollution from industry is the main cause of climate change.	26	26.7	22.3	15.0	10.0	3.43	1.29
Total Scale						3.45	0.78

(Note: SA strongly agree, A agree, U undecided, D disagree, SD strongly disagree, M mean, St D standard deviation).

3.4. Are Teenagers Skeptical about the Reality of Climate Change?

The teenagers were also asked to reveal their agreement to statements on skepticism about the reality of climate change (see Table 4). The mean score was calculated as 2.68 n a scale of 1–5 (St D = 0.71). Thus, it seems that some teenagers are skeptical about the reality of climate change. The findings revealed that only half of the teenagers (50.4%) claimed to be certain about the reality of climate change and perceived this issue as a real problem (50.3%). On the other hand, the majority of them agreed that it is not too late to do anything about climate change (60.0%). In addition, more than half of the respondents (63.5%) supported claims that human activities have a significant impact on global temperatures. Regarding the consequences of climate change, a relatively large percentage of teenagers are uncertain about statements such as 'flooding is not increasing, there is just more reporting of it in the media these days' (29.3%), 'climate change will improve Türkiye's weather' (29.8%).

Table 4. Frequency Distributions for Skepticism in Climate Change Statements and Corresponding Item Means and Standard Deviations.

Items	SA	A	U	D	SD	M	St D
Climate change will improve Türkiye's weather.	17	21.6	29.8	15.5	16.1	3.08	1.30
It is already too late to do anything about climate change.	6.9	10.2	22.9	28.6	31.4	2.32	1.21
Human activities have no significant impact on global temperatures.	7.7	12.0	16.8	25.2	38.3	2.25	1.28
I am uncertain about whether climate change is really happening.	8.9	14.0	26.7	26.2	24.2	2.57	1.24
It is too early to say whether climate change is really a problem.	12.1	14.6	29.8	27.0	16.6	2.78	1.23
The media is often too alarmist about issues like climate change.	12.7	18.5	32.3	18.5	12.7	2.92	1.22
Flooding is not increasing, there is just more reporting of it in the media these days.	12.7	20.2	29.3	20.0	17.7	2.90	1.26
I do not believe climate change is a real problem.	12.4	14.7	22.6	24.1	26.2	2.63	1.34
Total Scale						2.68	0.71

(Note: SA strongly agree, A agree, U undecided, D disagree, SD strongly disagree, M mean, St D standard deviation).

3.5. Determinants of Climate Change-Related Actions

A multiple regression analysis was conducted to evaluate how much variance in teenagers' climate change-related actions can be explained by scores on skepticism about the reality of climate change, belief in climate change, and ecocentric and anthropocentric attitudes. Initially, sample size, normality, linearity, multicollinearity, and singularity assumptions were checked before conducting the analysis. There were no violations regarding these assumptions. The results indicated that belief in climate change and ecocentric and anthropocentric attitudes significantly contributed to the teenagers' climate change-related actions ($R = 0.407$, $R^2 = 0.161$, $F(3, 635) = 41.90$, $p < 0.000$). 'Beliefs in climate change' was a significant determinant which explained the greatest proportion of the criterion variance uniquely ($\beta = 0.22$; part correlation = 0.21) with a small effect size. 'Ecocentric' and 'anthropocentric attitudes' significantly and positively contributed to participation in climate change-related actions by the teenagers ($\beta = 0.16$, part correlation = 0.13; $\beta = 0.13$, part correlation = 0.11, respectively) with small effect sizes. This model, including belief in climate change and ecocentric and anthropocentric attitudes, explains 16% of the variance in teenagers' climate change-related actions with a medium effect size. On the other hand, skepticism about the reality of climate change was found to make no significant contribution in this model. See Table 5.

Table 5. The Results of Multiple Linear Regression Analysis.

	Part-Cor.	T	*p*	B (Standard)	R	Adj. R^2	F	*p*
Criterion Variable: CC-related Actions					0.407	0.161	41.90	0.000 *
Belief in climate change	0.21	5.51	0.000 *	0.223				
Ecocentric Attitudes	0.13	3.37	0.001 *	0.161				
Anthropocentric Attitudes	0.11	2.96	0.003 *	0.132				

* statistically significant at 0.05 alpha level.

3.6. Climate Change-Related Attributes in Terms of Gender

The present study intended to examine the discriminating power of gender in terms of climate change-related attributes. Thus, a discriminant analysis was carried out to reveal whether five predictor variables—namely, climate change-related actions, belief in climate change, skepticism about the reality of climate change and ecocentric and anthropocentric

attitudes—could differentiate female and male teenagers in the present study. The overall Wilk's lambda was found to be statistically significant ($\Lambda = 0.92$, χ^2 (5, $n = 617$) = 50.35, $p < 0.01$), showing that overall variables differentiated significantly between female and male teenagers. The results showed that 78% of these teenagers could be classified correctly. The discriminant function has an eigenvalue 0.086 and a canonical correlation of 0.251. As was reflected in Table 6, the Wilk's lambda values indicated significant differences in the means of the predictor variables, except for anthropocentric attitudes in terms of gender.

