journalism and media

MDPI

Article

Shifting the Dial: Does Exposure to Climate Change Efficacy Messages Boost Individual and Collective Political Activism Intentions?

Nimmagadda Bhargav [1,*] and Jagadish Thaker [2]

[1] Communication Area, Indian Institute of Management Indore, Indore 453556, India
[2] School of Communication and Arts, The University of Queensland, Brisbane 4072, Australia
* Correspondence: nbhargav@iimidr.ac.in

Abstract

Media primarily frames climate change as a threat or disaster, which may dampen public interest and engagement. Does shifting communication strategies to emphasize people's ability to enact change increase political engagement with climate change? This study examines whether exposure to a news story containing efficacy information is associated with changes in self-efficacy, collective efficacy, and intentions to engage in political activism. Using a quasi-experimental classroom-based design, a single exposure to a news story embedded with efficacy information was not associated with higher levels of any of the three dimensions of political self-efficacy—internal, external, and response—as well as perceived collective efficacy among undergraduate students (N = 731) in a large city in India. Exposure to efficacy information was not associated with intentions to engage in individual or political activism indirectly either. However, internal efficacy, response efficacy, and collective efficacy were positively associated with intentions to engage in individual and collective political action. In addition, perceived collective efficacy mediated the association between internal and response efficacies with collective political action intentions, highlighting the critical role of collective efficacy in collective political action. The findings suggest that while perceived self- and collective efficacies are important for increasing public engagement, they may not be readily amenable to change through single or infrequent exposure to efficacy-oriented messages.

Keywords: self-efficacy; collective efficacy; political activism; climate change; collective action

Check for updates

Academic Editor: Patrick D. Murphy

Received: 19 March 2026
Revised: 15 May 2026
Accepted: 18 May 2026
Published: 25 May 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

1. Introduction

Climate change is one of the defining collective threats of the 21st century. Despite its adverse impacts on human well-being and the economy, public and policy responses are not commensurate with the challenge of climate change. Even the recently announced national ambitions to reduce polluting gases are insufficient to achieve the necessary mitigation goals (UNEP, 2023; UNFCCC, 2023). Scientists caution that unless emissions start to drop immediately and are cut by almost half by 2030, warming will continue to increase beyond the target of 1.5 °C (IPCC, 2023).

Scholars argue that the public divide and disengagement with climate change have likely contributed to climate policy inertia (e.g., Uppalapati et al., 2026; Ophir et al., 2024; Merry, 2024; Dunlap et al., 2016; McCright & Dunlap, 2011). Exposure to inconsistent, sometimes inaccurate, media coverage of climate change (Boykoff & Boykoff, 2004; Schäfer

& Painter, 2021) and individuals' selective media use has likely led to public apathy (Fritz et al., 2024; Thaker, 2024; Fairbrother, 2022; Falkenberg et al., 2022; Moser, 2016; Hmielowski et al., 2013; Feldman et al., 2012; Zhao et al., 2011; Zhao, 2009. Media frames about climate change are saturated with catastrophe connotations of impacts, skepticism about climate science, and skepticism about the individual and collective will and actions to address the issue (e.g., Feldman et al., 2012; Hart & Feldman, 2014; Painter & Ashe, 2012). Recent studies show that although exposure to media images of climate change impacts may increase the salience or importance of the issue, such images can also undermine people's belief that they can do something about it (Bravo et al., 2026; S. O'Neill, 2025; Karlsson et al., 2024; Armbruster et al., 2022; Bigsby & Albarracín, 2022; Metag et al., 2016; S. J. O'Neill et al., 2013).

Does shifting the communication strategy from highlighting climate change threats to emphasizing people's self- and collective efficacy to act on those threats promote public engagement? Several models and theories, such as the extended parallel process model (e.g., Witte, 1992), the theory of planned behavior (e.g., Ajzen, 2002), the social identity model of collective action (van Zomeren et al., 2010), and the social cognitive theory (Bandura, 2000), among others, posit that when people feel efficacious about acting on threats, they are likely to engage in positive coping and issue-related behaviors. Efficacy beliefs in the climate change domain refer to perceptions that citizens can understand, participate in, and persist in their efforts to mitigate the impacts of climate change.

Several studies find a robust and positive association between efficacy and pro-environmental behavioral intentions and policy support (Meijers et al., 2023; Barth et al., 2021; Choi & Hart, 2021; Gulliver et al., 2020; Bostrom et al., 2019; Hart & Feldman, 2016b; Jugert et al., 2016; Chen, 2015; Thaker et al., 2015). However, efforts to improve people's perceptions about their abilities to act on climate change through exposure to text, images, virtual reality, or games have been mixed (Galeote et al., 2023; Hornsey et al., 2021; Hart & Feldman, 2016a, 2016b; Jugert et al., 2016).

Some scholars even question the possibility that informational campaigns can improve people's efficacy beliefs and subsequent engagement with climate change (Angill-Williams & Davis, 2022; Hornsey et al., 2022). For example, in a series of studies, Feldman and Hart (Feldman & Hart, 2016; Hart & Feldman, 2016a, 2016b) report a limited influence of exposure to efficacy information on self-efficacy perceptions. These self-efficacy beliefs, however, had unique, positive, and significant associations with intentions to engage in political participation, including contacting government officials, participating in a rally or protest in support of climate action, and volunteering or donating money to a climate change organization. It remains a mystery then that while several cross-sectional surveys indicate the importance of self- and collective efficacy in shaping pro-environmental intentions, including political activism, why is it difficult to "shift the dial" on people's perceived individual and collective abilities to act on climate change?

The current study extends the previous findings in four critical ways. First, several of these studies focus on self-efficacy, a potent predictor of individual behavior but a poor predictor when behaviors require coordination and collective action (Lee, 2010; van Zomeren et al., 2008), such as addressing environmental issues (Chen, 2015; Homburg & Stolberg, 2006). Enlightened individuals acting alone, such as recycling behaviors or using public transportation, are essential actions but must be commensurate with the global challenge of climate change, which requires large-scale behavior and policy change. Further, individuals who may feel inefficacious in addressing a problem far exceeding their capacity may feel more efficacious in collaborating with others to address their everyday collective problems (Lorenzoni et al., 2007).

Collective efficacy refers to a "group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997, p. 477). Perceived collective efficacy beliefs refer to people's perceptions of their group's ability to unite, organize as influential collectives, and sustain collective efforts despite initial failures. It plays a crucial role in motivating individual members to participate actively in group endeavors, which determine whether they achieve their group goals (Doherty & Webler, 2016; Roser-Renouf et al., 2014).

Second, even as previous studies highlight the importance of collective efficacy as a significant predictor of pro-environmental intentions (Doherty & Webler, 2016; Roser-Renouf et al., 2014) and self-reported environmental behaviors (Chen, 2015; Homburg & Stolberg, 2006; Jugert et al., 2016), these studies underestimate the predictive value of collective efficacy by not distinguishing between individual-oriented and collective-oriented behaviors. For example, several scholars distinguish between individual-level pro-environmental behaviors such as private-sphere environmentalism (e.g., saving energy, purchasing recycled goods) and activism (e.g., protest participation, active involvement in environmental organizations), non-activist behaviors in the public sphere (e.g., petitioning on environmental issues), and organizational actions (e.g., product design) (e.g., Stern, 2000; Vraga, 2017). In practical terms, environmental behaviors span personal actions and collective actions. When behaviors are primarily under individual control, self-efficacy should be a strong predictor of individual actions. Collective efficacy should be a more proximal predictor of behaviors that require coordination and collective action, such as organizing rallies or protests and encouraging others to petition and participate in different modes of political engagement (Fernández-Ballesteros et al., 2002; Jugert et al., 2016). This hypothesis has largely remained untested, even as recent studies indicate the importance of studying different efficacy subtypes to differences in the private and public sphere behavioral intentions and policy support (Meijers et al., 2023). It is also important to better understand these differences, as at least one recent study reports no spillover effects of personal mitigation behaviors on collective mitigation behavioral intentions (Lacroix et al., 2022).

A third challenge is the invariance in the measurement of collective efficacy. For example, Jugert et al. (2016) alternate between measuring collective efficacy as individual perceptions about group ability ("I am certain that we will find ways to be ecologically mobile" (Study 1), "I am certain that we as students will find ways to save energy" (Study 3)) and group capabilities ("To what extent do you think that university students can jointly prevent the negative consequences of climate change?" (Study 2), "Large-scale groups can do something together to reduce the negative consequences of climate change" (Study 4)). Gulliver et al.'s (2020) measurement of collective efficacy is akin to response efficacy, defined below ("I think together the Stop Coal Mining Now movement can make a difference on this issue"). Choi and Hart (2021) measured collective efficacy as the perceived likelihood of collective action rather than collective ability ("How likely do you think it is that large numbers of people will limit their energy use to try to reduce climate change?"), which they recognize as a limitation. They reported that collective efficacy was negatively associated with behavioral intention and was not associated with policy support, using a cross-sectional survey across 23 European countries. This invariance in the measurement makes it difficult to compare studies and make claims about their implications for theory or practice.

Finally, this study tests the findings of the above U.S. and European studies in a crucial cross-cultural context in India, the world's third-largest greenhouse gas polluter, emitting 2.4 gigatons of carbon dioxide in 2020 (Crippa et al., 2021). The rapid increase in emissions has made India a key player in international negotiations on climate change, and it faces increasing pressure to reduce emissions. While national emissions are high, the per capita

emissions were 0.6 tons of oil equivalent, which is only one-third of the global average (IEA, 2021). Millions of Indians are still without access to electricity—a reminder of country's development challenges. Gaining public support is vital but difficult, as ambitious climate change policies may pose an additional financial burden on citizens. For example, India has pledged to achieve net-zero emissions by 2070. However, to meet that target, India will need an estimated $10.1 trillion in investments. Financing this using only domestic measures would likely result in a 2% decline in total household consumption (ASPI, 2022). Lessons from India about strategies to increase public engagement on climate change are likely to apply to other major current and emerging emitters such as China, Brazil, and South Africa.

