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Where Does an Individual's Willingness to Act on Alleviating the Climate Crisis in Korea Arise from?

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Abstract: Climate change is the result of anthropogenic activities and will lead to widespread and rapid changes on Earth in the following decades. The climate change crisis has led to economic, social, and cultural crises worldwide. This study analyzes the factors impacting the voluntary actions of individuals to mitigate the climate change crisis. Data were collected using a self-administered questionnaire survey from 650 Korean adults. Statistical analysis was performed using the statistical program IBM SPSS Statistics 25. The results show that the factors affecting an individual's willingness to act on climate change mitigation were gender, social class, perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion. In particular, the results show that social exclusion had a moderating effect on the severity of the willingness to act on climate change mitigation. Regarding the moderating effect of social exclusion, significance was determined for gender, social class, perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion (R^2 = 0.617). The government should thus make efforts to reduce social exclusion in order to strengthen individuals' willingness to act on climate change mitigation.

Keywords: climate crisis; will to act; risk perception; crisis management; social exclusion

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1. Introduction

According to the IPCC report on the climate crisis [1], anthropogenic activities that have continued since 1970 have warmed the atmosphere, sea, and land as a result of higher greenhouse gas concentrations. Moreover, the atmosphere, ocean, cryosphere, and biosphere on Earth have faced widespread and rapid changes. The IPCC report [1] also states that human influence may be the primary contributor to the global retreat of glaciers and the decline of the Arctic since the 1990s. Moreover, humans may have contributed to the melting of Greenland glaciers since 1950.

Climate change challenges the perspectives of many people due to the resulting economic and political impacts that are incompatible with the liberal ideals of free markets [2–4]. This has led to an environment with increased misinformation, thus making it difficult to facilitate communication on climate crisis management and derive public acceptance of the environment [5]. Climate change is projected to increase the frequency and severity of disasters in the coming decades. A growing body of research has focused on disaster-related infrastructure and environmental consequences [6–9]. However, few studies have focused on the potential risks to human health due to climate change [10,11] or on preparations for climate change and the factors influencing the adoption of positive behaviors at an individual level [12]. The willingness to act on climate change mitigation depends on individual, social, and psychological determinants. In particular, a study posited that an individual willingness to act on climate change mitigation is related to risk concerns and social and psychological variables [13–15], which in turn leads to a global community and egalitarianism, thereby influencing the efficacy of mitigating climate change [16].

Individual behavior impacts not only the individual but also their community. People can jointly lobby decision makers to prioritize the climate crisis and demand that coal be

replaced with renewable energy sources and geotechnical engineering to combat global warming. For example, cooperative measures among governments, businesses, and citizens can address climate change mitigation issues by abandoning the use of fossil fuels and adopting alternative energy production [16].

In Korea, many studies have focused on climate change scenarios to address the climate crisis in the context of engineering [17–19]. Numerous studies have been conducted on climate change in the Korean context—for example, ecological studies for climate change adaptation [20–22] and vulnerability [23–25]. The current study focused on the individual level to address the climate crisis by using case studies in Korea, and the results can be utilized as basic data to create a sustainable environment in Asia.

2. Theoretical Framework

2.1. Efficacy of Climate Change Response

Social cognitive theory conceptualized different concepts of efficacy: individual self- and response efficacy, group efficacy, and proxy efficacy. Individual self-efficacy refers to the ease with which an action is taken. Response efficacy refers to the perceived effect of an action. Group efficacy refers to the confidence in the ability of a group to achieve goals, and proxy efficacy refers to confidence in the ability of a third party, such as a government, to succeed on its behalf. In this context, climate risk mitigation can be perceived as a collective desire; thus, individual actions depend on shared willpower and governmental actions [26–28].

Individual anxiety and fear regarding climate change were among the most common determinants that recognize the phenomena as dangerous, along with attitudes and moral norms [26,29,30]. Regarding behavioral efficacy for climate change mitigation, individual actions are believed to be a contributing factor, including recycling and less meat consumption [31–33]. In addition, risk perceptions related to climate change [27,34,35] were found to be related to behavioral responses, such as the prediction of and adaptation to climate change [36–38].

These research findings indicate the need to investigate the efficacy and determinants of climate change responses. The individual, social, and psychological variables must be jointly considered.

2.2. Risk Perception

Concerns related to environmental risk can be a relevant predictor of climate change behavior and efficacy, based on the general approaches of environmental stress theory [39,40]. In particular, risk perception has been examined in various domains concerning individuals, communities, and the international social environment. The findings show that, compared to the other domains, individuals recognize more risks to the environment [41–43]. Individual risk perception has been shown to predict ecological behavior, unlike the risk for actual environmental impacts [44]. In addition, compared with international communities, local communities have shown a higher willingness to act on the perception of climate change risks [16]. Risks can be determined according to the emotional component, namely the fear of risk consequences. Moreover, risks are predictable through collective action [45–47]. These results indicate the need to examine climate change risks by using a multidimensional structure differentiated for the target audience and to understand the relationship among risk concerns, knowledge, and individual and collective efficacy for climate change mitigation [48–52].

2.3. Willingness to Act

A key predictor of climate change mitigation is the willingness to act on climate change mitigation for future sustainability-related decision making [53]. Climate risk concerns were examined with relation to ecological behavior and efficacy, and willpower [54] was predicted as the primary variable. To what extent are individual actions believed to interfere with climate change? Addressing this question is important because individual actions

influence climate change response strategies. For instance, behaviors such as an annual decrease in air travel, control of household energy use, cessation of aerosol spray use, and less meat consumption are considered predictors [26]. According to Sawitri et al. [55], individuals with a higher environmental self-efficacy through higher awareness, that is, a sense of being able to contribute positively to climate change, have an increased motivation to act on climate solutions.

2.4. Social Exclusion

Social exclusion is a violation of social bonds and is considered to reduce participation, access, and solidarity with respect to climate change mitigation [56–58]. Silver [56] considered social exclusion as inadequate social cohesion or integration at the social level, and lack of opportunities to build meaningful social relationships while functioning in social activities at the individual level.

According to Ifeanyi-Obi and Ugorji [59], in Nigeria, women contribute more toward livestock and crop production, but they still face deprivation and exclusion in some important areas, such as land ownership, positions in mixed farmers' associations, and wages. In addition, their findings confirmed that there was a high level of economic exclusion, such as rights to financial assets. One could consider how these results affect their adaptability to climate change, as a result of being denied access to improved adaptability to climate change.

In particular, with regard to the relevant difference between social exclusion and economic resources in the context of the climate crisis, people with relatively greater resources can monopolize scarce "escape routes," thereby forcing the excluded population to endure the brutality of these risks [60]. Therefore, we must examine how social exclusion affects the willingness to act on climate change mitigation.

2.5. Individual Factors for Climate Change Mitigation

2.5.1. Perceived Severity

Research has examined the "cognitive image" of climate change and found that for most people, the foremost image of climate change is dark and negative [61–64]. In fact, these negative emotions are often explained as one of the single important determinants in risk perception research on climate change [61,65]. In particular, perceived negative perceptions or experiences appeared as a result of environmentally friendly actions [66] or resulted in a higher interest in climate change policy support [61,67]. Such perceptions could cause a motivation effect on actions related to climate change [68]. Therefore, the relationship between perceived severity and willingness to act must be examined to confirm the motivation for climate change action.

Hypothesis 1 (H1): *Higher perceived severity will lead to a higher willingness to act on climate change mitigation.*

2.5.2. Perceived Benefits

Perceived benefits are related to adaptation and mitigation policies to respond to climate change [69]. In this case, the perceived benefits of climate change policies can reduce skepticism about climate-related policies. Niles et al. [70] noted that positive experiences (e.g., perceived benefits) related to previous policies reduced the perceived risk of climate change. According to Pahl et al. [71], a positive effect on climate action was noted when there was a wide range of benefits for individuals. In particular, more willingness to take eco-friendly actions was noted when more social and environmental benefits were included, and positive actions were determined. Therefore, the relationship between perceived benefits and willingness to act must be clarified to verify the positive effect on climate change.

