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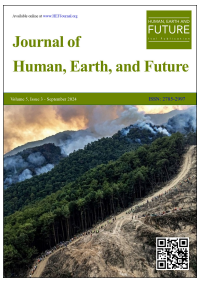

Comparative Perceptions Influence Actions on Climate Change Between Eastern and Western Europeans

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Abstract

Climate change is an important issue that countries worldwide are aware of and campaign to reduce. All parties must cooperate, whether the government, the private sector, individuals, etc. Many perception surveys have met the public's understanding and knowledge about climate change. Despite the odds, previous research supported environmental protection and sustainability in surveys, polls, and past research. However, the existing literary gap between intentions and actions and awareness and implementation has recently widened. The objectives of this research include comparing perceptions and climate change mitigation actions between Eastern and Western European countries because both regions are different, as well as searching for and comparing perceptions influencing climate change mitigation actions between them. The research adopts a quantitative methodology, emphasizing exploring secondary data from the European Investment Bank (EIB) climate change survey 2022–2023. It analyzed the data to compare the perceptions and actions of the two regions in mitigating climate change. The statistical tests included a t-test and stepwise multiple regression analysis to predict the influence of perceptions and actions on reducing climate change. The results showed that respondents' perceptions of climate change in Eastern and Western Europe were not significantly different. However, there was a significant difference in the number of reduction actions taken by Western Europeans compared to Eastern Europeans. Perceptions of climate change catastrophes and serious government mitigation actions positively influenced actions in Eastern Europe. This study found that businesses' attention to mitigation and their perception of the catastrophic effects of climate change positively influence mitigation actions in Western Europe. The recommendations guided governments, policymakers, and businesses to take action to reduce climate change, motivating people's adequate perceptions and actions. Stakeholders communicating climate change's impacts on catastrophe should present true information with honesty and transparency.

Keywords: Comparative; Perceptions on Climate Change; Actions on Climate Change; Eastern and Western Europeans.

1. Introduction

Climate change is a complex problem involving temperature and weather changes over extended periods. While some of these changes occur naturally, human activities have accelerated the process, mainly by burning fossil fuels such as coal, petroleum, and gas. Burning these fuels releases harmful greenhouse gases, like carbon dioxide and methane, into the atmosphere. Unfortunately, these gases trap heat from the sun, leading to an increase in global temperatures.

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Activities such as using fuel oil for transportation, burning coal to heat buildings, and practices such as soil preparation and deforestation contribute to carbon dioxide emissions. Additionally, garbage disposal, particularly through decommissioning processes, is a significant source of greenhouse gas emissions that further complicates the challenges posed by climate change [1-3].

According to the United Nations (UN) [1], climate change is causing severe issues such as droughts, water shortages, forest fires, rising sea levels, floods, melting polar ice caps, large storms, and biodiversity loss. These problems greatly impact our lives, such as health, farming, housing, safety, and work. For example, rising sea levels and saltwater intrusion have forced many people to migrate from islands. Additionally, long droughts can result in food shortages, and unstable and extreme weather conditions worsen the problems of hunger and malnutrition, affecting fisheries, farming, and livestock. The heat causes water sources to dry up and decreases grassland areas for raising animals. Acidic oceans also damage marine resources that sustain billions of people. Changes in snow and ice in the North Pole have severely affected the amount of food available for grazing, hunting, and fishing. Moreover, extreme heat reduces the amount of water and grazing available for animals.

In 2023, the global average temperature rose significantly, reaching 14.98°C, 0.17°C higher than the highest annual value recorded in 2016. This led to the designation of 2023 as the hottest year on record [4]. Citizens must take action to prevent and resolve climate change by working together to raise awareness and establish vital national and international policies and plans. In addition to the government's role, citizens must also be involved in climate solutions for sustainability. Everyone's everyday actions significantly impact the planet, regardless of the amount of electricity consumed, the food consumed, or the mode of transportation [5].

Many scholars now accept that human activity is causing climate change. However, despite this widespread awareness, studies have shown that people are not always willing to take the necessary action to reduce it [6]. Many individuals agree that humans cause climate change but are unwilling to make the investments and sacrifices required to respond to this threat [7]. In Germany, Venghaus et al. [8] found that people had a positive attitude towards climate protection and recognized the dangers of climate change, but their travel behaviors remained unchanged. However, they were more mindful of their diet and lifestyle choices. Another study by Vieira et al. [9] in Portugal showed that respondents had a positive attitude towards the environment, which moderately correlated with the frequency of their environmental actions such as material recycling, reducing consumption of animal products, saving water and energy, and using aeroplanes, but they had conditionally cooperative behavior. Andre et al. [6] conducted a representative survey of 125 countries, interviewing nearly 130,000 individuals, and found widespread support for climate action. 69% of the world's population expressed willingness to donate 1% of their income to organizations or activities to reduce global warming, and 89% called for stronger political action. Most people still see reducing climate change as the government's responsibility.

There is a noticeable increase in people's awareness of the impacts of climate change, but their actions towards reducing it are not as significant. This indicates a significant gap between what they perceive and what they do. Perception shapes attitudes, intentions, and decisions, ultimately affecting behaviors or actions [10]. Thus, it is important to have a deeper understanding of people and their behaviors through analytics to comprehend why people do or do not respond to climate change. This understanding can contribute to designing more effective interventions. Additionally, psychology can help by shedding light on the psychological factors that affect organizational behavior change and cultural and policy changes [11, 12].

This study raised the question of what perceptions about climate change can motivate people to act towards reducing it, and stakeholders should continue to raise awareness and work towards improving in areas where people have less perception. The method investigated the perceptions that impact climate change actions in 27 EU countries. Europe plays a significant role in addressing climate change and planning a warming plan for the next 10–30 years, even amidst the COVID-19 pandemic. Despite the pandemic, many Europeans still consider climate change the most significant threat to their countries. The Eurobarometer survey in 2021 showed that European citizens believe climate change is the world's most serious problem. More than nine out of ten people surveyed, or 93%, consider climate change a serious problem [13]. In the Yale Program on Climate Change Communication survey in 2022, Europeans were most likely to correctly answer that human activities cause climate change [14].

It had two objectives: (1) to compare perceptions of climate change and climate-reducing actions between Eastern and Western Europe, given that these two regions differ significantly in terms of political systems, cultural background, and economic structure; and (2) to identify the perceptions that influence climate change mitigation actions and issues that affect such actions, using data from the Climate Survey of the Bank of the European Union or the EIB between 2022 and 2023 [15]. The study analyzed the relationship between European perceptions and climate-changing actions to guide building awareness and enhancing climate-change actions.

2. Literature Review

2.1. Psychology Theories about Perceptions and Actions

Psychology is the scientific study of human and animal mental states, processes, and behaviors. It encompasses various subfields, including human development, social behavior, clinical psychology, and cognitive processes. Psychologists and behavioral scientists agree that perception and action are intricately linked in daily life. Perception guides action, and when people perceive their environment, they select targets for action. Action can change perception, too. Perception and action are intertwined, shaping how a person interacts with the world and adapts to his surroundings [16, 17].

There are psychological theories related to perception and action, including:

1. Cognitive dissonance is a psychological theory [18] that explains the mental discomfort people experience when they hold conflicting beliefs, values, attitudes, or perceptions. This tension arises when people have inconsistent thoughts or behaviors, leading to feelings of unease or discomfort. It is natural for people to seek consistency in their attitudes and perceptions, so when they encounter contradictory information, it can create mental tension. Cognitive dissonance manifests as discomfort before deciding, justifying, or rationalizing an already-made decision, feeling guilt, regret, or embarrassment about past actions, giving in to social pressure, or experiencing fear of missing out, even when it contradicts their desires [17].