This paper uses a quasi-experimental classroom-based design to test whether exposure to a climate change news story with self-efficacy information increases respondents' perceptions of self-efficacy and, as a result, heightens their individual-oriented political engagement intentions. It also examines whether exposure to collective efficacy information increases perceived collective efficacy and, in turn, increases respondents' willingness to organize and engage in collective political action on climate change. It further examines the dynamics of the relationship between self-efficacy and collective efficacy on intentions to engage in collective political action.

1.1. Understanding Self-Efficacy

Self-efficacy beliefs, or beliefs about one's abilities, govern how individuals feel, think, motivate themselves, and mobilize the resources needed to succeed in their endeavors (Bandura, 1997). Hart and Feldman (Hart & Feldman, 2014; Feldman & Hart, 2016), drawing on different research disciplines, highlighted three dimensions of self-efficacy related to climate change: internal, external, and response political efficacy.

Internal political efficacy refers to an individual's beliefs that they are knowledgeable about and can influence political action through political engagement, such as contacting public officials. External political efficacy refers to perceptions about government responsiveness to citizens' demands. A third dimension is response efficacy—beliefs that a proposed policy will be effective in addressing the problem at hand.

1.2. Importance of Self-Efficacy in Pro-Environmental Behavior Intentions

A number of empirical studies attest that all three dimensions of self-efficacy beliefs are strongly and positively associated with pro-environmental intentions (Meijers et al., 2023; Choi & Hart, 2021; Hart & Feldman, 2016a, 2016b; Jugert et al., 2016). For example, Hart and Feldman (2016b) reported that all three forms of self-efficacy—internal, external, and response efficacy—have unique, significant positive associations with intentions to become politically engaged with climate change issues, including contacting government officials, participating in a rally or protest to support action, and volunteering or donating money to an organization working on climate change. Doherty and Webler (2016) showed that, among the already engaged climate audience, or 'Alarmed' in the US, self-efficacy was a strong driver of political engagement. Using a sample of respondents from 23 European countries, Choi and Hart (2021) report a positive association between self-efficacy, behavioral intentions, and policy support.

1.3. Shifting the Dial on Self-Efficacy Beliefs

Even as there is an almost universal acknowledgment that self-efficacy beliefs play a central role in people's pro-environmental behavioral intentions, empirical evidence to determine if efficacy beliefs can be augmented through exposure to information has found mixed results. Based on an online experiment, Hart and Feldman (2016b) tested exposure to a news story embedded with efficacy information on respondent's internal, external,

and response efficacies. They found mixed evidence with support for only two of the six hypotheses: positive internal efficacy information increased perceptions of internal efficacy, which, in turn, was associated with political engagement intentions. Negative external efficacy information lowered perceptions of external efficacy, which mediated the association between exposure and intentions for political engagement. The other four frames—negative internal efficacy, positive external efficacy, and positive and negative response efficacies—were not associated with perceptions of their respective efficacies compared to the control group. In addition, they report unique and independent associations between the type of efficacy information and perceived efficacy among respondents. That is, exposure to internal efficacy did not increase other dimensions (external and response) of self-efficacy. This further strengthens the three-dimensional construct of self-efficacy in the domain of climate change political activism.

Jugert et al. (2016) manipulated individual efficacy in Study 4 but did not find that the manipulation had an effect on individual efficacy beliefs or pro-environmental intentions. Hart and Feldman (2016b) found that only solar panel imagery was associated with perceptions of efficacy, while images of climate protests, flooding, and pollution were not significantly associated with efficacy perceptions. They did not report a significant interaction between text and imagery in increasing perceived efficacy. In all, they found that only solar imagery and textual information that included actions that can be taken to address climate change had significant positive associations with intentions to engage in energy conservation behavior and willingness to take actions in the political sphere through the mediator of perceived efficacy.

Hornsey et al. (2021) found that exposure to efficacy information increased efficacy, which, in turn, increased pro-environmental intentions in only one of their two experiments. When questions related to social desirability or implying that the video stimuli had an impact on them were removed, they could not replicate the findings in a U.S. sample. Similarly, Angill-Williams and Davis (2022) found that short video messages increased levels of response efficacy but not self-efficacy, and neither of the two translated to increased climate commitment. The aforementioned studies indicate that while cross-sectional surveys attest to the importance of self-efficacy in shaping pro-environmental behaviors, it appears to be difficult to experimentally shift people's self-efficacy beliefs.

1.4. Understanding Collective Efficacy

While the studies reviewed so far provide important evidence on the role of self-efficacy and individual political behavior, climate change is a collective problem that requires coordinated action at local, national, and international levels (e.g., Adger et al., 2005; Ostrom, 2010). Indeed, previous studies underscore that people's perceptions about their collective abilities have more predictive value compared to self-efficacy when tasks require coordination and collective action (e.g., Lee, 2006; Velasquez & LaRose, 2015), including in the domain of climate change activism (Doherty & Webler, 2016; Roser-Renouf et al., 2014) and self-reported environmental behaviors (Chen, 2015; Homburg & Stolberg, 2006; Jugert et al., 2016).

Collective efficacy is defined as a group's shared beliefs in their collective capabilities to organize and perform collective tasks and is an important predictor of group goal achievements (Bandura, 1997, 2000). While collective efficacy refers to a group's shared belief, it resides and operates through individual members of the group because, as Bandura (2002) argues, "there is no emergent entity that operates independently of the beliefs and actions of the individuals who make up a social system" (p. 271). In this study, perceived collective efficacy is conceptualized at the individual level, or an individual's beliefs about their group's abilities.

Homburg and Stolberg (2006) reported that collective efficacy and not self-efficacy were significantly associated with problem-focused coping and pro-environmental behaviors across behavioral domains (social engagement, private sphere, and workplace) and different samples of students and employees. Using a sample of Taiwanese respondents, Chen (2015) reported that collective efficacy beliefs, compared to self-efficacy beliefs, activate people's problem-focused coping, which in turn makes people engage in pro-environmental behavior. Lee (2006) found that perceived collective efficacy, and not internal or external political efficacy, was positively associated with Hong Kong's citizens' support for democratization and protest participation. Velasquez and LaRose (2015) reported that perceived collective efficacy, and not internal political efficacy, was associated with youths' online collective political activism.

Research on collective efficacy in the domain of climate change has been relatively limited compared to self-efficacy. Perhaps in a first-of-its-kind study, Krosnick et al. (2006) reported that the belief that humans can reduce the climate change threat was a significant predictor of U.S. citizens' perceptions of the seriousness of global warming as a national issue, which in turn increases policy support to ameliorate negative impacts of climate change. Recent scholarship also highlights that humans will successfully reduce climate change is one of the four key beliefs that predict support for mitigation policies and both political and consumer climate change activism (Roser-Renouf et al., 2014, 2016). Among respondents who believed climate change was real and posed a high risk (two key beliefs), only 3 percent contacted their legislators in support of mitigation policy in the last year. When accounting for beliefs that humans are the primary cause of climate change and, therefore, can reduce it (two other key beliefs), 40% of U.S. respondents contacted a legislator (Roser-Renouf et al., 2014).

While the studies reviewed above allude to the importance of collective efficacy in addressing a collective action on climate change, they overlook the differential effects between the dimensions of self- and collective efficacy on individual-oriented and collective-oriented behaviors. Prior research distinguished between public and private sphere behaviors, but both behaviors were individual-oriented and largely in control of individuals. For example, research on self-efficacy (Feldman & Hart, 2016; Hart & Feldman, 2016a, 2016b; Roser-Renouf et al., 2014) and collective efficacy (Chen, 2015; Doherty & Webler, 2016; Jugert et al., 2016; Roser-Renouf et al., 2014) tests similar outcome variables of individual political engagement, such as voting, contacting officials, volunteering, protesting, or individual transportation choices. While scholars argued that perceived collective efficacy is an important predictor of individual actions, these behaviors are partly in the public domain and largely under individual control.

However, collective efficacy should be a strong predictor of behaviors that require coordination and collective action, such as organizing rallies or protests, networking among advocacy or interest groups, and encouraging others to petition and participate in protests (Fernández-Ballesteros et al., 2002). Perceived collective efficacy should be a more proximate source of influence for such collective organizing behaviors. Meijers et al. (2023) found that while private- and public-sphere environmental behavioral intentions were associated with self-efficacy (but not collective efficacy), private- and public-sphere policy support was associated with collective efficacy (but not self-efficacy).

1.5. Shifting the Dial on Collective Efficacy Beliefs

As mentioned, few studies experimentally test whether people's efficacy beliefs can be increased. Far fewer studies have tested whether collective efficacy perceptions can also be shifted. Jugert et al. (2016) argued that collective efficacy exerts a positive influence on pro-environmental behavior by raising perceptions of self-efficacy. Based on four experiments,

they found that manipulating collective efficacy information shifts perceptions of collective and self-efficacies, which, in turn, were associated with pro-environmental intentions. Notably, the effects were modest in size. Moreover, similar to studies on self-efficacy, they did not find consistent direct effects of collective efficacy reminders on pro-environmental intentions in 3 of the 4 experiments. However, their study focused on only private-sphere pro-environmental intentions, such as environmentally friendly travel, mobility, car-sharing, and switching off lights.