Table 6. Means, Standardized Coefficients, and Correlations of Predictors with the Discriminant Function.

Predictors	Female Mean	Male Mean	Λ	*p*	Correlation Coefficients	Standardized Coefficients
Actions	3.40	3.25	0.987	0.008 *	−0.36	−0.25
Ecocentric Attitudes	3.50	3.29	0.983	0.001 *	−0.45	−0.39
Anthropocentric Attitudes	3.21	3.25	0.999	0.534	0.09	0.34
Belief in Climate Change	3.55	3.31	0.976	0.000 *	−0.54	−0.35
Skepticism	2.55	2.86	0.953	0.000 *	0.76	0.68

* statistically significant at 0.05 alpha level.

The within-group correlations between the predictor variables and the discriminant function as well as the standardized weights are also presented in Table 6. These coefficients reflected the fact that ecocentric attitudes and skepticism about the reality of climate change showed a relatively strong relationship with the discriminant function. The mean scores calculated for these groups of teenagers supported this interpretation. More specifically, female teenagers appeared to have stronger ecocentric attitudes and tended to believe in climate change more compared to males. Furthermore, female teenagers seemed to engage in climate change-related actions more than males did. The results also reflected that anthropocentric attitudes were not statistically significant factors in differentiating teenagers in terms of gender.

4. Discussion and Conclusions

Considering the plausible patterns of changes at environmental, societal, economical levels in the country due to climate change, this study paid special attention to this issue in terms of teenagers' awareness, attitudes, beliefs, and actions. In terms of awareness, the present study showed that the teenagers were familiar with climate change and had heard of 'climate change' before. It appears that major information sources for the teenagers were 'school' and 'television'. Although our knowledge about how awareness of climate change is experienced by teenagers and children is quite limited (Léger-Goodes et al., 2022) [35], in line with the present research, Ozdem et al. (2014) [36] reported that students' main sources of information about climate change were television and school. Supporting this situation, Rickinson (2001) [37] argues that the media and school education are significant agents in perceiving environmental consequences and climatic changes. Therefore, media and educational programs that emphasize evidence from scientific research are key to raising awareness about climate change (Leiserowitz, Maibach, Roser-Renouf, Smith, and Dawson, 2013) [38]. However, our results indicated that less than half of the teenagers believed in the things that could be done to tackle climate change. Furthermore, a relatively large percentage of the teenagers reflected their illiteracy regarding the relevant issue (34.2%). These preliminary findings deserve to attract the attention of educators, policymakers, and researchers since dealing with climate change-related issues at school was found to be relatively uncommon among the teenagers (only 41.8%), which is in line with their levels of illiteracy regarding tackling climate change. It implies the need for an urgent call to evaluate the impact of formal education programs in terms of climate change education.

Regarding actions pertinent to climate change, it was found that these teenagers exhibited such actions at a moderate level. In particular, they indicated that physical actions tend to be more common than actions reflecting the consumerism and persuasion aspects,

but they are still not at the desirable level. To illustrate, they enacted their engagement as frequently as possible in some actions on energy and water saving, and the recycling of materials such as paper, glass, and aluminum cans, wherein they could have a direct impact on saving the natural world. Recently, a governmental initiative called The Zero Waste Project has been accelerated across the country in order to enhance the recycling and waste management behavior of citizens. This project overtly highlights the importance of eliminating waste in terms of tackling the climate crisis. This effort might, at a certain level, have had an impact on the teenagers' decisions to participate in such actions. Furthermore, the shortage of water and the increase in forest fires experienced in recent years across the country might result in a raised in awareness concerning energy and water saving, and plant protection. However, these teenagers showed a lesser tendency to take some actions requiring the encouragement of others to engage in environmentally friendly activities. Similar results have been reported in the related literature including in studies sampling individuals with different demographic characteristics. To illustrate, the research conducted by Higde, Oztekin, and Sahin (2017) [12] and Meilinda, Rustaman, and Tjasyono (2017) [66] showed that teacher candidates stated that they were more likely to take actions towards energy saving and recycling in the fight against climate change, but their consumption of products in recyclable packages and purchase of local products is less frequently taken into account. Similarly, Hermans and Korhonen (2017) [29] emphasized that the actions that secondary school students were willing to engage in to fight against climate change were reducing electricity use and reusing and recycling. Chhokar et al. (2011) [34] stated that young people tend to turn off the lights and electronic devices they do not use in order to reduce climate change, but they are reluctant to take actions such as reducing meat consumption, limiting the purchase of clothing, and using public transportation.