2. Cognitive bias [19, 20] refers to systematic patterns of deviation from rationality in people's judgments and decision-making. These biases occur due to the way their cognitive system processes information. Essentially, they cause us to be irrational in searching for, evaluating, interpreting, judging, using, and remembering information. Individuals construct their subjective reality based on their perception of input. It is not objective information that dictates behavior; rather, it is their interpretation. Biases often operate unconsciously, influencing their thoughts and actions without awareness. Biases are part of human nature, affecting how people perceive reality and make decisions.

3. Perception bias [20, 21] is a fascinating phenomenon that influences how humans perceive themselves and their environment. It refers to the tendency to perceive the surroundings subjectively, often influenced by human assumptions, expectations, and emotions. Despite believing in impartial judgment, they unconsciously filter information through these biases, leading to distorted perceptions. Selective perception is when the brain selectively focuses on specific stimuli out of the multitude around humans. This process helps differentiate between important and unimportant information. Consequently, their perceptions of reality are not a photographic representation but a unique blend of objective data, prior beliefs, expectations, and emotions. Understanding perception bias empowers people to make more informed choices and see the world through clearer lenses.

4. Attribution theory [22] is a psychological concept that aims to understand how people explain the reasons behind behavior and events. According to Heider's Dispositional and Situational Attribution Theory, dispositional attribution happens when someone attributes a person's behavior to their internal characteristics, such as personality traits or motives. In contrast, situational attribution occurs when someone attributes a person's behavior to factors or situations outside their control.

Jones and Davis proposed the Correspondent Inference Theory in 1965, which suggests that people pay attention to intentional behavior rather than accidental actions [17]. They tend to make internal attributions when they observe a correspondence between a person's behavior and personality. This means they attribute the behavior to the person's disposition or internal qualities. Dispositional (internal) attributions help individuals predict future behavior based on what they perceive as intentional actions. Attribution theory provides a powerful lens through which individuals can interpret the world, understand how they perceive and explain behavior, and focus on internal traits or external circumstances. Attribution theory provides a powerful lens through which individuals can interpret the world, understand how they perceive and explain behavior, and focus on internal traits or external circumstances.

5. Psychological or mental barriers [16] are internal assumptions and beliefs that can significantly impact our lives. These barriers affect how we view ourselves, our abilities, and our place in the world. This text will explore some common psychological barriers and strategies to overcome them. For example, self-doubt and negative thinking are two of the most common psychological barriers people experience. While self-doubt is natural, negative thoughts about oneself can hinder progress. Doubting skills, talents, or abilities can lead to doubt, preventing people from pursuing promotions, relationships, or personal goals.

Fear is a strong emotion that can control someone's actions. It can hold them back from the unknown, failure, or feeling inadequate. The comfort zone feels safe and familiar. However, staying within it can limit growth and prevent people from taking risks. Accepting discomfort as a sign of progress can help overcome this barrier [23].

Overcoming psychological barriers requires self-awareness, compassion, and persistence. People can unlock their potential and learn to live fulfilling lives by addressing these internal obstacles.

2.2. Perceptions of Climate Change

Perception is a belief or opinion frequently held by many people and is predicated on how the public or individuals perceive something, or an idea, conviction, or viewpoint frequently shared by many and founded on outward appearances [24]. It is essential to comprehend how the public views climate change to create democratic policies, socially robust technologies, and efficient communication campaigns [25]. Action refers to acting, especially when addressing a dilemma or confronting a physical limitation [26]. Lee et al. [27] suggested that perception and understanding of climate change inspire mitigation actions, such as developing national climate communication plans that increase basic education, climate literacy, and public knowledge of the local effects.

Several organizations, including the United Nations Development Programme (UNDP) [28], have researched how people perceive climate change. A collaborative study with the University of Oxford conducted a creative survey in several participating nations. The survey findings reveal a widespread desire for more comprehensive climate policies than those currently in place. For instance, most people in eight of the ten countries polled, which have the highest emissions from the power sector, supported greater use of renewable energy. Additionally, most people in four of the five countries with the largest emissions from land-use change and sufficient data on policy preferences supported land and forest conservation. Furthermore, nine of the most urbanized countries supported clean electric vehicles such as cars, buses, and bicycles.

Various agencies conducted research on perceptions about climate change, yielding similar results. Respondents believe that climate change is harmful now or will be harmful within the next decade, while some say it will pose a threat in the next 20 years [25]. They also believe climate change impacts are happening far away. Liu et al. [29] used data from the UK Household Longitudinal Study, a national survey from 2012 to 2020. The respondents tended to deny the seriousness of climate change and the urgency or necessity of dealing with it. The concerned ones displayed anxiety about climate change risks and supported action to reduce them. People also perceive that climate change due to carbon emissions affects their daily lives, such as the need to save energy and expenses at the household level. However, household purchases of energy-saving products lead to higher energy expenditures [27]. Moreover, it can also affect the mental health and well-being of many people [29].

The public perceives that reducing climate change is the responsibility of governments with a clear policy on climate change reduction [8, 30]. Businesses have a significant role in reducing environmental damage as they make decisions that affect the choices available to hundreds or thousands of citizens [31]. Unsworth et al. [32] said organizations are intrinsically involved in climate change, both in its causes and solutions. It is also imperative for individuals to take adaptation measures to reduce or avoid the negative impacts of climate change. People who strongly believe in their worth are especially aware of this [33]. This is in line with the research of Clayton et al. [12], who found that human behavior is an important factor in causing global climate change and responding and adapting. Human behavior and motivation may mitigate global warming caused by human perception of climate change, understanding, and changing individual and household behaviors that drive climate change [33].

Individuals who believe in themselves that they can reduce global warming are more optimistic, according to Liu & Sibley [34]. People living in countries with a higher Human Development Index (HDI) perceive the importance of global warming and have a self-reported willingness to make sacrifices to help protect the environment. They are hopeful for a positive future by preparing their convictions and intentions to sacrifice for the environment through action.

2.3. Climate Change Actions

When the public becomes aware of the impacts of climate change, they tend to take action to reduce them. This study focuses on daily life behaviors in the household. Understanding the drivers of household behaviors and actions is essential to effectively managing climate-related risks. These actions often involve adopting more sustainable consumption behaviors in housing, food consumption, and mobility, according to the research models of Venghaus et al. [8] and Carman & Zint [35].

One way to reduce climate change is by consuming less. Avoiding excessive purchases, buying second-hand goods, and fixing or recycling things that are still usable can achieve this. While using air conditioning or heating systems, it is better to use goods that consume less energy [36]. However, the production process, from raw material harvesting to market transportation, produces carbon dioxide emissions. To reduce energy consumption, one should use energy-saving equipment and LED lighting, install solar panels to produce energy for homes or buildings, replace old clothes washers with cold-water showers, and use renewable energy sources such as solar or electrical energy. Note that burning coal, oil, and gas is the primary source of electricity and heat generation, significantly contributing to climate change [37].

Making changes to mobility choices can have a significant impact on the environment. Most vehicles, such as cars and trucks, use fossil fuels like diesel or gasoline, contributing to greenhouse gas emissions. People can opt for more sustainable modes of transportation, such as walking or cycling, to reduce their carbon footprint and improve their health

[27]. If they need to travel longer distances, they can plan and choose options like taking a bus, a passenger train, or carpooling with others. It is important to limit air travel as much as possible since aeroplanes consume massive amounts of fossil fuels and emit many greenhouse gases, contributing to global warming [38]. Although aviation plays an important role in the global economy and meets society's travel needs, it contributes to climate change through the effects of carbon dioxide and non-carbon dioxide gases, including the formation of contrail cirrus and ozone. Using electric cars significantly reduces air pollution and greenhouse emissions compared to gas or diesel cars [39].

