

Article

Examining the Effectiveness of Climate Change Communication with Adolescents in Vietnam: The Role of Message Congruency

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Abstract: Climate change makes coastal communities more vulnerable to floods associated with storm surges and sea level rise, requiring both adaptation and mitigation measures. Moreover, proper understanding of flood risks and their potential impacts on climate change appears to be a communication challenge. In climate change communication, the effect of framing congruency on perception of risk, efficacy and behavioural intentions towards climate change adaptation and mitigation has received limited attention. Messages have not been congruent in framing risks associated with climate change. We define congruency as the coherent alignment of several aspects of message content. Messages are considered congruent when they provide recipients with consistent contents such as giving concrete and actionable advice, or by providing more abstract and general background information. This research focuses on climate change communication in fostering mitigation behaviours among adolescents in vulnerable locations in the global South. Based on Construal Level Theory, this paper investigates how message congruency affects the link between perceptions of climate change risk and efficacy and two predictors of behavioural change: perceived responsibility and mitigation intentions. We conducted an experiment to test the effect of congruent vs. incongruent risk communication among adolescents in highly vulnerable coastal communities in the Mekong Delta in Vietnam ($N = 348$). Multiple regression analysis found strong effects of congruency in message framing; when messages were congruent in the content, communicative interventions changed adolescents' perceptions and attitudes toward climate change mitigation more consistently. This research contributes both theoretically and practically to risk communication among adolescents and toward climate change mitigation behaviour.

Keywords: climate change; risk communication; message framing; construal level; adolescents

1. Introduction

Global climate change is posing serious risks for ecological and social systems worldwide [1–5]. Climate change makes coastal communities even more vulnerable to floods associated with storm surges and sea level rise [6–8]. Addressing climate change and its impacts requires adaptation as well as mitigation efforts [9]. While adaptation deals with the consequences of climate change, mitigation aims to tackle its causes. Both adaptation and mitigation involve individual along with societal responses. Efforts to address macro issues on climate change adaptation have

been taking place in both developed and developing countries, especially regarding urban and environmental planning (e.g., understanding social norms and human behaviours in addressing global environmental challenges [10,11]; urban planning and social learning to adapt to climate change [12–16]. Understanding flood risks and potential impacts of climate change appears to be a communication challenge in addressing the determinants of risk negligence [17]. Climate change communication is therefore important to raise awareness, to garner support for collective initiatives, and to motivate individual action.

This research focuses on climate change communication to foster mitigation behaviours among adolescents in vulnerable locations in the global South. Mitigation was emphasized in the Paris Agreement with the goal to keep global temperature rise by the end of this century “well below 2 degrees Celsius above pre-industrial levels” [18]. It involves manifold measures to reduce anthropogenic greenhouse gas emissions through policy, technology and behavioural changes [19]. Successful mitigation requires coordinated societal action, but also responsible behaviour at the individual or organizational level. Therefore, it is vital to understand how people can be motivated to feel responsible for the climate impacts of their conduct and to adopt behavioural changes to environmentally more sustainable lifestyles. From a behaviour change perspective, this is the key task of climate change communication. An essential starting point is that people tend to base their future behaviours on their past behaviours or habits [20–23]. Therefore, it is important for climate communication efforts to target young people, who are still in the process of forming habits, in order to promote societal change.

Despite major efforts, in particular since the creation of the Intergovernmental Panel on Climate Change (IPCC) in 1998, to engage and mobilize public support to address the causes of climate change, risk communication has had limited effects with often polarized debates and wide-spread scepticism [24–27]. A number of studies have argued that communicating a psychologically distant risk like climate change remains the biggest challenge for attempts to change individuals’ behaviours in response to climate change [28–31]. The notion of psychological distance is described in Construal Level Theory (CLT) as the ways people experience an object or event to be psychologically distant (i.e., abstract construal) or close (i.e., concrete construal) [32]. Psychological distance is commonly defined in several dimensions, with spatial, temporal, social, and hypothetical distance being considered most important [32,33].

The aim of this research is to investigate how perceptions of climate change risk and efficacy influence two key predictors of behavioural change: one’s perceived responsibility and one’s mitigation intentions regarding climate change [34]; further, it tests how congruency in risk messages moderates this relationship. Often, it has been observed that messages are not congruent in framing risks associated with climate change. Messages are considered congruent when they provide recipients with consistent contents such as giving clear advice on concrete actions (i.e., action-oriented), or by providing more general and abstract background information (i.e., information-oriented). Messages are considered as incongruent when they provide recipients with inconsistent contents such as linking abstract background information with advice on concrete actions or conveying urgency without advice on concrete actions. People’s reactions are strongly influenced by how the risk is presented [35,36]. For example, one common message framing technique in climate change communication is to present actionable advice to tackle climate change with messages that are intended to arouse emotions [35,37,38]. This framing method was not applied in many climate change communication attempts over the last two decades, which tended to instil anxiety and concern amongst audiences without providing viable solutions or actions to take [28,39–42] which may cause low congruency in framing messages and limited effectiveness of risk communication. Therefore, it is necessary to look at the importance of message congruency and risk perception interaction.

The paper first reviews the literature on climate change communication, message representation, and applications of the CLT in framing psychological distance in climate change communication. In the following section, we present our research framework for message representation on climate change

mitigation. We then present the findings of an experiment with adolescents in Vietnam's Mekong delta to investigate the role of communication in climate change mitigation. Vietnam is a country representative of an emerging economy in the developing world with a relatively young population. During the period 1991–2012 Vietnam's greenhouse gas emissions (GHG) increased on average by 12% annually, recording 251.0 MtCO₂e (or million metric tons of carbon dioxide equivalent) in 2012, equivalent to 0.53% of global GHG emissions [43]. In 2013, the total GHG emission was recorded at 259.0 MtCO₂e with LULUCF (i.e., Land Use, Land-Use Change and Forestry) sector and 293.3 MtCO₂e without LULUCF sector, as reported in the Second Biennial Updated Report of Viet Nam to the United Nations Framework Convention on Climate Change [44]. A further rapid increase is projected in the coming decades if no action is taken [45].

Vietnam is ranked as one of the most vulnerable countries to climate change [46,47]. As an emerging economy, Vietnam is being industrialized rapidly. Children and young adults under the age of 29 make up 50.25% of its fast-growing population [48]. In the near future, these generations will have more money to spend, will consume more, and as a direct consequence, will cause more greenhouse gas emissions. If no proper action is taken to educate these populations and make them aware and feel responsible for their sustainable behaviour, climate consequences will be more serious and meeting the emission reduction targets agreed in the 2015 Paris Agreement [18] will become more difficult. In the past few decades, initiatives have been taking place in Vietnam by the education management agencies both at central and local levels [49–52], community level [17,53], and by various non-governmental organizations [54–56] with the aim of integrating environmental and climate change-related education topics into existing curricular or extra-curricular activities for school children. These efforts have met with some initial success in terms of raising awareness of the younger generations to protect the environment and adapt to climate change [54–56].

The experiment was conducted with adolescents ($N = 384$) from secondary schools in highly flood-prone communities due to climate change and associated sea level rise. In the experiment, we adopted a 2×2 factorial design (information-oriented vs. action-oriented and abstract vs. concrete messages) to test the effectiveness of risk messages that were either congruent or incongruent in framing the risk. Overall, the findings demonstrate that message representation and congruency play an important role. When the messages were congruent in content (i.e., they were either concrete and action-oriented, or abstract and information-oriented) then communicative interventions changed adolescents' perceptions on climate change severity and susceptibility more consistently, achieved a higher sense of self-response efficacy, and more adolescents were willing to perform climate change mitigation behaviours. However, the communicative content that creates perceived proximity is specific to each case, context, and target group.

2. Materials and Methods

2.1. Message Representation and Construal Level Theory (CLT) in Climate Change Communication

2.1.1. Message Framing in Risk Communication and Climate Change

Message framing refers to a technique that allows people or companies to package their information for their intended audience. The message or information targets specific people based on its agenda and one can determine its results by the effect it has on the targeted audience [35]. A number of ways exist to define frames in communication science. Gitlin [57] defined frames as "principles of selection, emphasis, and presentation composed of little tacit theories about what exists, what happens and what matters". Entman [58] emphasized that framing essentially involves selection and salience. In a theoretical review of message framing in health, Wilson et al. [59] summarized three types: gain, loss and fear which had widely been applied by scientists and practitioners to explore the communication effect of the relationship between behaviour change and consequence valence in risk, health and, recently, environmental protection communication. For example, a study by Rothman et al. [60] revealed that gain-framed messages are more effective when targeting disease mitigation behaviours whereas

loss-framed messages are more effective when targeting disease detection behaviours. In a meta-analytic review of relative persuasiveness of gain-and loss-framed messages to promote vaccination, the authors found no significant difference in the persuasiveness framed messages for encouraging vaccination [61].

There are various message framing methods that relay information, depending on the message and audience. Message framing is an important aspect of developing information that communicates with the audience. Ideally, a message that ponders its audience's desires and needs may create a more positive response than a message that is insistent and demanding. The popularity of framing in communication helps scholars in different disciplines such as political science, behavioural economics and psychology [62]. However, the ambiguities that surround their conceptualization may cause confusion and become ineffective which requires communication experts to shift from an era of mass communication to tailor-made and specific-target audience communication. For example, the use of logic, ethics or emotions may highlight a person or group's core motivations [35,63,64].

In recent decades, in climate change communication to promote mitigation and adaptation behaviours by individuals and society, one of the main challenges faced by experts and practitioners is that of invisible causes, whereby climate change traits are not visible, making it hard to convince people that it exists [25,35,63,64]. Another challenge is distant impacts, whereby the cause of climate change is far from its effects [25,26,30]. For instance, emission of greenhouse gas causes global warming which threatens the life of polar bears which do not attract much attention from people living in the hot climatic zones. Thus, it is hard to convince individuals and companies of the need to secure the environment or reduce emission. Therefore, message framing requires one to understand climate change causes and consequences at first hand, then work on effective message framing that will educate a society regardless of whether it is the cause or feels the effect of climate change.

2.1.2. Psychological Distance in Climate Change Communication

In this section, we review the literature around the topic of psychological distance in climate change communication. According to Trope & Liberman [33], this is described as the ways people experience an object or event to be psychologically distant (i.e., abstract construal) or close (i.e., concrete construal) and is commonly defined on several dimensions (e.g., spatial, temporal, social, and hypothetical). A framing method that has received much attention in recent decades in climate change communication research has employed the concept of psychological distance [30,31,65–68]. CLT suggests that varying levels of psychological distance affect individuals' perceptions of risk and their judgments with regard to decision-making behaviours [32,33]. When the perceived psychological distance between an individual and a risk increases, the risk is construed more abstractly [69]. Consequently, individuals that experience a risk as psychologically distant and abstract, across a variety of domains, are more likely to downplay the risk than those who perceive it as psychologically proximal and concrete [69].