This research also depicted the teenagers' belief in climate change, the causes of this issue, and the ways to mitigate it. Unfortunately, it was revealed that only half of these individuals were certain about the reality of climate change and understood this issue to be a real problem. Similarly, a relatively large percentage of these teenagers did not appear to believe in the role of modern life in climate change, the catastrophic consequences of climate change, and the radical changes that we should make in our society. Regarding this psychological construct, these data collected from young people aged 13–14 living in a rural area did not show similar results to those in the climate change literature. To illustrate, in their recent study, Deshiana, Sriyanti, and Ismet (2022) [50] stated that 95.7% of young people from high schools in a province of Indonesia believe in climate change mitigation and tend to engage in actions to reduce the effects of climate change. Other empirical evidence gathered from young people (Li and Monroe, 2017; Igu et al., 2023; Pandve, Deshmukh, Pandve, and Patil; 2009) [51–53] revealed their belief in the existence of climate change, the need to reduce the effects of climate change, and their personal contribution to combating climate change.

This research assessed the extent to which skeptical beliefs about the reality of climate change contribute to explaining relevant actions. In line with the data gathered from pre-service teachers (Higde, Oztekin, and Sahin, 2017) [12], this psychological factor was not a significant antecedent of climate change-related actions. Skepticism about climate change was overshadowed in predictive power by a combination of factors including belief in climate change and environmental attitudes reflecting ecocentrism and anthropocentrism. This result implied that young climate change skeptics have no role in tackling this issue.

It is important to note that a meta-analysis on the demographic and psychological determinants of belief in climate change (Hornsey et al., 2016) [4] reported that most determinants and outcomes of belief in climate change exhibit small (e.g., public/private pro-environmental behavior) to medium (e.g., biospheric values, trust in scientists) effect sizes. From this perspective, the results of the present study mostly align with the general patterns in the literature on climate change beliefs. Considering the significant determinants of climate change-related actions, this study provided further evidence on the role of beliefs and attitudes in relation to this issue with a medium effect size reported for the relevant

linear model. To be more specific, teenagers believing that anthropogenic factors lead to climate change and, therefore, that we, as humans, should do our bit to reduce climate change, also tend to take the necessary actions to combat climate change. Furthermore, those individuals who value the natural environment for its own sake engage in actions for climate change mitigation. De Groot and Steg (2007) [40] previously asserted that ecocentric worldviews reflected as ecocentrism and biospherism in the related literature are more remarkable factors pointing nature-centered perspectives compared to worldviews represented by altruism, egoism, and anthropocentrism, extensively showing nonsignificant or less additional positive variance in explaining pro-environmental behaviors.

At this point, we should note that it was interesting to find a significant relationship between climate change-related actions and anthropocentric attitudes in our study, reflecting the interconnectedness of human needs with nature. This result could be attributed to the living standards and conditions of these teenagers living in a rural area. Being mostly the children of farmers and stockbreeder parents, these orientations—namely, ecocentrism and anthropocentrism—may not be in conflict while explaining climate change related actions. Similar to previous research (Onur, Sahin, and Tekkaya, 2012) [6] Turkish teenagers living in rural areas that were physically connected to the natural environment tended to support the value of nature for its own sake but also for the needs and comfort of humans and, in turn, demonstrated pro-environmental behaviors. In other words, these individuals, having judgments on nature having its own value as well as a utilitarian approach, had more of an inclination to take climate change-related actions.

Regarding the discriminating power of gender for climate change-related attributes, as reported by Deshiana, Sriyanti, and Ismet (2022) [50], among young people, females were found to have a higher tendency to engage in actions for climate change mitigation compared to males. Similarly, Shi et al. (2016), McCright (2010) and Pandve and Raut (2011) [54,67,68] argued that females were more concerned about climate change than males and their awareness of climate change was higher. However, contrary to these claims, Whitmarsh (2008) [26] and Falaye and Okwilagwe (2016) [69] pointed out that young people did not exhibit gender differences in their beliefs on this issue. Looking into the gender difference for ecocentrism, a significant determinant of climate change-related actions, females had a stronger fundamental belief in the intrinsic value of nature and all living things than males. It has been argued that gender differences in attitudes regarding environmental issues including climate change could be due to the difference in the social roles of men and women. Numerous research studies (e.g., Williams and Best, 1990; Zhao et al., 2021; Zelezny, Chua, Aldrich, 2000) [70–72] in the field of environmental psychology have utilized gender socialization theory when explaining the factors underlying attitudes, values, and behaviors. Furthermore, Zelezny, Chua, and Aldrich (2000) [72] pointed out that gender socialization predominantly has some impacts on individual behaviors even in the early years of life and across cultures. Supporting the claims of these researchers, the present study implied that females are not less active on the climate change issue than to males. Thus, females are empowered with potential and could be influential in activism intended to tackle climate change.