Hypothesis 2 (H2): *Higher perceived benefits will lead to a higher willingness to act on climate change mitigation.*

2.5.3. Perceived Obstacles

Efforts to mitigate climate change include the intentional pursuit of unstable and inconvenient situations to deviate from current practices (for example, inconveniences such as using public transportation and prohibiting the use of disposable products) and preparations for unexpected future situations [72,73]. Ramı'rez and Ravetz [74] stated that acceptance of "inconvenient knowledge (perceived obstacles)" was useful for planning future sustainable climate change scenarios. In particular, if an individual does not feel "inconvenient" even though taking action for climate change mitigation is "inconvenient," and the individual willingness to mitigate climate change is strong, climate change can be curbed [75–77]. Therefore, clarifying whether the perceived obstacles are related to the willingness to act on climate change mitigation is a necessary task.

Hypothesis 3 (H3): *Lower perceived obstacles will impact the willingness to act on climate change mitigation.*

2.5.4. Behavioral Attitude

Although some studies have provided a technical solution that is appropriate for resolving the problems related to climate change [78], public participation is crucial for realizing programs and policies to ensure the effective implementation of climate change mitigation and adaptation measures in a democratic society [79]. Enhanced public participation is vital for fostering individual actions, enabling people to play an active role in climate change mitigation in public debates, and promoting public support for climate protection policies [80–82]. According to Pearce et al. [83], behavioral attitudes can influence changes in perceptions regarding climate change mitigation. Contu et al. [84] stated that depending on governmental efforts, such behavioral attitudes can influence attitudes towards climate change, either positively or negatively. Therefore, empirical analyses are necessary to clarify the relationship between behavioral attitudes and the willingness to act on climate change mitigation.

Hypothesis 4 (H4): *Enhanced behavioral attitudes will lead to a higher willingness to act on climate change mitigation.*

3. Sample and Measures

The study survey was conducted in Korea via the Internet. The survey aimed to measure the characteristics of public risk perception, social exclusion, and willingness to act on the climate crisis. The questionnaire data were collected through Macomill Embrain, an online survey company, from 5 to 10 February 2022. Participants were recruited through arbitrary online sampling accounting for sex, age, and region. An email invitation to complete the survey was sent to 7320 panelists aged 20 years and older and a total of 650 requests to participate in the survey were received (response rate = 8.8%). Prior to completing the survey, those who had agreed to participate were asked if they consented to voluntarily completing the survey. Only those who agreed were allowed access to the questionnaire. Panelists who completed the survey received an incentive equivalent to approximately USD3.00. Statistical analysis was performed using the statistical program IBM SPSS Statistics 25. Frequency distributions, reliability analyses, and regression analyses were conducted.

The survey comprised 51.1% male and 48.9% female respondents. Regarding age, 19.5% respondents were in their 20s, 20% were in their 30s, 23.7% were in their 40s, 24.9% were in their 50s, and 11.8% were in their 60s. In terms of residence, 51.1% of respondents resided in the metropolitan area, 25.7% in Gyeongsang Province, 10.8% in Jeolla Province and Jeju Island, and 10.2% in Chungcheong and Gangwon provinces. Regarding the educa-

tion level, 20.2% respondents had completed high school or lower, 16.9% respondents had completed community college, 52.9% respondents had completed a four-year college education, and 10% respondents had completed graduate school. In terms of average monthly household income, 8% respondents earned less than KRW 2 million, 38.5% respondents earned between KRW 2 million and KRW 4 million, 26.7% respondents earned between KRW 4 million and KRW 6 million, 14.5% respondents earned between KRW 6 million and KRW 8 million, 7.5% respondents earned between KRW 8 million and KRW 10 million, and 4.8% respondents earned more than KRW 10 million.

All variables were measured using a 5-point Likert scale. In addition, reliability and validity were ascertained; the reliability values are presented in Table 1. Cronbach's alpha for each latent variable was over 0.7 points. The verification of each question was made with internal consistency.

The items for measuring Perceived Severity were taken from previous studies by Semenza et al. [85], Sun and Han [35], Mitter et al. [86], and Whitmarsh and Capstick [87], and the items for measuring Perceived Benefits were taken from previous studies by Hart and Feldman [88], De Groot et al. [89], and Preston, et al. [90]. The items for measuring Perceived Obstacles were taken from previous studies by Semenza, et al. [91], Hu, et al. [92], Semenza, et al. [85], and Butler and Pidgeon [93], and the items for measuring Behavioral Attitude were taken from previous studies by Patchen [94], Gifford, et al. [95], Howell [96], Viscusi and Zeckhauser [97], and Nabi, et al. [98]. The questions for measuring social exclusion were taken from previous studies by Sevoyan and Hugo [57], Forsyth [99], Woroniecki et al. [100], Chu and Michael [101], Elliott [102], and the questions for measuring Willingness to Action were taken from previous studies by Xie et al. [34], Lee, et al. [103], Mayer and Smith [104], and Zelenika, et al [105].

Table 1. Concept, measures, and reliability.

Concept	Measures
Perceived severity	I think the climate crisis will lead to physical risks.
	I think the climate crisis will lead to psychological risks.
	I think the climate crisis will lead to significant economic losses.
	I think the climate crisis will lead to significant job losses.
Perceived benefits	I think that waste reduction and recycling will help solve the climate crisis.
	I think the ban on using fossil fuel vehicles will help solve the climate crisis.
	I think reduced air travel will help solve the climate crisis.
	I think reduced meat consumption will help solve the climate crisis.
	I think increased use of renewable energy will help solve the climate crisis.
Perceived obstacles	I feel uncomfortable with not using plastic.
	I feel uncomfortable with not using fossil fuel vehicles.
	I feel uncomfortable complying with waste reduction and recycling.
	I find it difficult to reduce flight travel.
	I find it difficult to reduce meat consumption.
	I find it difficult to use renewable energy.
Behavioral attitude	I find it desirable to reduce and recycle waste to solve the climate crisis.
	I find it desirable to ban the use of fossil fuel vehicles to solve the climate crisis.
	I find it desirable to reduce air travel to solve the climate crisis.
	I find it desirable to reduce meat consumption to solve the climate crisis.
	I find it desirable to use renewable energy to solve the climate crisis.

Table 1. *Cont.*

Concept		Measures
Social exclusion	Emotional exclusion	I have been criticized for my efforts to reduce waste and strictly adhere to a ban on plastic use during the climate crisis.
		I have been ridiculed for my efforts to reduce waste and strictly adhere to a ban on plastic use during the climate crisis.
	Information exclusion	I think Korean society has not provided me with sufficient information about the climate crisis.
		I think Korean society has not provided me with a better way to solve the climate crisis.
	Material exclusion	Compared with other places, at the places where I work, there are seemingly insufficient measures to solve the climate crisis (e.g., electric vehicle charging stations, mugs, recycling bins, etc.).
		It seems that Korean society has not provided me with appropriate financial help to solve the climate crisis problems.
	Community exclusion	People around me praise or acknowledge other people's waste reduction efforts and bans on plastic use, but do not praise or acknowledge my efforts.
		It seems that Korean society praises or acknowledges other people's waste reduction efforts and bans on plastic use, but does not praise or acknowledge my efforts.
Willingness to act		[Household] If necessary, I shall reduce waste, stop using plastic, and separate recyclable waste to solve the climate crisis.
		[Society] I shall refrain from using petroleum vehicles, if required, to solve the climate crisis.
		[Indirect eco-friendly consumption] I shall refrain from air travel, if necessary, to solve the climate crisis.
		[Direct eco-friendly consumption] I shall consume less meat, if necessary, to solve the climate crisis.
		[Intention to use alternative energy] I shall use renewable energy, if needed, to solve the climate crisis.

4. Analysis and Results

4.1. Basic Structure

Figure 1 indicates the perceptions related to the willingness to act on the climate crisis. For this measurement, five factors were used: willingness to act on climate change mitigation in households, willingness to act on climate change mitigation in society, willingness to act on indirect eco-friendly consumption behavior, willingness to act on direct eco-friendly consumption behavior, and willingness to act on alternative energy.