Despite numerous studies on climate change communication and message development, the effects of reframing climate change from "distal or further away" to "proximal or closer to its origin" as a strategy to change the public's perceptions and behavioural intentions also significantly vary due to people's experience of climate change as something psychologically distant [24,30,32,70]. For example, Brügger et al. [30] found that "participants with a distant focus relied more on scepticism to represent risks and make decisions about supporting climate change, whereas participants with a proximal perspective relied more on fear when making such judgments". In contrast, Spence & Pidgeon [48] found that "framing climate change impacts as distant resulted in climate change impacts being perceived as more severe, whilst attitudes towards climate change mitigation were more positive when participants were asked to consider social rather than personal aspects of climate change".

Moreover, existing studies of psychological distance have so far underexplored individual differences or contextual variables as drivers for climate change perception and behavioural change [24,30,32,65,70]. This is an important aspect to consider because climate change communication meets recipients with existing attitudes, values, and perceptions. Therefore, in this research we

investigate the effectiveness of climate change communication, given a person's appraisal of the climate change threat and of efficacy related to mitigation behaviours.

2.1.3. Appraisal of Threat and Efficacy in Mitigation Behaviour

According to the extended parallel processing model (EPPM) developed by Witte [71]—a framework that predicts how individuals react when being confronted with appeals to fear—a person's intention to protect oneself against a given risk depends on the perceived severity and susceptibility of the threat and the perceived self-efficacy and response efficacy. We will now elaborate upon each of these four factors: (1) perceived severity refers to an individual's subjective perception of the magnitude of a threat or risk [72], (2) perceived susceptibility to a risk entails the appraisal of one's vulnerability regarding the risk; (3) self-efficacy refers to an individual's subjective perception of his or her ability to successfully perform risk mitigation practices; and (4) response efficacy means the perceived effectiveness of the risk mitigation behaviours. Reviews of EPPM [71,73–75] studies have firmly established that perceptions of severity, susceptibility, self-efficacy, and response efficacy are positively associated with peoples' inclination to exert self-protective behaviours. Threat and efficacy perceptions play a "critical role in determining" subsequent attitudes toward risks [76]. Communicating climate change threats without efficacy information failed to trigger changes in audience attitudes [77]. The threats posed by climate change should be communicated, along with efficacy content, to be effective in climate change risk communication [78]. In the research presented here we put forward the notion that these perceptions of threats and efficacy are moderated by the congruency of climate change communication.

2.1.4. Congruency in Climate Change Communication

It is commonly agreed that climate change communication is challenging due to the inherently uncertain and abstract nature of climate change in terms of temporal, social, and geographical impacts [25,28,31,79]. Communication frames were effective if they participated in "reducing the amount of psychological distance separating an individual and a risk" [69]. For example, bringing "the abstract risk closer to the individual" makes a risk more personal to an individual and can reduce the abstractness of the risk (here: climate change); on the other hand, making "an individual think more abstractly (bringing the individual closer to the risk) also helps to reduce the amount of psychological distance about that risk (here: climate change) that closes the gap between the abstract risk and the person's experience" [69]. However, risk communication may become ineffective if messages contain a mix of abstract and concrete elements [69].

In this research, we take this notion one step further by positing that congruency in terms of construal levels matters, as a message can be predominantly information-oriented or action-oriented. We define congruency as the coherent alignment of several aspects of message content. With regard to climate change communication, not only the level of abstraction in the presentation of the threat is important, but also whether the message is either information-oriented or action-oriented. We will explore message congruency, which has been extensively studied in brand marketing science [80] and health [81–83], by testing whether messages framed in a more congruent way are more effective in promoting behavioural intentions to climate change adaptation or mitigation than incongruently framed messages. We propose that messages are congruent if their content is either concrete and action-oriented, or abstract and information-oriented. In contrast, messages are incongruent when no such alignment exists—i.e., if messages are abstract and action-oriented, or concrete and information-oriented (see Table 1). We expect that the combination of concrete and action-oriented messages will couple lively psychological experience with clear behavioural options, thus reducing barriers to act; while the combination of abstract and information-oriented messages will facilitate the adoption of a more contemplative perspective, especially in the case of a long-term phenomenon like climate change.

Table 1. Factorial design 2 × 2 on message congruency.

Congruency		
	Congruent	Incongruent
Message Framing	Information-oriented × Abstract Action-oriented × Concrete	Information-oriented × Concrete Action-oriented × Abstract

Climate change communication may become most effective when it connects to individuals' risk perceptions and helps the audience to make sense of the problem, while suggesting that response actions must also comply with the audiences' normative attitudes. From the perspective of CLT, it has been argued that "decreasing psychological distance should not itself influence people's willingness to act but change the processes that underlie individual decision-making" [26]. Participants with a distant focus are more sceptical about the risks and about decision-making to support climate change, whereas participants with a proximal perspective tend to perceive a higher susceptibility when making such judgments [26]. Simply making the climate change impacts seem closer to people will not necessarily increase their engagement in climate change actions, and therefore it requires a more differentiated perspective on the effects of psychological distance in the context of climate change, and one significantly related to decision-making behaviours [25,26].

2.2. Research Framework

To investigate the interaction between climate change risk perceptions and message congruency, we propose a research framework (Figure 1) that is rooted in Construal Level Theory (CLT) developed by Trope & Liberman [33]—a theory that describes the relation between psychological distance and the extent to which people's thinking is abstract or concrete. According to the Theory of Planned Behaviour (TPB), behavioural intentions "can be predicted with high accuracy from attitudes toward the behaviour", and these behavioural intentions "together with perceptions of behavioural control, account for considerable variance in actual behaviour" [84]. In general, the framework treats threat and efficacy perceptions as independent variables that affect the perceived responsibility and the intention to adopt responsive behaviours, with message congruency as a moderating factor. From EPPM theory, we adopt perceived severity, susceptibility, self-efficacy, and response efficacy to climate change as the four independent variables. The two dependent (or outcome) variables to examine the predictors of behavioural change are perceived responsibility and mitigation intentions. We investigate the influence of the moderator variable congruency by testing whether the relationship between individual perceptions on mitigation intentions and perceived responsibility is dependent on climate change message congruency.

The analysis was organized around two hypotheses:

Hypothesis 1. *Perceptions of risk and efficacy have a positive relationship with predictors of behavioural change, i.e., perceived responsibility and mitigation intentions regarding climate change (see Figure 1).*

Hypothesis 2. *The strength of this relationship is moderated by congruency in risk messages: we expect a stronger relation when messages are congruent (either abstract and information-oriented, or concrete and action-oriented) rather than incongruent (messages that are either abstract and action-oriented, or concrete and information-oriented).*

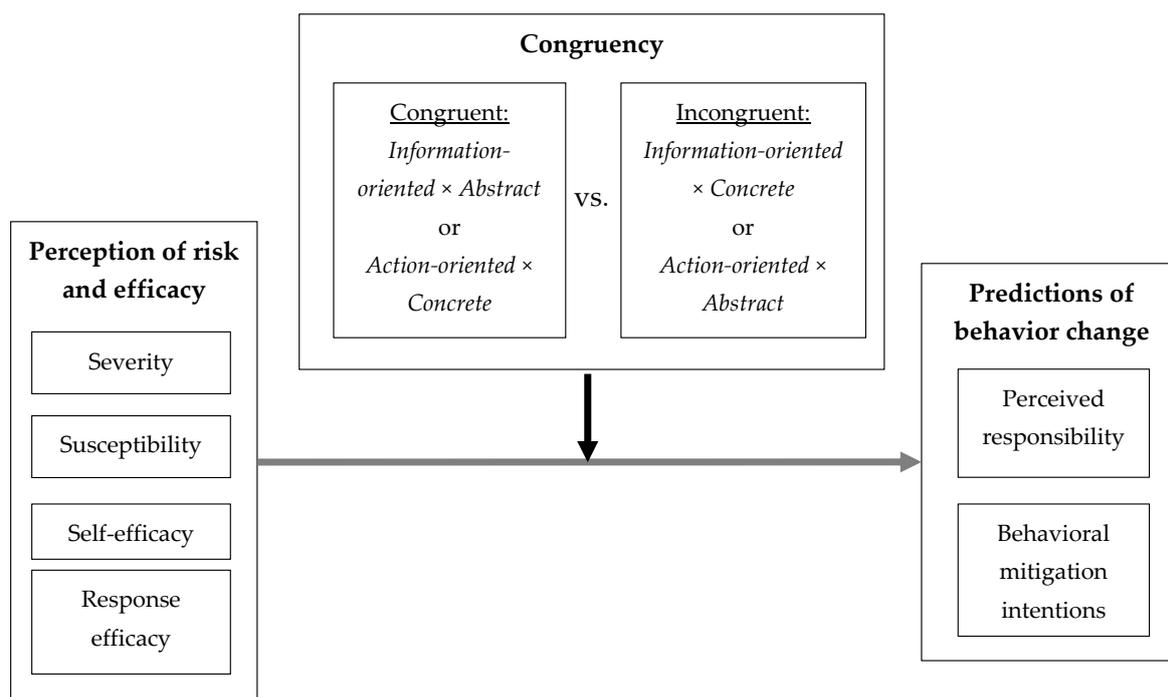


Figure 1. Research Framework.

2.3. Methods

2.3.1. Research Sites

The research was conducted in Can Tho City, which is located in the Mekong Delta of Vietnam and adjacent to one of the arms of the Mekong River (see Figure 2). This region is one of the world's most vulnerable areas to climate change impacts [85]. According to Vietnam Climate Change and Sea Level Rise scenarios, under the Representative Concentration Pathway (RCP) 6.0 (high emission scenario), the sea level is projected to rise between 37 to 82 cm by the end of the 21st century [86]. This would cause major flooding in the Mekong delta; a sea level rise of 100 cm is projected to inundate 38.9% of the Mekong delta land surface. As a result, the biggest rice and aquaculture farming area of Vietnam will be under serious risk of lost production that will affect food security and people's livelihood.