By delving into the present state and the explanatory power of some socio-psychological and demographic variables on teenagers' actions pertinent to climate change in a developing country, the findings of this study may provide some practical implications for policymakers, curriculum developers, and environmental and sustainability educators. It reveals that these stakeholders have much work to do in terms of preparing future citizens of the country with an acceptable degree of awareness, the right attitudes and beliefs, and the will to participate in movements that fight climate change. We are not confident that the climate change-related beliefs, attitudes, and actions will remain stable among the teenagers as they grow older. However, it is still very significant to reveal the possible determinants of the commitment to tackling climate change among this target group. In other words, it is essential to identify the barriers that hinder teenagers from translating climate awareness into meaningful action within their communities. The teenage years are

a time of emotional and social development, and the internalization of values as well as the acquisition of much of understanding about climate change in school (Ojala, 2015) [73]. Thus, the present state of climate change-related attributes and their interplay in this study should be taken into account in climate change education.

We have to recall that the present data portray relatively high levels of skeptical beliefs about the reality of climate change and only moderate levels of actions aimed at tackling climate change. Although speculative, this finding may be linked to two other possible aspects: disparities compared to their urban peers in terms of access to resources and quality issues in the formal education system available to teenagers in rural areas of the country. According to the Hacettepe University Institute of Population Studies Report (2018) [74], significant disparities exist between teenagers living in urban and rural areas in terms of different socioeconomic status, educational attainment, parental education level, support for early learning, and access to care and healthy nutrition, all of which are known indicators for educational and behavioral outcomes (Johnson et al., 2014; Iruka et al., 2020) [59,60]. Consequently, teenagers in rural areas may have limited access to resources related to climate change, and this lack of knowledge may hinder their beliefs and actions in terms of addressing climate change.

As a second aspect, teachers are key actors in formal education (Monk, 2007) [75] who disseminate scientific information and knowledge about the reality of climate change, which might work to hinder skeptical beliefs and facilitate relevant actions. However, according to a recent report published by a national education think tank (TEDMEM, 2021) [61], in the first year of their career, teachers are often assigned to work in disadvantaged and rural areas of the country. In Türkiye, approximately half of the teachers in their early years in the profession work in rural areas and in schools where socioeconomically disadvantaged students are the majority. Unfortunately, Türkiye has the highest ranking among 48 countries in terms of the ratio of teachers in their early years working in rural areas and in schools with predominantly socioeconomically disadvantaged students. More importantly, in TEDMEM's report (2021) [61] it was also concluded that considering the importance of professional experience and sustainability in education for students, the trends in terms of teaching experience bring about quality and stability problems in education and problems related to ensuring equality of opportunity in education in Türkiye. In other words, these novice teachers may tend to have limited pedagogical knowledge and understanding on how to teach sustainability issues, including climate change, and they are required to develop in terms of their capacities to implement education for sustainability and climate change (Zhukova, Fjodorova, and Iliško, 2020) [76].

5. Limitations and Recommendations

The present study was framed relying on quantitative research and trust in the self-reporting of attributes as reflected by the teenagers themselves. As pointed out by Hollweg et al. (2011) [77], self-reported constructs such as actions, attitudes, and values might be influenced by social desirability factors which should be taken into account as a limitation on the validity of judgements resulting from such data. In order to address this issue, the authors suggested three considerations including negatively worded items, statements assessing unrelated to actions, and the use of blind observers. Thus, as an indicator of climate change-related actions, assessing actual actions can be utilized in future research. Supportive evidence could be provided by considering some measures used in previous research such as face-to-face or exploratory interviews (Whitmarsh 2005; 2009) [9,44], composite behavioral measures (Abrahamse et al., 2005; 2007) [78,79], meter reading, and the use of previous studies (Gatersleben, Steg, and Vlek 2002) [80].

Regarding the generalizability of the results, samples from different geographical regions of the country or urban areas may show different findings. The replication of this study but examining different geographical settings can provide valuable insights because teenagers are both 'climate change victims' and future 'climate change actors' (Nche, Achunike, and Okoli, 2019) [15]. By understanding the nature of teenagers' belief

in climate change, their present worldviews, their present choices and actions, and the interplay of these constructs with respect to certain demographics, we can better estimate the future conditions for climate change-related issues and draw some paths for climate change mitigation.

This research utilized beliefs and attitudes as a proxy for the teenagers' actions aimed at tackling climate change. Considering the small and medium effect sizes reported for the relevant determinants, future studies could examine other psychological and cognitive factors that facilitate such actions. For further studies, the associations between teenagers' actions and their experience of local weather change, trust in scientists, objective and subjective knowledge, and pro-environmental beliefs (New Ecological Paradigm) could be taken into account. The present research also reveals gender differences in favor of females on climate change-related attributes, excluding anthropocentric attitudes, but leaves some questions relevant to the reasons for this difference. We utilized gender socialization theory, which examines differences in the social roles of men and women as the cause of differences in climate change-related beliefs, attitudes, and actions, but could not strongly support such explanations with the survey used in this research. These claims should be examined and verified in future research.