The willingness to act on climate change mitigation in households is generally related to promotional activities in the house, such as recycling, water conservation, and food waste reduction [91,106,107]. The willingness to act on climate change mitigation in society is related to actions that can be promoted in communities and includes the reduced use of fossil fuels [108–110]. The willingness to act on indirect eco-friendly consumption behavior consists of broad and indirect consumption behaviors related to climate change, and primarily includes changes in travel patterns [111–113]. The willingness to act on direct eco-friendly consumption behavior is a direct consumption pattern for climate change, and primarily includes less meat consumption [114–116]. The willingness to act on the basis of science and technology relates to responses to the environment through scientific and technological developments for climate change mitigation, and primarily includes the development and utilization of alternative energy [117–119].

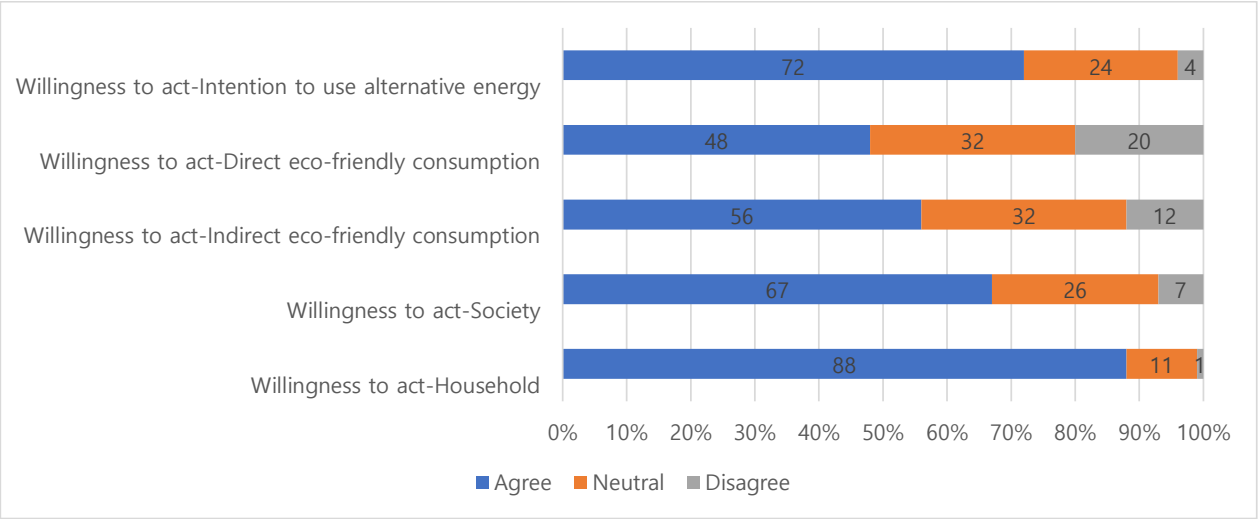


Figure 1. Willingness to act on climate change mitigation.

The following are the results on the willingness to act on climate change mitigation. A total of 88% were willing to act on climate change mitigation in households, 67% were willing to act on climate change mitigation in society, 56% were willing to act on indirectly eco-friendly consumptive behavior, 49% were willing to act on directly eco-friendly consumptive behavior, and 72% were willing to act on the basis of science and technology. In particular, 88% of households were most willing to act on climate change mitigation thereby confirming a high individual agreement within households to overcome climate change through enhanced norms and rules.

Figure 2 shows the results of the demographic analysis on the willingness to act on climate change mitigation. This is the average score of the technical statistics. The perception was higher among women; in terms of age, this perception was higher for those in the 50s and the older age group. These results partially align with the results of studies showing gender differences in adaptation to climate change [120–122] and those analyzing the relationship between age groups [123,124]. In terms of education level, the willingness to act was highest among those who had completed graduate school or higher. Regarding income level, the willingness to act was highest among those who earned between KRW 3 million and KRW 6 million.

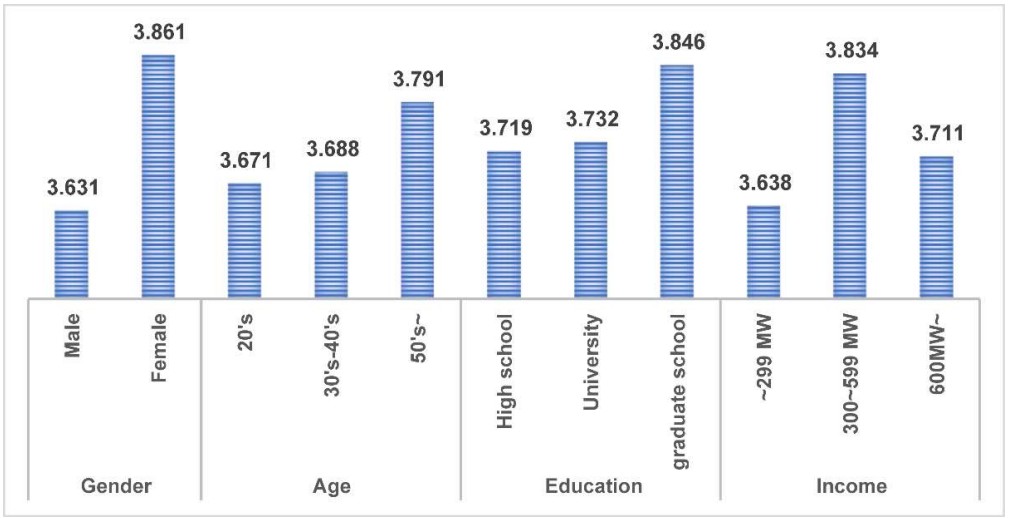


Figure 2. Mean by sociodemographic variable.

To determine the relationship between each variable, we performed a simple correlation analysis wherein age, income, gender, and education levels were controlled, as shown in Table 2. The findings show that willingness to act was correlated with severity, benefits, obstacles, and behavioral attitude. In particular, a highly positive correlation was noted with behavioral attitudes, whereas a negative correlation was noted with obstacles. Improved understanding of the severity of climate change, benefits related to adopting climate change mitigation activities, and environmental attitude had a positive impact on the willingness to act on climate change mitigation. More obstacles led to a reduced willingness to act on climate change mitigation. Therefore, the appropriate management of obstacles is necessary to increase public willingness to act on climate change mitigation.

Table 2. Simple correlation.

		Perceived Severity	**Perceived Benefits**	**Perceived Obstacles**	**Behavioral Attitude**	**Social Exclusion**	**Willingness to Act**
Perceived severity	Pearson Correlation coefficient	1	0.585 **	−0.089 *	0.497 **	0.003	0.435 **
	Significance level (both sides)		0.000	0.024	0.000	0.938	0.000
Perceived benefits	Pearson Correlation coefficient	0.585 **	1	−0.153 **	0.731 **	0.049	0.656 **
	Significance level (both sides)	0.000		0.000	0.000	0.216	0.000
Perceived obstacles	Pearson Correlation coefficient	−0.089*	−0.153**	1	−0.214 **	0.188 **	−0.318 **
	Significance level (both sides)	0.024	0.000		0.000	0.000	0.000
Behavioral attitude	Pearson Correlation coefficient	0.497 **	0.731 **	−0.214 **	1	0.013	0.740 **
	Significance level (both sides)	0.000	0.000	0.000		0.740	0.000
Social exclusion	Pearson Correlation coefficient	0.003	0.049	0.188 **	0.013	1	0.035
	Significance level (both sides)	0.938	0.216	0.000	0.740		0.371
Willingness to act	Pearson Correlation coefficient	0.435 **	0.656 **	−0.318 **	0.740 **	0.035	1
	Significance level (both sides)	0.000	0.000	0.000	0.000	0.371	

Note: * $p < 0.05$; ** $p < 0.01$.

4.2. Determinant Structure

A hierarchical regression analysis was conducted to measure the willingness to act on climate change mitigation. The results are presented in Table 3.

Table 3. Hierarchical analysis for acceptance of willingness to act.