Change food consumption behaviors because food production causes global warming, livestock breeding releases methane gases, and farming reduces forest areas. People can avoid it by improving production practices, adopting a healthy diet, and reducing consumer and retail food waste [40]. If they slow down, meat consumption will reduce land use and produce more food for more people, as well as more efficient use of land because trees absorb fewer carbon gases than humans [41]. Most people turn to vegetables, fruit, grains, full seeds, more beans and seeds, and less meat and dairy products. Because producing food from plants produces fewer greenhouse gases and still uses less energy, soil, and water than the animal food process, stopping eating leftover food can also reduce the winter cycle [42]. Every time consumers buy food; they should have a portion of the food that is hard to eat to reduce the amount of gas that is not needed to grow or to produce the energy left out of the vegetables [43].

Persuading friends and family is a common way to bring about change, as it is the fastest and most efficient approach. We encourage people to invite residents and inform businesses about the need for change to ensure a sustainable future. The UN Environment Programme [28] suggests two steps to combat climate change: planting trees and making investments that benefit the global community. Planting trees can reduce 25% of the world's greenhouse gas emissions caused by deforestation and changes in land use, such as agriculture. Additionally, individuals can choose financial institutions that do not invest in carbon-polluting industries and opt for more ethical investing to stimulate change.

Based on the literature review, the researchers have identified two research questions: (1) What are the differences in perceptions of climate change and mitigation actions between Eastern and Western Europeans? (2) What perceptions influence climate change mitigation actions in these two regions?

Perceptions of climate change's importance [6, 10], its impact on daily life [25, 27], and its potential for global catastrophe [27, 29] are the determined dependent variables. Additionally, perceptions of the actions of various parties, including individuals [12, 33], businesses [31, 32], governments [8, 30], and their countries' carbon emissions by 2030 [34], may influence the dependent variables, which are the actions taken by Europeans to mitigate climate change. These actions include reduced consumption, mobility, food, and employment, which define the research concept presented in Figure 1. These actions used classifications based on Venghaus et al. [8] and Carmana & Zinta [35]. It involves reducing consumption, using fewer vehicles to travel, and consuming less food, which causes climate change.

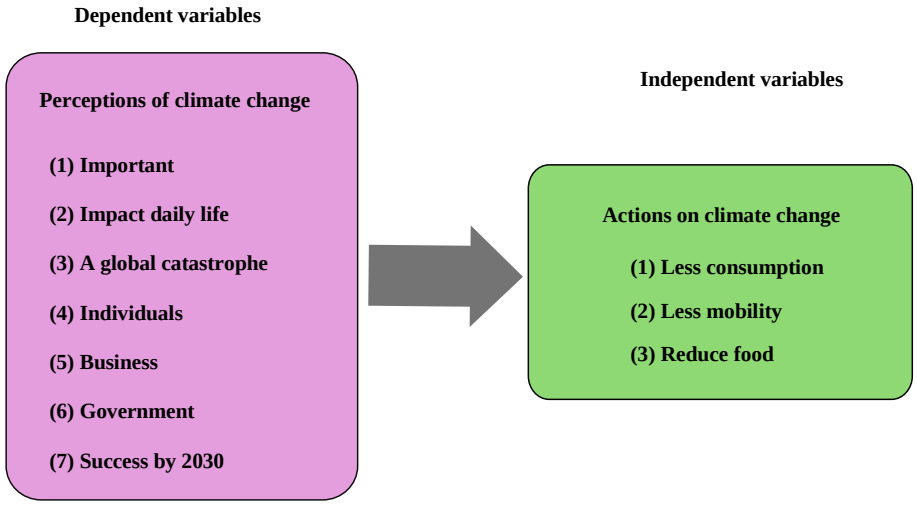


Figure 1. Conceptual framework

3. Research Methodology

The following steps guided the design of this study on how Eastern and Western Europeans perceive the impact of actions on climate change (see Figure 2).

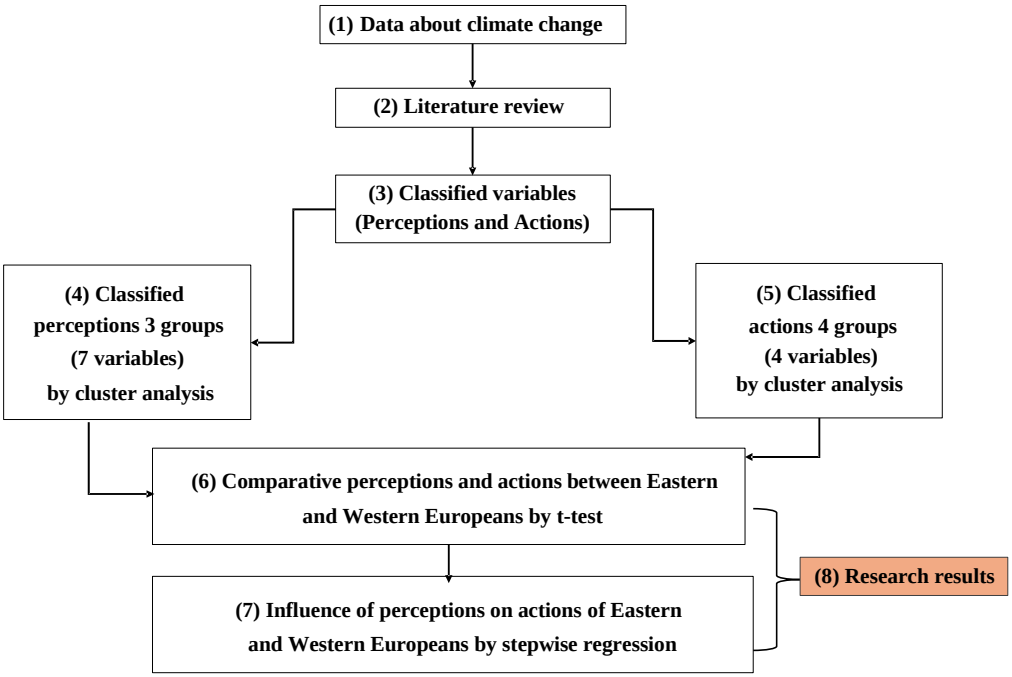


Figure 2. Framework of comparative perceptions influencing actions on climate change between Eastern and Western Europeans

The study used secondary data from "Climate Survey V," conducted by BVA for the European Investment Bank (EIB) in August 2022. All 27 EU countries participated in the online survey. The total sample size was 22,722 people, including 8,510 Eastern Europeans and 14,212 Western ones. We obtained the samples through a quota method, representing the population aged 15 and over in each country (16 and over in Luxembourg). We weighed the samples based on gender, age, occupation, and region.

The researchers reviewed existing literature on climate change and found that, while most people are aware of the issue, not enough action has been taken to address it [6–8]. Therefore, the study aimed to determine what perceptions lead people to take action to mitigate climate change.

The European Investment Bank (EIB) [15] conducted a Climate Survey questionnaire, which the study utilized to investigate the perceptions and actions of 27 European countries, including small towns and rural areas. The researchers categorized the questions and answers into two sets: set 1 is the perceptions, considered the independent variable, and set 2 is the actions, considered the dependent variable.

The researchers analyzed the perception responses to climate change from the 27 countries and grouped them into clusters using cluster analysis. The clusters were based on three groups of perceptions.

Group 1 is included.

- The perception that climate change poses a significant problem for the country is widespread.
- The perception that climate change has an impact on daily life, and
- The perception that climate change is causing a global catastrophe.

Group 2 consisted of the perception that businesses are taking serious action to combat climate change, the perception that the government is serious about reducing climate change and acting fast, and the belief that their country will successfully reduce its carbon emissions by 2030. Lastly,

Group 3 focused on the perception that individuals or everybody can reduce climate change.

This study has seven independent variables from the cluster analysis, as shown in Figure 3.

The study focuses on four areas related to reducing climate change: (1) actions to reduce consumption; (2) actions to reduce mobility by using vehicles less; and (3) food consumption reduction. The researchers arranged the variables based on the same grouping as the cluster analysis and presented the findings in Figure 4. The researchers divided the actions to reduce climate change into four groups.