Their operationalization of collective efficacy shifts between focusing on individual perceptions and group beliefs, thereby making it difficult to ascertain if the audience responded in a way consistent with the theoretical framework. For example, in Study 1, they focus on individual perceptions about group abilities (e.g., "*I am certain* that we will find ways to be ecologically mobile", "*I trust* that we as young people can contribute to the mobility turnaround," "*I do not think* that we can make the difference to be ecologically mobile in the long run," emphasis added). Self-efficacy was measured by replacing "we" in the above sentences with "I". In Study 2, they focus on the collective nature of collective efficacy ("To what extent do you think that university students can jointly prevent the negative consequences of climate change?"). In Study 3, they shift back to measuring individual perceptions about group abilities ("I am certain that we as students will find ways to save energy," "I think we together can permanently reduce CO2 emissions"). In Study 4, they shift back to measuring collective efficacy about group-oriented perceptions ("Large-scale groups can do something together to reduce the negative consequences of climate change"). This inconsistency in the measurement of self- and collective efficacy and testing only on individual-focused behaviors leaves open the question about whether collective efficacy perceptions, similar to self-efficacy perceptions, are amenable to change, and if so, to what extent can we distill impact on an individual versus collective action-oriented behaviors. Given the mixed evidence available on the type of efficacy and the target behavior intention, it remains to be seen, as asserted by Hornsey et al. (2021), if perceptions of individual and collective efficacies are unaffected by the presentation of explicit information about efficacy.

To summarize, this study tests whether exposure to self-efficacy information in a news story increases perceptions of self-efficacy and whether exposure to collective efficacy information enhances perceptions of collective efficacy. If so, do self- and collective perceptions matter in motivating individual and collective political engagement with the issue of climate change? See Figure 1 for a representation of the theoretical model.

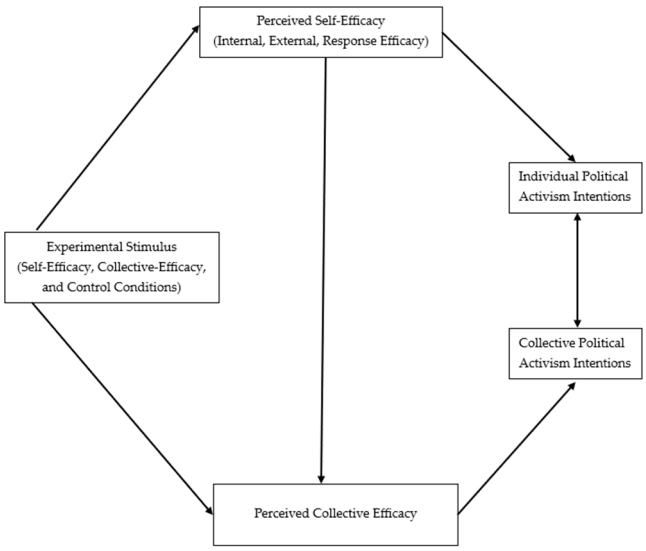


Figure 1. Postulated influence of exposure to efficacy content and dimensions of individual and collective efficacy and intended political behavior.

This paper examines the following hypotheses using a quasi-experimental design:

H1a. *Exposure to self-efficacy content will increase perceptions of internal, external, and response efficacy regarding climate change.*

H1b. *Exposure to collective efficacy content will increase perceptions of collective efficacy regarding climate change.*

H2a. *Perceptions of internal, external and response efficacy will be positively associated with intentions to take individual political action on climate change.*

H2b. *Perceptions of collective efficacy will be positively associated with collective political activism intentions on climate change.*

H3. *Exposure to efficacy content in news stories will be associated with intentions to take political action through the mediators of internal, external, and response efficacy perceptions as well as collective efficacy perceptions.*

RQ1: How do perceptions of self-efficacy influence collective efficacy and intentions for collective political action on climate change?

2. Materials and Methods

2.1. Participants

Seven hundred and thirty-one participants (44.9% female; national average = 48.5%) were recruited from different undergraduate colleges in a large urban city in south India. All students in the classroom were exposed to only one of the three conditions for convenience: either a no-efficacy message control or one of two treatment efficacy conditions—self-efficacy and collective efficacy. Participants were assigned to conditions at the classroom level rather than through individual random assignment, largely for logistical and administrative reasons. Classrooms were allocated to one of three conditions (control, self-efficacy, collective-efficacy), resulting in clustered exposure within naturally occurring groups. This design enhances ecological validity but limits strict causal inference due to potential pre-existing group differences and the non-independence of observations.

Classrooms were assigned to conditions based on scheduling and administrative feasibility rather than random allocation. The number of classrooms per condition varied, although the total number of participants in each condition was broadly comparable. No formal multilevel modeling adjustments were implemented to account for classroom-level clustering; therefore, results should be interpreted with appropriate caution. Preliminary checks did not indicate substantial differences in key demographic characteristics across conditions; however, unobserved differences cannot be ruled out.

Following previous experimental research on efficacy (e.g., Feldman & Hart, 2016; Hart & Feldman, 2016b; Swim & Bloodhart, 2015), the target was to reach a minimum of 200 participants per group. The number of participants in each condition ranged from 260 (control), self-efficacy (241), and collective efficacy (230). Participants' ages ranged from 16 to 25 years (median = 19 years).

Largely representative of the student population in India, about half of the participants (51.7%) were studying for technology and engineering-based degrees (BTech, Bachelor of Technology) compared to others (48.3%), including 19.6% BA (Bachelor of Arts), 27.6% BCom (Bachelor of Commerce), 0.1% BSc (Bachelor of Science), and 1% others. The important difference between BTech and other liberal arts degrees in India is that distinct university systems offer them, and students are exposed to different learning systems.

BTech degree, on average, takes four years, while liberal arts and basic sciences (BA, BCom, BSc) undergraduate degree takes three years.

About half of the sample (49.2%) said they belonged to "Upper or Forward" castes, referring to higher socio-economic groups, and 82.6% of respondents self-identified as Hindu, the dominant religion in India. The sample overrepresents these castes relative to the general population; however, privileged castes dominate the higher education system, and the sample reflects that domination. Dreze and Sen (2014) report that upper castes hold about 75% of positions in education institutions and other sectors of society, although their proportion in the general population is 20%.

2.2. Message Manipulation

The two treatment conditions consisted of reading a one-page news story indicated to be from *The Hindu*—a reputed and widely circulated English newspaper in India. The news stories also contained images sourced from *The Hindu* newspaper from similarly themed news stories on climate change (see Appendix A). The first paragraph of the news story was similar in all conditions and highlighted the general impacts of climate change in India: "Heat-waves, floods, droughts, changing monsoon patterns, sea-level rise, increase in malaria transmissions, and negative impacts on agriculture and food security are likely in India as a result of climate change. India is one of the most vulnerable countries to climate change impacts, according to a new report released by scientists from the Indian Network on Climate Change Assessment (INCCA)."

In order to manipulate efficacy information, the headline of the news articles was varied as well as the second and third paragraphs of the three-paragraph news article. The content of efficacy information in the news stories was adapted from prior research (Feldman & Hart, 2016; Hart & Feldman, 2016a, 2016b). The efficacy manipulation comprised two-thirds of the article text, in addition to an image. For the self-efficacy condition, the three dimensions of internal, external, and response efficacies were highlighted. Self-efficacy condition text suggested that many Indians are well informed and are taking several measures to engage the government (internal efficacy), that the government is responsive to citizens' demands (external efficacy), and that government policies on coal and other fossil fuels and investment in renewable energy will be effective in reducing negative impacts of climate change (response efficacy). For the collective efficacy condition, the text referred to achieving a global deal on climate change by 200 countries in Paris, Indians' collective endeavors to hold governments and businesses accountable to climate action, and coordinated protests by 350.org and other such volunteer-based networks. For the control condition, a science story was sourced from *The Hindu*, which highlighted a new research station set up in the Himalayas by Indian scientists to understand climate change impacts on glaciers. The efficacy manipulations combined multiple elements, including perceptions of individual or collective capability, government responsiveness, and examples of ongoing action. As such, the stimuli reflect a broader "efficacy-oriented framing package" rather than isolating efficacy beliefs alone. This limits the ability to attribute observed effects solely to efficacy framing.

2.3. Measures

2.3.1. Self-Efficacy

Indices for the three dimensions of self-efficacy were adopted from previous studies (e.g., Hart & Feldman, 2016a, 2016b) and were measured on a 5-point scale that ranged from *not at all confident* (1) to *very confident* (5). Two items measured internal efficacy: (1) "If I wanted to, I would have the ability to contact a government official about climate change" (M = 2.93, SD = 1.31); (2) "I think that I am as well informed about politics and government

as most people" (M = 2.72, SD = 1.15). The two items were averaged to create an internal efficacy scale (M = 2.82, SD = 1.01). External efficacy was measured using: (1) "People like me don't have any say about what the government does about climate change," (M = 3.11, SD = 1.15) and (2) "Public officials don't care much about what people like me think about climate change" (M = 2.59, SD = 1.24). The items were recoded prior to computing an average external efficacy scale (M = 2.84, SD = 0.95). Two items measured response efficacy: (1) "If government were to pass laws to reduce India's dependence on coal and other fossil fuels, this would be effective in reducing the negative impacts of climate change" (M = 3.51, SD = 1.23) and (2) "If the government were to pass laws for climate change and environmental protection, it would be effective in reducing India's risks due to climate change" (M = 3.67, SD = 1.21). The two items were summed to create a response efficacy scale (M = 3.59, SD = 1.04). Factor analysis indicated a three-dimensional structure of efficacy referring to internal, external, and response efficacy dimensions, as expected (see Table 1).

Table 1. Factor Analysis of Self-Efficacy Dimensions: Internal, External and Response Efficacy.

