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Yixin Chen

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Social media use, political ideology, climate change belief, and support for greenhouse emissions regulation: an analysis of the 2020 American National Election Studies (ANES)

Yixin Chen   iD

Department of Communication Studies, Sam Houston State University, Huntsville, TX, USA

ABSTRACT

Previous studies have reported mixed findings regarding the influence of social media use on climate change belief or climate-related actions. Political ideology and climate change belief have been found to be significant predictors of climate-related actions. This study hypothesized that social media use and political ideology predict support for greenhouse gas regulations through climate change belief. The hypothesized model was tested by SEM analyses using data from the American National Election Studies (ANES) 2020 Time Series, with a sample of U.S. citizens aged 18 or older living in the United States ($N = 8,280$). Findings reveal that **(1)** the hypothesized model provided an excellent fit to the data; **(2)** no form of social media uses (Facebook, Twitter, and Reddit) is associated with belief in climate change; **(3)** more liberal political ideology and stronger climate change belief predict stronger support for greenhouse gas regulations; **(4)** stronger climate change belief mediates the relationship between more liberal political ideology and stronger support for greenhouse gas regulations. Findings suggest that both political ideology and climate change belief are important psychological variables that should be the focus of public discourse about climate change. Climate change belief is a more proximal predictor of support for policy.

Climate change is driving an increase in extreme weather events worldwide, including heatwaves, cold spells, floods, and wildfires, leading to significant human suffering, fatalities, worsening health conditions, and large-scale displacement (Earthjustice, 2023; EPA, 2023). The World Health Organization (2023) estimates that climate change will contribute to approximately 250,000 deaths annually between 2030 and 2050 due to health issues including malnutrition, malaria, diarrhea, and heat stress. A systematic review by Mora et al. (2022) further shows that 58% of infectious diseases affecting humans have been exacerbated by climate change. Additionally, data provided by the Internal Displacement Monitoring Centre (IDMC),) (2021) reported that, in 2019 alone, nearly 25 million people across 140 countries were newly displaced due to climate change-induced disasters.

The scale of these impacts highlights the urgent need to address the root causes of climate change. Human-generated greenhouse gas emissions remain the primary driver of rising global temperatures since the mid-twentieth century (EPA, 2023). Therefore, reducing these emissions is essential for climate change mitigation. Government regulations are a critical approach for achieving such reductions (Hoppe et al., 2023). However, public support for government regulations often depends on individuals' political ideology (Hess et al., 2016) and climate change belief (Krosnick et al., 2006). Climate change belief refers to the belief that climate change is real, serious, and personally important (Albright & Crow, 2019; Leiserowitz et al., 2023); it is often shaped by individuals' media exposure (Diehl et al., 2021).

The U.S. stands as the world's second-largest emitter of greenhouse gases (Larsen et al., 2021). Thus, actions taken by both the U.S. government and the American people have global significance for climate change mitigation. Social media platforms, now central channels for information dissemination (Stasi,

2019), are key spaces for daily discussion and debate about climate change (Pearce et al., 2019). Such exposure may significantly shape climate change beliefs. The present study aims to investigate whether Americans' social media use predicts their climate change beliefs. Another aim of this study is to examine the roles of political ideology and climate change belief in predicting support for greenhouse emissions regulation.

Theoretical framework: social cognition models

Social cognition models are a class of theoretical frameworks that explain how individuals form beliefs and translate those beliefs into behavioral intentions and actions (Armitage & Conner, 2000; Sutton, 2001). These models emphasize that cognitive beliefs—formed through personal experience, social interaction, or media exposure—serve as proximal predictors of behavioral outcomes, whereas individual characteristics (such as political ideology or media-use patterns) function as distal antecedents that shape behavior indirectly through beliefs (Armitage & Conner, 2000; Sutton, 2001). The present study draws on social cognition models as a general conceptual framework for organizing relationships among distal antecedents, beliefs, and outcomes, rather than as formally specified models subject to direct empirical testing.

Key models in this tradition include the Health Belief Model (HBM) and Social Cognitive Theory (SCT). The HBM focuses on individual cognitive appraisals (e.g. perceived threat, benefits, and barriers) as drivers of behavioral engagement (Skinner et al., 2015). SCT, on the other hand, emphasizes the reciprocal interactions among cognition, environmental inputs (e.g. media exposure), and behavioral outcomes (Bandura, 2001). Both models have been widely applied to research on media effects and environmental communication (Chen & Liu, 2021, 2023; Vu et al., 2023; Weems & Subramaniam, 2017). For example, Weems and Subramaniam (2017) examined factors (e.g. political ideology, media coverage) influencing public opinions on climate change in the U.S., arguing for the HBM's relevance in explaining micro-level climate attitudes. Similarly, Vu et al. (2023) drew on SCT to examine how various forms of media exposure and political ideology influence pro-environmental behavior across European nations. Collectively, these studies demonstrate the utility of social cognition perspectives for understanding environmental issues—particularly in contexts where media and sociopolitical inputs play important roles—even when specific models are *not* explicitly tested.

This framework aligns with media-effects research conceptualizing beliefs as mediators that link media exposure to behavioral outcomes (Chen & Liu, 2023; Vrselja et al., 2024), as well as with political psychology research showing that political ideology shapes climate-related decisions and behaviors indirectly through belief systems (Chan & Faria, 2022; Jagers et al., 2024).

At least two notable gaps remain in the literature related to the application of social cognition models to environmental belief and behavior. First, most applications of social cognition models in environmental domains focus on self-protective or impact-reducing behaviors, such as mask-wearing during smog events (Chen & Liu, 2023) or purchasing fuel-efficient vehicles (Kim & Cooke, 2021). Much less work has examined policy support, a crucial element for legitimizing and implementing large-scale pro-environmental policies (Zhou et al., 2022). Accordingly, this study extends the social cognition framework by focusing on policy support—an outcome whose key predictors are still being identified.

Second, while prior research has examined how beliefs predict climate- or environment-relevant behaviors (e.g. Chen & Liu, 2023) and how media exposure predicts beliefs (e.g. Chen & Liu, 2021), few studies have explicitly modeled climate change belief as a mediating mechanism between distal variables—such as media use or political ideology—and policy support. Given the collective nature of the causes, consequences, and solutions of climate change, identifying the theoretical pathways that connect distal factors to policy-relevant outcomes is essential. Accordingly, this study applies the social cognition framework to examine how media and sociopolitical factors shape public support for climate policy through climate change belief, which is conceptualized here as a key mediating mechanism.

In sum, the present study draws on and extends the social cognition framework by applying it to an underexplored collective outcome—climate policy support—and by specifying climate change belief as a central mediating mechanism. The following sections review empirical evidence and introduce the hypothesized model guiding the analysis.