	B	SE	Beta	t	Sig	B	SE	Beta	t	Sig	B	SE	Beta	t	Sig
(Willingness to Act)	3.412	0.144		23.730	0.000	1.130	0.166		6.824	0.000	0.590	0.376		1.570	0.117
Gender	−0.221	0.051	−0.169	−4.376	0.000	−0.104	0.033	−0.079	−3.178	0.002	−0.104	0.032	−0.080	−3.217	0.001
Age	0.007	0.002	0.138	3.584	0.000	0.002	0.001	0.041	1.657	0.098	0.002	0.001	0.040	1.636	0.102
Social class	0.056	0.043	0.051	1.304	0.193	0.055	0.028	0.050	1.979	0.048	0.055	0.028	0.050	1.987	0.047
Perceived severity						0.025	0.028	0.028	0.908	0.364	0.239	0.077	0.263	3.125	0.002
Perceived benefits						0.220	0.041	0.210	5.338	0.000	0.359	0.125	0.342	2.870	0.004
Perceived obstacles						−0.181	0.027	−0.175	−6.776	0.000	−0.201	0.069	−0.193	−2.925	0.004
Environmental attitude						0.523	0.037	0.523	14.210	0.000	0.314	0.118	0.314	2.670	0.008
Social exclusion						0.045	0.019	0.061	2.403	0.017	0.256	0.130	0.346	1.976	0.049
Perceived severity * Social exclusion											−0.081	0.027	−0.499	−3.035	0.003
Perceived benefits * Social exclusion											−0.053	0.044	−0.318	−1.213	0.226
Perceived obstacles * Social exclusion											0.006	0.023	0.031	0.270	0.787
Environmental attitude * Social exclusion											0.079	0.043	0.456	1.837	0.067
F-value			8.862					114.487					81.474		
p-value			0.000					0.000					0.000		
R^2			0.052					0.617					0.625		
Adjusted R^2			0.046					0.611					0.617		
Change in R^2			0.052					0.565					0.008		
Sig. F Change			0.000					0.000					0.010		

Note: * $p < 0.05$. B: regression coefficient; SE: standard error of the mean.

Hierarchical regression analysis is a form of multiple regression analysis. This verifies the influence on the outcome variable when there are two or more sets composed of multiple predictors. Alternatively, it is an appropriate technique to uncover causality with statistical analysis techniques that can hierarchically, in other words, phase-by-step verify the influence of a particular set on the outcome variable when a set of third-party predictors is controlled. The regression analysis showed the direct impact of willingness to act on climate change. Therefore, to further explore how these value factors moderate the relationship between perceptions and action on climate change, we applied the procedure of moderation analysis, suggested by Baron and Kenny [125].

Regarding the influence of the willingness to act through hierarchical regression analysis, when applying the variables of gender, age, and social class, significance was noted in gender and age, but the explanatory power was not high. In the analysis of perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion, a high explanatory power was noted, and there was a significant relationship in terms of gender, perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion. Finally, regarding the moderating effect of social exclusion, significance was determined for gender, social class, perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion. Specifically, regarding gender difference in the willingness to act on climate change mitigation, as shown in Pearse [126] and MacGregor [127], the results show that women expressed more concerns and worries about climate change than men did. Moreover, women showed more willingness to act on climate change mitigation. Therefore, gender differences were noted in the results of the current study.

With respect to social class, Godfrey [128], Pearson et al. [129], and Laidley [130] indicated that the variable affected attitudes toward climate change, perception, willingness to participate, and role of participation. The impact of perceived severity on climate change-related behavior has already been demonstrated in numerous studies, including Xie et al. [34], Sun and Han [35], and Van der Linden [131]. The current study results align with their findings. Regarding benefits, Morton et al. [132] mentioned that the perception and understanding of climate change depended on costs and benefits, resulting in the recognition of the importance of climate change. According to Patt and Weber [133], costs and benefits can be utilized to obtain more public sympathy when delivering climate change-related policies. Similar to previous research, the results of the current study r also indicate that higher benefits were related to a higher willingness to act on climate change mitigation.

According to Ramı´rez and Ravetz [73], the acceptance of "inconvenient knowledge (i.e., perceived obstacles)" was useful for planning future sustainable climate change scenarios. The current study results show that fewer perceived obstacles led to a higher willingness to act on climate change mitigation. Regarding environmental attitude, public support and attitudes played a key role in mitigating climate change. Pearce et al. [83] stated that, in most cases, behavioral attitudes can lead to changes in climate change mitigation and behavior. The results also showed that an enhanced behavioral attitude leads to a higher willingness to act on climate change mitigation.

In particular, this study presents a unique finding in that social exclusion had a moderating effect on perceived severity regarding the willingness to act on climate change mitigation. This indicates that even if the public recognizes the seriousness of climate change, this will lead to a higher perception of social exclusion and a reduced willingness to act on climate change mitigation. In other words, to increase the willingness to act on climate change mitigation, the government must develop policies wherein social exclusion does not affect the perceived severity.

5. Discussion

5.1. Climate Crisis and Social Exclusion

There has been an unprecedented accumulation of evidence on climate change in modern human history, presented in detail in the 2021 IPCC report [1]. New diseases, viruses, and pests are also presented as potential risks. Climate change has highly differential impacts on the most vulnerable elements of society [134,135]. Based on the action plan agenda of the 1992 Rio Earth Summit's adoption of Agenda 21—an action plan to mitigate climate change—in Denmark, local governments established Local Agenda 21, and made efforts to mitigate climate change through immediate action and local activities [136].

Botzen et al. [137] indicated that government policies on climate change can be effective through successful risk management communication that draws public attention toward climate change-related risks. In addition, strengthening awareness through public education also helps solve social problems [138–140].

Previous studies in South Korea have also shown that education and policy have an effect on awareness and climate change behavior [141–143]. In addition, a previous study was conducted on the negative effect of social exclusion in South Korea [144–146]. However, previous studies in South Korea attempted to highlight individual factors related to overcoming the climate crisis through social exclusion due to the lack of links between social exclusion and public behavior research.

The resilience approach to climate change may be associated with social exclusion [147]. In the climate crisis situation, the negative effects and high vulnerability caused by social exclusion will be further strengthened around the vulnerable [99]. Therefore, we should strive for sustainable development and adaptation through social solidarity and social empowerment [100,148].

5.2. Implications

This study has limitations. The participants in this study were limited to South Koreans. Since research on the climate crisis has a worldwide impact, there is a need to examine various countries, types of social exclusion, risk, vulnerability, NGO, and governance, and to compare the results in the future.

Thus, the discussion on social exclusion and climate change should be supplemented in the future by adding variables related to the size of the country, the size of governance, and policy.

6. Conclusions

This study examined the role of individuals in overcoming the climate crisis. The results showed that the factors affecting an individual's willingness to act for climate change mitigation were gender, social class, perceived severity, perceived benefits, perceived obstacles, environmental attitude, and social exclusion. In particular, the results showed that social exclusion had a moderating effect on perceived severity regarding the willingness to act on climate change mitigation. This finding indicates that the government should make efforts to reduce social exclusion and eventually strengthen an individuals' willingness to act on climate change mitigation.

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

Data Availability Statement: Not applicable.