	Internal 1	External 2	Response 3
–If I wanted to, I would have the ability to contact a government official about climate change	0.84		
–I think that I am as well informed about government policies on climate change as most people	0.74		
–People like me don't have any say about what the government does about climate change (recoded)		0.91	
–Public officials don't care much about what people like me think about climate change (recoded)		0.38	
–If government were to pass laws to reduce India's dependence on coal and other fossil fuels, this would be effective in reducing the negative impacts of climate change			0.79
–If the government were to pass laws for climate change and environmental protection, it would be effective in reducing India's risks due to climate change			0.83

Note: n = 617. Principal Component Analysis with Varimax Rotation. Kaiser-Meyer-Olkin = 0.75; Bartlett's test of sphericity $\chi 2$ (15) = 478.795, $p < 0.001$.

2.3.2. Collective Efficacy

Perceived collective efficacy was measured using six items assessing participants' beliefs in collective abilities at the neighborhood ("people in your neighborhood. . .."), national ("people in India. . .."), and global levels ("all countries in the world. . .."). Many of the items also referred to a cost (". . .even if other countries do not cooperate," "even if it increases the cost of electricity,") to highlight a potential negative short-term impact. Each item was rated on a 5-point scale that ranged from *not at all confident* (1) to *very confident* (5). All the items were moderately correlated (r's ranged from 0.19 to 0.46, $p < 0.001$, $\alpha = 0.72$). Factor analysis showed that all the measures loaded on one factor, explaining 58% of the variance in perceived collective efficacy: Kaiser-Meyer-Olkin = 0.78, $p < 0.001$; Bartlett's test of sphericity $\chi 2$ (15) = 611.944, $p < 0.001$. $\alpha = 0.72$. The average of the six items was used to construct the perceived collective efficacy scale (M = 2.98, SD = 0.82). The collective efficacy scale captures perceived capacity for coordinated action across multiple levels, local (neighborhood), national, and global, reflecting the inherently multi-scalar nature of climate change as a collective action problem. Although these levels represent distinct referents, they are conceptualized here as expressions of a broader underlying belief in the ability of groups to organize and act collectively. Consistent with this interpretation, factor analysis indicated a single underlying dimension. At the same time, we recognize

that perceptions of efficacy may vary across levels, and aggregating these items reflects an analytical simplification rather than fully distinct domains of collective belief. See Table 2.

Table 2. Correlations between Perceived Collective Efficacy items.

	M (SD)						
–all countries in the world will come together for a global agreement to deal with climate change impacts, even if it involves sacrificing national interests	3.06 (1.21)	1					
–India will do more to help reduce impacts of climate change, even if other countries don't cooperate	3.12 (1.28)	0.305 **	1				
–that people in India will come together and support renewable energy use to decrease the negative impacts of climate change, even if it increases the cost of electricity	2.9 (1.27)	0.278 **	0.407 **	1			
–people in India will organize and participate in protests, *rasta-rokos* (road blockades), rallies and their demonstrations to demand more government action on climate change?	3.03 (1.29)	0.269 **	0.279 **	0.321 **	1		
–people in your neighborhood will come together to demand more government action to reduce climate change impacts even if people have to invest extra time and money?	2.82 (1.29)	0.192 **	0.279 **	0.362 **	0.285 **	1	
–that people in your neighborhood will work together even after any large scale negative impact due to climate change in your community?	3.03 (1.3)	0.195 **	0.225 **	0.369 **	0.232 **	0.462 **	1

Note: $n = 627$. Kaiser-Meyer-Olkin = 0.78, $p < 0.001$; Bartlett's test of sphericity $\chi 2$ (15) = 611.944, $p < 0.001$. $\alpha = 0.72$. All items correlated well (r's ranged from 0.19 to 0.46, $p < 0.01$). Mean collective efficacy ($M = 2.98$, $SD = 0.82$). ** indicate statistical significance at the 0.01 level.

2.3.3. Individual and Collective Political Activism Intentions

Following previous studies, individual political activism intentions were measured by asking participants how likely it is that in the next twelve months they will engage in the following activities on a five-point scale that ranged from *not at all likely* (1) to *very likely* (5): (1) "contact government officials to urge them to take action to reduce climate change" ($M = 3.01$, $SD = 1.34$); (2) "participate in a rally, rasta-roko (road blocking) or participate in protest demonstrations demanding government to act on climate change" ($M = 3.40$, $SD = 1.25$); (3) "sign a petition in support of government action to reduce climate change" ($M = 3.45$, $SD = 1.17$). The respective answers moderately correlated with each other (r's range from 0.30 to 0.45, $p < 0.001$, $\alpha = 0.65$) and were then averaged to create an individual-oriented political behavior intentions scale ($M = 3.29$, $SD = 0.96$).

Collective political activism intentions were measured by asking participants about measures that specifically highlight the coordinative nature of organizing collective action. On a 5-point scale ranging from *not at all likely* (1) to *very likely* (5), participants responded to how likely they were to do the following in the next twelve months: (1) "Organize or encourage people to participate in a protest, rally, *rasta-roko* (road blockade) demonstrations supporting global action on climate change" ($M = 3.33$, $SD = 1.25$); (2) "Organize or encourage people to participate in protests, rally, *rasta-rokos*, demonstrations demanding more ambitious government action on climate change" ($M = 3.51$, $SD = 1.18$); (3) "Organize or encourage people to volunteer with an organization working to reduce climate change impacts" ($M = 3.52$, $SD = 1.20$) and (4) "Organize or encourage people in your community to demand more government action on climate change" ($M = 3.82$, $SD = 1.23$). The four items were moderately

correlated (*r*'s ranged from 0.32 to 0.51, $p < 0.001$, $\alpha = 0.76$). The mean of the four items was computed to create collective political activism intentions ($M = 3.43$, $SD = 0.92$). Factor analysis showed a one-factor solution explaining 58% of variance (Kaiser-Meyer-Olkin = 0.76, $p < 0.001$; Bartlett's test of sphericity $\chi 2$ (6) = 544.130, $p < 0.001$).

In this study, the distinction between individual and collective political activism intentions is based on the role of the individual within political action, rather than whether the action occurs in a group setting. Individual political activism intentions refer to participatory behaviors individuals can undertake on their own, such as contacting officials, signing petitions, or joining a protest. In contrast, collective political activism intentions refer to mobilization-oriented behaviors, including organizing, coordinating, or encouraging others to participate in collective action. We acknowledge that some forms of participation, such as protest attendance, are inherently collective. However, they are conceptualized here as individual-level decisions to participate, whereas the collective activism measure captures efforts to initiate or sustain coordinated action. Accordingly, the distinction between individual and collective activism is analytical rather than absolute.

2.4. Manipulation Check

Immediately after reading the story, participants were asked to write a summary of the news story they had just read in their own words. This resulted in a unique set of 403 open-ended responses (55%, responses to all three conditions ranged between 52% for collective efficacy information and 60% for individual efficacy information). Using a grounded theory approach, a codebook was prepared to identify if the responses fit into highlighting either self-efficacy-related (1) or collective efficacy-related information (2), relative to the science information (0). Sample quotes are highlighted in Appendix B. A second independent researcher coded a 10% random sample of student responses from each of the three frames. We used Hayes' macro for SPSS (Hayes & Krippendorff, 2007) to calculate Krippendorff's alpha. Results showed a high degree of reliability at 0.88.

2.5. Analysis

Differences in how efficacy information was associated with three dimensions of self-efficacy and perceived collective efficacy, as compared to the control condition, were tested using a one-way ANOVA and 1-sided Dunnett post hoc tests. Mediation models were analyzed with SPSS version 21 and the SPSS PROCESS macro (Hayes, 2017). PROCESS is a path analysis modeling macro for SPSS used to estimate the direct and indirect effects of mediators. Bootstrapped standard errors and confidence intervals (CIs) were computed using 10,000 bootstrap samples (Hayes, 2017). The mediation analysis examined whether exposure to efficacy information influenced self-efficacy and collective efficacy perceptions, which, in turn, were associated with individual and collective political activism intentions. Finally, the association between self-efficacy and collective political behavioral intentions, mediated by perceived collective efficacy, was tested.

3. Results

No support was found for Hypothesis 1a. Respondents who were exposed to self-efficacy content were no more likely to show higher levels of self-efficacy compared to the control group. The overall test of between-subject effects was insignificant for perceived internal (F (2, 647) = 0.087, $p = 0.917$), external (F (2, 628) = 0.84, $p = 0.43$), and response (F (2, 646) = 0.624, $p = 0.624$) efficacies, as well as the scale of internal efficacy (F (2, 616) = 0.672, $p = 0.511$).

No support was found for Hypothesis 1b. Respondents exposed to collective efficacy content were no more likely to report heightened perceptions of collective efficacy compared

to the control group. The overall test of between-subject effects was not significant for perceived collective efficacy (F (2, 626) = 0.075, p = 0.927). A post hoc Dunnett test did not reveal any significant differences between the control condition and the individual treatment conditions of either self-efficacy or collective efficacy, failing to support the hypothesis that exposure to efficacy information heightens people's perceptions of their individual or collective abilities for climate activism.

Regression results showed that perceptions of internal efficacy (B = 0.26, p < 0.001) and response efficacy (B = 0.12, p < 0.01) were positively associated with individual political activism intentions. However, external efficacy (B = −0.07, p = 0.36) was not significantly associated with individual political activism intentions. Hypothesis 2a is partly supported. Perceived collective efficacy was positively associated with individual political activism intentions (B = 0.24, p < 0.001) and collective political activism intentions (B = 0.32, p < 0.001), providing support for Hypothesis 2b. See Table 3.

Table 3. Linear Regression Predicting Individual and Collective Political Activism Intentions.