Social cognition variables: social media use and political ideology

In the present study, social media use and political ideology were selected as social cognition variables predicting support for greenhouse emissions regulation based on both theoretical considerations and accumulated empirical evidence. From the perspective of the social cognition framework, social media use and political ideology can be conceptualized as distal sociopolitical inputs that shape individuals' cognitive beliefs and, ultimately, behavioral outcomes (Sutton, 2001). As such, they fall within the category of social cognition variables emphasized by the framework.

Prior empirical research provides strong support for the relevance of these two variables. Social media use has been found to be associated with climate change beliefs (Diehl et al., 2021), which have been identified as a direct predictor of climate policy support (Krosnick et al., 2006). In addition, according to the 2025 Reuters Institute Digital News Report, social media has become the primary source of news for Americans, surpassing traditional media (Newman et al., 2025). Given the central role of social media in the contemporary information environment, the present study focuses on social media use as a particularly salient environmental input for belief formation, rather than including multiple forms of media use.

Operationalization of social media use

In the present study, social media use is conceptualized as individuals' overall level of engagement with social media platforms. Accordingly, social media use is operationalized as the frequency of usage of social media platforms (e.g. Facebook, Twitter, Reddit). Although alternative operationalizations are possible, this approach closely reflects the study's conceptualization and has been widely adopted in prior research examining the effects of social media use (e.g. Barrera-Verdugo, 2023; Čábelková et al., 2022).

Given this operationalization, the present study relies on the social cognition framework to examine how individuals' frequency of social media use shapes climate policy support indirectly through climate change beliefs. Unlike theoretical frameworks focusing primarily on the technological or structural characteristics of media systems (e.g. affordance-based approaches; Boyd, 2010), which center on media features rather than user-level psychological processes, social cognition models place users' experiences and cognitive processes at the center of theoretical explanation. Specifically, these models emphasize cognitive beliefs as a central mediating mechanism through which environmental inputs (e.g. media exposure) shape behavioral outcomes. As such, the social cognition framework is both appropriate and sufficient for addressing the research questions and hypotheses of the present study.

Previous studies have consistently demonstrated that political identity has greater explanatory power than many other social cognition–related predictors in explaining climate change belief (Hornsey et al., 2016). Considering that climate change belief is a well-established proximal predictor of climate policy support (Krosnick et al., 2006), it is therefore reasonable to expect political ideology to serve as a key distal predictor of policy support through its influence on climate change belief.

In summary, guided by the social cognition framework and supported by robust empirical evidence, social media use and political ideology were selected as central social cognition predictors in the present study. Although other social cognition-related variables—such as subjective knowledge or cultural values—may also influence climate change belief or policy support, these variables generally exhibit weaker and less-consistent predictive power than political identity (Hornsey et al., 2016). To maintain theoretical parsimony and analytic focus, and because political ideology was already included as a central distal predictor of policy support, additional social cognition variables were not incorporated into the present analysis.

Social media use and climate change beliefs

Previous research has examined the relationship between frequency of social media usage and climate- or environment-related beliefs; however, findings remain mixed. Existing studies suggest that usage frequency may be positively, negatively, or not significantly associated with individuals' climate- and environment-related beliefs and perceptions. For example, Barrera-Verdugo (2023) reported a positive association between the frequency of social media exposure and environmental concern among Chilean

students. In contrast, other studies have identified null or negative associations. Čábelková et al. (2022) found that frequency of exposure to social media platforms—including Facebook, Twitter, and Instagram—was *not* significantly associated with attitudes toward climate change among respondents in the Czech Republic. Diehl et al. (2021) further found that, across multiple countries, more frequent use of social media for news consumption was associated with weaker pro-social climate beliefs, including the belief that human activity is causing global climate change. Additionally, there is evidence that frequent social media use reduces attention to the climate crisis and may diminish optimism about confronting it (Van der Ven et al., 2024). Taken together, these inconsistent findings suggest the need for further examination of how usage frequency of social media relates to climate change beliefs.

One explanation for these mixed findings is that different studies have examined different social media platforms, which vary substantially in user demographics, technological affordances, and communicative functions (Fleeman, 2025; Park et al., 2023). Such platform-level differences are likely to shape climate beliefs in distinct ways. The present study disaggregates social media platforms, rather than treating social media usage frequency as a single, unified construct for two reasons.

First, according to medium theory articulated by Marshall McLuhan, 'the medium is the message', suggesting that the unique characteristics of a communication medium shape how individuals perceive and interact with the world, independent of its content (McLuhan & Fiore, 1967). Following this logic, media with different characteristics are likely to influence users' beliefs and behaviors in different ways. Communication research demonstrates that social media platforms vary substantially in their affordances, algorithms, and community norms (Fleeman, 2025; Park et al., 2023). Consequently, usage frequency on different platforms may be differentially associated with climate change beliefs, even when users encounter broadly similar topics across platforms.

Second, empirical research also supports the need to examine platforms separately. Cinelli et al. (2021) documented how structural and algorithmic differences among platforms such as Facebook, Twitter, and Reddit influence information diffusion and echo-chamber formation. In the climate communication context, Shahbazi et al. (2025) independently analyzed Facebook, Twitter, and Reddit to detect climate misinformation, recognizing their distinct communicative dynamics. Together, these studies underscore the analytical value of treating usage frequency of each platform as a distinct predictor when assessing social media effects.

In sum, treating usage frequencies across different social media platforms as separate variables is both theoretically and empirically warranted. The present study focuses on three platforms—Facebook, Twitter (X), and Reddit—as they are especially salient for political and climate communication (Pearce et al., 2019; Treen et al., 2022). It aims to evaluate whether usage frequency of these platforms is differentially associated with climate change beliefs. Accordingly, this leads to the following research question:

> RQ1: To what extent does usage frequency of (A) Facebook, (B) Twitter, and (C) Reddit predict climate change beliefs?

Climate change beliefs and support for greenhouse emission regulation

Prior studies have indicated a significant correlation between individuals' beliefs regarding climate change and their support for climate-related policies. For instance, Krosnick et al. (2006) discovered that four fundamental climate change beliefs (that climate change is real, it is caused by human beings, it is serious, and it can be solved) serve as important predictors of support for climate policies. Ding et al. (2011) observed that individuals who have the misconception that scientists hold conflicting views on global warming tend to exhibit greater uncertainty about the occurrence of global warming and express reduced support for climate policies. Unsworth and Fielding (2014) study suggested that, among Australians who make their political identity salient, a diminished belief in an anthropogenic cause of climate change is associated with decreased support for government policies aimed at addressing climate change.

Kammermann and Dermont (2018) reported that heightened skepticism toward climate change among the general Swiss population produced a negative effect on their level of support for clean energy policies. Hornsey et al. (2016) conducted meta-analyses examining factors and consequences of

climate change beliefs; their findings suggested that these beliefs have only a small to moderate influence on individuals' willingness to engage in climate-friendly actions.