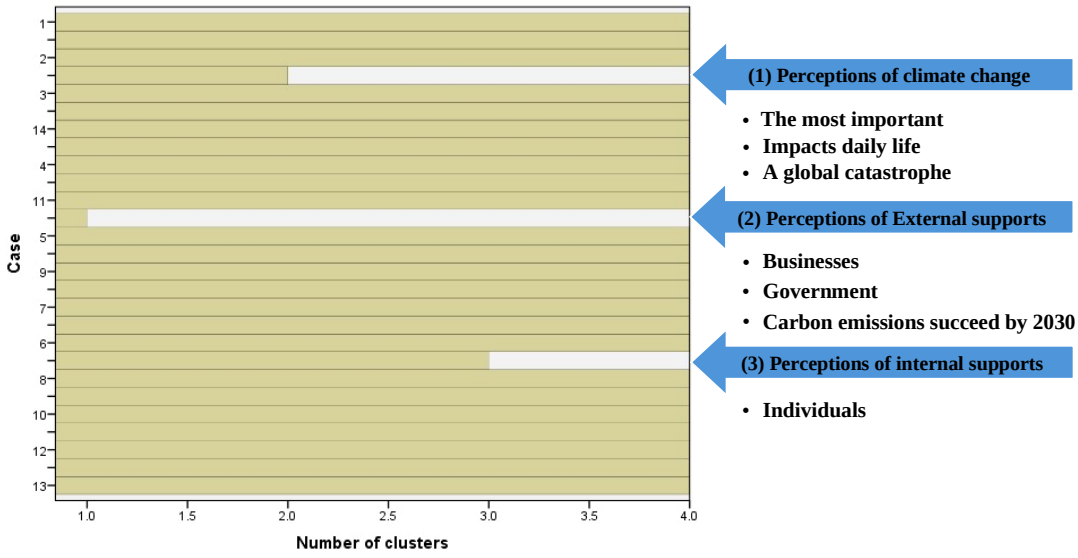


Figure 3. Clusters of independent variables

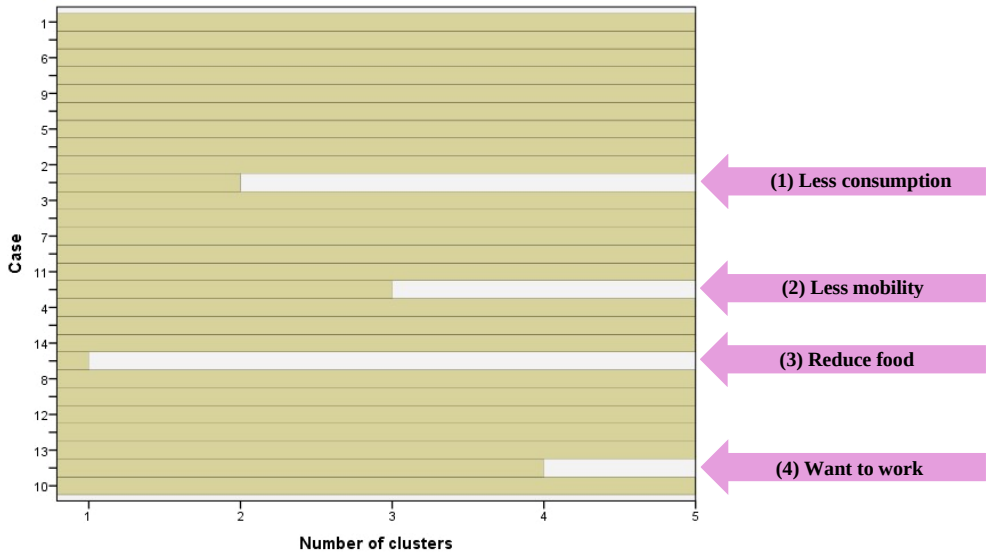


Figure 4. Clusters of independent variables

When categorizing the measures taken to combat climate change, the researchers found that some actions focused on supporting sustainability or working within an eco-friendly organization. Consequently, the researchers included an additional "want to work" variable for the fourth variable, as shown in Figure 5. This variable wanting to work alludes to the respondents' preference for working in organizations actively addressing and acknowledging climate change.

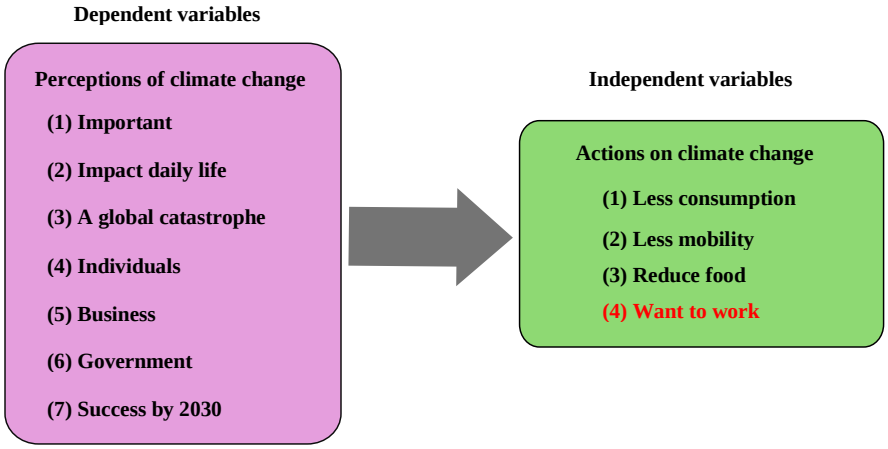


Figure 5. The new conceptual framework

The researchers classified European countries into two regions, as shown in Figure 6: Eastern Europe consists of 13 countries: Bulgaria, Czechia, Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, the Republic of Cyprus, Poland, Romania, Slovakia, and Slovenia, and Western Europe consists of 14 countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Spain, and Sweden. Both regions have economic, social, political, and cultural differences that may affect their perception of climate change differently.

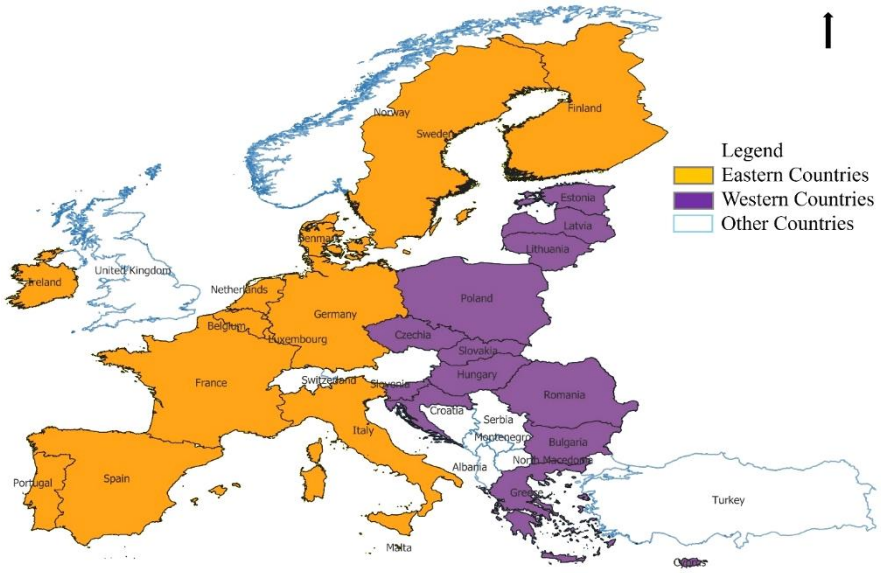


Figure 6. Map of Eastern and Western European countries

Next, the researchers used a questionnaire to gather data on how Eastern Europeans and Westerners perceive climate change and their actions to mitigate its effects, which were the independent variables. The researchers conducted a t-test on the means of two separate sample groups to compare the differences between the two regions. The t-test, a statistical method, compares the average values of two groups of samples, concluding that the averages of the two populations differ. The t-test analysis revealed a statistical significance value less than 0.05, indicating a significant difference between Eastern Europe and Western Europe.