	Individual Political Activism Intentions			**Collective Political Activism Intentions**		
	B	***SE* (*B*)**	***β***	***B***	***SE* (*B*)**	***β***
Constant	2.31	0.79		2.67 ***	0.74	
Age	−0.04	0.04	−0.05	−0.07	0.04	−0.09
Male	0.05	0.08	0.03	0.01	0.07	0.00
Bachelor of Technology vs. others	0.23 **	0.08	0.12	0.09	0.08	0.05
Education year (third year and above)	−0.02	0.11	−0.01	0.30 **	0.10	0.14
Caste (Other)	0.02	0.08	0.01	0.04	0.07	0.02
Religion (Hindu)	−0.10	0.11	−0.04	−0.15	0.10	−0.06
Internal efficacy condition vs. Others	0.01	0.09	0.01	0.14	0.09	0.07
Collective efficacy condition vs. Others	−0.08	0.09	−0.04	0.09	0.09	0.05
Perceived Internal Efficacy	0.26 ***	0.04	0.27	0.18 ***	0.04	0.20
Perceived External Efficacy	−0.07	0.05	−0.07	−0.06	0.04	−0.07
Perceived Response Efficacy	0.12 **	0.04	0.13	0.19 ***	0.04	0.21
Perceived Collective Efficacy	0.24 ***	0.05	0.20	0.32 ***	0.04	0.28
ΔR^2	0.20			0.25		
n	524			529		

Note: ** and *** indicate statistical significance at the 0.01 and 0.001 levels, respectively.

Further, perceived internal efficacy (B = 0.18, p < 0.001) and response efficacy (B = 0.19, p < 0.001) were positively associated with collective action intentions. Among the factors considered, perceived collective efficacy was most strongly associated with collective action intentions (B = 0.32, p < 0.001), and internal efficacy was strongly associated with individual political action intentions (B = 0.26, p < 0.001).

Next, mediation analyses were conducted. There was no evidence of indirect effects of exposure to self-efficacy information on individual and collective political activism intentions related to climate change. The indirect effect of the self-efficacy condition on intended political action via the three dimensions of self-efficacy are as follows: internal efficacy (b = 0.008, SE = 0.04 [Boot 95% CI = −0.06, 0.08]), external efficacy (b = −0.03, SE = 0.02 [Boot 95% CI= −0.08, 0.01]), and response efficacy (b = −0.007, SE = 0.02 [Boot 95% CI = −0.04, 0.04]). Finally, no evidence was found for the indirect effect of collective efficacy condition on collective action intentions through perceived collective efficacy (b = −0.005, SE = 0.03 [Boot 95% CI = −0.07, 0.07]). No support was found for Hypothesis 3.

Finally, internal efficacy was associated with collective political action intentions partly through its influence on collective efficacy, as shown in Figure 2. Similarly, response efficacy was positively associated with perceptions of collective efficacy, which, in turn, were

associated with intentions for collective political action on climate change (see Figure 3). No support was found for the claim that external efficacy indirectly affects collective action intentions through collective efficacy perceptions. Two of the three dimensions of individual efficacy were associated with intentions for collective political action partly through their influence via perceived collective efficacy.

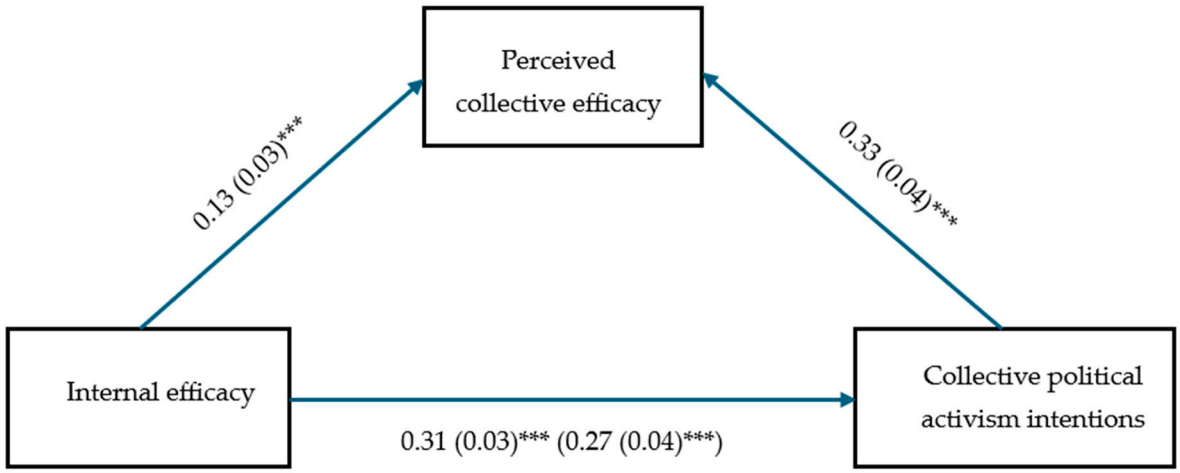


Figure 2. Perceived collective efficacy partially mediates the association between internal efficacy and collective political activism intentions. PROCESS used (Hayes, 2017), indirect effect = 0.04 (*SE* = 0.01, Boot 95% *CI* = 0.02, 0.07). *** indicates statistical significance at the 0.001 level.

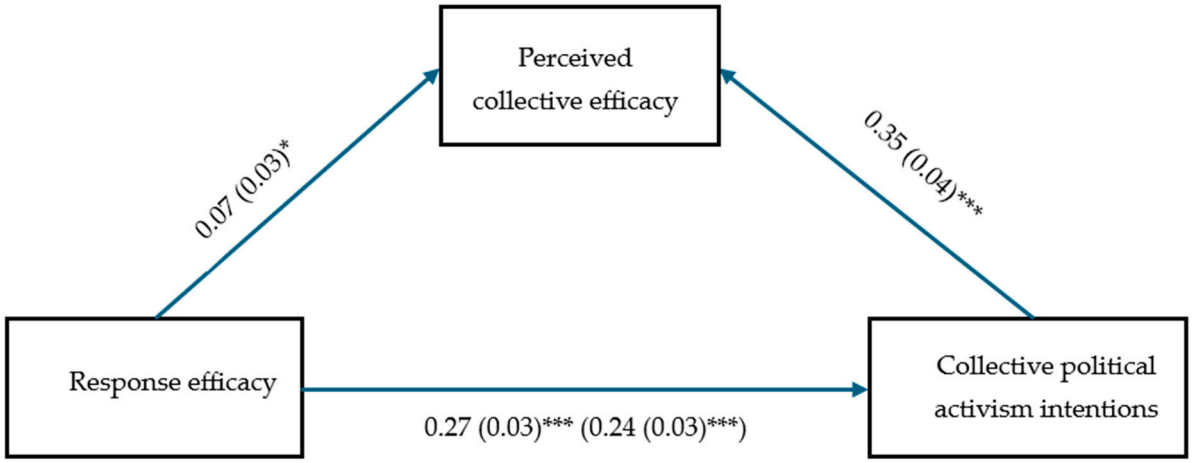


Figure 3. Perceived collective efficacy partly mediates the association between response efficacy and collective political activism intentions. PROCESS used (Hayes, 2017), indirect effect = 0.025 (*SE* = 0.01, Boot 95% *CI* = 0.003, 0.046). * and *** indicate statistical significance at the 0.05 and 0.001 levels, respectively.

4. Discussion

A single exposure to news stories embedded with efficacy information was not associated with higher levels of any of the three dimensions of self-efficacy—internal, external, and response efficacies—and perceived collective efficacy. These results are largely similar to a few prior studies that report null or mixed findings about exposure to efficacy information as a way to heighten self-efficacy beliefs or behavioral intentions (Angill-Williams & Davis, 2022; Jugert et al., 2016; Hornsey et al., 2021). For example, Hart and Feldman (2016b) found evidence for only two out of six hypotheses: exposure to positive internal efficacy information increased perceptions of internal efficacy, and exposure to negative external efficacy information lowered perceptions of external efficacy. Taken together,

efficacy beliefs appear to be resistant to change, at least as a result of a single exposure to efficacy information. The absence of significant effects may also reflect the composite nature of the stimuli, which combined efficacy cues with broader informational and motivational content. It is important to report and introspect such null findings, as Hornsey et al. (2021) highlighted, "The relative silence on this question may speak to a file-drawer problem, as people (mis)construe their null results as 'failed' experiments that have nothing to say about how people think about climate change or simply regard their null results as unpublishable" (p. 336).

Efficacy beliefs are robust perceptions about one's abilities and that of one's group's abilities (Bandura, 1997). They form over many years of trials, failures, and successes. Efficacy beliefs are stable psychological constructs (Verba & Nie, 1972) and may be resistant to short-term changes following a single exposure (Feldman & Hart, 2016). Concurrent with the findings of other studies indicated above, this study suggests that efficacy perceptions may not be easily changed under these conditions. Efficacy beliefs, however, are significant predictors of political activism intentions.

Two of the three dimensions of self-efficacy, internal efficacy, and response efficacy, have unique, positive associations with intentions for individual political action, similar to the findings from Hart and Feldman (2016b). While their prior study found that even external efficacy was associated with political engagement intentions, we did not find any support. Previous research by Lee (2006) shows that external efficacy was negatively and significantly associated with political participation in a protest demanding democratization in Hong Kong. Lee (2006, 2010) explained that the finding was consistent with Gamson's (1968) hypothesis that a certain degree of belief in the lack of government responsiveness likely drives people's participation in more confrontational tactics, such as participating in protests. That is, individuals need to at least have low external efficacy in order to be motivated to demand more ambitious government action on climate change. Future research can test this explanation by analyzing the interactions between the different dimensions of perceived efficacies on intentions of individual political engagement on climate change.

The most unique and important contribution of this research is to our understanding of intentions to engage collectively on climate change, at least among a group of youngsters in a large city in India. While exposure to collective efficacy information did not raise the respondents' collective efficacy levels, perceived collective efficacy was positively associated with intentions for collective political action on climate change. Among the factors considered in the model, perceived collective efficacy was most strongly associated with intentions for collective political engagement, while perceived internal efficacy was most strongly associated with intentions for individual political engagement. In addition, two of the three dimensions of self-efficacy—internal efficacy and response efficacy—had a positive association with intentions for collective action were partly mediated through perceived collective efficacy.