Author Contributions: Conceptualization, S.S., E.S. and E.H.; Methodology, S.S., E.S. and E.H.; Software, E.S. and E.H.; Validation, S.S., E.S., E.H. and S.D.; Formal analysis, S.S., E.S. and E.H.; Investigation, S.S., E.S. and E.H.; Resources, S.S., E.S. and E.H.; Data curation, S.S., E.S. and E.H.; Writing—original draft, E.S. and E.H.; Writing—review & editing, E.S., E.H. and S.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by Afyon Provincial Directorate of National Education (Approval Code: 49809702-620-1320167, Date of Approval: 1 February 2017).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. IPCC. *Climate Change 2022: Impacts, Adaptation and Vulnerability*; Pörtner, H.-O., Roberts, D.C., Tignor, M., Poloczanska, E.S., Mintenbeck, K., Alegría, A., Craig, M., Langsdorf, S., Löschke, S., Möller, V., et al., Eds.; Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change; Cambridge University Press: Cambridge, UK; New York, NY, USA, 2022; 3056p. [CrossRef]
2. Poortinga, W.; Whitmarsh, L.; Steg, L.; Böhm, G.; Fisher, S. Climate change perceptions and their individual-level determinants: A cross European analysis. *Glob. Environ. Chang.* **2019**, *55*, 25–35. [CrossRef]
3. Corner, A.; Whitmarsh, L.; Xenias, D. Uncertainty, skepticism and attitudes towards climate change: Biased assimilation and attitude polarisation. *Clim. Chang.* **2012**, *114*, 463–478. [CrossRef]
4. Hornsey, M.J.; Harris, E.A.; Bain, P.G.; Fielding, K.S. Meta-analyses of the determinants and outcomes of belief in climate change. *Nat. Clim. Chang.* **2016**, *6*, 622–626. [CrossRef]
5. Lorenzoni, I.; Nicholson-Cole, S.; Whitmarsh, L. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Glob. Environ. Chang.* **2007**, *17*, 445–459. [CrossRef]
6. Onur, A.; Sahin, E.; Tekkaya, C. An investigation on value orientations, attitudes and concern towards the environment: The case of Turkish elementary school students. *Environ. Educ. Res.* **2012**, *18*, 271–297. [CrossRef]
7. UNFCCC. *The Paris Agreement*; United Nations Framework Convention on Climate Change: Bonn, Germany, 2017.
8. United Nations Environment Programme. *Climate Change Strategies 2020*; United Nations Environment Programme: Nairobi, Kenya, 2020.
9. Whitmarsh, L. Behavioural responses to climate change: Asymmetry of intentions and impacts. *J. Environ. Psychol.* **2009**, *29*, 13–23. [CrossRef]
10. Whitmarsh, L. Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Glob. Environ. Chang.* **2011**, *21*, 690–700. [CrossRef]
11. Poortinga, W.; Spence, A.; Whitmarsh, L.E.; Capstick, S.B.; Pidgeon, N.F. Uncertain climate: An investigation into public scepticism about anthropogenic cdisslimate change. *Glob. Environ. Chang.* **2011**, *21*, 1015–1024. [CrossRef]