These findings suggest a necessity for additional research to explore how climate change beliefs might impact support for climate change policies. The present study focuses on regulatory policy for greenhouse gas emissions, the primary factor contributing to climate change (EPA, 2023). To address this necessity, the following hypothesis is posed:

> H1: Stronger climate change belief is associated with stronger support for greenhouse emissions regulation.

Political ideology predicts climate change beliefs and policy support

Political ideology is often characterized as a spectrum ranging from liberal to conservative (Conover & Feldman, 1981), and it plays a central role in shaping climate change beliefs (Johnson, 2017). The ideological divide over climate change opinions has been particularly pronounced in the United States (Dunlap et al., 2016). According to Hornsey et al. (2016) meta-analysis, political orientation is a stronger predictor of climate change beliefs than many intuitively-appealing variables, such as education and sex.

Previous studies have demonstrated that individuals with more liberal political orientations are more likely than conservatives to believe in the occurrence and anthropogenic causes of climate change, as well as to support mitigation policies (Goldberg et al., 2020; Jessani & Harris, 2018). Additionally, Chan and Faria (2022) found that conservative ideology was associated with fewer climate change–mitigating behaviors, even after controlling for climate change beliefs. Together, these findings suggest that political ideology uniquely influences both climate change beliefs and climate-related behaviors, including support for mitigation policies.

A major limitation of previous research is that different types of environmental policies are often not distinguished (Jagers et al., 2018). Addressing this gap, Kim and Shin (2017) examined support for pro-environmental tax policies among American and Korean college students and found that political ideology significantly predicted policy support among American students, even after accounting for belief-related variables such as environmental concern and perceived severity. Building on the previous literature, the present study examines the role of political ideology in shaping climate change beliefs and support for greenhouse emissions regulation. Accordingly, we propose the following hypotheses:

> H2: More liberal political ideology is associated with stronger climate change belief.

> H3: More liberal political ideology is associated with stronger support for greenhouse emissions regulation.

The mediating role of climate change beliefs

Social cognition models, including the Health Belief Model (HBM; Skinner et al., 2015) and Social Cognitive Theory (SCT; Bandura, 2001), posit that beliefs are the proximal factors predicting behaviors, while other factors, such as media use, are distal predictors that indirectly influence behaviors through their effects on beliefs (Armitage & Conner, 2000; Sutton, 2001). In light of this theoretical proposition, it is likely that Americans' social media use influences their climate change beliefs, which subsequently affect their support for greenhouse gas emission regulations. Unfortunately, no study has yet tested this theoretical mechanism, although these models have been tested in a variety of environmental contexts, such as responses to environmental pollution (e.g. Chen & Liu, 2021, 2023). Thus, the following research question is posed:

> RQ2: Does climate change belief mediate the relationship between social media use and support for greenhouse emissions regulation?

Although there is evidence for the influence of political ideology on support for climate policies (Kim & Shin, 2017; Van Boven et al., 2018), it's not clear whether such influence is mediated by climate change belief. As belief is assumed to be a proximal predictor of climate actions, the present study

explores whether climate change belief serves as a mediator in the relationship between political ideology and support for greenhouse emissions regulation. Thus, the following research question is posed:

> RQ3: Does climate change belief mediate the relationship between political ideology and support for greenhouse emission regulation?

Figure 1 depicts the hypothesized model, outlining the research questions and hypotheses.

Method

This study used the dataset of the American National Election Studies (ANES) 2020 Time Series data file (American National Election Studies (ANES), 2021). The ANES provide data concerning various aspects of the U.S. population, including their socio-demographic profiles, social and political beliefs, viewpoints on public policy issues, and involvement in political activities. The 2020 data file was chosen because it represents the most recent dataset in this series and includes measures assessing key constructs in the present study. Information related to IRB approval and informed consent of participants is available in the User Guide and Codebook document (American National Election Studies (ANES), 2021).

Measures

Social media use

The present study does not treat social media use as a unidimensional construct, but rather as a set of theoretically-distinct communication variables. As discussed in the literature review, each social media platform constitutes a unique form of engagement, shaped by platform-specific characteristics (Fleeman, 2025; Park et al., 2023). In line with RQ1, the present study measured use of Facebook, Twitter (now X), and Reddit as separate constructs. Specifically, each platform's use was assessed with a single item: (1) 'How often do you use Facebook?' (2) 'How often do you use Twitter?' and (3) 'How often do you use Reddit?' Response options ranged from 1 = 'Many times every day' to 7 = 'Less than once a month'. Items were reverse coded so that higher values reflect more frequent use. This disaggregated measurement approach allows for the examination of platform-specific associations with climate change beliefs.

Political ideology

Political ideology was measured by one item: Where would you place yourself on this scale? Responses ranged from 1=Extremely liberal to 7=Extremely conservative. Items were *reverse* coded so that higher values indicate *more liberal* political ideology.

Climate change belief

Climate change belief was measured by two items: (1) How much, if at all, do you think climate change is currently affecting severe weather events or temperature patterns in the United States? Responses
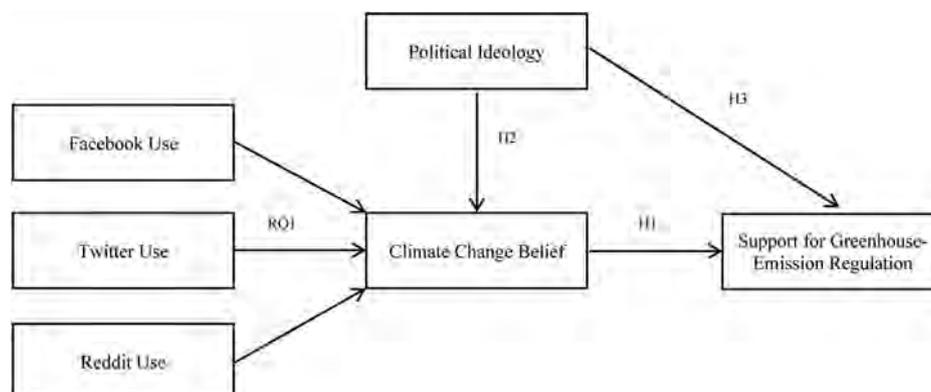

Figure 1. The hypothesized model.

ranged from 1 = Not at all to 7 = A great deal. (2) How important is the issue of climate change to you personally? Responses ranged from 1 = Not at all important to 7 = Extremely important. These two items were averaged to create the climate change belief variable with a good reliability (Cronbach's Alpha = .894). Higher values indicate stronger belief. As stated in the literature review section, climate change belief was conceptualized as the belief that climate change is happening, that it is severe, and that it is personally important. This conceptualization is based on a recent report by Leiserowitz et al. (2023) on beliefs and attitudes about climate change among the American public. The operationalization of climate change belief reflects this conceptualization, with the first item assessing beliefs about the existence and severity of climate change, and the second assessing personal relevance.