This research highlights the need to distinguish dimensions of perceived self-efficacy and collective efficacy, similar to findings across research in political communication (e.g., Lee, 2006, 2010), pro-environmental behaviors (Chen, 2015; Homburg & Stolberg, 2006) and climate change activism (Doherty & Webler, 2016; Roser-Renouf et al., 2014). Large-scale problems such as climate change can make citizens feel ineffective to act on an issue that far exceeds their individual capacities (Lorenzoni et al., 2007; Metag et al., 2016). Self-efficacy is an important and unique predictor of an individual's behavior with respect to individual engagement, such as recycling behaviors, and is positively associated with perceived collective efficacy (Fernández-Ballesteros et al., 2002). A group plagued by self-doubters is likely to organize and enact agency to overcome barriers to achieve their common goals (Bandura, 2000). Climate change is a collective problem and requires coordination across

local, regional, and international levels. When such coordinated endeavors are the outcome, perceived collective efficacy plays a more important role than self-efficacy to motivate collective action against common threats (Chen, 2015; Homburg & Stolberg, 2006).

Prior research did not clarify or distinguish the mechanisms of self-efficacy and perceived collective efficacy influence on individuals' political engagement with climate change (Chen, 2015; Doherty & Webler, 2016; Feldman & Hart, 2016; Hart & Feldman, 2016a, 2016b; Roser-Renouf et al., 2014). These studies have interchangeably used self-efficacy and collective efficacy in predicting individuals' public and private sphere behaviors (contacting public officials, voting, participating in protests, donating money, and volunteering). While these actions are partly in the public domain and dependent on collective norms of participation, they are largely under an individual's control. For example, many public-sphere activist behaviors, such as protest participation, apart from an individual participating in the protest, also require collective endeavors, such as organizing synchronous activities by many actors (activist groups, media, etc.) to ensure protest success (Jugert et al., 2016). Such coordinating behaviors are vital for building social networks among activists and for institutionalizing local and international advocacy groups. Thus, such collective engagement behaviors are directly driven by perceived collective efficacy. Collective efficacy establishes a strong social norm among its members to contribute and collaborate, overriding the potential negative effects of an individual's free-riding on the efforts of other group members (Goddard et al., 2004; Lubell et al., 2007). For example, Meijers et al. (2023) found that collective efficacy—but not self-efficacy—was associated with both policy support. Individuals likely prefer the means of action that they believe to be most efficacious in achieving their goals. Future research should replicate the findings of this study and help develop mechanisms to explain the interplay between self-efficacy and collective efficacy on the one hand and individual and group-oriented behaviors on the other.

The findings of this study are contrary to some recent research. Doherty and Webler (2016), for example, found an insignificant association between perceived collective efficacy and public climate actions (e.g., contact, volunteer, vote, donate, or protest participation). This could be because they measured collective efficacy as the capability of generalized others (capability of "family and friends," "humans," "Vermont," and "federal government" to reduce global warming) to engage in public climate actions, which ignores the collective—a respondent assessing the abilities of a group it identifies with, belongs to and participates in. Measures that contain explicit group identity or group membership (e.g., "our or your team;" "your neighborhood") are more likely to result in cognitive appraisals about a collective one belongs to, as conceptualized by Bandura (2000). Such social identity anchoring plays a key role in fostering beliefs in collective efficacy (van Zomeren et al., 2008). Lubell et al. (2007) measured collective efficacy as expected reciprocity from others and civic participation, both positively associated with political participation. A key limitation of such studies based on the idea of a rational actor, who is unlikely to contribute to group efforts unless reciprocated, ignores that "Beliefs that one can help to ameliorate adverse conditions provide *additional* [emphasis added] self-interested reasons to participate in collective action" (Bandura, 1997, p. 488). Future researchers should satisfy the condition of collective efficacy as "coordinative and interactive aspects operating within groups" (Bandura, 2000, p. 76), which is likely shaped by group identification and task interdependence.

Jugert et al. (2016), in a series of experiments, show that manipulations of collective efficacy raise pro-environmental intentions through perceptions of self-efficacy, but only for individual-oriented, private-sphere pro-environmental behaviors such as choice of personal mobility, conserving energy at households, among others. However, they report "no such interaction effect for intended collective action that requires the synchronous contribution of many people in a situation (i.e., public-sphere behavior)" (p. 20), measured

as "I am ready to join others to do something for the environment" (p. 19). Indeed, the conclusion supports the central finding of this paper: self-efficacy perceptions are powerful predictors of people's individual pro-climate actions, and collective efficacy perceptions are robust predictors of explicit collective actions. Future researchers should use multiple measures of collective efficacy instead of a single measure (Roser-Renouf et al., 2014), referring specifically to a group affiliation—as community members, citizens, and voters, workers—instead of generalized group measures for collective action.

Limitations

Future research can improve this line of research in several ways. First, because the assignment occurred at the classroom level rather than through individual randomization, the study cannot fully rule out pre-existing differences between groups or clustering effects. Future research using randomized controlled designs or multilevel modeling approaches would strengthen causal inference. Second, future researchers should try to test exposure to efficacy in different ways to help understand if efficacy beliefs are indeed resistant to easy change. Although the experimental manipulation appears successful based on participants' open-ended responses, it is possible that it was not powerful enough or that, even though they passed the attention check, participants were simply not paying attention to the stimuli (Hornsey et al., 2021). It is also important to test exposure to both positive and negative valence efficacy information (Hart & Feldman, 2016a) to understand potential parallel or suppressor effects. Moreover, it is possible that knowledge-based interventions increase self-efficacy for interpersonal discussions (Geiger et al., 2017), but it is unclear how such interventions are associated with other behavioral outcomes and policy support.

In addition, the collective efficacy measure spans multiple levels of collective action, including neighborhood, national, and global contexts. While this reflects the multi-level nature of climate change governance, it may also obscure meaningful variation across levels. This breadth of measurement could reduce sensitivity to condition-specific effects and may partially explain the absence of significant differences across experimental conditions.

Further, while this study used images (Metag et al., 2016; S. J. O'Neill et al., 2013), a limitation identified by Hart and Feldman (2016b), it did not measure participants' responses to images as related to efficacy and could not explore the interaction between text and image on participants' perceptions of efficacy and behavioral intentions. Future research can potentially use more engaging media, such as videos and animations apart from text and visuals, to explore different ways to enhance citizens' efficacy. However, we point to a recent study by Angill-Williams and Davis (2022), who found that in an online sample of 161 participants, short video messages focusing on individual or collective behavior did not increase perceptions of self-efficacy but only response efficacy. They argued that increasing climate efficacy is not a surefire means to promoting climate commitment as it may reduce the perceived urgency of action. Similarly, Galeote et al. (2023) found no difference between a narrative climate change game, immersive virtual reality, and text messages in shaping efficacy beliefs or intentions to participate in climate action. They argued for further research to test such commonly assumed effects of the use of immersive technology in shaping efficacy beliefs and pro-environmental behaviors. According to education-entertainment scholars, exposure to engaging content over a prolonged period helps the audience emotionally relate and learn from the characters who look and feel like the target audience. Such engaging content has been shown to increase people's sense of self and collective efficacy and has improved health and environmental behaviors and outcomes (Papa et al., 2000; Singhal & Rogers, 1999).

It is desirable to track actual behavior—at individual and collective levels—instead of relying on self-reported behavioral intentions. Finally, using population samples apart

from student samples and longitudinal analysis of data will better help establish the causal mechanisms of exposure to efficacy information, its influence on perceived efficacies, and behavioral intentions and behavior.

5. Conclusions

One of the primary barriers to public engagement with climate change is the lack of people's belief in their ability to impact a global problem. People who may feel ineffective to act as individuals may instead feel they can enact change when they act as part of a group, a community, or political blocs (e.g., Bandura, 1997, 2000). This study illustrates that media messages containing efficacy information may have limited associations with changes in people's relatively stable perceptions of their abilities. Self-efficacy and perceived collective efficacy, however, are important predictors of people's individual-oriented and collective action-oriented political engagement intentions. Harnessing this collective ability is vital in resolving a collective crisis.

Author Contributions: Conceptualization, N.B. and J.T.; Methodology, N.B. and J.T.; Software, J.T.; Validation, N.B.; Formal analysis, N.B. and J.T.; Investigation, J.T.; Resources, N.B.; Data curation, N.B. and J.T.; Writing—original draft, N.B. and J.T.; Writing—review & editing, N.B. and J.T.; Visualization, J.T.; Supervision, N.B.; Project administration, N.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Massey University Human Ethics Committee (4000022852; date of approval: 2 February 2017).

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

Data Availability Statement: The data presented in this study are available upon reasonable request from the authors. The datasets are not publicly available due to on-going research project.

Acknowledgments: The authors thank the Special Issue editor and the three anonymous reviewers for their constructive comments and suggestions, which helped improve the manuscript. The usual disclaimers apply.

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

Abbreviations

The following abbreviations are used in this manuscript:

ASPI	Asia Society Policy Institute
BA	Bachelor of Arts
BCom	Bachelor of Commerce
BSc	Bachelor of Science
BTech	Bachelor of Technology
CI	Confidence Interval
IEA	International Energy Agency
INCCA	Indian Network on Climate Change Assessment
IPCC	Intergovernmental Panel on Climate Change
SD	Standard Deviation
SE	Standard Error
SPSS	Statistical Package for Social Sciences
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Appendix A

Appendices A.1 and A.2 show the two efficacy information news stories compared to the third control frame, which features a scientific expedition story. All stories contain the exact first paragraph.