12. Higde, E.; Oztekin, C.; Sahin, E. Turkish pre-service science teachers' awareness, beliefs, values, and behaviours pertinent to climate change. *Int. Res. Geogr. Environ. Educ.* **2017**, *26*, 253–263. [CrossRef]
13. Arbuckle, J.G.; Morton, L.W.; Hobbs, J. Understanding Farmer Perspectives on Climate Change Adaptation and Mitigation: The Roles of Trust in Sources of Climate Information, Climate Change Beliefs, and Perceived Risk. *Environ. Behav.* **2015**, *47*, 205–234. [CrossRef]
14. Kuthe, A.; Keller, L.; Körfgen, A.; Stötter, H.; Oberrauch, A.; Höferl, K.M. How many young generations are there?—A typology of teenagers' climate change awareness in Germany and Austria. *J. Environ. Educ.* **2019**, *50*, 172–182. [CrossRef]
15. Nche, G.C.; Achunike, H.C.; Okoli, A.B. From climate change victims to climate actors: The role of eco-parenting in building mitigation and adaptation capacities in children. *J. Environ. Educ.* **2019**, *50*, 131–144. [CrossRef]
16. Busch, K.C. Textbooks of doubt, tested: The effect of a denialist framing on adolescents' certainty about climate change. *Environ. Educ. Res.* **2021**, *27*, 1574–1598. [CrossRef]
17. UNICEF. *Unless We Act Now: The Impact of Climate Change on Children*; United Nations Children's Fund (UNICEF): New York, NY, USA, 2015; Available online: www.unicef.org (accessed on 6 January 2024).
18. Hanna, R.; Oliva, P. Implications of Climate Change for Children in Developing Countries. *Future Child.* **2016**, *26*, 115–132. [CrossRef]
19. UNICEF. *Climate Change and Children*; United Nations Children's Fund (UNICEF): New York, NY, USA, 2007. Available online: www.unicef.org (accessed on 6 January 2024).
20. Trott, C.D. Children's constructive climate change engagement: Empowering awareness, agency, and action. *Environ. Educ. Res.* **2020**, *26*, 532–554. [CrossRef]
21. Prati, G.; Albanesi, C.; Pietrantoni, L. The interplay among environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate: A longitudinal study. *Environ. Educ. Res.* **2017**, *23*, 176–191. [CrossRef]
22. Izadpanahi, P.; Elkadi, H.; Tucker, R. Greenhouse affect: The relationship between the sustainable design of schools and children's environmental attitudes. *Environ. Educ. Res.* **2017**, *23*, 901–918. [CrossRef]
23. Zaval, L.; Cornwell, J.F.M. Effective education and communication strategies to promote environmental engagement. *Eur. J. Educ.* **2017**, *52*, 477–486. [CrossRef]
24. Tam, K.P.; Leung, A.K.; Clayton, S. Research on climate change in social psychology publications: A systematic review. *Asian J. Soc. Psychol.* **2021**, *24*, 117–143. [CrossRef]
25. Islam; Mofakkarul, M.; Barnes, A.; Toma, L. An investigation into climate change scepticism among farmers. *J. Environ. Psychol.* **2013**, *34*, 137–150. [CrossRef]
26. Whitmarsh, L. Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *J. Risk Res.* **2008**, *11*, 351–374. [CrossRef]
27. Herman, B.C. The Influence of global warming science views and sociocultural factors on willingness to mitigate global warming. *Sci. Educ.* **2015**, *99*, 1–38. [CrossRef]
28. Sia, A.P.; Hungerford, H.R.; Tomera, A.N. Selected predictors of responsible environmental behaviors: An analysis. *J. Environ. Educ.* **1986**, *17*, 31–40. [CrossRef]
29. Hermans, M.; Korhonen, J. Ninth graders and climate change: Attitudes towards consequences, views on mitigation, and predictors of willingness to act. *Int. Res. Geogr. Environ. Educ.* **2017**, *26*, 223–239. [CrossRef]
30. Hines, J.M.; Hungerford, H.R.; Tomera, A.N. Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *J. Environ. Educ.* **1987**, *18*, 1–8. [CrossRef]
31. Jensen, B.B. Knowledge, Action and Pro-environmental Behaviour. *Environ. Educ. Res.* **2002**, *8*, 325–334. [CrossRef]
32. Kollmuss, A.; Agyeman, J. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environ. Educ. Res.* **2002**, *8*, 239–260. [CrossRef]
33. Steg, L.; Bolderdijk, J.W.; Keizer, K.; Perlaviciute, G. An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *J. Environ. Psychol.* **2014**, *38*, 104–115. [CrossRef]
34. Chhokar, K.; Dua, S.; Taylor, N.; Boyes, E.; Stanisstreet, M. Indian secondary students' views about global warming: Beliefs about the usefulness of actions and willingness to act. *Int. J. Sci. Math. Educ.* **2011**, *9*, 1167–1188. [CrossRef]
35. Léger-Goodes, T.; Malboeuf-Hurtubise, C.; Mastine, T.; Généreux, M.; Paradis, P.O.; Camden, C. Eco-anxiety in children: A scoping review of the mental health impacts of the awareness of climate change. *Front. Psychol.* **2022**, *13*, 872544. [CrossRef]
36. Özdem, Y.; Dal, B.; Öztürk, N.; Sönmez, D.; Alper, U. What is that thing called climate change? An investigation into the understanding of climate change by seventh-grade students. *Int. Res. Geogr. Environ. Educ.* **2014**, *23*, 294–313.
37. Rickinson, M. Learners and learning in environmental education: A critical review of the evidence. *Environ. Educ. Res.* **2001**, *7*, 207–320. [CrossRef]
38. Leiserowitz, A.A.; Maibach, E.W.; Roser-Renouf, C.; Smith, N.; Dawson, E. Climategate, public opinion, and the loss of trust. *Am. Behav. Sci.* **2013**, *57*, 818–837. [CrossRef]
39. Van der Linden, S. On the relationship between personal experience, affect and risk perception: The case of climate change. *Eur. J. Soc. Psychol.* **2014**, *44*, 430–440. [CrossRef] [PubMed]
40. De Groot, J.I.M.; Steg, L. Value orientations and environmental beliefs in five countries: Validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *J. Cross Cult. Psychol.* **2007**, *38*, 318–332. [CrossRef]