Support for regulation of greenhouse emissions

Support for regulation of greenhouse emissions was measured by the following item: Do you favor or oppose increased regulation on greenhouse emissions? Responses were: 1 = Favor a great deal; 2 = Favor a moderate amount; 3 = Favor a little; 4 = Neither favor nor oppose; 5 = Oppose a little; 6 = Oppose a moderate amount; 7 = Oppose a great deal. Items were reverse coded so that higher values indicate higher support for regulation. As stated in the literature review section, the primary factor contributing to climate change has been the emission of greenhouse gases (EPA, 2023) and government regulations are vital to decrease greenhouse emissions (Hoppe et al., 2023). Thus, the current study used support for regulation of greenhouse emissions to assess a potential behavioral response resulting from climate change belief.

Analysis

To test the hypothesized model, three R packages were used: lavaan, survey, and lavaan.survey. Lavaan is a free, open-source package that fits a variety of latent variable models, including Structural Equation Modeling (SEM; Rosseel, 2012). The survey package can account for complex survey designs, including stratification, clustering, and sampling weights (Lumley, 2004). Following the user guide of the American National Election Studies (ANES) (2021) Time Series Study, the appropriate stratum variable, cluster variable, and weight variable were specified through the survey package. The lavaan.survey package leverages existing code in the lavaan and survey packages and can be used for SEM analyses of stratified, clustered, and weighted data (Oberski, 2014). These three packages were used together to conduct SEM analyses of the hypothesized model.

Results

Participants

Participants are 8,280 U.S. citizens aged 18 or older living in the 50 US states or the District of Columbia. Demographics of participants (unweighted) are presented in Table 1.

Model testing

SEM analyses after accounting for the survey deign found that Chi-square was non-significant: χ^2/df = .691/3 = .230, p = .875; CFI = 1.000, TLI = 1.000, and RMSEA = .000. These results indicated that the hypothesized model provided an excellent fit to the data (Kline, 2016; McDonald & Ho, 2002). The model accounted for 58.1% of the variance in Support for regulation on greenhouse emissions (R^2 = .581).

SEM analyses also found that Facebook use (β = .004, p = .924), Twitter use (β = .019, p = .666), and Reddit use (β = .059, p = .110) were not significantly associated with climate change belief. Thus, RQ1 was answered: use frequency of different social media platforms including Facebook, Twitter, and Reddit did *not* predict climate change belief.

Stronger climate change belief was associated with stronger support for greenhouse emissions regulation (β = .553, p < .001). Thus, H1 was supported.

Table 1. Demographics of participants (based on the unweighted sample).

Age		Sex	%	Ethnicity	%	Education	%	marital status	%
Mean	48.37	−9. Refused	0.7	−9. Refused	0.9	−9. Refused	0.2	−9. Refused	0.5
SD	17.68	1. Male	47.8	−8. Don't know	0.1	−8. Don't know	0.0	−8. Don't know	0.0
Min	18.00	2. Female	51.5	1. White, non-Hispanic	64.9	1. Less than high school	7.3	1. Married: spouse present	53.0
Max	80.00	Total	100.0	2. Black, non-Hispanic	11.3	2. High school graduate	26.2	2. Married: spouse absent	0.1
				3. Hispanic	13.4	3. Some college but no degree	18.1	3. Widowed	5.0
				4. Asian or Native Hawaiian/other Pacific Islander	3.9	4. Associate degree in college - occupational/ vocational	5.9	4. Divorced	11.4
				5. Native American/ Alaska Native	2.0	5. Associate degree in college - academic	4.8	5. Separated	2.2
				6. Multiple races, non-Hispanic	3.4	6. Bachelor's degree (e.g. BA, AB, BS)	23.0	6. Never married	27.9
				Total	100.0	7. Master's degree (e.g. MA, MS, MEng, MEd, MSW, MBA)	9.8	Total	100.0
						8. Professional school degree (e.g. MD, DDS) /Doctoral degree (e.g. PHD, EDD)	3.3		
						95. Other {SPECIFY}	1.4		
						Total	100.0		

More liberal political ideology was significantly associated with stronger climate change belief (β = .681, p < .001) and stronger support for greenhouse emissions regulation (β = .267, p < .001). Thus, H2 and H3 were both supported.

No form of social media use was associated with climate change belief (the hypothesized mediator). Thus, RQ2 was answered: climate change belief did *not* mediate the relationship between social media use and support for greenhouse emissions regulation.

Mediation analyses revealed that there was a significant indirect effect of political ideology on support for greenhouse emissions regulation through climate change belief (B =.409, SE = .042, β = .377, p < .001). Thus, RQ3 was answered: climate change belief partially mediated the relationship between political ideology and support for greenhouse emissions regulation. Figure 2 presents standard path coefficients of the hypothesized model.

Discussion

This study examined the impacts of social media use and political ideology on climate change beliefs and support for greenhouse gas emission regulations, as well as testing climate change belief as a mediating mechanism among the American population. The influence of social media use was found to be non-significant. A more liberal political ideology is associated with a stronger climate change belief. Both liberal political ideology and climate change belief positively predict support for greenhouse gas emission regulations, with climate change belief being the stronger predictor (its effect size [β = .553] is twice that of political ideology [β = .267]). The impact of political ideology on support for greenhouse gas emission regulations is mediated by climate change belief. Interpretations and implications of these findings are discussed below.

Social media use

The present study found that, after accounting for political ideology, use of each of the three social media platforms (Facebook, Twitter, and Reddit) was not significantly associated with climate change
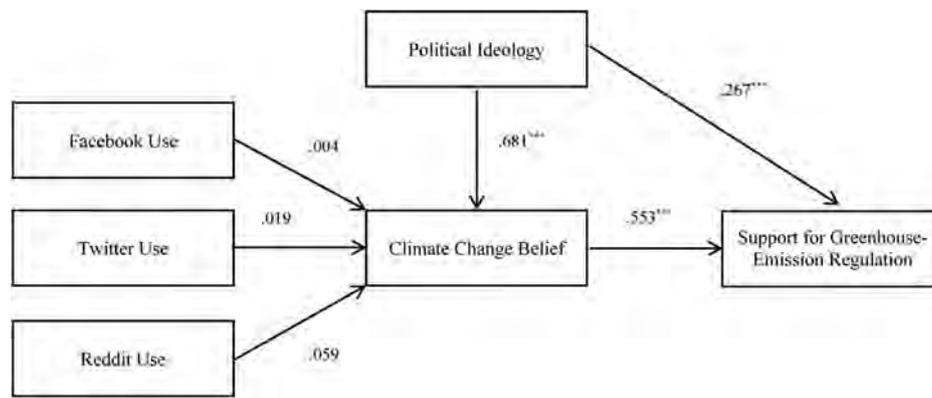
Figure 2. Standard path coefficients of the hypothesized model.
Note. ***$p < .001$.

belief. This result contributes to ongoing debates about whether social media ultimately facilitates or impedes climate change engagement (Gómez-Casillas & Gómez Márquez, 2023; Van der Ven et al., 2024). Several plausible explanations may account for the absence of an effect across all three platforms.