Appendix A.1

THE HINDU

Many Indians are Finding it Easy to Help Shape a new Climate Change Policy

December 10, 2016

Staff writer



New Delhi: Heat-waves, floods, droughts, changing monsoon patterns, sea-level rise, increase in malaria transmissions, and negative impacts on agriculture and food security are likely in India as a result of climate change. India is one of the most vulnerable countries to climate change impacts, according to a new report released by scientists from the Indian Network on Climate Change Assessment (INCCA).

As the impacts of climate change are becoming clearer, many Indians find it easy to contact local government officials to act on climate change and other environmental issues. "When the issues as important as climate change, it is not hard to find time. It is easy enough to sign a petition, write a letter or contact a governmental official about a new law to reduce climate change, such as more investment in renewable energy such as solar and wind power, reduce coal consumption, and fund local environmental projects," said political analyst, Dr. Ramesh.

Many citizens also feel they are well informed about government polices on climate change and how the government policy process works. As a result, they feel more confident to take political action on the issue. Many Indians are already taking several measures to act on climate change such as meeting government officials to speak their mind on a new climate change policy. Unlike previous years, public officials are willing to listen to ordinary people's ideas about ways to resolve climate change and the government has organized several meeting in different cities to consult the public on the climate change policy. Some of the government proposals include laws to reduce India's dependence on coal and other fossil fuels, and investment in climate change and environmental protection. If these laws were passed by the Indian parliament, they will be effective in reducing the negative impacts of climate change.

Appendix A.2

THE HINDU

With Severe Impacts of Climate Change on the Horizon, Many Indians Participate in a Climate Change Rally to Demand Government Action



December 10, 2016
Staff writer

New Delhi: Heat-waves, floods, droughts, changing monsoon patterns, sea-level rise, increase in malaria transmissions, and negative impacts on agriculture and food security are likely in India as a result of climate change. India is one of the most vulnerable countries to climate change impacts, according to a new report released by scientists from the Indian Network on Climate Change Assessment (INCCA).

There is global unity as nearly 200 countries have agreed on a global deal to reduce negative impacts of climate change. This agreement sends a strong signal that individual countries are willing to sacrifice their national interests for a global deal. "India has already promised to produce 40% of the total electricity from renewable energy sources, such as solar power by 2030. While challenging, the Indian government feels confident to achieve the target and contribute to the international agreement even if other countries do not cooperate," said political analyst, Dr. Ramesh.

As the impacts of climate change are becoming clearer, many Indians are coming together to take action on climate change. People in India are forming neighborhood groups or associations to organize and encourage people to participate in protests, rallies, rasta-rokos, demanding more ambitious government action on climate change. More than half a million people marched in nearly 3,000 simultaneous events conducted across 161 countries, including several Indian cities, as part of the People's Climate March on September 21. They carried placards promoting renewable energy sources and chanted slogans condemning governments for their inaction on climate change and for selling to global capitalism and fossil fuel industry lobbies. The demonstrations were mobilized by volunteers from non-governmental organisation 350.org, along with a growing global network of volunteer-based organisations.

Appendix B

Sample quotes for illustrating self-efficacy information include, "according to the story. . .climate change happening all over the world. India is one of the main country (countries) which is usually affected by climate change. Students and people are taking

many steps to get over this situation. They are also taking precautions due to the drastic change in climate," "so as we keep hearing these things called 'climate change & global warming.' We always thought of these phrases as something non-relevant. But it is happening, the government is taking steps along with the citizens," and "There are many environmental issues and are increasing day by day. The citizens have chosen to share cabs and all to reduce the effect of pollution. Many appliances are also be introduced and used in order to reduce the problem. Youngsters are also taking a lead in it by making people aware of it." Some of the phrases coded as referring to collective efficacy information are: "It is taking a step forward to fight climate change and major problems caused due to it. Steps taken by a few of us to bring about some positive change (and) promote others to do some or something else to improve our climatic conditions," "....environmental problems like climate change exist in India. And hence, a successful climatic deal is made in Paris in which 200 countries participated to show their environmental concern," and "Due climate change many people are facing difficulties. The change is due to global warming. People are aware of it; in fact there are few people who can understand the consequences are trying to protect by doing several rallies & awareness programs with the help of government." Science stories were similarly coded for highlighting a new research station in the Himalayas established by Indian scientists to understand the impact of climate change on glaciers, as mentioned in the control science story.

References

Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, *15*(2), 77–86. [CrossRef]

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 4. [CrossRef]

Angill-Williams, A., & Davis, C. J. (2022). Increasing climate efficacy is not a surefire means to promoting climate commitment. *Thinking & Reasoning*, *28*(3), 375–395. [CrossRef]

Armbruster, S. T., Manchanda, R. V., & Vo, N. (2022). When are loss frames more effective in climate change communication? An application of fear appeal theory. *Sustainability*, *14*(12), 7411. [CrossRef]

ASPI (Asia Society Policy Institute). (2022). *Getting India to net zero (getting Asia to net zero)*. Asia Society Policy Institute. Available online: https://asiasociety.org/sites/default/files/2022-08/ASPI_Getting%20India%20to%20Net%20Zero.pdf (accessed on 17 March 2026).

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science*, *9*(3), 75–78. [CrossRef]

Bandura, A. (2002). Social cognitive theory in cultural context. *Applied Psychology*, *51*(2), 269–290. [CrossRef]

Barth, M., Masson, T., Fritsche, I., Fielding, K., & Smith, J. R. (2021). Collective responses to global challenges: The social psychology of pro-environmental action. *Journal of Environmental Psychology*, *74*, 101562. [CrossRef]

Bigsby, E., & Albarracín, D. (2022). Self- and response efficacy information in fear appeals: A meta-analysis. *Journal of Communication*, *72*(2), 241–263. [CrossRef] [PubMed]

Bostrom, A., Hayes, A. L., & Crosman, K. M. (2019). Efficacy, action, and support for reducing climate change risks. *Risk Analysis*, *39*(4), 805–828. [CrossRef]

Boykoff, M. T., & Boykoff, J. M. (2004). Balance as bias: Global warming and the US prestige press. *Global Environmental Change*, *14*(2), 2. [CrossRef]

Bravo, I., Walter, S., Prasse, K., & Keuper, M. (2026). Visualizing climate change in the media: A systematic literature review, challenges, and future research. *Annals of the International Communication Association*, wlag011. [CrossRef]

Chen, M.-F. (2015). Self-efficacy or collective efficacy within the cognitive theory of stress model: Which more effectively explains people's self-reported proenvironmental behavior? *Journal of Environmental Psychology*, *42*, 66–75. [CrossRef]

Choi, S., & Hart, P. S. (2021). The influence of different efficacy constructs on energy conservation intentions and climate change policy support. *Journal of Environmental Psychology*, *75*, 101618. [CrossRef]

Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food*, *2*, 198–209. [CrossRef]

Doherty, K. L., & Webler, T. N. (2016). Social norms and efficacy beliefs drive the Alarmed segment's public-sphere climate actions. *Nature Climate Change*, *6*(9), nclimate3025. [CrossRef]

Dreze, J., & Sen, A. (2014). *An uncertain glory: India and its contradictions*. Penguin Books.

Dunlap, R. E., McCright, A. M., & Yarosh, J. H. (2016). The political divide on climate change: Partisan polarization widens in the US. *Environment: Science and Policy for Sustainable Development*, *58*(5), 4–23. [CrossRef]

Fairbrother, M. (2022). Public opinion about climate policies: A review and call for more studies of what people want. *PLoS Climate*, *1*(5), e0000030. [CrossRef]

Falkenberg, M., Galeazzi, A., Torricelli, M., Di Marco, N., Larosa, F., Sas, M., Mekacher, A., Pearce, W., Zollo, F., Quattrociocchi, W., & Baronchelli, A. (2022). Growing polarization around climate change on social media. *Nature Climate Change*, *12*, 1114–1121. [CrossRef]

Feldman, L., & Hart, P. S. (2016). Using political efficacy messages to increase climate activism: The mediating role of emotions. *Science Communication*, *38*(1), 99–127. [CrossRef]

Feldman, L., Maibach, E. W., Roser-Renouf, C., & Leiserowitz, A. (2012). Climate on cable: The nature and impact of global warming coverage on Fox News, CNN, and MSNBC. *The International Journal of Press/Politics*, *17*, 3–31. [CrossRef]

Fernández-Ballesteros, R., Díez-Nicolás, J., Caprara, G. V., Barbaranelli, C., & Bandura, A. (2002). Determinants and structural relation of personal efficacy to collective efficacy. *Applied Psychology*, *51*(1), 107–125. [CrossRef]

Fritz, L., Baum, C. M., Low, S., & Sovacool, B. K. (2024). Public engagement for inclusive and sustainable governance of climate interventions. *Nature Communications*, *15*, 4168. [CrossRef]

Galeote, D. F., Legaki, N.-Z., & Hamari, J. (2023). Text- and game-based communication for climate change attitude, self-efficacy, and behavior: A controlled experiment. *Computers in Human Behavior*, *149*, 107930. [CrossRef]

Gamson, Z. F. (1968). Organizational responses to members. *The Sociological Quarterly*, *9*(2), 139–149. [CrossRef]

Geiger, N., Swim, J. K., & Fraser, J. (2017). Creating a climate for change: Interventions, efficacy and public discussion about climate change. *Journal of Environmental Psychology*, *51*, 104–116. [CrossRef]

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educational Researcher*, *33*(3), 3. [CrossRef]

Gulliver, R., Chapman, C. M., Solly, K. N., & Schultz, T. (2020). Testing the impact of images in environmental campaigns. *Journal of Environmental Psychology*, *71*, 101468. [CrossRef]

Hart, P. S., & Feldman, L. (2014). Threat without efficacy? Climate change on US network news. *Science Communication*, *36*(3), 325–351. [CrossRef]

Hart, P. S., & Feldman, L. (2016a). The impact of climate change–related imagery and text on public opinion and behavior change. *Science Communication*, *38*(4), 415–441. [CrossRef]

Hart, P. S., & Feldman, L. (2016b). The influence of climate change efficacy messages and efficacy beliefs on intended political participation. *PLoS ONE*, *11*(8), e0157658. [CrossRef] [PubMed]

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.

Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures*, *1*(1), 77–89. [CrossRef]

Hmielowski, J. D., Feldman, L., Myers, T. A., Leiserowitz, A., & Maibach, E. (2013). An attack on science? Media use, trust in scientists, and perceptions of global warming. *Public Understanding of Science*, *23*, 866–883. [CrossRef]

Homburg, A., & Stolberg, A. (2006). Explaining pro-environmental behavior with a cognitive theory of stress. *Journal of Environmental Psychology*, *26*(1), 1–14. [CrossRef]

Hornsey, M. J., Chapman, C. M., & Oelrichs, D. M. (2021). Ripple effects: Can information about the collective impact of individual actions boost perceived efficacy about climate change? *Journal of Experimental Social Psychology*, *97*, 104217. [CrossRef]

Hornsey, M. J., Chapman, C. M., & Oelrichs, D. M. (2022). Why it is so hard to teach people they can make a difference: Climate change efficacy as a non-analytic form of reasoning. *Thinking & Reasoning*, *28*(3), 327–345. [CrossRef]

IEA (International Energy Agency). (2021). *India energy outlook*. Available online: https://www.iea.org/reports/india-energy-outlook-2021 (accessed on 17 March 2026).

IPCC (Intergovernmental Panel on Climate Change). (2023, March 20). *Urgent climate action can secure a liveable future for all*. Available online: https://www.ipcc.ch/2023/03/20/press-release-ar6-synthesis-report/ (accessed on 17 March 2026).

Jugert, P., Greenaway, K. H., Barth, M., Büchner, R., Eisentraut, S., & Fritsche, I. (2016). Collective efficacy increases pro-environmental intentions through increasing self-efficacy. *Journal of Environmental Psychology*, *48*, 12–23. [CrossRef]

Karlsson, H., Erlandsson, A., Asutay, E., & Västfjäll, D. (2024). The role of environmental mental imagery in impact beliefs about climate change mitigation and pro-environmental intentions. *Current Research in Ecological and Social Psychology*, *6*, 100181. [CrossRef]

Krosnick, J. A., Holbrook, A. L., Lowe, L., & Visser, P. S. (2006). The origins and consequences of democratic citizens' policy agendas: A study of popular concern about global warming. *Climatic Change*, *77*, 7–43. [CrossRef]

Lacroix, K., Carman, J. P., Goldberg, M. H., Gustafson, A., Rosenthal, S. A., & Leiserowitz, A. (2022). Does personal climate change mitigation behavior influence collective behavior? Experimental evidence of no spillover in the United States. *Energy Research & Social Science*, *94*, 102875. [CrossRef]

Lee, F. L. F. (2006). Collective efficacy, support for democratization, and political participation in Hong Kong. *International Journal of Public Opinion Research*, *18*(3), 297–317. [CrossRef]

Lee, F. L. F. (2010). The perceptual bases of collective efficacy and protest participation: The case of pro-democracy protests in Hong Kong. *International Journal of Public Opinion Research*, *22*(3), 392–411. [CrossRef]

Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, *17*(3–4), 445–459. [CrossRef]

Lubell, M., Zahran, S., & Vedlitz, A. (2007). Collective action and citizen responses to global warming. *Political Behavior*, *29*, 391–413. [CrossRef]

McCright, A. M., & Dunlap, R. E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *The Sociological Quarterly*, *52*(2), 155–194. [CrossRef]

Meijers, M. H. C., Wonneberger, A., Azrout, R., Torfadóttir, R., Heather, & Brick, C. (2023). Introducing and testing the personal-collective-governmental efficacy typology: How personal, collective, and governmental efficacy subtypes are associated with differential environmental actions. *Journal of Environmental Psychology*, *85*, 101915. [CrossRef]

Merry, M. K. (2024). Climate change news coverage, partisanship, and public opinion. *Climatic Change*, *177*, 171. [CrossRef]

Metag, J., Schäfer, M. S., Füchslin, T., Barsuhn, T., & Kleinen-von Königslöw, K. (2016). Perceptions of climate change imagery: Evoked salience and self-efficacy in Germany, Switzerland, and Austria. *Science Communication*, *38*(2), 197–227. [CrossRef]

Moser, S. C. (2016). Reflections on climate change communication research and practice in the second decade of the 21st century: What more is there to say? *Wiley Interdisciplinary Reviews: Climate Change*, *7*(3), 345–369. [CrossRef]

O'Neill, S. (2025). *The visual life of climate change*. Bristol University Press. [CrossRef]

O'Neill, S. J., Boykoff, M., Niemeyer, S., & Day, S. A. (2013). On the use of imagery for climate change engagement. *Global Environmental Change*, *23*(2), 413–421. [CrossRef]

Ophir, Y., Walter, D., Jamieson, P. E., & Jamieson, K. H. (2024). The politicization of climate science: Media consumption, perceptions of science and scientists, and support for policy. *Journal of Health Communication*, *29*, 18–27. [CrossRef]

Ostrom, E. (2010). A multi-scale approach to coping with climate change and other collective action problems. *Solutions*, *1*(2), 27–36.

Painter, J., & Ashe, T. (2012). Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10. *Environmental Research Letters*, *7*(4), 044005. [CrossRef]

Papa, M. J., Singhal, A., Law, S., Pant, S., Sood, S., Rogers, E. M., & Shefner-Rogers, C. L. (2000). Entertainment-education and social change: An analysis of parasocial interaction, social learning, collective efficacy, and paradoxical communication. *Journal of Communication*, *50*(4), 31–55. [CrossRef]

Roser-Renouf, C., Atkinson, L., Maibach, E., & Leiserowitz, A. (2016). The consumer as climate activist. *International Journal of Communication*, *10*, 4759–4783.

Roser-Renouf, C., Maibach, E. W., Leiserowitz, A., & Zhao, X. (2014). The genesis of climate change activism: From key beliefs to political action. *Climatic Change*, *125*(2), 163–178. [CrossRef]

Schäfer, M. S., & Painter, J. (2021). Climate journalism in a changing media ecosystem: Assessing the production of climate change-related news around the world. *WIREs Climate Change*, *12*(1), e675. [CrossRef]

Singhal, A., & Rogers, E. M. (1999). *Entertainment-education: A communication strategy for social change*. Psychology Press.

Stern, P. C. (2000). New environmental theories: Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407–424. [CrossRef]

Swim, J. K., & Bloodhart, B. (2015). Portraying the perils to polar bears: The role of empathic and objective perspective-taking toward animals in climate change communication. *Environmental Communication*, *9*(4), 446–468. [CrossRef]

Thaker, J. (2024). Cross-country analysis of the association between media coverage and exposure to climate news with awareness, risk perceptions, and protest participation intention in 110 countries. *Environmental Communication*, *18*(3), 233–249. [CrossRef]

Thaker, J., Maibach, E., Leiserowitz, A., Zhao, X., & Howe, P. (2015). The role of collective efficacy in climate change adaptation in India. *Weather, Climate, and Society*, *8*(1), 1. [CrossRef]

UNEP (United Nations Environment Programme). (2023, August 11). *Emissions gap report 2023*. UNEP—UN Environment Programme. Available online: http://www.unep.org/resources/emissions-gap-report-2023 (accessed on 17 March 2026).

UNFCCC (United Nations Framework Convention on Climate Change). (2023). *New analysis of national climate plans: Insufficient progress made, cop28 must set stage for immediate action*. Available online: https://unfccc.int/news/new-analysis-of-national-climate-plans-insufficient-progress-made-cop28-must-set-stage-for-immediate (accessed on 17 March 2026).

Uppalapati, S. S., Campbell, E., Kotcher, J., Their, K., Ansah, P., Gour, N., & Meibach, E. (2026). Public engagement with climate change and health: A global literature review. *EcoHealth*, *23*, 58–70. [CrossRef]

van Zomeren, M., Postmes, T., & Spears, R. (2008). Toward an integrative social identity model of collective action: A quantitative research synthesis of three socio-psychological perspectives. *Psychological Bulletin*, *134*(4), 504–535. [CrossRef]

van Zomeren, M., Spears, R., & Leach, C. W. (2010). Experimental evidence for a dual pathway model analysis of coping with the climate crisis. *Journal of Environmental Psychology*, *30*(4), 339–346. [CrossRef]

Velasquez, A., & LaRose, R. (2015). Youth collective activism through social media: The role of collective efficacy. *New Media & Society*, *17*(6), 899–918. [CrossRef]

Verba, S., & Nie, N. H. (1972). *Participation in America: Political democracy and social equality*. Harper & Row.

Vraga, E. K. (2017). Political participation and voting relevant to climate change. In *Oxford research encyclopedia of climate change communication*. Oxford Academic. Available online: http://climatescience.oxfordre.com/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-339 (accessed on 17 March 2026).

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, *59*(4), 4. [CrossRef]

Zhao, X. (2009). Media use and global warming perceptions: A snapshot of the reinforcing spirals. *Communication Research*, *36*(5), 698–723. [CrossRef]

Zhao, X., Leiserowitz, A. A., Maibach, E. W., & Roser-Renouf, C. (2011). Attention to science/environment news positively predicts and attention to political news negatively predicts global warming risk perceptions and policy support. *Journal of Communication*, *61*(4), 713–731. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.