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References

1. IPCC. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S.L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M.I., et al., Eds.; Cambridge University Press: Shaftesbury Road Cambridge, UK, 2021; *in press*.
2. Campiglio, E.; Dafermos, Y.; Monnin, P.; Ryan-Collins, J.; Schotten, G.; Tanaka, M. Climate change challenges for central banks and financial regulators. *Nat. Clim. Change* **2018**, *8*, 462–468. [CrossRef]
3. Bouchard, C.; Dibernardo, A.; Koffi, J.; Wood, H.; Leighton, P.A.; Lindsay, L.R. Climate change and infectious diseases: The challenges: N increased risk of tick-borne diseases with climate and environmental changes. *CCDR* **2019**, *45*, 83. [CrossRef] [PubMed]
4. Alves, F.; Leal Filho, W.; Casaleiro, P.; Nagy, G.J.; Diaz, H.; Al-Amin, A.Q.; de Andrade, J.B.S.O.; Hurlbert, M.; Farooq, H.; Klavins, M.; et al. Climate change policies and agendas: Facing implementation challenges and guiding responses. *Environ. Sci. Policy* **2020**, *104*, 190–198. [CrossRef]
5. Lewandowsky, S. Climate change disinformation and how to combat it. *Annu. Rev. Public Health* **2021**, *42*, 1–21. [CrossRef]
6. Kumar, N.; Poonia, V.; Gupta, B.B.; Goyal, M.K. A novel framework for risk assessment and resilience of critical infrastructure towards climate change. *Technol. Forecast. Soc Change* **2021**, *165*, 120532. [CrossRef]
7. Allard, R.F. Climate change adaptation: Infrastructure and extreme weather. *Ind. Innov. Infrastruct.* **2021**, 105–116. [CrossRef]
8. Bianchi, E.; Malki-Epshtein, L. Evaluating the risk to Bangladeshi coastal infrastructure from tropical cyclones under climate change. *Int. J. Disaster Risk Reduct.* **2021**, *57*, 102147. [CrossRef]
9. Chester, M.V.; El Asmar, M.; Hayes, S.; Desha, C. Post-disaster infrastructure delivery for resilience. *Sustainability* **2021**, *13*, 3458. [CrossRef]
10. Meierrieks, D. Weather shocks, climate change and human health. *World Dev.* **2021**, *138*, 105228. [CrossRef]
11. Goshua, A.; Gomez, J.; Erny, B.; Burke, M.; Luby, S.; Sokolow, S.; LaBeaud, A.D.; Auerbach, P.; Gisondi, M.A.; Nadeau, K. Addressing climate change and its effects on human health: A call to action for medical schools. *Acad. Med.* **2021**, *96*, 324–328. [CrossRef]
12. Glenk, K.; Faccioli, M.; Martin-Ortega, J.; Schulze, C.; Potts, J. The opportunity cost of delaying climate action: Peatland restoration and resilience to climate change. *Glob. Environ. Change* **2021**, *70*, 102323. [CrossRef]
13. Germani, A.; Buratta, L.; Delvecchio, E.; Mazzeschi, C. Emerging adults and COVID-19: The role of individualism-collectivism on perceived risks and psychological maladjustment. *Int. J. Environ. Res.* **2020**, *17*, 3497. [CrossRef] [PubMed]
14. Azadi, Y.; Yazdanpanah, M.; Mahmoudi, H. Understanding smallholder farmers' adaptation behaviors through climate change beliefs, risk perception, trust, and psychological distance: Evidence from wheat growers in Iran. *J. Environ. Manag.* **2019**, *250*, 109456. [CrossRef]
15. Sameroff, A.J.; Seifer, R. Accumulation of environmental risk and child mental health. In *Children of Poverty*; Routledge: Abingdon, UK, 1995.
16. Scafuto, F. Individual and social-psychological factors to explain climate change efficacy: The role of mindfulness, sense of global community, and egalitarianism. *J. Community Psychol.* **2021**, *49*, 2003–2022. [CrossRef] [PubMed]
17. Li, T.; Kim, G. Impacts of climate change scenarios on non-point source pollution in the Saemangeum watershed, South Korea. *Water* **2019**, *11*, 1982. [CrossRef]
18. Seo, S.B.; Kim, Y.O. Impact of spatial aggregation level of climate indicators on a national-level selection for representative climate change scenarios. *Sustainability* **2018**, *10*, 2409. [CrossRef]
19. Ko, J.; Ng, C.T.; Jeong, S.; Kim, J.H.; Lee, B.; Kim, H.Y. Impacts of regional climate change on barley yield and its geographical variation in South Korea. *Int. Agrophys.* **2019**, *33*, 81–96. [CrossRef]
20. Aryal, J.P.; Sapkota, T.B.; Khurana, R.; Khatri-Chhetri, A.; Rahut, D.B.; Jat, M.L. Climate change and agriculture in South Asia: Adaptation options in smallholder production systems. *Environ. Dev. Sustain.* **2020**, *22*, 5045–5075. [CrossRef]
21. Chen, F.; Chen, J.; Huang, W.; Chen, S.; Huang, X.; Jin, L.; Jia, J.; Zhang, X.; An, C.B.; Zhang, J.; et al. Westerlies Asia and monsoonal Asia: Spatiotemporal differences in climate change and possible mechanisms on decadal to sub-orbital timescales. *Earth Sci. Rev.* **2019**, *192*, 337–354. [CrossRef]
22. d'Alpoim Guedes, J.; Bocinsky, R.K. Climate change stimulated agricultural innovation and exchange across Asia. *Sci. Adv.* **2018**, *4*, eaar4491. [CrossRef]
23. Yadav, S.S.; Lal, R. Vulnerability of women to climate change in arid and semi-arid regions: The case of India and South Asia. *J. Arid Environ.* **2018**, *149*, 4–17. [CrossRef]
24. Islam, M.R.; Khan, N.A. Threats, vulnerability, resilience and displacement among the climate change and natural disaster-affected people in South-East Asia: An overview. *J. Asian Pac. Econ.* **2018**, *23*, 297–323. [CrossRef]
25. Rao, N.; Lawson, E.T.; Raditloaneng, W.N.; Solomon, D.; Angula, M.N. Gendered vulnerabilities to climate change: Insights from the semi-arid regions of Africa and Asia. *Clim. Dev.* **2019**, *11*, 14–26. [CrossRef]