This study analyzed respondents' perceptions that influence actions towards climate change mitigation. The researchers employed a statistical technique known as stepwise multiple regression to ascertain the correlation between one dependent variable and two or more independent variables. This technique relies on a linear relationship between variables to make predictions. The researchers wanted to determine whether any variables could predict the criterion variables and which variables had a positive or negative effect. In statistical analysis, a statistical significance of less than 0.05 indicates that the independent variable (perceptions) affects the dependent variable (actions).

4. Results

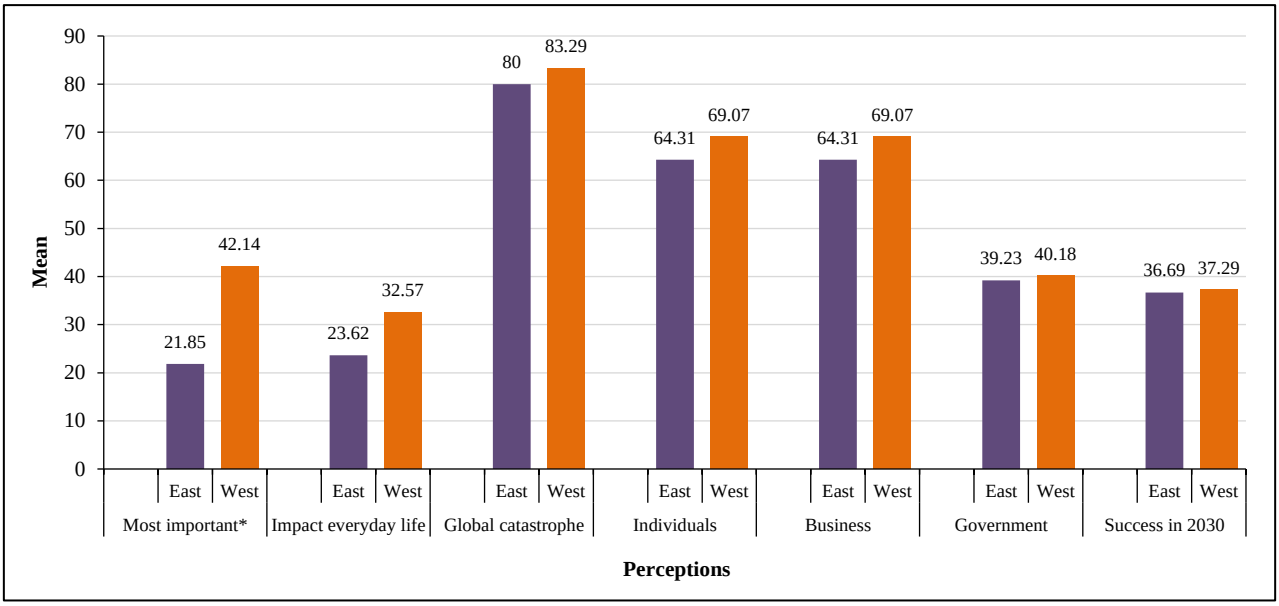
The study aimed to compare the differences in perceptions of climate change and actions taken to mitigate it between Eastern and Western Europe. The study results showed that respondents from both regions did not have significantly different perceptions of climate change (Figure 7). They perceived that climate change impacts daily life and is causing a global catastrophe, that individuals can reduce it, that businesses are taking serious action to combat it, and that the government is serious about reducing it and acting fast. They also had confidence that their country would reduce its carbon emissions by 2030.

However, respondents from Western European countries viewed climate change as a significantly more important problem than their Eastern European counterparts. They perceived climate change as important at an average of 42.14%, while Eastern Europeans viewed it as important at 21.85%. The only significant difference between the two regions was that Western Europeans viewed climate change as their countries' biggest problem. At the same time, Eastern Europeans did not see it as such an important issue.

Based on Figure 8, comparing actions shows a noticeable contrast in the efforts made by respondents from various regions of Europe to mitigate climate change. Participants from Western European countries took more significant measures to reduce climate change than their counterparts from the Eastern region. Western Europeans reported a greater reduction in climate change through actions such as reducing household consumption by lowering the temperature during winter, using less air conditioning, streaming less video, cleaning email, adopting a vegetarian or normal diet, and avoiding jobs that do not align with businesses taking action to reduce climate change. The actions taken by Western

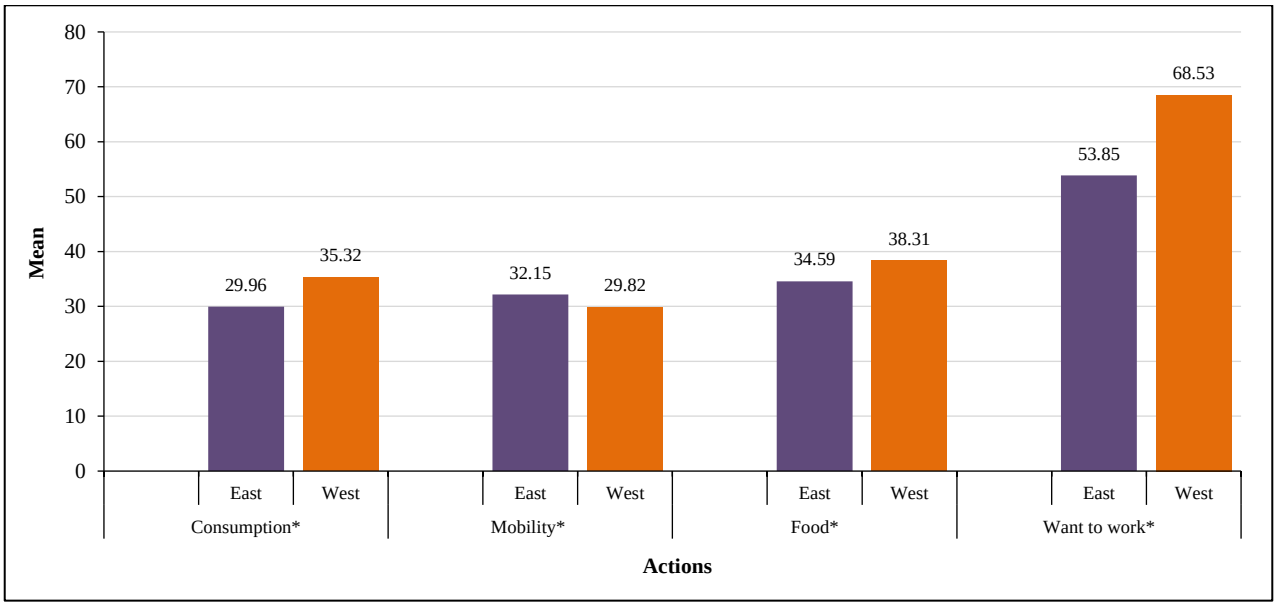
European respondents were more effective in reducing climate change than those from Eastern Europe, as indicated by the significant difference in consuming less (Sig = 0.001), reducing food (Sig = 0.049), and jobs (Sig = 0.000).

Respondents from Eastern European countries were significantly more likely to take action to reduce climate change in terms of mobility (Sig = 0.013) than respondents from Western European countries, at a 0.05 significance level. The West has daily movements such as carpooling, cycling, walking short distances, or traveling by public transport. This suggests that Eastern and Western Europeans are taking different actions to reduce climate change. Western Europeans have taken more actions to mitigate climate change than Eastern Europeans in every aspect except for reducing mobility or vehicle use.



* The correlation is significant at the 0.05 level (2-tailed).