2.3.2. Participants and Design

This research was conducted among adolescents in the Mekong delta in Vietnam. This is a relevant target group and research location, because the frequency and intensity of extreme weather events and associated economic and health consequences will intensify and disproportionately affect vulnerable populations including children and adolescents, the poor, and the elderly [46,47,87]. Secondary schools in the immediate vicinity of Can Tho City were designated as research location. In consultation with the local climate change office, these schools were selected as they had no previous climate change project or communication campaign. The school headmasters announced the research and recruited a voluntary sample of 348 secondary-school pupils (adolescents) of seventh and eighth grades, aged 13 to 15 years. Students were randomly assigned to one of the conditions of the 2 × 2 factorial design (information-oriented vs. action-oriented messages and abstract vs. concrete messages). Between 81 and 90 students participated in each condition.

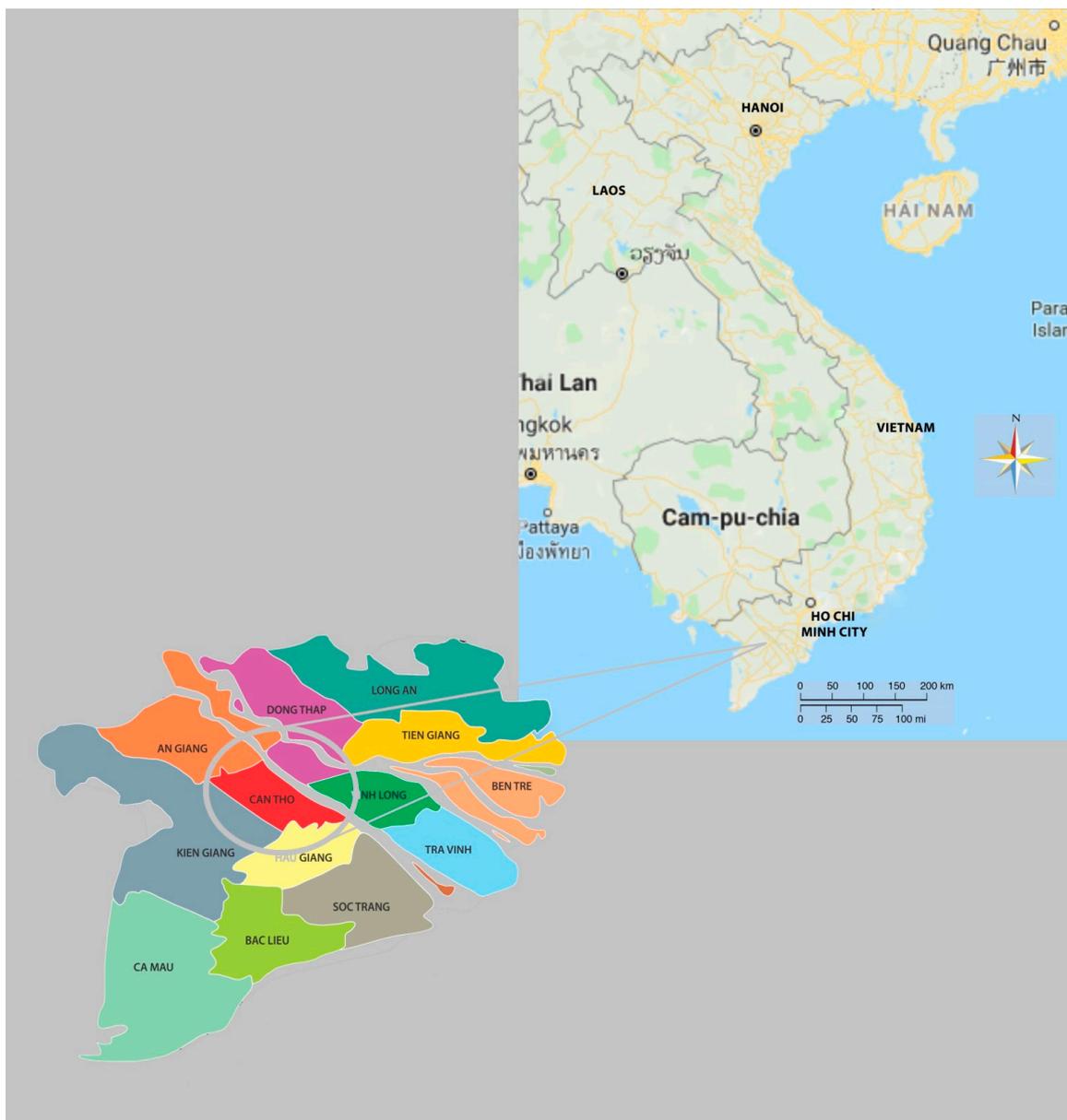


Figure 2. Research location.

2.3.3. Procedure

A pilot study to test the experimental materials and survey items and to optimize the final research setup was conducted with 24 eighth grade students in a secondary school in suburban Hanoi (to avoid potential spill-over effects on the participants in the main study in Can Tho City). Based on the pilot experiences, the research team adjusted some of the texts used in the communication messages to make them more relevant to adolescents and the local context of a rural setting.

For the main survey, ten university students from the Department of Environmental and Natural Resources at Can Tho University were trained as research assistants. The survey was conducted during one visit to the school. A month before the actual study was conducted at the selected schools, the research team worked with the schools' management boards to inform them about the study and to recruit the participants. At the beginning of the visit, all secondary-school participants were gathered in the school hall and briefed about the research. The researchers emphasized voluntary participation and informed that any students who felt not willing to participate were not required to do so. During the study, if students did not want to continue, they could stop and leave the

classroom. Before participation in the survey, each student completed a consent form to document voluntary participation. The students were then randomly assigned to different classrooms for each of the conditions, where they received questionnaires and pens. The participants were first asked to respond to questions about their perceptions of climate severity and susceptibility, self-efficacy, and response efficacy. After a 15-min break, they were asked to read the communication messages pertaining to their experimental condition and to take notes; this took around 15 min. Finally, the participants received a questionnaire related to the dependent variables of our research framework, i.e., perceived responsibility and mitigation intentions. In total, the experiment lasted around 120 min. Students were asked not to discuss the message content, nor how to answer the survey questions. Researchers were present in each classroom to supervise the experiment and provide support to students. At the end of the experiment, the teachers, researchers, and supervisors thanked the students for their participation and each student received a small gift.

Four versions of pre-printed climate messages were pre-tested in the pilot, then revised and used in the study. The messages were developed using IPCC's terms on climate change in the Fifth Assessment Report [88] and tailored to suit the research context in Can Tho City. Each set of communication messages represented one of the factorial conditions; either information-oriented and abstract, information-oriented and concrete, action-oriented and abstract, or action-oriented and concrete. The complete messages can be found in Table S1.

The information-oriented messages emphasized the information (threat: severity, susceptibility) about climate change without any suggested actions (abstract framed message, e.g., future, global/polar, other/out-group/dissimilar, unlikely) while action-oriented message suggested specific actions to respond to climate change (concrete-framed message, e.g., present, local, self/in-group/similar, likely) in the printed messages (self-efficacy). The abstract messages emphasized general information about climate change (threat: severity, susceptibility) while the concrete messages emphasized the benefits of taking suggested actions to encourage adolescents to do something to mitigate the climate change (response-efficacy).

For example, an information-oriented message in combination with an abstract message (congruent) was framed like this: "The phenomenon of climate change will very likely cause land and ocean surface temperatures to rise". An information-oriented in combination with a concrete message (incongruent) was framed like this: "The phenomenon of climate change has already caused Can Tho's temperature to rise and will very likely make Can Tho's weather hotter over the next 10 years". An action-oriented in combination with abstract message (incongruent) was framed like this: "The phenomenon of climate change will highly likely cause land and ocean surface temperatures to rise. This effect can be countered by reducing deforestation and planting more trees". An action-oriented in combination with a concrete message (congruent) was framed like this: "The phenomenon of climate change has already caused Can Tho's average temperatures to rise and will very likely make Can Tho's weather hotter over the next 10 years. You can counter this effect indirectly by less burning of fuels, by walking instead of riding motorbikes, and by planting more trees to offer shade to people and farm animals".

2.3.4. Measurements

We now explain the measurements used to analyse the survey:

- The perceived severity of climate change impacts was measured by using four items, each with a 5-point Likert scale, which were combined to form a reliable scale ($\alpha = 0.80$); (α or Cronbach's alpha was calculated by correlating the score for each scale item, with the total score for each response, then comparing the result to the variance for all individual item scores). A sample item was: "I believe that climate change is severe" with response options ranging from 1 (agree not at all) to 5 (agree very much)".

- The perceived susceptibility of climate change impacts was measured by a second scale ($\alpha = 0.71$) that consisted of four items with 5-point Likert scale questions, for example, “I am at risk from the consequence of climate change”.
- Self-efficacy was measured by five items with 5-point Likert scale questions ($\alpha = 0.67$), for example, “I am capable to walk or go by bicycle to school to mitigate climate change”.
- Response efficacy was measured by four items with 5-point Likert scale questions ($\alpha = 0.70$), for example “Reducing the use of electricity and fuel is effective in mitigating climate change”.
- Behavioural intentions for climate change mitigation were measured by eleven items (5-point Likert scale; $\alpha = 0.74$). This section was introduced with the frame: “There are some things that can be done against climate change. Please indicate how likely it is that you personally will perform the activities mentioned below”. Then participants were asked about the likelihood of adopting specific activities, e.g., “Will you turn off lights or fan after use?”.
- Perceived responsibility was measured by six items (5-point Likert scale; $\alpha = 0.70$). A sample item was, for example, “Not only the government is responsible for climate change problems, but me too”.

In addition, the participants were asked about general demographic information (gender, age, school) and their current practices in everyday life to protect the environment. The complete questionnaire can be found in Table S2.

2.3.5. Data Analysis

Data from filled-in questionnaires were entered into SPSS by using data double-entry (data was entered into the system twice) to reduce errors. Descriptive statistics and regression analyses were conducted to test the conceptual model. In order to test the moderating role of message framing congruency, we first constructed the moderator variable by recoding the four treatment conditions into two congruency conditions: the congruent condition was formed by the concrete/action-oriented conditions and the abstract/information-oriented conditions; the non-congruent condition was formed by the abstract/action-oriented conditions and the concrete/information-oriented conditions. We performed regression analyses to look at the relationship between the independent variables of perception measures (risk: severity and susceptibility, and efficacy: self and response efficacy) and the outcome variables (predictors of behavioural change: perceived responsibility and mitigation intentions) for both congruent and non-congruent message framing conditions (moderator: congruency variable). To illustrate the trend of these relationships, we plotted the slopes in a 3-dimensional graph where the horizontal axis represents the independent variables, the vertical axis the outcome variables and the third dimension the message congruency [89].