41. Gagnon Thompson, S.C.; Barton, M.A. Ecocentric and anthropocentric attitudes toward the environment. *J. Environ. Psychol.* **1994**, *14*, 149–157. [CrossRef]
42. Gunnar, G.; Wollebaek, D. Greener still? An empirical examination of Eckersley's ecocentric approach. *Environ. Behav.* **1998**, *30*, 653–675.
43. Elvan, S.; Alper, U.; Oztekin, C. Modelling pre-service science teachers' pro-environmental behaviours in relation to psychological and cognitive variables. *Environ. Educ. Res.* **2021**, *27*, 1–21.
44. Whitmarsh, L. A Study of Public Understanding of and Response to Climate Change in the South of England. Doctoral Thesis, Department of Psychology, University of Bath, Bath, UK, 2005.
45. Fishbein, M.A.; Ajzen, I. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*; Addison-Wesley: Reading, MA, USA, 1975; Volume 6, pp. 244–245.
46. Brownlee, M.T.; Powell, R.B.; Hallo, J.C. A review of the foundational processes that influence beliefs in climate change: Opportunities for environmental education research. *Environ. Educ. Res.* **2013**, *19*, 1–20. [CrossRef]
47. Pooley, J.A.; o'Connor, M. Environmental education and attitudes: Emotions and beliefs are what is needed. *Environ. Behav.* **2000**, *32*, 711–723. [CrossRef]
48. Bloom, P.J.; Ellis, L. Helping teachers identify and articulate their values and beliefs. *The Director's Link*, 2009, pp. 1–3. Available online: https://mccormickcenter.nl.edu/library/helping-teachers-identify-and-articulate-their-values-and-beliefs/ (accessed on 25 July 2024).
49. Nespor, J. The role of beliefs in the practice of teaching. *J. Curric. Stud.* **1987**, *19*, 317–328. [CrossRef]
50. Deshiana, A.; Sriyanti, I.; Ismet, I. High school students' awareness and attitudes toward climate change. *Berk. Ilm. Pendidik. Fis.* **2022**, *10*, 320–330. [CrossRef]
51. Igu, N.; Anochiwa, R.; Ogba, F.N.; Nwinyinya, E.; Eze, B.; Ogar, J.O.; Obih, S.O.A.; Ugbogu, C. How teacher's climate change belief influences classroom management practices for students' climate change awareness in Nigerian schools. *Pol. J. Environ. Stud.* **2023**, *32*, 2657–2668. [CrossRef]
52. Li, C.J.; Monroe, M.C. Exploring the essential psychological factors in fostering hope concerning climate change. *Environ. Educ. Res.* **2017**, *25*, 936–954. [CrossRef]
53. Pandve, H.; Deshmukh, P.; Pandve, R.; Patil, N. Role of youth in combating climate change. *Indian J. Occup. Environ. Med.* **2009**, *13*, 105–106. [CrossRef]
54. Shi, J.; Visschers, V.H.M.; Siegrist, M.; Arvai, J. Knowledge as a driver of public perceptions about climate change reassessed. *Natl. Clim. Chang.* **2016**, *6*, 759–762. [CrossRef]
55. Robert, G.; Comeau, L.A. Message framing influences perceived climate change competence, engagement, and behavioral intentions. *Glob. Environ. Chang.* **2011**, *21*, 1301–1307.
56. Paul, U.; Whitmarsh, L.; Poortinga, W.; Purdam, K.; Darnton, A.; McLachlan, C.; Devine-Wrigh, P. *Public Attitudes to Environmental Change: A Selective Review of Theory and Practice*; ESRC/LWEC: Manchester, UK, 2009.
57. Atiqul, H.S.M.; Ahmed, K.J. Perceptions about climate change among university students in Bangladesh. *Nat. Hazards* **2020**, *103*, 3683–3713.
58. Eurobarometer Special. *Attitudes of European Citizens Towards the Environment*; European Commission: Brussels, Belgium, 2008; 295p.
59. Iruka, I.U.; DeKraai, M.; Walther, J.; Sheridan, S.M.; Abdel-Monem, T. Examining how rural ecological contexts influence children's early learning opportunities. *Early Child. Res. Q.* **2020**, *52*, 15–29. [CrossRef]
60. Johnson, J.; Showalter, D.; Klein, R.; Lester, C. *Why Rural Matters 2013–2014: The Condition of Rural Education in the 50 States*; Rural School and Community Trust: Washington, DC, USA, 2014. Available online: https://eric.ed.gov/?id=ED556045 (accessed on 2 July 2024).
61. TEDMEM. *20. Millî Eğitim Şûrası Konularına Ilişkin Görüş ve Öneriler [Remarks and Recommendations on the themes of the 20th National Education Council] (TEDMEM Güncel Yayınlar Dizisi 6)*; Türk Eğitim Derneği: Ankara, Turkey, 2021; ISBN 978-605-74377-1-6.
62. MedECC. *Climate and Environmental Change in the Mediterranean Basin—Current Situation and Risks for the Future. First Mediterranean Assessment Report*; Cramer, W., Guiot, J., Marini, K., Eds.; Union for the Mediterranean, Plan Bleu, UNEP/MAP: Marseille, France, 2020; p. 632, ISBN 978-2-9577416-0-1. [CrossRef]
63. OECD. OECD Country Note: Turkey. Rural Well-Being: Geography of Opportunities. Available online: https://www.oecd.org/regional/Rural-WellBeing-Turkey.pdf (accessed on 5 July 2024).
64. Saplıoğlu, K.; Klit, M. İklim değişikliğinin Afyon ilindeki yağış ve sıcaklıklara etkisinin araştırılması ve trendlerinin belirlenmesi. *Eng. Sci.* **2012**, *7*, 696–705.
65. Higde, E.; Oztekin, C. An Investigation into scepticism and knowledge about climate change among prospective science teachers. In *International Perspectives on New Aspects of Learning in Teacher Education*; IPALTE: Diyarbakir, Turkey, 2013.
66. Meilinda, R.N.; Tjasyono, B. The perceptions of pre-service science teachers and science teachers about climate change. *J. Pendidik. IPA Indones.* **2017**, *6*, 292–397. [CrossRef]
67. McCright, A.M. The effects of gender on climate change knowledge and concern in the American public. *Popul. Environ.* **2010**, *32*, 66–87. [CrossRef]
68. Pandve, H.; Raut, A. Assessment of awareness regarding climate change and its health hazards among the medical students. *Indian J. Occup. Environ. Med.* **2011**, *15*, 42–46. [CrossRef]