One possibility is that all three social media platforms can simultaneously function as channels for both scientifically-grounded climate information and climate misinformation. Environmental activists frequently use social media platforms to promote awareness and mobilize climate action (Vu et al., 2021), while fossil fuel–aligned actors deploy the same platforms to spread doubt, denial, and conspiracy narratives (Hopke, 2021; Turrentine, 2022). As a result, users within the same platform may be exposed to both accurate and inaccurate information about climate change, producing a net effect in which opposing messages offset one another. This dynamic may operate similarly across Facebook, Twitter, and Reddit, thereby limiting the emergence of platform-specific effects. Future research would benefit from examining the specific types and sources of climate-related content to which users are exposed on each platform.

A second explanation shifts the focus from message content to patterns of information consumption. Users with strong political convictions often cluster into ideologically-homogeneous communities—a phenomenon observed on all three platforms (Cinelli et al., 2021). Such communities foster mutual reinforcement of shared beliefs (i.e. echo-chamber effects; Cinelli et al., 2021) and are often reinforced by algorithmic systems that preferentially deliver belief-consistent content (Slater et al., 2020). Because these dynamics may occur among both pro–climate and climate-skeptical communities across platforms, they may contribute to the non-significant aggregate effects observed for each platform in the present study. Future research could address this possibility by examining heterogeneous effects across user subgroups within the same platform, rather than focusing exclusively on platform-level differences.

Climate change belief predicted by political ideology

The present study found that belief in climate change among Americans is directly influenced by political ideology. This finding aligns with previous studies, which have reported that people who identify with conservative ideologies are more likely to be skeptical of climate change, often viewing it as exaggerated or a hoax, and that those with liberal ideologies tend to acknowledge the scientific consensus, accepting that it is real and has severe consequences (Goldberg et al., 2020; Jessani & Harris, 2018). A unique aspect of the current study is its examination of political ideology and social media use together. Hornsey et al. (2016) meta-analyses reported that political orientation is a stronger predictor of climate change beliefs than many other variables, such as education and sex. However, their analyses did not include media use variables. The present study addresses this gap by revealing that, when both political ideology and social media use are considered, only political ideology has a significant impact on shaping climate change belief, while the influence of social media use becomes negligible. Thus, the ideological divide among Americans, rather than social media use, appears to drive differences in climate change beliefs.

Support for greenhouse mission regulation predicted by both political ideology and climate change belief

The present study found that both political ideology and climate change belief are significant predictors of support for greenhouse emissions regulation. Previous studies often treated either political ideology or climate change belief as the major predictor of policy support, using the other as a control variable (e.g. Chan & Faria, 2022; Fleming et al., 2021). The current findings suggest that the ideological divide remains a critical factor in shaping public opinion on greenhouse-emission policies in the U.S. Additionally, belief in climate change itself is a crucial predictor of support for these regulations, with a much stronger impact than political ideology. Therefore, it appears more appropriate to consider both political ideology and climate change belief as major determinants of policy support. This approach offers a more comprehensive understanding of the factors influencing public support for environmental regulation. By considering these two variables together, researchers and policymakers can better predict and address the complexities of public support for greenhouse emissions regulations, incorporating perspectives from both political science and cognitive psychology.

Theoretical implications

The findings of this study carry several theoretical implications. First, the non-significant effect of social media use frequency on climate change belief across the three platforms calls into question claims that social media platforms inherently undermine climate change mitigation efforts (Van der Ven et al., 2024). Instead, this pattern suggests that pre-existing ideological orientations may exert a stronger influence on climate change belief formation than the frequency of social media use itself, regardless of platform. This interpretation aligns with research indicating that Americans' climate-related attitudes are stable and predominantly shaped by long-standing ideological predispositions (Palm et al., 2017). Accordingly, despite meaningful differences in platform affordances and cultures, Americans' climate change beliefs may remain more firmly anchored in political ideology than in how frequently they use a particular social media platform.

Second, the finding that climate change belief mediates the relationship between political ideology and support for greenhouse gas emission regulations offers empirical support for the core tenets of both the Health Belief Model (HBM; Skinner et al., 2015) and Social Cognitive Theory (SCT; Bandura, 2001). Both theories emphasize the crucial role of beliefs as proximal determinants of both behavioral intentions and actions (e.g. support for policies), with other factors exerting indirect influence on intentions and actions through these beliefs (Sutton, 2001). In the context of the present study, political ideology not only directly influences support for regulations, but also appears to have an indirect effect by shaping beliefs about climate change. This aligns with the HBM's emphasis on the predicting roles of perceived susceptibility and severity (Skinner et al., 2015). For example, individuals with a more conservative ideology, often exposed to information downplaying the threats of climate change, may have lower perceived susceptibility and severity of climate change, and thus see less need for regulatory action. Conversely, those with a more liberal ideology, often exposed to information highlighting the threats of climate change, may have higher perceived susceptibility and severity of climate change, leading to their greater support for regulations.

Third, this finding also aligns with SCT's emphasis on the interplay of personal, behavioral, and environmental factors (Bandura, 2001). Political ideology can influence the information individuals are exposed to (e.g. through selective media consumption and social networks). This exposure then shapes personal factors, such as beliefs about climate change, which in turn influence behavioral intentions, such as support for emission regulations. This reflects SCT's tenet of reciprocal determinism (Bandura, 2001). In essence, the mediating role of climate change belief underscores the importance of addressing Americans' belief systems when attempting to influence their support for climate-related policies, as these beliefs serve as a crucial link between ideological orientations and specific behavioral intentions.

Practical implications

The findings of this study hold several practical implications for policymakers and environmental advocates seeking to enhance public support for greenhouse emissions regulation in the United States. *Firstly,*

the non-significant relationship between social media use and climate change belief suggests that social media campaigns alone may be insufficient to influence public perceptions and beliefs about climate change. Given the potential limitations of using social media as a tool to shape climate beliefs, efforts to enhance public support for climate policies may need to address deeper ideological and belief factors. *Secondly,* the robust associations of political ideology with climate change belief and policy support underscore the need for designing messages that resonate across the political spectrum. Messages should be crafted to appeal to both the left and the right, emphasizing the urgency of actions to mitigate climate change. *Finally,* the mediating role of climate change belief in the relationship between political ideology and support for regulation indicates that climate change belief may represent an important pathway to policy support. Specifically, an individual's ideological orientation appears to be a key predictor of belief in climate change, and this belief is associated with heightened support for policies aimed at reducing greenhouse gas emissions. Therefore, intervention efforts to increase public support for greenhouse emissions regulations may aim to bridge ideological divides and boost cognitive engagement with climate change issues, emphasizing the reality and personal relevance of climate change.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, all measures relied on self-report, which may be subject to social desirability bias. However, since the questions used in this study were not sensitive, it is probable that most participants provided honest responses.