3. Results

3.1. Descriptive Statistics

Of the 348 participants, 47.1% were male, 52.6% were female and 0.3% did not reveal their gender. Their age ranged from 12 to 15 years ($M_{age} = 13.62$; $SD = 0.68$). 58.6% of participants attended seventh grade and 41.4% eighth grade. Regarding environmental protection at home, in their school, or community, 60.6% indicated they never participated in such activities while 32.4% did. Asked about their current practices related to environmental protection, most participants (93.4%) responded that they turn off the lights when leaving a room, 91.7% turn off water taps after use, 64.1% protect trees around their homes, 56.0% separate household waste for recycling, 48.0% save water, and 43.1% limit the use of plastic bags.

3.2. Test of the Conceptual Model: Interactive Effects of Risk and Efficacy Perceptions and Congruency on Mitigation Intentions and Perceived Responsibility

We ran a series of regression analyses to test the hypothesized relationship between risk variables (severity, susceptibility), efficacy perception variables (self and response efficacy), the moderator variable (congruency) and the two outcome variables (mitigation intentions and perceived responsibility to climate change). Step 1 included the independent variables of perceptions of risk and efficacy and the congruency variable; step 2 included the interaction term between perceptions of risk and efficacy (independent variables) and congruency (moderator variables). We first report on the results of the interactive effect of congruency and severity perceptions, followed by its joint effects with susceptibility, self-efficacy, and response efficacy, respectively.

The results (see Table 2) show that perceived severity was positively related to perceived responsibility ($\beta = 0.32, p < 0.001$). Then in step 2, the interaction term between severity and congruency was entered into the analysis model. This yielded a significant interaction effect ($\beta = 0.77, p < 0.01$), as shown in Figure 3. The positive relationship between severity and perceived responsibility was stronger under the high congruency conditions as compared to the low congruency conditions.

Table 2. Results of regression analysis of congruency and severity perceptions on predictors of behavioural change.

Step and Variables	Perceived Responsibility		Mitigation Intentions	
	1	2	1	2
1. Congruency	−0.00	−0.76 **	−0.02	−0.56 †
Severity	0.32 ***	0.34 ***	0.15 **	0.15 **
2. Interaction		0.77 **		0.55 †
ΔR^2	0.10 ***	0.02 **	0.02 *	0.01 †
Adjusted R^2	0.10 ***	0.12 ***	0.02 *	0.02 *

Note: Standardized regression coefficients are reported. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

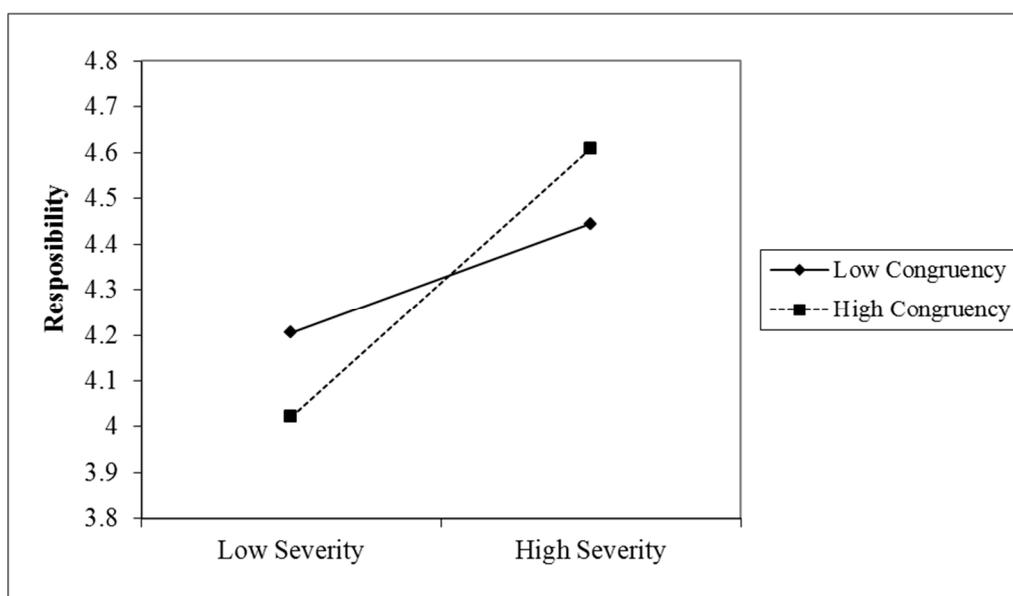


Figure 3. The interactive effect of perceived risk severity and level of congruency on perceived responsibility.

Perceived severity ($\beta = 0.15, p < 0.01$) was also positively related to mitigation intentions (see Table 2). Entering the interaction term between severity and congruency yielded a marginally

significant interaction effect ($\beta = 0.55, p < 0.10$) (see Table 2), as plotted in Figure 4. As predicted, the relationship between perceived severity and mitigation intentions was stronger in the high congruency condition as compared to the low congruency condition.

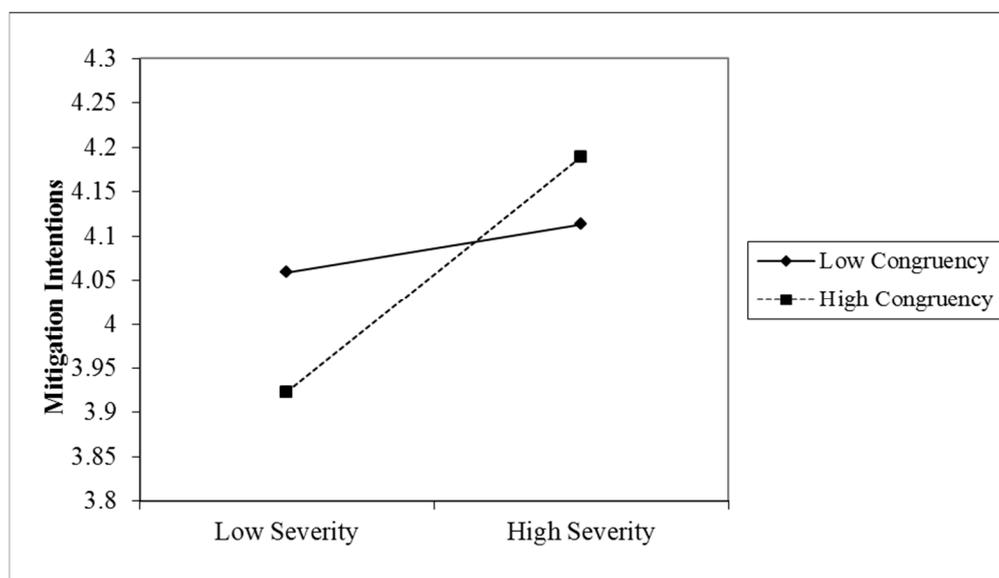


Figure 4. The interactive effect of perceived risk severity and level of congruency on mitigation intention.

The results in Table 3 indicate that perceived susceptibility ($\beta = 0.26, p < 0.001$) was also positively related to perceived responsibility. Entering the interaction term between susceptibility and congruency into the analysis model yielded a marginally significant interaction effect ($\beta = 0.36, p < 0.10$). Figure 5 shows that the relationship between susceptibility and perceived responsibility was stronger in the high congruency condition as compared to the low congruency condition.

Table 3. Results of regression analysis of congruency and susceptibility perceptions on predictors of behavioural change.

Step and Variables	Perceived Responsibility		Mitigation Intentions	
	1	2	1	2
1. Congruency	−0.01	0.36 *	−0.03	−0.48 *
Severity	0.26 ***	0.26 ***	0.12 *	0.12 *
2. Interaction		0.36 †		0.47 *
ΔR^2	0.07 ***	0.01 *	0.02 †	0.01 *
Adjusted R^2	0.06 ***	0.07 ***	0.01 †	0.02 *

Note: Standardized regression coefficients are reported. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Perceived susceptibility to climate risks was also positively related to mitigation intentions ($\beta = 0.12, p < 0.05$) (see Table 3). Entering the interaction term between susceptibility and congruency yielded a significant interaction effect ($\beta = 0.47, p < 0.05$) (see Table 3), which is plotted in Figure 6. As predicted, the relationship between susceptibility and mitigation intentions was stronger in the high congruency condition as compared to the low congruency condition.

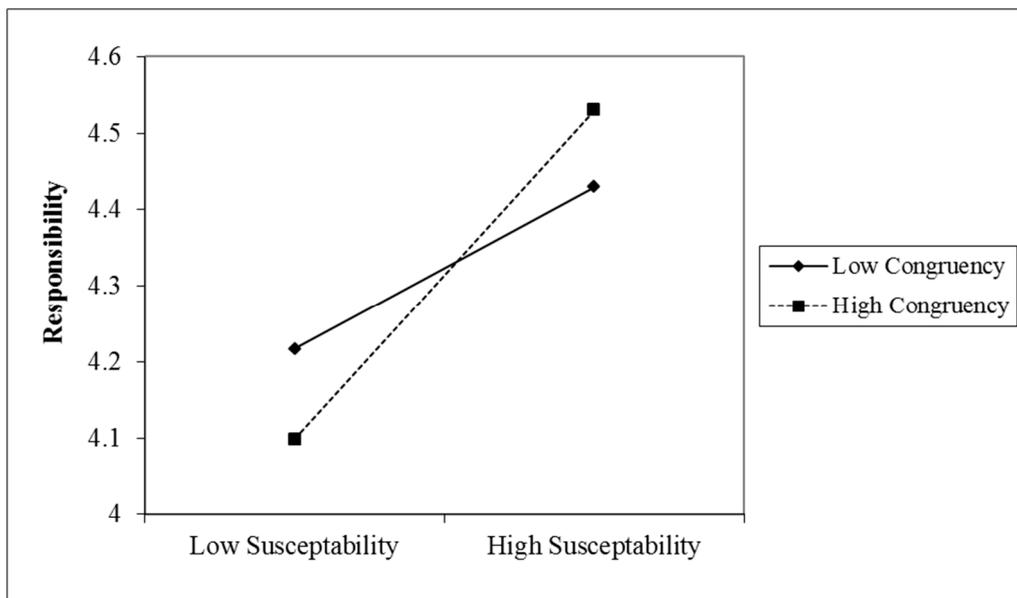


Figure 5. The interactive effect of perceived risk susceptibility and level of congruency on perceived responsibility.