Figure 7. Comparing perceptions of climate change between Eastern and Western Europeans.



* The correlation is significant at the 0.05 level (2-tailed).

Figure 8. Comparing the actions of climate change between Eastern and Western Europe.

Before analyzing climate change perceptions that influence climate change actions for Europeans by multiple regression analysis, the researchers analyzed a correlation between the seven independent variables. This is because many independent variables may be related and lead to a violation of the main assumption of multiple regression analysis. The independent variables should not be highly correlated with values close to 1. The relationship between the independent variables of this research is shown in Table 1.

Table 1. Relationship between independent variables (Perceptions of climate change)

Variables	Most Important	Impact	A global catastrophe	Individuals	Business	Government
Impact	0.076					
A global catastrophe	0.411*	-0.526**				
Individuals	0.438*	-0.472*	0.715**			
Business	0.231	0.459*	-0.612**	-0.455*		
Government	-0.041	-0.110	-0.001	0.177	-0.090	
Success	-0.154	0.097	-0.185	-0.213	0.256	0.468*

Table 1 presents the correlation between the independent variables and the climate change perceptions for analyzing the effect on the actions of Europeans towards climate change as dependent variables. We found no highly correlated pair of independent variables that violated the multiple regression analysis's assumptions. This makes it possible to present the results of the stepwise regression analysis in Table 2.

Table 2. The perceptions that affect the actions on climate change.

Actions	Constant	Important	Daily life	Catastrophe	Individual	Business	Government	Success 2030	R Square
Eastern Europe									
Consumption	-17.765	-0.532	0.335	0.963*	-0.574	-0.147	0.525*	0.020	0.650
Mobility	59.866	0.123	0.024	-0.223	0.050	-0.445	-0.008	-0.305	0.441
Food	-5.115	0.240	-0.344	0.736*	0.408	-0.256	0.289	-0.091	0.541
Job	25.744	-0.006	0.210	0.571*	0.121	-0.304	0.090	0.293	0.327
Western Europe									
Consumption	0.733	0.374	-0.208	0.654*	-0.177	0.110	-0.215	-0.354	0.428
Mobility	44.691	-0.040	-0.014	-0.191	0.082	0.022	-0.148	0.086	0.205
Food	-7.509	0.192	-0.253	0.797*	0.329	-0.176	0.041	-0.180	0.635
Job	78.879	0.316	-0.167	0.006	0.427	0.794*	-0.218	-0.278	0.631

* Statistically significant < 0.05 level

Table 2. reveals that perceptions of a global catastrophe due to climate change significantly influence actions to reduce climate change, with a statistical significance of 0.05. These perceptions include a reduction in consumption, a reduction in food that contributes to global warming, and a desire to work for an environmentally friendly organization. This study also discovered that Eastern Europeans' perception of serious government action leads to a significant reduction in their consumption.

Western Europeans found that their perception that climate change would lead to global catastrophe led them to reduce their energy consumption and change their dietary behavior. Also, the business sector's perception of reducing climate change makes respondents want to apply for jobs.

The research results in each region can be explained separately according to Figures 9 and 10.

Figure 9 shows the perception variables significantly reducing consumption among respondents in Eastern European countries at 0.05. They perceive that climate change leads to catastrophe and that their governments care about climate change problems. Perceived at a high level, these positive linear relationships lead to a predicted reduction in consumption of 65%.

It was also found that when Eastern Europeans perceive that climate change will lead to many catastrophes, it will influence the actions of reducing food consumption that affect climate change more and wanting to work in organizations that are responsible for climate change at a greater level as well, with predictive values of 54% and 33%, respectively, but they did not find awareness that affected mobility-reducing actions with statistical significance at 0.05.

It is said that Eastern Europeans will have more reductions in consumption, such as household energy use. If they were more aware of the danger climate change poses to them and the future world and recognized that their government acts seriously, they would also reduce their consumption of foods contributing to climate change due to increased awareness that it will lead to future disasters. Eastern Europeans will be more likely to work in organizations that support climate change if they are more aware of the dangers of climate change.

In conclusion, awareness of the serious effects of climate change affects less energy consumption, food reduction, and the desire to work in an environmentally friendly organization. It is also found that the perception of government action influences Western Europeans' lower energy use or consumption. Figure 10 displays the analysis results for Western European countries.