Second, the present study measured social media use solely by self-reported frequency of usage for three social media platforms: Facebook, Twitter, and Reddit. While this platform-specific approach represents an improvement over previous studies that used an aggregated measure of social media use (e.g. Čábelková et al., 2022; Chen & Liu, 2023; Vu et al., 2023), the current items still fall short in capturing the full complexity of social media engagement. Specifically, the ANES dataset lacks measures regarding (a) the purpose of social media use (e.g. news consumption, social interaction, information sharing), (b) the topical content encountered (e.g. climate change-related content), and (c) the mode of engagement (e.g. passive browsing vs. active posting), all of which are potential dimensions influencing political and environmental beliefs (Diehl et al., 2021; Gómez-Casillas & Gómez Márquez, 2023; Tyson et al., 2021). Thus, the observed non-significant relationships between social media use and climate change belief in the hypothesized model should be interpreted with caution. It is possible that these null effects are an artifact of measurement limitations rather than a true absence of influence. These null effects may simply suggest that general frequency of use, in isolation, is not a strong predictor of climate change belief across the general population. Future research using more refined instruments that assess users' motivations, topical exposure, and engagement style is needed to disentangle the nuanced roles of social media use in shaping climate beliefs and policy support.

Third, for the sake of parsimony, the present study examined political ideology as a direct predictor of climate change belief. However, it is plausible that higher levels of social media use are associated with stronger climate change beliefs among users with liberal political ideologies and weaker climate change beliefs among those with conservative political ideologies (Diehl et al., 2021). Future research may want to explore the role of political ideology as a moderator in the relationship between general social media use and climate change beliefs.

Fourth, studies suggest social media platforms may foster echo chambers, defined as 'environments in which the opinion, political leaning, or belief of users about a topic gets reinforced due to repeated interactions with peers or sources having similar tendencies and attitudes' (Cinelli et al., 2021, p. 1). Furthermore, according to the Reinforcing Spirals Model (Slater et al., 2020), social media have made selective exposure to aligned information increasingly easy, potentially leading to polarized or extreme views. However, examining these phenomena requires data on the specific information to which participants were exposed, as well as repeated measures over time, which are unavailable in the ANES (2021) dataset. Exploring these phenomena represents a potentially fruitful avenue for future research.

Fifth, although the present study used a large national sample taken in 2020, it should be noted that the sample consisted of 64.9% White, non-Hispanic participants, while the 2020 U.S. census data reported

that 57.8% of the U.S. population was White, non-Hispanic (U.S. Census Bureau, 2020). Thus, care should be taken when attempting to generalize these findings, as there was an oversample of the White population.

Lastly, the data employed in the present study are cross-sectional in nature. Although cross-sectional designs can provide meaningful insights—particularly when the proposed model is grounded in robust theoretical frameworks and supported by prior empirical evidence (Shrout, 2011), as is the case in the current study—they inherently limit the ability to draw definitive causal inferences. Therefore, the present findings should be interpreted with appropriate caution regarding causality. Future research should consider longitudinal panel designs—for instance, by measuring social media use and ideology at Time 1, climate change belief at Time 2, and policy support at Time 3—to better assess causal mediations through cross-lagged analysis.

Conclusion

Despite the limitations mentioned, the present study stands out as one of the very few that systematically examines the impacts of social media use, political ideology, and climate change beliefs on support for greenhouse gas emission regulations. The present study contributes to the climate change communication literature by revealing that frequency of social media use may actually have little influence on climate change beliefs or support for climate policy. While this finding may seem disappointing, the good news is that frequent social media use does not lead to weaker belief in climate change or less support for climate policy. The current study also underscores the importance of considering both political ideology and climate change belief as significant predictors of support for greenhouse gas emission regulation. There is an urgent need for a multidisciplinary approach to understanding and addressing public support for climate policy. This approach needs to involve collaborations among researchers and practitioners in media studies, political science, cognitive psychology, and climate science. Finally, the current study reveals that climate change belief acts as a theoretical mechanism linking political ideology to policy support. This suggests that intervention efforts should aim to bridge ideological divides and foster stronger climate change belief, emphasizing the reality and personal relevance of climate change. Future research should continue to explore the influences of other communication, political, and psychological factors to develop effective strategies for fostering public support for climate policies.

Disclosure statement

Author contributions

CRediT: **Yixin Chen**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Writing – original draft, Writing – review & editing.

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About the author

Yixin Chen is an Associate Professor in the Department of Communication Studies at Sam Houston State University in the United States. She holds a master's degree from the University of Texas at El Paso and a Ph.D. from University at Buffalo, the State University of New York, both in Communication.
As a health and interpersonal communication researcher, Dr. Chen studies how interpersonal and mediated communication processes influence individuals' cognition and emotion. She also examines how cognition, emotion, and communication technology impact decision-making, health/risk behaviors, and well-being. Her work has been published in communication, psychology, public health, education, and social science journals.

ORCID

Yixin Chen http://orcid.org/0000-0001-7330-2366

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are publicly available from the ANES 2020 Time Series Study, which can be accessed at https://electionstudies.org/data-center/2020-time-series-study/.

References

Albright, E. A., & Crow, D. (2019). Beliefs about climate change in the aftermath of extreme flooding. *Climatic Change*, *155*(1), 1–17. https://doi.org/10.1007/s10584-019-02461-2

American National Election Studies (ANES). (2021). ANES 2020 Time Series Study Full Release [dataset and documentation] February 10, 2022 version. https://electionstudies.org/data-center/2020-time-series-study/

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology & Health*, *15*(2), 173–189. https://doi.org/10.1080/08870440008400299

Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, *3*(3), 265–299. https://doi.org/10.1207/S1532785XMEP0303_03

Barrera-Verdugo, G. (2023). The link between social media exposure and students' moral reasoning and environmental concern: A generational analysis in Chile. *Cogent Social Sciences*, *9*(1), 1-26. https://doi.org/10.1080/23311886.2023.2167570

Boyd, D. (2010). Social network sites as networked publics: Affordances, dynamics, and implications. In Z. Papacharissi (Ed.), *Networked self: Identity, community, and culture on social network sites* (pp. 39–58). Routledge.