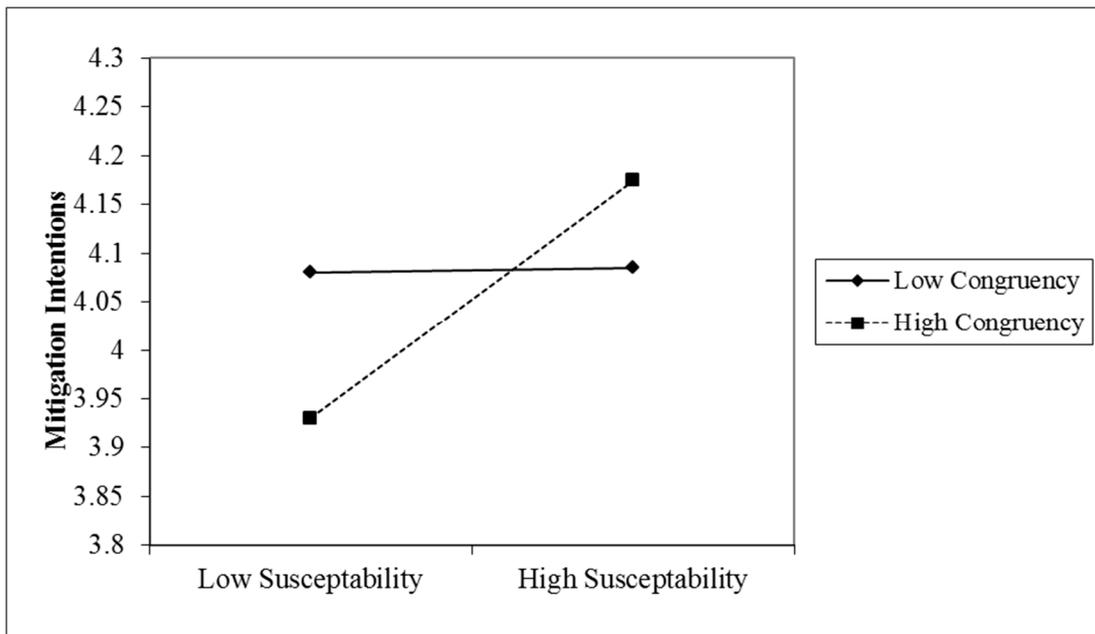


Figure 6. The interactive effect of perceived risk susceptibility and level of congruency with mitigation intention.

Table 4 shows that also perceived self-efficacy ($\beta = 0.32, p < 0.001$) was positively related to perceived responsibility. When the interaction term between self-efficacy and congruency was entered into the analysis model, however, this did not yield a significant interaction effect ($\beta = 0.43, n.s.$).

Furthermore, perceived self-efficacy ($\beta = 0.17, p < 0.01$) was also positively related to mitigation intentions (see Table 4). When the interaction term between self-efficacy and congruency was entered into the analysis model, this yielded a marginal interaction effect ($\beta = 0.54, p < 0.10$), and we plotted this in Figure 7 (see Table 4). As predicted, this showed that the relationship between self-efficacy and mitigation intentions was stronger in the high congruency conditions as compared to the low congruency conditions.

Table 4. Results of regression analysis of congruency and self-efficacy perceptions on predictors of behavioural change.

Step and Variables	Perceived Responsibility		Mitigation Intentions	
	1	2	1	2
1. Congruency	0.01	−0.42	−0.02	−0.56 *
Severity	0.26 ***	0.26 ***	0.17 **	0.18 **
2. Interaction		0.43		0.54 †
ΔR ²	0.07 ***	0.01	0.03 **	0.01 †
Adjusted R ²	0.06 ***	0.07 ***	0.03 **	0.03 **

Note: Standardized regression coefficients are reported. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

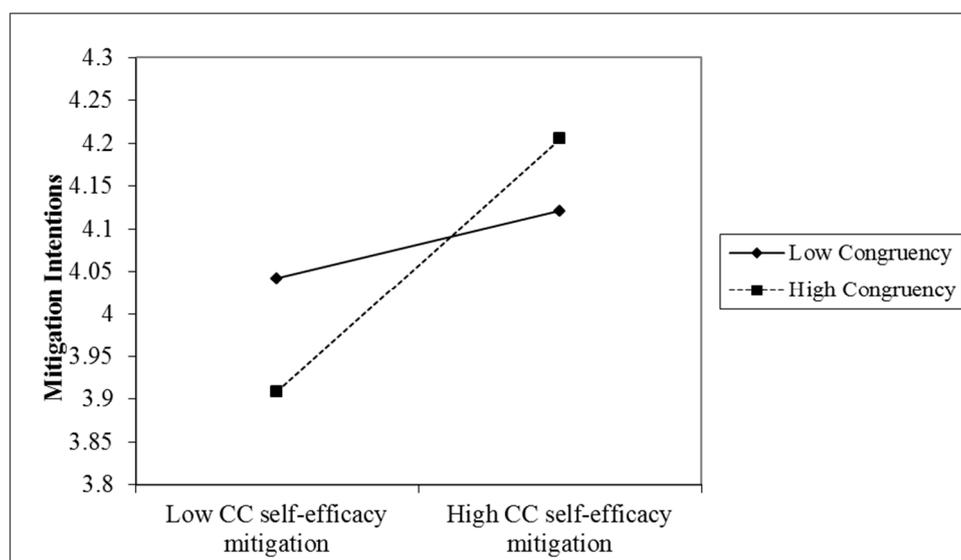


Figure 7. The interactive effect of perceived self-efficacy and level of congruency with mitigation intention.

Table 5 shows that perceived response efficacy ($\beta = 0.02, p < 0.001$) was positively related to perceived responsibility. When the interaction term between response efficacy and congruency was entered into the analysis model, this yielded a significant interaction effect ($\beta = 0.59, p < 0.05$), as plotted in Figure 8. This showed that the relationship between response efficacy and perceived responsibility was stronger in the high congruency condition as compared to the low congruency condition.

Table 5. Results of regression analysis of congruency and response efficacy perceptions on predictors of behavioural change.

Step and Variables	Perceived Responsibility		Mitigation Intentions	
	1	2	1	2
1. Congruency	0.01	−0.58 *	−0.03	−0.30
Severity	0.02 ***	0.22 ***	0.15 **	0.16 **
2. Interaction		0.59 *		0.27
ΔR ²	0.04 **	0.01 *	0.02 *	0.00
Adjusted R ²	0.03 **	0.04 **	0.02 *	0.02 *

Note: Standardized regression coefficients are reported. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

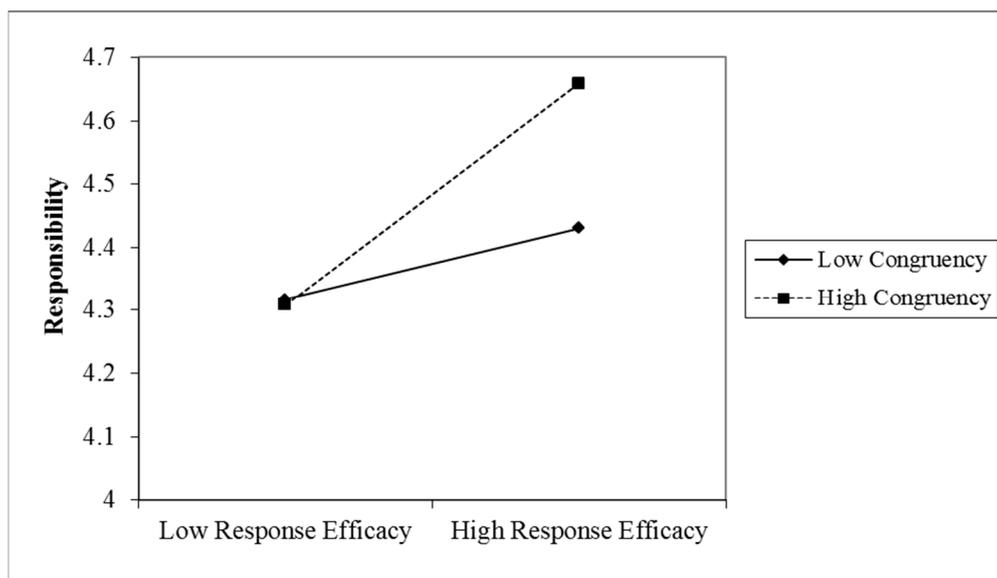


Figure 8. The interactive effect of perceived response efficacy and level of congruency on perceived responsibility.

As expected, response efficacy ($\beta = 0.15$, $p < 0.01$) was also positively related to mitigation intentions (see Table 5). When the interaction term between severity and congruency was entered into the analysis model, however, this did not yield a significant interaction effect ($\beta = 0.27$, n.s.).

4. Discussion

4.1. General Discussion

Assessment of the effects of message framing in reducing the psychological distance of climate change as a strategy to change the public's perceptions and behavioural intentions have met with mixed success (e.g., [30–33,67,70]). Our approach suggests that previous research may not have sufficiently considered: (1) the effects of risk and efficacy perceptions on behavioural intentions and (2) the effects of message congruency on both risk and efficacy perceptions as well as on behavioural intentions among audiences. Therefore, our research framework combined perceptions of climate change threats and efficacy as predictors of behavioural change with congruency in risk messages as a potential moderator of this relationship. This framework allows the assessment of an additional dimension of framing effects in climate change communication by testing the expectation that congruent message frames will bolster the relation between perceptions of risk and efficacy and adolescents' felt responsibility and behavioural intentions toward climate change mitigation.

We applied CLT in designing messages (abstract vs. concrete and information vs. action-oriented) to address psychological distance which is largely agreed as a barrier to effective climate change communication [28,29,31,33]. We further applied the concepts identified in the EPPM to assess the levels of risk and efficacy perceptions about climate change (severity, susceptibility, self and response efficacy), and evaluate their influence on the behavioural intentions of the message recipients (perceived responsibility and intentions towards climate change mitigation). We also measured the perceptions of risk and efficacy towards climate change mitigation before exposing adolescents to communication messages about climate change that were either low or high in message congruency.