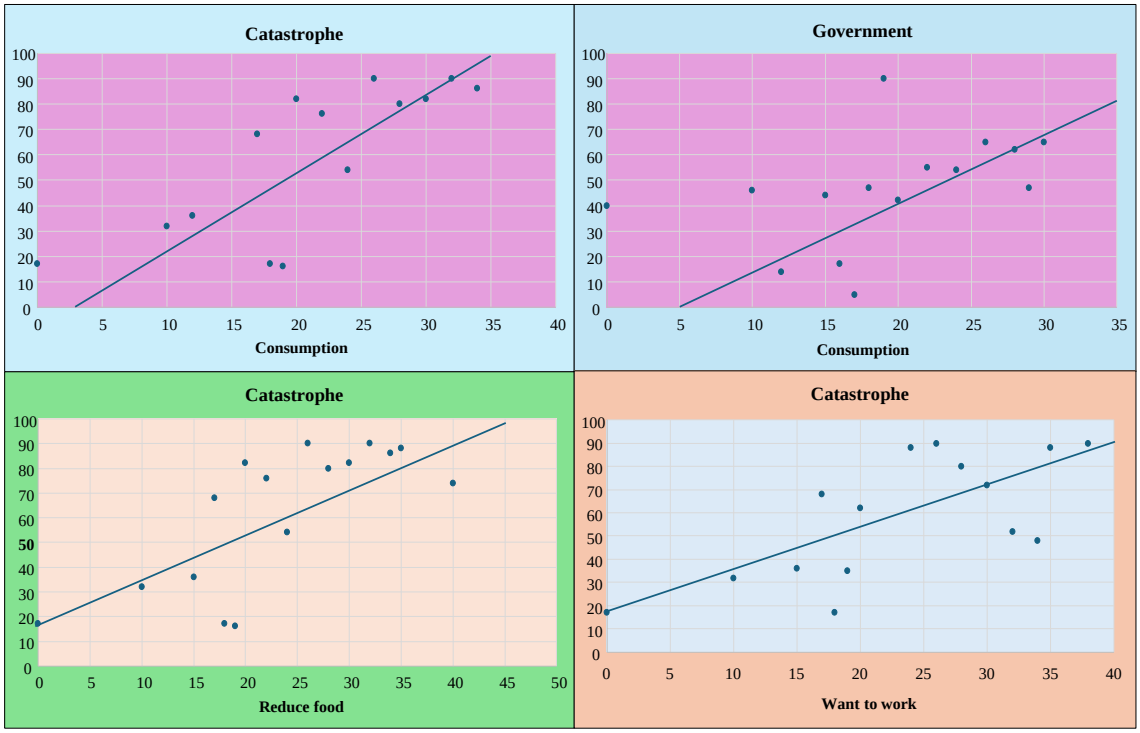


Figure 9. Perceptions and actions in Eastern European countries

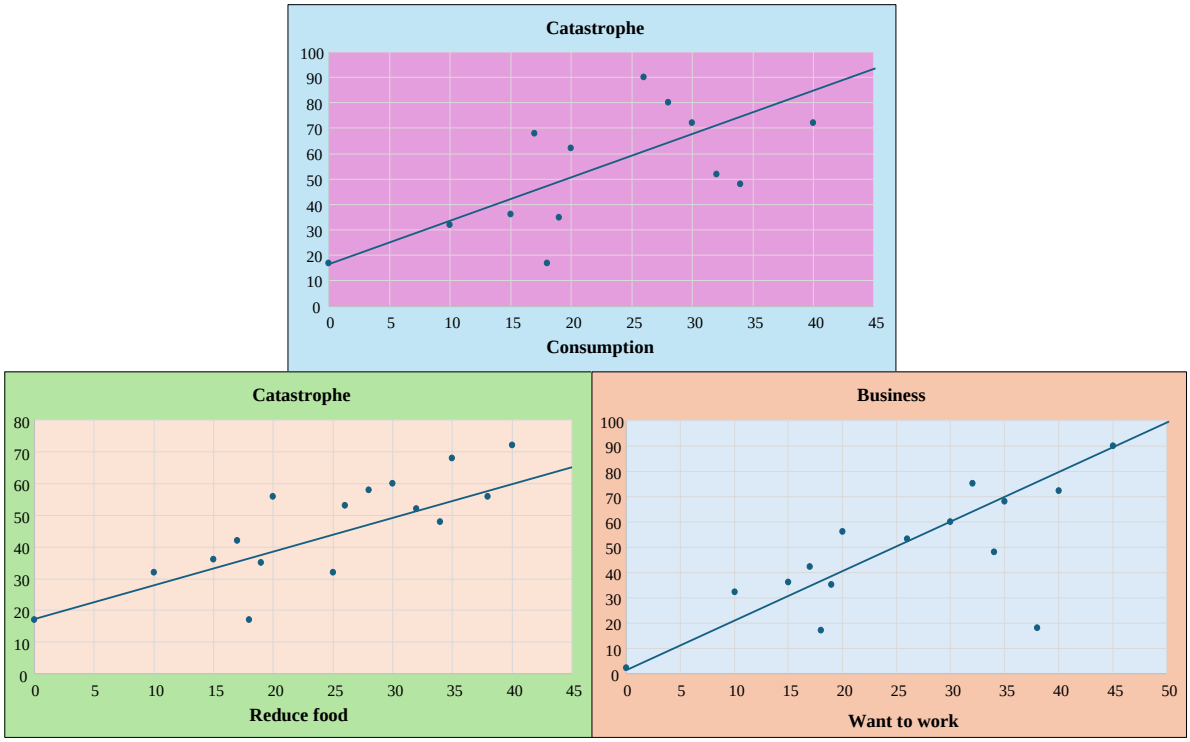


Figure 10. Perceptions and actions in Western European countries

As for respondents in Western European countries, as shown in Table 2 and Figure 9, it was found that the perception that climate change leads to catastrophe has a greater influence on consumption reduction actions with a prediction value of 43% and influences lesser food consumption, which has a greater effect on climate change with a prediction value of 63%. Suppose they perceive that their businesses are seriously involved in solving climate change. In that case, it will

have an even greater effect on their desire to work in organizations responsible for climate change, with a predictive value of 63%. All of them are positive linear relationships. However, it found no perceptions affecting actions to reduce vehicle use for Western Europeans.

Western Europeans would reduce their household energy consumption and diets, contributing more to climate change, if they were more exposed to its seriousness. Moreover, they are more likely to work for companies that recognize and take action to reduce climate change if they perceive those companies to be taking climate change mitigation seriously.

5. Discussions

This research could answer two questions: (1) What are the differences in perceptions of climate change and mitigation actions between Eastern and Western Europeans? (2) What perceptions influence climate change mitigation actions in these two regions?

According to a study, Eastern Europeans perceive climate change as less important than Western Europeans. Eastern Europeans place more importance on the economy and finance, especially in financial crises such as those in Hungary, Greece, and Cyprus. Some countries, like Bulgaria and Latvia, give little importance to climate change compared to other issues [15]. The study concludes that respondents in Western and Eastern European countries significantly differ in their perceptions of climate change, which is the most important for them.

Western European countries have consistently prioritized climate change for a long time. This aligns with the research conducted by Lee et al. [27], which found that European and Latin American countries have the highest public awareness of climate change and perceived risks at the national level. Even during the COVID-19 outbreak, most Western European countries prioritize climate change. On the other hand, Eastern countries prioritize the spread of infectious diseases and the economic situation over climate change. This finding is consistent with the study conducted by Grosu et al. [44], which found that the financial market behavior in Eastern Europe and Romania during the COVID-19 pandemic differed from normal periods. Sahlian et al. [45] also discovered that since the 2008 financial crisis and the COVID-19 pandemic, European citizens have been more interested in finance than the environment, society, and governance.

In terms of perceptions about climate change and its impact on daily life, the possibility of a global catastrophe, and the likelihood of success in reducing carbon emissions by 2030, people in Eastern and Western Europe share similar views. It is consistent with research by Tuitjer & Dirksmeier [46], who found little difference between perceived climate change performance within Europe and overall performance at the national level.

The findings of a study suggest that people are more likely to gather information from various sources, such as schools, universities, the internet, media, and books, to learn about the environment. This knowledge helps them form opinions about climate change. People who have a better understanding of the causes of climate change are more likely to perceive its impact and be willing to act. In Poland, people with higher levels of education are more likely to support efforts to address climate change. Similarly, individuals with higher education levels are more likely to support mitigation efforts in the UK, Sweden, and Italy [47]. The study also reveals that Baiardi & Morana [48] found that people in the European Union are concerned about environmental issues, such as greenhouse gas emissions, because they affect their financial status and well-being. Their level of education and social trust also influence their perception of these issues.

The people of both regions in Europe acknowledge that reducing climate change is the responsibility of governments, businesses, and citizens or individuals. However, most of them perceive the government and businesses quite negatively. They believe the government has been slow to act and not strict enough to encourage citizens to reduce climate change. This is consistent with research by Meckling & Karplus [49], which suggests that government actions to address environmental problems like climate change are often more of a political campaign by the government or politicians. They perceived that the business sector has been reluctant to significantly modify its production and consumption methods to reduce climate change. Zemigala's [50] study reveals a thorough exploration of climate change, greenhouse gases, and global warming in the business context, accompanied by extensive planning, designing, and research.

Nevertheless, they perceive that individuals can still be crucial in reducing climate change and believe their countries will successfully reduce carbon emissions by 2030. Clayton et al.'s [12] research has shown that human behavior is a significant factor in causing global climate change and responding to and adapting to it. Moreover, Liu & Sibley [37] have found that people living in Europe, countries with a higher Human Development Index (HDI), are more aware of the importance of global warming and self-report a willingness to make sacrifices to protect the environment. They are hopeful about a positive future and willing to take action to uphold their convictions and intentions to sacrifice for the environment.

Although the perceptions of respondents from Eastern and Western Europe were similar, their actions to reduce climate change differed in terms of consumption. Western Europeans tend to reduce home heating and cooling by lowering the temperature of their homes and using less air conditioning more often than Eastern Europeans. This is because Eastern European countries have different geographical and climatic conditions with dry and relatively cold winters, where the heater is set to 20°C or higher in winter. The temperature in these regions is usually around 1-2°C. In contrast, winter temperatures in countries bordering the Mediterranean Sea in Italy, southern Spain, and France are around eight °C, while in Western Europe, countries such as Austria, the Netherlands, Belgium, and northern Germany have warm, humid climates with mild winters, where the temperature usually falls between 1-7°C [51-53].

Compared to Eastern Europeans, Western Europeans exhibit a preference for local and seasonal products, as well as second-hand goods. In addition, the food consumption behaviors of Western Europeans have shifted towards vegetarian diets, with an increasing number of people restricting their meat intake. They are also more conscious of food labels and interested in working with organizations responsible for addressing climate change. A research study by Romanello et al. [54] revealed that Europeans believe that alterations to water and food systems are crucial for both human health and the planet.

Western Europeans are taking fewer actions towards reducing the use of vehicles to mitigate climate change than Eastern Europeans. This may be because Eastern Europeans are not interested in owning vehicles; instead, they recognize the significance of electric cars. However, the high cost of electric cars has deterred them. One of the reasons for this difference in attitude towards vehicles and the environment is the variance in the quality of life between the regions. Countries such as Denmark, Sweden, Germany, the Netherlands, Austria, and Finland in Western Europe enjoy a better quality of life, including purchasing power, safety, healthcare, cost of living, property price to income ratio, traffic commute time, pollution, and climate, as compared to Eastern European countries [55].