26. Bostrom, A.; Hayes, A.L.; Crosman, K.M. Efficacy, action, and support for reducing climate change risks. *Risk Anal.* **2019**, *39*, 805–828. [CrossRef] [PubMed]
27. Bradley, G.L.; Babutsidze, Z.; Chai, A.; Reser, J.P. The role of climate change risk perception, response efficacy, and psychological adaptation in pro-environmental behavior: A two nation study. *J. Environ. Psychol.* **2020**, *68*, 101410. [CrossRef]
28. Pakmehr, S.; Yazdanpanah, M.; Baradaran, M. How collective efficacy makes a difference in responses to water shortage due to climate change in southwest Iran. *Land Use Policy* **2020**, *99*, 104798. [CrossRef]
29. Bamberg, S.; Möser, G. Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *J. Environ. Psychol.* **2007**, *27*, 14–25. [CrossRef]
30. Brody, S.; Grover, H.; Vedlitz, A. Examining the willingness of Americans to alter behaviour to mitigate climate change. *Clim Policy* **2012**, *12*, 1–22. [CrossRef]
31. Mutezo, G.; Mulopo, J.; Chirambo, D. Climate change adaptation: Opportunities for increased material recycling facilities in African cities. *Afr. Handb. Clim. Change Adapt.* **2020**, 1–26. [CrossRef]
32. Kwon, S.A.; Kim, S.; Lee, J.E. Analyzing the determinants of individual action on climate change by specifying the roles of six values in South Korea. *Sustainability* **2019**, *11*, 1834. [CrossRef]
33. Stollberg, J.; Jonas, E. Existential threat as a challenge for individual and collective engagement: Climate change and the motivation to act. *Curr. Opin. Psychol* **2021**, *42*, 145–150. [CrossRef] [PubMed]
34. Xie, B.; Brewer, M.B.; Hayes, B.K.; McDonald, R.I.; Newell, B.R. Predicting climate change risk perception and willingness to act. *J. Environ. Psychol.* **2019**, *65*, 101331. [CrossRef]
35. Sun, Y.; Han, Z. Climate change risk perception in Taiwan: Correlation with individual and societal factors. *Int. J. Environ. Res. Public Health* **2018**, *15*, 91. [CrossRef]
36. Smith, E.K.; Mayer, A. A social trap for the climate? Collective action, trust and climate change risk perception in 35 countries. *Glob Environ. Change* **2018**, *49*, 140–153. [CrossRef]
37. Bouman, T.; Verschoor, M.; Albers, C.J.; Böhm, G.; Fisher, S.D.; Poortinga, W.; Whitmarsh, L.; Steg, L. When worry about climate change leads to climate action: How values, worry and personal responsibility relate to various climate actions. *Glob. Environ. Change* **2020**, *62*, 102061. [CrossRef]
38. Fahad, S.; Wang, J. Farmers' risk perception, vulnerability, and adaptation to climate change in rural Pakistan. *Land Use Policy* **2018**, *79*, 301–309. [CrossRef]
39. Homburg, A.; Stolberg, A. Explaining pro-environmental behavior with a cognitive theory of stress. *J. Environ. Psychol.* **2006**, *26*, 1–14. [CrossRef]
40. Pakmehr, S.; Yazdanpanah, M.; Baradaran, M. Explaining farmers' response to climate change-induced water stress through cognitive theory of stress: An Iranian perspective. *Environ. Dev. Sustain.* **2021**, *23*, 5776–5793. [CrossRef]
41. Poortinga, W.; Whitmarsh, L.; Steg, L.; Böhm, G.; Fisher, S. Climate change perceptions and their individual-level determinants: A cross-European analysis. *Glob Environ. Change* **2019**, *55*, 25–35. [CrossRef]
42. Clayton, S. Climate anxiety: Psychological responses to climate change. *J. Anxiety Disord.* **2020**, *74*, 102263. [CrossRef]
43. Stroe, S.; Parida, V.; Wincent, J. Effectuation or causation: An fsQCA analysis of entrepreneurial passion, risk perception, and self-efficacy. *J. Bus Res.* **2018**, *89*, 265–272. [CrossRef]
44. Hart, P.S.; Feldman, L. The influence of climate change efficacy messages and efficacy beliefs on intended political participation. *PLoS ONE* **2016**, *11*, e0157658. [CrossRef] [PubMed]
45. Wormbs, N.; Söderberg, M.W. Knowledge, fear, and conscience: Reasons to stop flying because of climate change. *Urban Plan* **2021**, *6*, 314–324. [CrossRef]
46. Westoby, R.; McNamara, K.E. Fear, grief, hope and action. *Nat. Clim. Change* **2019**, *9*, 500–501. [CrossRef]
47. Gregg, J. Motivating climate activism through framing: Hope, fear, injustice, and sacrifice. *Sch. Horiz. Univ. Minn. Morris Undergrad. J.* **2019**, *6*, 2.
48. Alam, E.; Mallick, B. Climate change perceptions, impacts and adaptation practices of fishers in southeast Bangladesh coast. *Int. J. Clim. Change Strateg. Manag.* **2020**, *14*, 191–211. [CrossRef]
49. Rahman, M.M.; Nabila, I.A.; Sakib, M.S.; Silvia, N.J.; Galib, M.A.; Shobuj, I.; Hasan, L.; Chisty, M.A.; Alam, E.; Islam, R.M.T. Knowledge, attitude, and practices towards lightning in Bangladesh. *Sustainability* **2022**, *14*, 448. [CrossRef]
50. Alam, E.; Hridoy, A.-E.; Naim, M. Factors Affecting Small-Scale Fishers Adaptation toward the Impacts of Climate Change: Reflections from South Eastern Bangladeshi Fishers. *Int. Energy J.* **2021**, *21*, 119–132.
51. Alam, E. Earthquake hazard knowledge, preparedness and risk reduction in readymade garments industries in Bangladesh. *Sustainability* **2020**, *12*, 10147. [CrossRef]
52. Alam, E. Landslide hazard knowledge, risk perception, and preparedness in southeast Bangladesh. *Sustainability* **2020**, *12*, 6305. [CrossRef]
53. Langer, E.J.; Moldoveanu, M. Mindfulness research and the future. *J. Soc. Issues* **2000**, *56*, 129–139. [CrossRef]
54. Scafuto, F.; Edelstein, M. Silencing citizen protest: Local environmental resistance in the land of fires. *Partecipazione e Conflitto* **2020**, *13*, 772–806. [CrossRef]
55. Sawitri, D.R.; Hadiyanto, H.; Hadi, S.P. Pro-environmental behavior from a socialcognitive theory perspective. *Procedia Environ. Sci* **2015**, *23*, 27–33. [CrossRef]

56. Silver, H. *Social Exclusion*; Wolfensohn Center for Development: Washington, DC, USA, 2007. Available online: https://www.meyi.org/uploads/3/2/0/1/32012989/silver_-_social_exclusion-comparative_analysis_of_europe_and_middle_east_youth.pdf (accessed on 9 March 2022).
57. Sevoyan, A.; Hugo, G. Vulnerability to climate change among disadvantaged groups: The role of social exclusion. In *Applied Studies in Climate Adaptation*; Palutikof, J.P., Sarah, L.B., Barnett, J., Rissik, D., Eds.; Wiley-Blackwell: New Jersey, NJ, USA, 2014; pp. 258–265.
58. Rahman, M.A. Governance Matters: Power, Corruption, Social Exclusion, and Climate Change in Bangladesh. Doctoral Dissertation, The University of Arizona, Tucson, AZ, USA, 2015.
59. Ifeanyi-Obi, C.C.; Ugorji, E.C. Effect of social exclusion on climate change adaptation of female arable crop farmers in Abia State, Nigeria. *S. Afr. J. Agric. Ext* **2020**, *48*, 55–69. [CrossRef]
60. Curran, D. Risk society and the distribution of bads: Theorizing class in the risk society. *Br. J. Sociol.* **2013**, *64*, 44–62. [CrossRef]
61. Leiserowitz, A. Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Clim. Change* **2006**, *77*, 45–72. [CrossRef]
62. Leviston, Z.; Price, J.; Bishop, B. Imagining climate change: The role of implicit associations and affective psychological distancing in climate change responses. *Eur. J. Soc. Psychol* **2014**, *44*, 441–454. [CrossRef]
63. Lorenzoni, I.; Leiserowitz, A.; Doria, M.; Poortinga, W.; Pidgeon, N. Crossnational comparisons of image associations with "global warming" and "climate change" among laypeople in the United States of America and Great Britain. *J. Risk Res.* **2006**, *9*, 265–281. [CrossRef]
64. Smith, N.; Leiserowitz, A. The rise of global warming skepticism: Exploring affective image associations in the United States over time. *Risk Anal.* **2012**, *32*, 1021–1032. [CrossRef]
65. van der Linden, S. The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. *J. Environ. Psychol.* **2015**, *41*, 112–124. [CrossRef]
66. Leviston, Z.; Walker, I. Beliefs and denials about climate change: An Australian perspective. *Ecopsychology* **2012**, *4*, 277–285. [CrossRef]
67. Smith, N.; Leiserowitz, A. The role of emotion in global warming policy support and opposition. *Risk Anal.* **2014**, *34*, 937–948. [CrossRef] [PubMed]
68. Wang, S.; Leviston, Z.; Hurlstone, M.; Lawrence, C.; Walker, I. Emotions predict policy support: Why it matters how people feel about climate change. *Glob. Environ. Change* **2018**, *50*, 25–40. [CrossRef]
69. Wang, J.; Kim, S. Analysis of the impact of values and perception on climate change skepticism and its implication for public policy. *Climate* **2018**, *6*, 99. [CrossRef]
70. Niles, M.T.; Lubell, M.; Haden, V.R. Perceptions and responses to climate policy risks among California farmers. *Glob. Environ. Change* **2013**, *23*, 1752. [CrossRef]
71. Pahl, S.; Sheppard, S.; Boomsma, C.; Groves, C. Perceptions of time in relation to climate change. *Wiley Interdiscip. Rev. Clim. Change* **2014**, *5*, 375–388. [CrossRef]
72. Klenk, N.; Meehan, K. Climate change and transdisciplinary science: Problematizing the integration imperative. *Environ. Sci. Policy* **2015**, *54*, 160–167. [CrossRef]
73. Stiles, E. What makes us uncomfortable helps us change. *Can. Vet. J.* **2020**, *61*, 1135.
74. Ramirez, R.; Ravetz, J. Feral futures: Zen and aesthetics. *Futures* **2011**, *43*, 478–487. [CrossRef]
75. Hornsey, M.J.; Chapman, C.M.; Oelrichs, D.M. Ripple effects: Can information about the collective impact of individual actions boost perceived efficacy about climate change? *J. Exp. Soc. Psychol.* **2021**, *97*, 104217. [CrossRef]
76. Nielsen, K.S.; Clayton, S.; Stern, P.C.; Dietz, T.; Capstick, S.; Whitmarsh, L. How psychology can help limit climate change. *Am. Psychol.* **2021**, *76*, 130. [CrossRef] [PubMed]
77. Zhao, J.; Luo, Y. A framework to address cognitive biases of climate change. *Neuron* **2021**, *109*, 3548–3551. [CrossRef] [PubMed]
78. Ricart, S. Water management and irrigation governance in the Anthropocene: Moving from physical solutions to social involvement. *J. Geogr. Environ. Earth Sci. Int.* **2018**, *15*, 1–15. [CrossRef]
79. Ricart, S.; Olcina, J.; Rico, A.M. Evaluating public attitudes and farmers' beliefs towards climate change adaptation: Awareness, perception, and populism at European level. *Land* **2019**, *8*, 4. [CrossRef]
80. Shwom, R.; Bidwell, D.; Dan, A.; Dietz, T. Understanding US public support for domestic climate change policies. *Glob. Environ. Change Hum. Policy Dimens.* **2010**, *20*, 472–482. [CrossRef]
81. Kousser, T.; Tranter, B. The influence of political leaders on climate change attitudes. *Glob. Environ. Change* **2018**, *50*, 100–109. [CrossRef]
82. Stanley, S.K.; Wilson, M.S. Meta-analysing the association between social dominance orientation, authoritarianism, and attitudes on the environment and climate change. *J. Environ. Psycho.* **2019**, *61*, 46–56. [CrossRef]
83. Pearce, T.D.; Rodríguez, E.H.; Fawcett, D.; Ford, J.D. How is Australia adapting to climate change based on a systematic review? *Sustainability* **2018**, *10*, 3280. [CrossRef]
84. Contu, D.; Kaya, O.; Kaya, I. Attitudes towards climate change and energy sources in oil exporters. *Energy Strategy Rev.* **2021**, *38*, 100732. [CrossRef]
85. Semenza, J.C.; Ploubidis, G.B.; George, L.A. Climate change and climate variability: Personal motivation for adaptation and mitigation. *Environ. Health* **2011**, *10*, 46. [CrossRef]