The overall results of this study were consistent with previous studies on message framing, psychological distance, and congruency in message representation [25,26,32,69]. The research findings confirm existing arguments that communicating climate change threats in combination with efficacy is more effective in triggering changes in audience attitudes toward taking response measures [77,78]. The study further investigated messages framed either abstractly or concretely and framed as either

action-oriented or information-oriented to predict changes in behavioural intention towards climate change mitigation among adolescents. The findings confirmed Hypothesis 1 that perceptions of risk severity and susceptibility as well as perceived self-efficacy and response efficacy have a positive relationship with two predictors of behavioural change: perceived responsibility and mitigation intentions regarding climate change. We were able to confirm that the combination of concrete and action-oriented messages coupled lively psychological experience with clear behavioural options, thus reducing barriers to act; while the combination of abstract and information-oriented messages facilitated the adoption of a more contemplative perspective, especially in the case of a long-term phenomenon like climate change.

Furthermore, the research findings confirm Hypothesis 2 that the strength of this relationship is moderated by congruency in risk messages; a stronger relation was observed between risk and efficacy perceptions and predictors of behavioural intentions to climate change mitigation when messages were congruent, in line with earlier research [69]. The research findings confirm that higher perception of risk (severity, susceptibility) and efficacy (self- and response efficacy) lead to higher levels of assumed responsibility and behavioural intentions towards climate change mitigation, but more strongly so under high message congruency conditions. We were able to conclude that messages which are congruently designed boost the relation between risk and efficacy perceptions and the behavioural outcome variables.

So far, studies on framing effects of climate change messages are limited [90–92], and even fewer address the effects in communicating with adolescents. For example, one study in Sweden on children's coping strategies revealed that different response strategies—problem-focused, de-emphasizing the seriousness of climate change, and meaning-focused—created either positive or negative effects on measures of children's environmental engagement [93]. Another study among adolescents in North Carolina, USA, found that climate change messages—when congruently framed with agricultural and environmental content—elicited more worry and hope than messages when congruently framed with community and health frames; and adolescents who worried more about climate change were more supportive of taking individual or collective action [94].

As argued above, people's future behaviours are influenced by their past behaviours or habits; therefore, it is important to target the younger generations for any climate change communication effort aiming at societal change. Previous studies on children also confirmed that the "late childhood and early adolescent" development period is vital for children to develop their interest in environmental issues [3,93,95,96]. Adolescents become capable of abstract thinking and start showing an interest in larger issues and global topics such as environmental crisis or climate change [97]; climate change creates particular and disproportionate risks to urban children in poverty due to both extreme events and changing weather patterns [3]. A study by Sheffield & Landrigan [98] found that in the year 2000 climate change was responsible (directly and indirectly) for more than 150,000 deaths worldwide, of which children and adolescents accounted for 88%. Climate change urgently requires a sustainable society, especially among the younger generations [93]. However, most previous studies were carried out in developed nations. Few studies are available in the developing world as well as studies to understand children's (or adults') perception of climate change risks, and even fewer on how to communicate climate change to adolescents [17,94]. This research contributed to a better understanding of the existing knowledge gap by conducting an experiment on climate change communication with adolescents in Vietnam, a developing country that is highly vulnerable to climate change impacts.

In summary this empirical research offers new evidence regarding message framing and congruency in climate change communication aimed at behavioural change among adolescents. An interesting observation was that, for this group of adolescents, climate change communication was more effective on mitigation than adaptation behaviours. This might reflect a perception of climate change as distant, due to the longer personal time horizon of adolescents and their currently limited autonomy in the household.

4.2. Theoretical and Practical Implications

In CLT, there are two approaches for reducing psychological distance: (i) bringing the risk closer to the individual or (ii) bringing the individual closer to the risk [69]. For risk communication, framing messages is only effective on the individual's perceived construal level if it is "composed on a single level of construal" and in a congruent manner [69]. In this research, by testing the effects of message congruency between the levels of threat proximity and action-vs. information-oriented construal, the research found that congruency in message framing plays an important role in explaining communication effects. Only when the messages are congruent in the content do the manipulations more consistently change adolescents' perceptions and attitudes. This research also contributed to narrowing the knowledge gaps about the conditions for climate change communication among adolescents in the developing world, and probably in other parts of the world, with the hope that they will foster a more sustainable lifestyle to combat global climate change impacts in the future.

This research contributes both theoretically and practically to climate change risk communication among adolescents towards mitigation behaviour. We established how message congruency affects the link between perceptions of climate change risk and efficacy and two predictors of behavioural change, namely perceived responsibility and mitigation intentions. Message manipulation and congruency in message framing were effective in influencing adolescents' attitudes toward climate change mitigation. However, we suggest that further studies on framing techniques, especially on psychological distance and message congruency, are needed to effectively design communication programs or campaigns on climate change mitigation, as well as adaptation with different target audiences.

Furthermore, previous communication efforts to change the public's perceptions and mitigation and adaptation intentions in order to reduce the psychological distance of climate change have gained mixed success (e.g., [30–33,67,68]). Therefore, our study proposes that previous research may not have sufficiently considered the effects of risk and efficacy perceptions on behavioural intentions and the effects of message congruency in climate change communications. Our research findings were able to confirm that the combination of perceptions of climate change threats and efficacy as predictors of behavioural change, with congruency in risk messages as a potential moderator of this relationship, is a successful research framework. Therefore, this framework would be applicable to explore additional dimensions of framing effects in climate change communication by testing the expectation that congruent message frames will bolster the relation between perceptions of risk and efficacy and participants' (e.g., adults, managers, policy-makers) felt responsibility and behavioural intentions toward both climate change adaptation and mitigation. However, it is clear that the options for hydro-sociological adaptation to climate change are shaped not only by psychological constraints but also by limited financial and human resources, or legal frameworks. Practically, this approach can be applied to communicate flood-related issues in order to advocate for adaptation behaviours in sustainable watershed management, flood management and hydrology in the context of climate change. A congruent message should be composed of perception of risk and efficacy regarding flood and climate change severity, susceptibility, and self and response efficacy toward predictors of behavioural changes in adaptation to the hydrological impacts of climate change.

Our research also contributes mainly to climate change communication in the area of mitigation among a specific group of adolescents. However, it can be applicable to a broader and emerging research approach in climate change adaptation studies, particularly in developing countries, to address macro issues and interventions associated with urban and environmental planning. We proved that when properly-designed message framing was applied, in terms of consistency and congruency, the effect on changing behavioural actions towards climate change are more effective. Thus, we may interpret that for communicating macro-issues and interventions, such as those associated with the macro-level (e.g., urban and environmental planning) [10,11] our study method at the micro-level (e.g., psychology) is feasible and applicable to address the broader challenges of achieving behavioural change through improved climate change communication in developing countries and with developing countries.

4.3. Limitations

The present study has several limitations. First, the research framework and hypotheses were limited to climate change mitigation only, while climate change action generally involves both adaptation and mitigation. In addition, the research did not include a follow-up study to measure the level of knowledge maintained and any real action taken by the participants after the communication interventions (e.g., six months after the experiment). Third, the participants only included seventh- and eighth-grade adolescents in a peri-urban setting in the Mekong delta, Vietnam. Findings might differ for other age groups and locations. Finally, future research could more solidly examine social desirability effects in assessing the effects of climate change communication.

5. Conclusions

Climate change has been causing and will continue to cause serious impacts on nature and humans in the future which will require more attention from researchers, government, and communities, including adolescents. This study is one of the first to examine the framing effects in climate change risk communication among adolescents, the future generation who will suffer most from climate change consequences, in order to influence their perception and behaviours toward mitigation. Our research confirms that perceptions of risk and efficacy positively influence the predictors of behavioural change in climate change mitigation. Most importantly, the research results confirm that congruency in message framing plays an important role in manipulation effects: only when the messages are congruent in content do the manipulations more consistently change adolescents' attitudes.

Supplementary Materials: The following are available online at <http://www.mdpi.com/2073-4441/12/11/3016/s1>, Table S1: General messages on climate change definitions, Table S2: Survey questionnaire.

Author Contributions: C.C.N. developed the methodology and concept, collected data, performed data analysis, and structured and wrote the first and final draft; P.M.P. reviewed methodology and concept, supervised data collection, supervised data analysis, and commented the first and final draft; P.H.F. provided inputs on methodology and concept, commented and edited the first and final draft. All authors have read and agreed to the published version of the manuscript.

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References

1. IPCC. *Climate Change: The IPCC Scientific Assessment*; Cambridge University Press: Cambridge, UK, 1990.
2. Sala, O.E.; Chapin, F.S.; Armesto, J.J.; Berlow, E.; BloomPeld, J.; Dirzo, R.; Huber-Sanwald, E.; Huenneke, L.F.; Jackson, R.B.; Kinzig, A.; et al. Global Biodiversity Scenarios for the Year 2100. *Sci. Compass Rev.* **2000**, *287*, 1770–1775. [[CrossRef](#)] [[PubMed](#)]
3. Bartlett, S. Climate Change and Urban Children: Impacts and Implications for Adaptation in Low- and Middle-Income Countries. *Environ. Urban.* **2008**, *20*, 501–519. [[CrossRef](#)]
4. Bellard, C.; Bertelsmeier, C.; Leadley, P.; Thuiller, W.; Courchamp, F. Impacts of Climate Change on the Future of Biodiversity. *Ecol. Lett.* **2012**, *15*, 365–377. [[CrossRef](#)] [[PubMed](#)]
5. IPCC. *Global Warming of 1.5 °C*; The Intergovernmental Panel on Climate Change: Geneva, Switzerland, 2018.
6. Hall, J.W.; Sayers, P.B.; Walkden, M.J.A.; Panzeri, M. Impacts of Climate Change on Coastal Flood Risk in England and Wales: 2030–2100. *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci.* **2006**, *364*, 1027–1049. [[CrossRef](#)]
7. Boateng, I. GIS Assessment of Coastal Vulnerability to Climate Change and Coastal Adaption Planning in Vietnam. *J. Coast. Conserv.* **2012**, *16*, 25–36. [[CrossRef](#)]
8. Voudoukas, M.I.; Mentaschi, L.; Voukouvalas, E.; Bianchi, A.; Dottori, F.; Feyen, L. Climatic and Socioeconomic Controls of Future Coastal Flood Risk in Europe. *Nat. Clim. Chang.* **2018**, *8*, 776–780. [[CrossRef](#)]