Finding employment in environmentally friendly organizations is a challenge for Eastern Europeans, despite their awareness of climate change. They have long-term poverty, which affects finances and employment opportunities [56]. Many Eastern Europeans, such as Romanians, Lithuanians, and Bulgarians, migrated to work in other European countries [57]. Western Europeans are more likely than Easterners to find and work with organizations that care about the environment.

Another research question about perceptions influencing climate change actions was that the study found Eastern and Western Europeans are aware of the catastrophe of climate change affecting the world and the need to reduce energy and goods consumption to mitigate its effects. Many European countries, such as Austria, Belgium, France, Italy, Spain, Portugal, Croatia, Greece, Hungary, Poland, Romania, and Slovenia, have a culture of avoiding uncertainty [58]. As a result, people in these regions are worried about the potentially catastrophic consequences of not reducing their energy and product consumption. They need to take action to reduce their carbon footprint and contribute to a sustainable future.

Much research says the result of climate change is uncertainty: how dire the consequences will be and their effect on society are not yet known. However, it influences public trust and acceptance of this information [59, 60] and is useful to decision-makers [61]. It is seen that increased awareness of the effects of climate change has an impact on psychological [12, 62] and social rather than technical factors that fuel public uneasiness [48] and stimulate actions, both positive and negative, as a result. It is possible for the fear and anxiety of individuals to lead to concerns about the future, particularly concerning environmental destruction. This can result in taking actions to address climate change, such as reducing consumption, minimizing food waste, and supporting companies that prioritize environmental friendliness. According to Morris et al. [63], pessimism may lead to increased participation in efforts to combat climate change, more so than optimism.

Climate change can cause emotional reactions mediated by culture, values, and beliefs, affecting people's behavior towards mitigating it. People may experience stress and anxiety, fearing that climate change will threaten their way of life. Frequent disasters and negative impacts of climate change have resulted in the need to adapt to and cope with it continually. The psychological effects of climate change can inspire control and correction to achieve safety and stability and reduce anxiety. Therefore, Europeans' worry about catastrophes influences their consumption actions and choices when working in environmentally friendly organizations. The more worried Europeans are, the more they tend to reduce climate change. When climate change causes fear, discomfort, distrust, and emotion, people want to overcome it. It can be explained by psychological or mental barriers [9, 16].

Researchers have found that in Eastern European countries, perceptions of government operations positively influence the reduction of action consumption. This is because all Eastern European countries were formerly members of the USSR-led communist Eastern bloc during the Cold War. While there has been an increase in the number of democratic countries in Europe over the past decade, Eastern Europe still lags behind Western Europe regarding democracy. Specifically, Eastern Europe has lower levels of democracy in areas such as the electoral process and pluralism, the functioning of government, political participation, political culture, and civil liberties. Furthermore, most

Eastern European countries have high-power distance cultures, accepting societal inequality as normal. Hofstede's theory [58] supports this idea, suggesting that less powerful members of society tend to respect and obey more powerful people or institutions. Research by Dimitrova [64] has also found that some Eastern Europeans embrace conservative values. Therefore, if people in Eastern Europe perceive that their government is strict and cares about reducing climate change, it is more likely that they will accept and follow along with these efforts.

In Western Europe, businesses that are environmentally friendly and take steps to reduce climate change have a positive impact on the job selection process of potential employees. People perceive these organizations as socially responsible, and they draw in more job seekers. They prefer to work for companies that invest in sustainability, including initiatives such as using renewable energy, reducing carbon emissions, and minimizing waste. Additionally, one in four respondents has considered switching jobs to work for a more sustainable company. They believe reducing climate change and promoting sustainability positively affects their job satisfaction. These findings are consistent with the research of Allen & Craig [65], who found that socially responsible businesses engage in activities that consider the protection of global warming. Such efforts can create sustainability for organizations and stakeholders, including governments, communities, competitors, supply chains, and employees. This is because it influences people's perception of corporate social responsibility (CSR) through positive attitudes and participation [66].

The two regions had no perceived influence on mobility reduction behavior, as they use a similar number of gasoline-powered, electric, and hybrid cars. People found electric cars to be expensive and not readily available. Additionally, they travel a lot during holidays, while a few respondents restrict air travel. According to a study, respondents believe it will not be very important if the measures taken to mitigate climate change affect their lifestyles. For instance, only 32% of respondents consider reducing energy use an essential factor, while 25% believe using public transport instead of cars is more important. Also, only 23% think that reducing air travel is significant. Notably, the Paris Agreement's goals can be achieved by reducing aviation emissions; changing travel behavior is also necessary to reduce climate change's impact on aviation. The recovery from COVID-19 provides an opportunity to incorporate changes in travel behavior, as travel patterns have not changed much despite the pandemic [67].

Cognitive dissonance theory [18] explains why people may behave in ways that contradict their perceptions. It occurs when there is a conflict between what someone knows and how they act. It is like a mental battle between two competing thoughts or actions. People may understand and accept the reality of climate change and its consequences yet fail to act accordingly. According to travelers, they are more satisfied with modes of transportation that offer freedom, enjoyment, and happiness than poor commuters who rely on public transport, consistent with research conducted by Lira & Paez [68]. Individuals experience low levels of anxiety and stress in a state of mental or emotional comfort known as a comfort zone, a mental barrier. Within this zone, they feel familiar, safe, and secure as they operate according to known routines, habits, and experiences. Stepping out of this comfort zone involves facing uncertainty, risk, and discomfort, which can trigger feelings of anxiety and fear [16, 23].

6. Conclusion

The research proved that the perception of climate change between Eastern and Western Europeans is not significantly different. However, it showed that their actions to reduce climate change differ significantly. In conclusion, the factors that significantly impacted Eastern Europe included awareness of the climate change catastrophe and the perception that governments care and take strict actions, leading to an increase in climate change mitigation actions. Simultaneously, the fear of suffering from climate change's catastrophe grips Western Europe, and the business sector's willingness to take responsibility for climate change drives positive actions. However, this research found no factors affecting vehicle use or reduced mobility.

This research recommends that in countries where governments have an influence on reducing citizens' climate change, governments or policymakers should enact regulations and standards to limit emissions from key sectors such as energy, household, transportation, industry, and business. This may include setting emission caps, fuel efficiency standards, renewable energy mandates, and promoting energy efficiency. Similarly, investing in sustainable mobility projects, including public transportation, electric vehicle charging stations, bike lanes, and renewable energy facilities, and developing environmentally friendly air travel, is important. Businesses can incorporate sustainable practices into their operations by engaging in eco-friendly activities and advocating for supportive climate policies at the local, national, and international levels through policymakers, industry associations, and advocacy groups. Stakeholders involved in climate change should communicate it with honesty and transparency. It is important to present facts in a balanced and convincing way when addressing a problem, rather than resorting to downplaying the issue or using fear tactics. They should provide helpful tips and advice on steps that people can take to reduce climate change. Moreover, further studies should explore the factors that will lead Europeans to reduce their mobility or use of vehicles to mitigate climate change.

7. Declarations

7.1. Author Contributions

Conceptualization, S.K. and J.R.; methodology, S.K.; software, J.R.; formal analysis, S.K; investigation, S.K.; data curation, J.R.; writing—original draft preparation, S.K.; writing—review and editing, J.R. and S.P.; visualization, J.R.; supervision, J.R. All authors have read and agreed to the published version of the manuscript.

7.2. Data Availability Statement

The data presented in this study are available in the article.

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7.4. Acknowledgements

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7.5. Institutional Review Board Statement

Not applicable.

7.6. Informed Consent Statement

Not applicable.

7.7. Declaration of Competing Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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