Čábelková, I., Smutka, L., & Strielkowski, W. (2022). Public support for sustainable development and environmental policy: A case of the Czech Republic. *Sustainable Development*, *30*(1), 110–126. https://doi.org/10.1002/sd.2232

Chan, E. Y., & Faria, A. A. (2022). Political ideology and climate change-mitigating behaviors: Insights from fixed world beliefs. *Global Environmental Change*, *72*, 102440. https://doi.org/10.1016/j.gloenvcha.2021.102440

Chen, Y., & Liu, X. (2021). How do environmental news and the Under the Dome documentary influence air-pollution knowledge and risk perception among Beijing residents? *Sage Open*, *11*(2), 215824402110157. https://doi.org/10.1177/21582440211015712

Chen, Y., & Liu, X. (2023). Determinants of Beijing residents' intentions to take protective behaviors against smog: An application of the health belief model. *Health Communication*, *38*(3), 447–459. https://doi.org/10.1080/10410236.2021.1956036

Cinelli, M., De Francisci Morales, G., Galeazzi, A., Quattrociocchi, W., & Starnini, M. (2021). The echo chamber effect on social media. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(9), e2023301118. https://doi.org/10.1073/pnas.2023301118

Conover, P. J., & Feldman, S. (1981). The origins and meaning of liberal/Conservative self-identifications. *American Journal of Political Science*, *25*(4), 617. https://doi.org/10.2307/2110756

Diehl, T., Huber, B., Gil de Zúñiga, H., & Liu, J. (2021). Social media and beliefs about climate change: A cross-national analysis of news use, Political Ideology, and Trust in Science. *International Journal of Public Opinion Research*, *33*(2), 197–213. https://doi.org/10.1093/ijpor/edz040

Ding, D., Maibach, E. W., Zhao, X., Roser-Renouf, C., & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change*, *1*(9), 462–466. https://doi.org/10.1038/nclimate1295

Dunlap, R. E., McCright, A. M., & Yarosh, J. H. (2016). The political divide on climate change: Partisan polarization widens in the U.S. *Environment: Science and Policy for Sustainable Development*, *58*(5), 4–23. https://doi.org/10.1080/00139157.2016.1208995

Earthjustice. (2023). *How climate change is fueling extreme weather*. https://earthjustice.org/feature/how-climate-change-is-fueling-extreme-weather

EPA. (2023). *Climate change indicators: Greenhouse gases*. https://www.epa.gov/climate-indicators/greenhouse-gases#ref3

Fleeman, K. (2025). Social media and reader engagement. In D. Blum & J. Hatch (Eds.), *The KSJ science editing handbook* (pp. 193–247). MIT Press. https://ksjhandbook.org/social-media-reader-engagement/different-platforms-different-audiences/

Fleming, W., Hayes, A. L., Crosman, K. M., & Bostrom, A. (2021). Indiscriminate, irrelevant, and sometimes wrong: Causal misconceptions about climate change. *Risk Analysis: An Official Publication of the Society for Risk Analysis*, *41*(1), 157–178. https://doi.org/10.1111/risa.13587

Goldberg, M. H., van der Linden, S., Leiserowitz, A., & Maibach, E. (2020). Perceived social consensus can reduce ideological biases on climate change. *Environment and Behavior*, *52*(5), 495–517. https://doi.org/10.1177/0013916519853302

Gómez-Casillas, A., & Gómez Márquez, V. (2023). The effect of social network sites usage in climate change awareness in Latin America. *Population and Environment*, *45*(2), 7. https://doi.org/10.1007/s11111-023-00417-4

Hess, D. J., Mai, Q. D., & Brown, K. P. (2016). Red states, green laws: Ideology and renewable energy legislation in the United States. *Energy Research & Social Science*, *11*, 19–28. https://doi.org/10.1016/j.erss.2015.08.007

Hopke, J. (2021, November 10). On Twitter, fossil fuel companies' climate misinformation is subtle – here's what I'm seeing during COP26. *The Conversation*. https://theconversation.com/on-twitter-fossil-fuel-companies-climate-misinformation-is-subtle-heres-what-im-seeing-during-cop26-170196

Hoppe, J., Hinder, B., Rafaty, R., Patt, A., & Grubb, M. (2023). Three decades of climate mitigation policy: What has it delivered? *Annual Review of Environment and Resources*, *48*(1), 615–650. https://doi.org/10.1146/annurev-environ-112321-103821

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, *6*(6), 622–626. https://doi.org/10.1038/nclimate2943

Internal Displacement Monitoring Centre (IDMC). (2021). *Global Report on Internal Displacement, 2020*. https://www.internal-displacement.org/global-report/grid2020/

Jagers, S. C., Harring, N., & Matti, S. (2018). Environmental management from left to right – on ideology, policy-specific beliefs and pro-environmental policy support. *Journal of Environmental Planning and Management*, *61*(1), 86–104. https://doi.org/10.1080/09640568.2017.1289902

Jagers, S. C., Harring, N., & Matti, S. (2024). Impact of ideology on individuals' attitudes to a climate-motivated tax on food. *Climate Policy*, *24*(10), 1381–1394. https://doi.org/10.1080/14693062.2024.2385484

Jessani, Z., & Harris, P. B. (2018). Personality, politics, and denial: Tolerance of ambiguity, political orientation and disbelief in climate change. *Personality and Individual Differences*, *131*, 121–123. https://doi.org/10.1016/j.paid.2018.04.033

Johnson, D. R. (2017). Bridging the political divide: Highlighting explanatory power mitigates biased evaluation of climate arguments. *Journal of Environmental Psychology*, *51*, 248–255. https://doi.org/10.1016/j.jenvp.2017.04.008

Kammermann, L., & Dermont, C. (2018). How beliefs of the political elite and citizens on climate change influence support for Swiss energy transition policy. *Energy Research & Social Science*, *43*, 48–60. https://doi.org/10.1016/j.erss.2018.05.010

Kim, S. C., & Cooke, S. L. (2021). Using the health belief model to explore the impact of environmental empathy on behavioral intentions to protect ocean health. *Environment and Behavior*, *53*(8), 811–836. https://doi.org/10.1177/0013916520932637

Kim, S., & Shin, W. (2017). Understanding American and Korean Students' support for pro-environmental tax policy: The application of the value–belief–norm theory of environmentalism. *Environmental Communication*, *11*(3), 311–331. https://doi.org/10.1080/17524032.2015.1088458

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

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*(1-2), 7–43. https://doi.org/10.1007/s10584-006-9068-8

Larsen, K., Pitt, H., Grant, M., & Houser, T. (2021). *China's greenhouse gas emissions exceeded the developed world for the first time in 2019*. https://rhg.com/research/chinas-emissions-surpass-developed-countries/#:~:text=Global%20greenhouse%20gas%20emissions%20estimates%20for%202019&text=China%20alone%20contributed%20over%2027,at%206.6%25%20of%20global%20emissions

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Goddard, E., Carman, J., Ballew, M., Verner, M., Marlon, J., Lee, S., Myers, T., Goldberg, M., Badullovich, N., & Thier, K. (2023). *Climate change in the American mind: Beliefs & attitudes, Fall 2023*. Yale University and George Mason University. Yale Program on Climate Change Communication. https://climatecommunication.yale.edu/wp-content/uploads/2024/01/climate-change-american-mind-beliefs-attitudes-fall-2023.pdf

Lumley, T. (2004). Analysis of complex survey samples. *Journal of Statistical Software*, *9*(8), 1-19. https://doi.org/10.18637/jss.v009.i08

McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*(1), 64–82. https://doi.org/10.1037/1082-989X.7.1.64

McLuhan, M., & Fiore, Q. (1967). *The medium is the massage: An inventory of effects*. Bantam Books.