9. IPCC. *Impacts, Adaptations and Mitigation of Climate Variability. Scientific-Teaching Analysis. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel of Climate Variability*; Cambridge University Press: Cambridge, UK, 1995.
10. Kinzig, A.P.; Ehrlich, P.R.; Alston, L.J.; Arrow, K.; Barrett, S.; Buchman, T.G.; Daily, G.C.; Levin, B.; Levin, S.; Oppenheimer, M.; et al. Social Norms and Global Environmental Challenges: The Complex Interaction of Behaviours, Values, and Policy. *Bioscience* **2013**, *63*, 164–175. [[CrossRef](#)]
11. Schill, C.; Anderies, J.M.; Lindahl, T.; Folke, C.; Polasky, S.; Cárdenas, J.C.; Crépin, A.S.; Janssen, M.A.; Norberg, J.; Schlüter, M. A More Dynamic Understanding of Human Behaviour for the Anthropocene. *Nat. Sustain.* **2019**, *2*, 1075–1082. [[CrossRef](#)]
12. Uittenbroek, C.J.; Janssen-Jansen, L.B.; Runhaar, H.A.C. Mainstreaming Climate Adaptation into Urban Planning: Overcoming Barriers, Seizing Opportunities and Evaluating the Results in Two Dutch Case Studies. *Reg. Environ. Chang.* **2013**, *13*, 399–411. [[CrossRef](#)]
13. Huong, H.T.L.; Pathirana, A. Urbanization and Climate Change Impacts on Future Urban Flooding in Can Tho City, Vietnam. *Hydrol. Earth Syst. Sci.* **2013**, *17*, 379–394. [[CrossRef](#)]
14. Clemens, M.; Rijke, J.; Pathirana, A.; Evers, J.; Quan, N.H. Social Learning for Adaptation to Climate Change in Developing Countries: Insights from Vietnam. *J. Water Clim. Chang.* **2016**, *7*, 365–378. [[CrossRef](#)]
15. Chu, E.K. The Governance of Climate Change Adaptation Through Urban Policy Experiments. *Environ. Policy Gov.* **2016**, *26*, 439–451. [[CrossRef](#)]
16. Phuong, L.T.H.; Tuan, T.D.; Phuc, N.T.N. Transformative Social Learning for Agricultural Sustainability and Climate Change Adaptation in the Vietnam Mekong Delta. *Sustainability* **2019**, *11*, 6775. [[CrossRef](#)]
17. Ngo, C.C.; Poortvliet, P.M.; Feindt, P.H. Drivers of Flood and Climate Change Risk Perceptions and Intention to Adapt: An Explorative Survey in Coastal and Delta Vietnam. *J. Risk Res.* **2019**, 1–23. [[CrossRef](#)]
18. United Nations. *Paris Agreement*; Cambridge University Press: Cambridge, UK, 2015; pp. 1–27. [[CrossRef](#)]
19. IPCC. *Climate Change 2007: Mitigation of Climate Change*; Cambridge University Press: Cambridge, UK, 2007.
20. Ouellette, J.A.; Wood, W. Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behaviour Predicts Future Behaviour. *Psychol. Bull.* **1998**, *12*, 54–74. [[CrossRef](#)]
21. Danner, U.N.; Aarts, H.; de Vries, N.K. Habit vs. Intention in the Prediction of Future Behaviour: The Role of Frequency, Context Stability and Mental Accessibility of Past Behaviour. *Br. Psychol. Soc.* **2008**, *47*, 245–265. [[CrossRef](#)]
22. Ajzen, I. The Theory of Planned Behaviour: Reactions and Reflections. *Psychol. Heal.* **2011**, *26*, 1113–1127. [[CrossRef](#)]
23. Sheeran, P.; Godin, G.; Conner, M.; Germain, M. Paradoxical Effects of Experience: Past Behaviour Both Strengthens and Weakens the Intention-Behaviour Relationship. *J. Assoc. Consum. Res.* **2017**, *2*, 309–318. [[CrossRef](#)]
24. Moser, S.C.; Dilling, L. Communicating Climate Change: Closing the Science—Action Gap. In *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*; Moser, S.C., Dilling, L., Eds.; Cambridge University Press: Cambridge, UK, 2007.
25. Spence, A.; Poortinga, W.; Pidgeon, N. The Psychological Distance of Climate Change. *Risk Anal.* **2012**, *32*, 957–972. [[CrossRef](#)]
26. Brügger, A.; Morton, T.A.; Dessai, S. “Proximising” Climate Change Reconsidered: A Construal Level Theory Perspective. *J. Environ. Psychol.* **2016**, *46*, 125–142. [[CrossRef](#)]
27. Leal Filho, W. An Overview of the Challenges in Climate Change Communication Across Various Audiences. In *Addressing the Challenges in Communicating Climate Change Across Various Audiences*; Filho Leal, W., Lackner, B., McGhie, H., Eds.; Springer: Cham, Switzerland, 2019; pp. 1–11. [[CrossRef](#)]
28. Leiserowitz, A. Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values. *Clim. Chang.* **2006**, *77*, 45–72. [[CrossRef](#)]
29. Lorenzoni, I.; Nicholson-Cole, S.; Whitmarsh, L. Barriers Perceived to Engaging with Climate Change among the UK Public and Their Policy Implications. *Glob. Environ. Chang.* **2007**, *17*, 445–459. [[CrossRef](#)]
30. Brügger, A.; Dessai, S.; Devine-Wright, P.; Morton, T.A.; Pidgeon, N.F. Psychological Responses to the Proximity of Climate Change. *Nat. Clim. Chang.* **2015**, *5*, 1031–1037. [[CrossRef](#)]
31. Jones, C.; Hine, D.W.; Marks, A.D.G. The Future Is Now: Reducing Psychological Distance to Increase Public Engagement with Climate Change. *Risk Anal.* **2017**, *37*, 331–341. [[CrossRef](#)] [[PubMed](#)]

32. Trope, Y.; Liberman, N. Construal-Level Theory of Psychological Distance. *Psychol Rev* **2010**, *117*, 440–463. [[CrossRef](#)] [[PubMed](#)]
33. Trope, Y.; Liberman, N. Temporal Construal. *Psychol. Rev.* **2003**, *110*, 403–421. [[CrossRef](#)] [[PubMed](#)]
34. Rogers, R.W. A Protection Motivation Theory of Fear Appeals and Attitude Change. *J. Psychol.* **1975**, *91*, 93–114. [[CrossRef](#)]
35. Moser, S.C. Communicating Climate Change: History, Challenges, Process and Future Directions. *WIREs Clim. Chang.* **2010**, *1*, 31–53. [[CrossRef](#)]
36. Keller, C.; Siegrist, M.; Gutscher, H. The Role of the Affect and Availability Heuristics in Risk Communication. *Risk Anal.* **2006**, *26*, 631–639. [[CrossRef](#)]
37. Chapman, D.A.; Lickel, B.; Markowitz, E.M. Reassessing emotion in climate change communication. *Nat. Clim. Chang.* **2017**, *7*, 850–852. [[CrossRef](#)]
38. UNEP. *Communicating Sustainability: How to Produce Effective Public Campaigns*; United Nations Environmental Programme: Nairobi, Kenya, 2005.
39. Nisbet, M.C. Communicating Climate Change: Why Frames Matter for Public Engagement. *Environ. Sci. Policy Sustain. Dev.* **2009**, *51*, 12–23. [[CrossRef](#)]
40. Covello, V.; Sandman, P. Risk Communication: Evolution and Revolution. In *Solutions for an Environment in Peril*; Wolbarst, A.B., Ed.; The Johns Hopkins University Press: Baltimore, MD, USA, 2001.
41. Reser, J.P.; Bradley, G.L. *Fear Appeals in Climate Change Communication*; Oxford University Press: Cambridge, UK, 2017. [[CrossRef](#)]
42. Nabi, R.L.; Gustafson, A.; Jensen, R. Framing Climate Change: Exploring the Role of Emotion in Generating Advocacy Behaviour. *Sci. Commun.* **2018**, *40*, 442–468. [[CrossRef](#)]
43. USAID. *Greenhouse Gas Emissions in Vietnam*; United States Agency for International Development: Washington, DC, USA, 2016.
44. Ministry of Natural Resources and Environment (MONRE). *The Second Biennial Updated Report of Vietnam to the United Nations Framework Convention on Climate Change*; NARENCA: Hanoi, Vietnam, 2017.
45. UNFCCC. *Intended Nationally Determined Contribution of Viet Nam*; United Nations Framework Convention on Climate Change: New York, NY, USA, 2016; Available online: <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/VIETNAM%27S%20INDC.pdf> (accessed on 20 October 2020).
46. World Bank. *Vulnerability, Risk Reduction, and Adaptation to Climate Change: Vietnam Climate Risk and Adaptation Country Profile*; The World Bank: Washington, DC, USA, 2011.
47. UNDP. *Human Development Report (2007-08)—Fighting Climate Changes: Human Solidarity in a Divided World*; United Nations Development Programmes: New York, NY, USA, 2007.
48. UNFPA; GSO. *Điều Tra Dân Số và Nhà ở Giữa Kỳ 2014: Cơ Cấu Tuổi, Giới Tính và Một Số Vấn Đề Kinh Tế Xã Hội [Mid-Term Housing and Population Survey 2014: Age, Gender, and some Socio-Economic Issues]*; Nhà xuất bản Thông tấn: Hanoi, Vietnam, 2016.
49. Tho, P.T.X. Tích Hợp Giáo Dục Môi Trường qua Môn Địa Lí Đô Thị [Mainstreaming environmental education through geography]. *Tạp chí Khoa học ĐHSP TP HCM* **2011**, *31*.
50. Duc, N.T. Giáo Dục Biến Đổi Khí Hậu qua Môn Địa Lí ở Trường Trung Học Cơ Sở [Educating climate change through geography in secondary schools]. *Khoa học Giáo dục* **2010**, *61*, 31–34.
51. Heck, E. Environmental Education in Vietnam: A Case Study at Le Loi Elementary School. *Indep. Study Proj. Collect.* **2015**. Available online: https://digitalcollections.sit.edu/cgi/viewcontent.cgi?referer=https://scholar.google.co.uk/&httpsredir=1&article=3247&context=isp_collection (accessed on 20 October 2020).
52. Dung, D.T.T. Những Cơ Hội và Thách Thức Trong Việc Giáo Dục Nhận Thức Cho Học Sinh Vùng Đồng Bằng Sông Cửu Long Sẵn Sàng Thích Ứng Với Biến Đổi Khí Hậu [Opportunities and challenges in educating students to be ready for climate change adaptation]. *J. Sci.* **2018**, *15*, 168–178.
53. Nguyen, T.H.T.; Boon, H.; King, D. Education to Enhance Vietnamese Coastal Communities' Adaptive Capacity to Cope with Climate Change. *eTropic* **2015**, *14*, 111–122. [[CrossRef](#)]
54. ARC; GRC; VNRC; AMDI. *Baseline Study for "Climate Smart Community-Based Disaster Risk Reduction Project in the Mekong, Vietnam"*; ARC; GRC; VNRC; AMDI: Hanoi, Vietnam, 2013.
55. OXFAM; MCD; AMDI. *Baseline Survey on Knowledge, Attitude and Practice (KAP) in Relation to Disaster Risk Reduction and Climate Change Adaptation*; OXFAM: Hanoi, Vietnam, 2013.
56. MCD; AMDI. *Baseline Survey for the Project: Youth Innovation and Synergies for Enhancing Climate Change Adaptation in the Red River Delta, Vietnam (READY)*; MCD: Hanoi, Vietnam, 2016.