86. Mitter, H.; Larcher, M.; Schönhart, M.; Stöttinger, M.; Schmid, E. Exploring farmers' climate change perceptions and adaptation intentions: Empirical evidence from Austria. *Environ. Manag.* **2019**, *63*, 804–821. [CrossRef] [PubMed]
87. Whitmarsh, L.; Capstick, S. Perceptions of climate change. In *Psychology and Climate Change*; Academic Press: Cambridge, MA, USA, 2018; pp. 13–33.
88. Hart, P.S.; Feldman, L. The benefit of focusing on air pollution instead of climate change: How discussing power plant emissions in the context of air pollution, rather than climate change, influences perceived benefits, costs, and political action for policies to limit emissions. *Sci. Commun.* **2021**, *43*, 199–224. [CrossRef]
89. De Groot, J.I.; Steg, L.; Poortinga, W. Values, perceived risks and benefits, and acceptability of nuclear energy. *Risk Anal. Int. J.* **2013**, *33*, 307–317. [CrossRef] [PubMed]
90. Preston, B.L.; Yuen, E.J.; Westaway, R.M. Putting vulnerability to climate change on the map: A review of approaches, benefits, and risks. *Sustain. Sci.* **2011**, *6*, 177–202. [CrossRef]
91. Semenza, J.C.; Hall, D.E.; Wilson, D.J.; Bontempo, B.D.; Sailor, D.J.; George, L.A. Public perception of climate change: Voluntary mitigation and barriers to behavior change. *Am. J. Prev. Med.* **2008**, *35*, 479–487. [CrossRef]
92. Hu, Q.; Zillig, L.M.P.; Lynne, G.D.; Tomkins, A.J.; Waltman, W.J.; Hayes, M.J.; Wilhite, D.A. Understanding farmers' forecast use from their beliefs, values, social norms, and perceived obstacles. *J. Appl. Meteorol. Climatol.* **2006**, *45*, 1190–1201. [CrossRef]
93. Butler, C.; Pidgeon, N. Climate Risk Perceptions and local experiences at the 2007 95. summer flooding: Opportunities or obstacles to change. *IOP Conf. Ser. Earth Environ. Sci.* **2009**, *6*, 262008. [CrossRef]
94. Patchen, M.; Public Attitudes and Behavior about Climate Change. Purdue Climate Change Research Center Outreach Publication 601. 2006. Available online: https://www.columban.jp/upload_files/data/EE0063_AttitudeChange.pdf (accessed on 9 March 2022).
95. Gifford, R.; Kormos, C.; McIntyre, A. Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *Wiley Interdiscip. Rev. Clim. Change* **2011**, *2*, 801–827. [CrossRef]
96. Howell, R.A. Investigating the Long-Term Impacts of Climate Change Communications on Individuals' Attitudes and Behavior. *Environ. Behav.* **2012**, *46*, 70–101. [CrossRef]
97. Viscusi, W.K.; Zeckhauser, R.J. The Perception and Valuation of the Risks of Climate Change: A Rational and Behavioral Blend. *Clim. Chang.* **2006**, *77*, 151–177. [CrossRef]
98. Nabi, R.L.; Gustafson, A.; Jensen, R. Framing Climate Change: Exploring the Role of Emotion in Generating Advocacy Behavior. *Sci. Commun.* **2018**, *40*, 442–468. [CrossRef]
99. Forsyth, T. Is resilience to climate change socially inclusive? Investigating theories of change processes in Myanmar. *World Dev.* **2018**, *111*, 13–26. [CrossRef]
100. Woroniecki, S.; Wamsler, C.; Boyd, E. The promises and pitfalls of ecosystem-based adaptation to climate change as a vehicle for social empowerment. *Ecol. Soc.* **2019**, *24*, 4. [CrossRef]
101. Chu, E.; Michael, K. Recognition in urban climate justice: Marginality and exclusion of migrants in Indian cities. *Environ. Urban.* **2018**, *31*, 139–156. [CrossRef]
102. Elliott, R. The sociology of climate change as a sociology of loss. *Eur. J. Sociol.* **2018**, *59*, 301–337. [CrossRef]
103. Lee, K.; Gjersoe, N.; O'Neill, S.; Barnett, J. Youth perceptions of climate change: A narrative synthesis. *WIREs Clim. Chang.* **2020**, *11*, e641. [CrossRef]
104. Mayer, A.; Smith, E.K. Unstoppable climate change? The influence of fatalistic beliefs about climate change on behavioural change and willingness to pay cross-nationally. *Clim. Policy* **2018**, *19*, 511–523. [CrossRef]
105. Zelenika, I.; Moreau, T.; Lane, O.; Zhao, J. Sustainability education in a botanical garden promotes environmental knowledge, attitudes and willingness to act. *Environ. Educ. Res.* **2018**, *24*, 1581–1596. [CrossRef]
106. Yu, T.K.; Lin, F.Y.; Kao, K.Y.; Chao, C.M.; Yu, T.Y. An innovative environmental citizen behavior model: Recycling intention as climate change mitigation strategies. *J. Environ. Manag.* **2019**, *247*, 499–508. [CrossRef]
107. Whitmarsh, L. Behavioural responses to climate change: Asymmetry of intentions and impacts. *J. Environ. Psychol.* **2009**, *29*, 13–23. [CrossRef]
108. Chen, C.F.; Wang, Y.; Adua, L.; Bai, H. Reducing fossil fuel consumption in the household sector by enabling technology and behavior. *Energy Res. Soc. Sci.* **2020**, *60*, 101402. [CrossRef]
109. Kothe, E.; Ling, M.; Berne, R.D.; Russell-Head, I.; Mullan, B. Protection Motivation Theory and intention to reduce fossil fuel consumption in response to climate change. *PsyArXiv* **2019**. [CrossRef]
110. Gunderson, R.; Fyock, C. The political economy of climate change litigation: Is there a point to suing fossil fuel companies? *New Political Econ.* **2021**, *27*, 1–14. [CrossRef]
111. Árnadóttir, Á.; Czepkiewicz, M.; Heinonen, J. Climate change concern and the desire to travel: How do I justify my flights? *Travel Behav. Soc* **2021**, *24*, 282–290. [CrossRef]
112. McKercher, B.; Prideaux, B.; Cheung, C.; Law, R. Achieving voluntary reductions in the carbon footprint of tourism and climate change. *J. Sustain. Tour* **2010**, *18*, 297–317. [CrossRef]
113. van de Ven, D.J.; González-Eguino, M.; Arto, I. The potential of behavioural change for climate change mitigation: A case study for the European Union. *Mitig. Adapt. Strat. Glob. Change* **2018**, *23*, 853–886. [CrossRef]
114. Stubbs, R.J.; Scott, S.E.; Duarte, C. Responding to food, environment and health challenges by changing meat consumption behaviours in consumers. *Nutr. Bull* **2018**, *43*, 125–134. [CrossRef]