Mora, C., McKenzie, T., Gaw, I. M., Dean, J. M., von Hammerstein, H., Knudson, T. A., Setter, R. O., Smith, C. Z., Webster, K. M., Patz, J. A., & Franklin, E. C. (2022). Over half of known human pathogenic diseases can be aggravated by climate change. *Nature Climate Change*, *12*(9), 869–875. https://doi.org/10.1038/s41558-022-01426-1

Newman, N., Ross Arguedas, A., Robertson, C. T., Nielsen, R. K., & Fletcher, R. (2025). *Digital news report 2025*. Reuters Institute for the Study of Journalism. https://reutersinstitute.politics.ox.ac.uk/digital-news-report/2025

Oberski, D. (2014). Lavaan.survey: An R Package for complex survey analysis of structural equation models. *Journal of Statistical Software*, *57*(1), 1-27. https://doi.org/10.18637/jss.v057.i01

Palm, R., Lewis, G. B., & Feng, B. (2017). What causes people to change their opinion about climate change? *Annals of the American Association of Geographers*, *107*(4), 883–896. https://doi.org/10.1080/24694452.2016.1270193

Park, J., Lediaeva, I., Lopez, M., Godfrey, A., Madathil, K. C., Zinzow, H., & Wisniewski, P. (2023). How affordances and social norms shape the discussion of harmful social media challenges on reddit. *Human Factors in Healthcare*, 3, 100042. https://doi.org/10.1016/j.hfh.2023.100042

Pearce, W., Niederer, S., Özkula, S. M., & Sánchez Querubín, N. (2019). The social media life of climate change: Platforms, publics, and future imaginaries. *WIREs Climate Change*, 10(2), e569. https://doi.org/10.1002/wcc.569

Rosseel, Y. (2012). Lavaan: An R Package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1-36. https://doi.org/10.18637/jss.v048.i02

Shahbazi, Z., Jalali, R., & Shahbazi, Z. (2025). AI-driven framework for evaluating climate misinformation and data quality on social media. *Future Internet*, 17(6), 231. Article 6. https://doi.org/10.3390/fi17060231

Shrout, P. E. (2011). Commentary: Mediation analysis, causal process, and cross-sectional data. *Multivariate Behavioral Research*, 46(5), 852–860. https://doi.org/10.1080/00273171.2011.606718

Skinner, C. S., Tiro, J., & Champion, V. L. (2015). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed., pp. 75–94). Jossey-Bass/Wiley.

Slater, M. D., Shehata, A., & Strömbäck, J. (2020). Reinforcing spirals model. In J. Bulck (Ed.), *The international encyclopedia of media psychology*. https://doi.org/10.1002/9781119011071.iemp0134

Stasi, M. L. (2019). Social media platforms and content exposure: How to restore users' control. *Competition and Regulation in Network Industries*, 20(1), 86–110. https://doi.org/10.1177/1783591719847545

Sutton, S. (2001). Health behavior: Psychosocial theories. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of the social and behavioral sciences.* (pp. 6499–6506). Elsevier. https://doi.org/10.1016/B0-08-043076-7/03872-9

Treen, K., Williams, H., O'Neill, S., & Coan, T. G. (2022). Discussion of climate change on reddit: Polarized discourse or deliberative debate? *Environmental Communication*, 16(5), 680–698. https://doi.org/10.1080/17524032.2022.2050776

Turrentine, J. (2022). April 19. Climate misinformation on social media is undermining climate action. Be a force for the future | NRDC. https://www.nrdc.org/stories/climate-misinformation-social-media-undermining-climate-action

Tyson, A., Kennedy, B., & Funk, C. (2021). Gen Z, millennials stand out for climate change activism, social media engagement with issue. https://www.pewresearch.org/science/2021/05/26/gen-z-millennials-stand-out-for-climate-change-activism-social-media-engagement-with-issue/

U.S. Census Bureau. (2020). *2020 U.S. Population More Racially and Ethnically Diverse than Measured in 2010*. https://www.census.gov/library/stories/2021/08/2020-united-states-population-more-racially-ethnically-diverse-than-2010.html

Unsworth, K. L., & Fielding, K. S. (2014). It's political: How the salience of one's political identity changes climate change beliefs and policy support. *Global Environmental Change*, 27, 131–137. https://doi.org/10.1016/j.gloenvcha.2014.05.002

Van Boven, L., Ehret, P. J., & Sherman, D. K. (2018). Psychological barriers to bipartisan public support for climate policy. *Perspectives on Psychological Science: a Journal of the Association for Psychological Science*, 13(4), 492–507. https://doi.org/10.1177/1745691617748966

Van der Ven, H., Corry, D., Elnur, R., Provost, V. J., & Syukron, M. (2024). Generative AI and social media may exacerbate the climate crisis. *Global Environmental Politics*, 24(2), 9–18. https://doi.org/10.1162/glep_a_00747

Vrselja, I., Pandžić, M., Rihtarić, M. L., & Ojala, M. (2024). Media exposure to climate change information and pro-environmental behavior: The role of climate change risk judgment. *BMC Psychology*, 12(1), 262. https://doi.org/10.1186/s40359-024-01771-0

Vu, H. T., Blomberg, M., Seo, H., Liu, Y., Shayesteh, F., & Do, H. V. (2021). Social media and environmental activism: Framing climate change on Facebook by global NGOs. *Science Communication*, 43(1), 91–115. https://doi.org/10.1177/1075547020971644

Vu, H. T., Conlin, J., Nguyen, N., & Baines, A. (2023). What influences public support for plastic waste control policies and green consumption? Evidence from a multilevel analysis of survey data from 27 European countries. *Online Media and Global Communication*, 2(1), 25–53. https://doi.org/10.1515/omgc-2022-0058

Weems, C., & Subramaniam, P. R. (2017). Special report: Reframing climate change for environmental health. *Journal of Environmental Health*, 79(8), 24–27. https://www.jstor.org/stable/26329730

World Health Organization. (2023). *Climate Change and Health*. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health

Zhou, L., Dai, D., Ren, J., Chen, X., & Chen, S. (2022). What is policy content and how is the public's policy support? A policy cognition study based on natural language processing and social psychology. *Frontiers in Psychology*, 13, 941762. https://doi.org/10.3389/fpsyg.2022.941762