57. Gitlin, T. *The Whole World Is Watching: Mass Media in the Making and Unmaking of the New Left*; The University of California Press: Berkeley, CA, USA, 1980.
58. Entman, R.M. Framing: Toward Clarification of a Fractured Paradigm. *J. Commun.* **1993**, *43*, 51–58. [[CrossRef](#)]
59. Wilson, D.K.; Purdon, S.E.; Wallston, K.A. Compliance to Health Recommendations: A Theoretical Overview of Message Framing. *Health Educ. Res.* **1988**, *3*, 161–171. [[CrossRef](#)]
60. Rothman, A.J.; Bartels, R.D.; Wlaschin, J.; Salovey, P. The Strategic Use of Gain- and Loss-Framed Messages to Promote Healthy Behaviour: How Theory Can Inform Practice. *J. Commun.* **2006**, *56*, 202–220. [[CrossRef](#)]
61. O’Keefe, D.J.; Nan, X. The Relative Persuasiveness of Gain- and Loss-Framed Messages for Promoting Vaccination: A Meta-Analytic Review. *Health Commun.* **2012**, *27*, 776–783. [[CrossRef](#)] [[PubMed](#)]
62. Cacciatore, M.A.; Scheufele, D.A.; Iyengar, S. The End of Framing as We Know It . . . and the Future of Media Effects. *Mass Commun. Soc.* **2016**, *19*, 7–23. [[CrossRef](#)]
63. Nerlich, B.; Koteyko, N.; Brown, B. Theory and Language of Climate Change Communication. *WIREs Clim. Chang.* **2010**, *1*. [[CrossRef](#)]
64. Lakoff, G. Why it Matters How We Frame the Environment. *Environ. Commun.* **2010**, *4*, 70–81. [[CrossRef](#)]
65. Brügger, A. Understanding the Psychological Distance of Climate Change: The limitations of construal level theory and suggestions for alternative theoretical perspectives. *Glob. Environ. Chang.* **2020**, *60*, 1–7. [[CrossRef](#)]
66. Singh, A.S.; Zwickle, A.; Bruskotter, J.T.; Wilson, R. The Perceived Psychological Distance of Climate Change Impacts and Its Influence on Support for Adaptation Policy. *Environ. Sci. Policy* **2017**, *73*, 93–99. [[CrossRef](#)]
67. Terpstra, T. Emotions, Trust, and Perceived Risk: Affective and Cognitive Routes to Flood Preparedness Behaviour. *Risk Anal.* **2011**, *31*, 1658–1675. [[CrossRef](#)]
68. Brody, S.D.; Zahran, S.; Vedlitz, A.; Grover, H. Examining the Relationship Between Physical Vulnerability and Public Perceptions of Global Climate Change in the United States. *Environ. Behav.* **2008**, *40*, 72–95. [[CrossRef](#)]
69. Zwickle, A.; Wilson, R. Construing Risk. In *Effective Risk Communication*; Arvai, J., Louie, R.I., Eds.; Routledge: Abingdon, UK, 2013; pp. 1–21.
70. Spence, A.; Pidgeon, N. Framing and Communicating Climate Change: The Effects of Distance and Outcome Frame Manipulations. *Glob. Environ. Chang.* **2010**, *20*, 656–667. [[CrossRef](#)]
71. Witte, K. Putting the Fear Back into Fear Appeals: The Extended Parallel Process Model. *Commun. Monographs* **1992**, *59*, 329–349. [[CrossRef](#)]
72. Smith, R.A.; Ferrara, M.; Witte, K. Social Sides of Health Risks: Stigma and Collective Efficacy. *Health Commun.* **2007**, *21*, 55–64. [[CrossRef](#)]
73. Witte, K. A Theory of Cognition and Negative Affect: Extending Gudykunst and Hammer’s Theory of Uncertainty and Anxiety Reduction. *Int. J. Intercult. Relat.* **1993**, *17*, 197–215. [[CrossRef](#)]
74. Witte, K.; Allen, M. A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns. *Heal. Educ. Behav.* **2000**, *27*, 591–615. [[CrossRef](#)]
75. So, J. A Further Extension of the Extended Parallel Process Model (E-EPPM): Implications of Cognitive Appraisal Theory of Emotion and Dispositional Coping Style. *Health Commun.* **2013**, *28*, 72–83. [[CrossRef](#)]
76. Maloney, E.K.; Lapinski, M.K.; Witte, K. Fear Appeals and Persuasion: A Review and Update of the Extended Parallel Process Model. *Soc. Personal. Psychol. Compass* **2011**, *5*, 206–219. [[CrossRef](#)]
77. Hart, P.S.; Feldman, L. Threat Without Efficacy? Climate Change on U.S. Network News. *Sci. Commun.* **2014**, *36*, 325–351. [[CrossRef](#)]
78. Roser-Renouf, C.; Maibach, E.W.; Leiserowitz, A.; Zhao, X. The Genesis of Climate Change Activism: From Key Beliefs to Political Action. *Clim. Chang.* **2014**, *125*, 163–178. [[CrossRef](#)]
79. Liberman, N.; Sagristano, M.D.; Trope, Y. The Effect of Temporal Distance on Level of Mental Construal. *J. Exp. Soc. Psychol.* **2002**, *38*, 523–534. [[CrossRef](#)]
80. Halkias, G.; Kokkinaki, F. Increasing Advertising Effectiveness through Incongruity-Based Tactics: The Moderating Role of Consumer Involvement. *J. Mark. Commun.* **2013**, *19*, 182–197. [[CrossRef](#)]
81. Updegraff, J.A.; Sherman, D.K.; Luyster, F.S.; Mann, T.L. The Effects of Message Quality and Congruency on Perceptions of Tailored Health Communications. *J. Exp. Soc. Psychol.* **2007**, *43*, 249–257. [[CrossRef](#)] [[PubMed](#)]
82. Sherman, D.K.; Traci, M.; Updegraff, J.A. Approach/Avoidance Motivation, Message Framing, and Health Behaviour: Understanding the Congruency Effect. *Motiv. Emot.* **2006**, *30*, 165–169. [[CrossRef](#)] [[PubMed](#)]

83. Kidwell, B.; Farmer, A.; Hardesty, D.M. Getting Liberals and Conservatives to Go Green: Political Ideology and Congruent Appeals. *J. Consum. Res.* **2013**, *40*, 350–367. [[CrossRef](#)]
84. Ajzen, I. The Theory of Planned Behaviour. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [[CrossRef](#)]
85. MONRE. *Kịch Bản Biến Đổi Khí Hậu và Nước Biển Dâng Cho Việt Nam [Climate Change and Sea Level Rise Scenarios for Vietnam]*; Nhà xuất bản Tài nguyên-Môi trường và bản đồ Việt Nam: Hanoi, Vietnam, 2012.
86. MONRE. *Kịch Bản Biến Đổi Khí Hậu, Nước Biển Dâng Cho Việt Nam [Climate Change and Sea Level Rise Scenarios for Vietnam]*; Nhà xuất bản Tài nguyên-Môi trường và bản đồ Việt Nam: Hanoi, Vietnam, 2016.
87. IPCC. *Climate Change 2007: Impacts, Adaptation and Vulnerability*; Parry, M., Canziani, O., Palutikof, J., Linden, P., van der Hanson, C., Eds.; Cambridge University Press: Cambridge, UK, 2007.
88. IPCC. *Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Cambridge University Press: Cambridge, UK, 2014.
89. Dawson, J.F. Moderation in Management Research: What, Why, When, and How. *J. Bus. Psychol.* **2014**, *29*, 1–19. [[CrossRef](#)]
90. Feldman, L.; Hart, P.S. Climate Change as a Polarizing Cue: Framing Effects on Public Support for Low-Carbon Energy Policies. *Glob. Environ. Chang.* **2018**, *51*, 54–66. [[CrossRef](#)]
91. Bernauer, T.; McGrath, L.F. Simple Reframing Unlikely to Boost Public Support for Climate Policy. *Nat. Clim. Chang.* **2016**, *6*, 680–683. [[CrossRef](#)]
92. Wolsko, C.; Ariceaga, H.; Seiden, J. Journal of Experimental Social Psychology Red, White, and Blue Enough to Be Green: Effects of Moral Framing on Climate Change Attitudes and Conservation Behaviours. *J. Exp. Soc. Psychol.* **2016**, *65*, 7–9. [[CrossRef](#)]
93. Ojala, M. How Do Children Cope with Global Climate Change? Coping Strategies, Engagement, and Well-Being. *J. Environ. Psychol.* **2012**, *32*, 225–233. [[CrossRef](#)]
94. Stevenson, K.T.; Peterson, M.N.; Bondell, H.D.; Moore, S.E.; Carrier, S.J. Overcoming Skepticism with Education: Interacting Influences of Worldview and Climate Change Knowledge on Perceived Climate Change Risk among Adolescents. *Clim. Chang.* **2014**, *126*, 293–304. [[CrossRef](#)]
95. Blanchet-Cohen, N. Taking a Stance: Child Agency across the Dimensions of Early Adolescents' Environmental Involvement. *Environ. Educ. Res.* **2008**, *14*, 257–272. [[CrossRef](#)]
96. Chawla, L.; Cushing, D.F. Education for Strategic Environmental Behaviour. *Environ. Educ. Res.* **2007**, *13*, 437–452. [[CrossRef](#)]
97. Holden, C. Young People's Concerns. In *Teaching the Global Dimension: Key Principles and Effective Practice*; Hicks, D., Holden, C., Eds.; Routledge: New York, NY, USA, 2007; pp. 31–42.
98. Sheffield, P.E.; Landrigan, P.J. Global Climate Change and Children's Health: Threats and Strategies for Prevention. *Environ. Health Perspect.* **2011**, *119*, 291–298. [[CrossRef](#)] [[PubMed](#)]

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