115. Kemper, J.A.; Ballantine, P.W. Targeting the structural environment at multiple social levels for systemic change: The case of climate change and meat consumption. *J. Soc. Mark* **2019**, *10*, 38–53. [CrossRef]
116. Whitmarsh, L.; Poortinga, W.; Capstick, S. Behaviour change to address climate change. *Curr. Opin. Psychol.* **2021**, *42*, 76–81. [CrossRef]
117. Goldberg, J.; Marshall, N.; Birtles, R.A.; Case, P.; Curnock, M.; Gurney, G. On the relationship between attitudes and environmental behaviours of key Great Barrier Reef user groups. *Ecol. Soc.* **2018**, *23*, 19. [CrossRef]
118. Hochschild, J.; Sen, M. Technology Optimism or Pessimism about Genomic Science: Social Scientists versus the American Public. *Ann. Am. Acad. Political Soc. Sci.* **2013**, *658*, 236–252. [CrossRef]
119. Mitchell, R.B. Technology is not enough: Climate change, population, affluence, and consumption. *J. Environ. Dev.* **2012**, *21*, 24–27. [CrossRef]
120. Mavisakalyan, A.; Tarverdi, Y. Gender and climate change: Do female parliamentarians make difference? *Eur. J. Political Econ.* **2019**, *56*, 151–164. [CrossRef]
121. Khalil, M.B.; Jacobs, B.C.; McKenna, K.; Kuruppu, N. Female contribution to grassroots innovation for climate change adaptation in Bangladesh. *Clim. Dev.* **2020**, *12*, 664–676. [CrossRef]
122. Perkins, P.E. Canadian indigenous female leadership and political agency on climate change. In *Climate Change and Gender in Rich Countries: Work, Public Policy and Action*, 1st ed.; Cohen, M.G., Ed.; Routledge: Oxfordshire, UK, 2017; p. 282. ISBN 9781138222403.
123. Weber, E.U. What shapes perceptions of climate change? New research since 2010. *Wiley Interdiscip. Rev. Clim. Change* **2016**, *7*, 125–134. [CrossRef]
124. Lowe, T.; Brown, K.; Dessai, S.; de França Doria, M.; Haynes, K.; Vincent, K. Does tomorrow ever come? Disaster narrative and public perceptions of climate change. *Public Underst. Sci.* **2006**, *15*, 435–457. [CrossRef]
125. Baron, R.M.; Kenny, D.A. The Moderator—Mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173–1182. [CrossRef]
126. Pearse, R. Gender and climate change. *Wiley Interdiscip. Rev. Clim. Change* **2017**, *8*, e451. [CrossRef]
127. MacGregor, S. 'Gender and climate change': From impacts to discourses. *J. Indian Ocean Reg.* **2010**, *6*, 223–238. [CrossRef]
128. Godfrey, P.C. Introduction: Race, gender & class and climate change. *Race Gend. Cl.* **2012**, *19*, 3–11.
129. Pearson, A.R.; Ballew, M.T.; Naiman, S.; Schuldt, J.P. Race, class, gender and climate change communication. In *Oxford Research Encyclopedia of Climate Science*; Oxford University Press: New York, NY, USA, 2017.
130. Laidley, T. Climate, class and culture: Political issues as cultural signifiers in the US. *Sociol. Rev.* **2013**, *61*, 153–171. [CrossRef]
131. 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]
132. Morton, T.A.; Bretschneider, P.; Coley, D.; Kershaw, T. Building a better future: An exploration of beliefs about climate change and perceived need for adaptation within the building industry. *Build Environ.* **2011**, *46*, 1151–1158. [CrossRef]
133. Patt, A.G.; Weber, E.U. Perceptions and communication strategies for the many uncertainties relevant for climate policy. *Wiley Interdiscip. Rev. Clim. Change* **2014**, *5*, 219–232. [CrossRef]
134. Adger, W.N. Social aspects of adaptive capacity. *Clim. Change Adapt. Capacit. Dev.* **2003**, 29–49. [CrossRef]
135. Lovvorn, J. Climate change beyond environmentalism part I: Intersectional threats and the case for collective action. *Geo. Envtl. L. Rev.* **2016**, *29*, 1. [CrossRef]
136. Damsø, T.; Kjær, T.; Christensen, T.B. Local climate action plans in climate change mitigation–examining the case of Denmark. *Energy Policy* **2016**, *89*, 74–83. [CrossRef]
137. Botzen, W.; Duijndam, S.; van Beukering, P. Lessons for climate policy from behavioral biases towards COVID-19 and climate change risks. *World Dev.* **2021**, *137*, 105214. [CrossRef]
138. Monroe, M.C.; Plate, R.R.; Oxarart, A.; Bowers, A.; Chaves, W.A. Identifying effective climate change education strategies: A systematic review of the research. *Environ. Educ. Res.* **2019**, *25*, 791–812. [CrossRef]
139. Apollo, A.; Mbah, M.F. Challenges and opportunities for climate change education (Cce) in East Africa: A critical review. *Climate* **2021**, *9*, 93. [CrossRef]
140. Verlie, B. From action to intra-action? Agency, identity and 'goals' in a relational approach to climate change education. *Environ. Educ. Res.* **2020**, *26*, 1266–1280. [CrossRef]
141. Kim, H. The effect of a climate change monitoring program on students' knowledge and perceptions of STEAM education in the republic of Korea. *Eurasia J. Math. Sci. Technol. Educ.* **2015**, *11*, 1321–1338. [CrossRef]
142. Lee, J.S.; Kim, J.W. Assessing strategies for urban climate change adaptation: The case of six metropolitan cities in South Korea. *Sustainability* **2018**, *10*, 2065. [CrossRef]
143. Jo, J.H.; Golden, J.S.; Shin, S.W. Incorporating built environment factors into climate change mitigation strategies for Seoul, South Korea: A sustainable urban systems framework. *Habitat Int.* **2009**, *33*, 267–275. [CrossRef]
144. Crous, G.; Bradshaw, J. Child social exclusion. *Child. Youth Serv. Rev.* **2017**, *80*, 129–139. [CrossRef]
145. Chung, S.; Jeon, H.; Song, A.; Kim, J.H. Developmental trajectories and predictors of social exclusion among older Koreans: Exploring the multidimensional nature of social exclusion. *Soc. Indic. Res.* **2019**, *144*, 97–112. [CrossRef]
146. Han, B.Y.; Yang, M.O.; Gustafsson, R. The Social Exclusion of Child-Rearing Unwed Mothers in South Korea. In *Handbook of Social Inclusion: Research and Practices in Health and Social Sciences*; Springer: Cham, Switzerland, 2020; pp. 1–21.

147. Zárate-Toledo, E.; Patiño, R.; Fraga, J. Justice, social exclusion and indigenous opposition: A case study of wind energy development on the Isthmus of Tehuantepec, Mexico. *Energy Res. Soc. Sci.* **2019**, *54*, 1–11. [CrossRef]
148. Rahman, M. Governance matters: Climate change, corruption, and livelihoods in Bangladesh. *Clim. Change* **2018**, *147*, 313–326. [CrossRef]