69. Falaye, F.V.; Okwilagwe, E.A. Assessing the senior school students' knowledge, attitude and practices related to climate change: Implications for curriculum review and teacher preparation. *J. Int. Soc. Teach. Educ.* **2016**, *20*, 44–52.
70. Williams, J.E.; Best, D.L. *Sex and Psyche: Gender and Self Viewed Cross-Culturally*; Sage Publications, Inc.: Thousand Oaks, CA, USA, 1990.
71. Zhao, Z.; Gong, Y.; Li, Y.; Zhang, L.; Sun, Y. Gender-related beliefs, norms, and the link with green consumption. *Front. Psychol.* **2021**, *12*, 710239. [CrossRef]
72. Zelezny, L.C.; Chua, P.-P.; Aldrich, C. Elaborating on gender differences in environmentalism. *J. Soc. Issues* **2000**, *56*, 443–457. [CrossRef]
73. Ojala, M. Climate change skepticism among adolescents. *J. Youth Stud.* **2015**, *18*, 1135–1153. [CrossRef]
74. Hacettepe University Institute of Population Studies. *2018 Turkey Demographic and Health Survey*; Hacettepe University Institute of Population Studies, T.R. Presidency of Turkey Directorate of Strategy and Budget and TÜBİTAK: Ankara, Turkey, 2018. Available online: https://fs.hacettepe.edu.tr/hips/dosyalar/Ara%C5%9Ft%C4%B1rmalar%20-%20raporlar/2018%20TNSA/TDHS2018_mainReport_compressed.pdf (accessed on 15 July 2024).
75. Monk, D.H. Recruiting and retaining high-quality teachers in rural areas. *Future Child.* **2007**, *17*, 155–174. [CrossRef] [PubMed]
76. Zhukova, O.; Fjodorova, I.; Iliško, D. Novice Teachers' Beliefs and Knowledge about Education for Sustainable Development. *Acta Paedagog. Vilnensia* **2020**, *44*, 34–44. [CrossRef]
77. Hollweg, K.S.; Taylor, J.R.; Bybee, R.W.; Marcinkowski, T.J.; McBeth, W.C.; Zoido, P. *Developing a Framework for Assessing Environmental Literacy*; North American Association for Environmental Education: Washington, DC, USA, 2011.
78. Abrahamse, W.L.; Vlek, S.C.; Rothengatter, J.A. A Review of Intervention Studies Aimed at Household Energy Conservation. *J. Environ. Psychol.* **2005**, *25*, 273–291. [CrossRef]
79. Abrahamse, W.; Steg, L.; Vlek, C.; Rothengatter, J.A. The Effect of Tailored Information, Goal Setting and Feedback on Household Energy Use, Energy Related Behaviors and Behavioral Determinants. *J. Environ. Psychol.* **2007**, *27*, 265–276. [CrossRef]
80. Gatersleben, B.; Steg, L.; Vlek, C. Measurement and determinants of environmentally significant consumer Behaviour. *Environ. Behav.* **2002**, *34*, 335–336. [CrossRef]