

Ethos of news media vs social movements

An explorative study about changing attitudes towards climate change

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Abstract

Research on climate change has focused on news media's framing of climate issues. With a shifting media landscape, news media face increased competition from other actors, including climate movement groups. This study examines how credibility and trustworthiness of a source (source ethos) influences attitudes toward information dissemination and collective action on climate change. Respondents (N = 507) were randomly assigned to news stories that varied in source ethos – legacy media (Dagens Nyheter), a conventional climate movement group (Fridays for Future), and a disruptive climate movement group (Extinction Rebellion) – as well as emotional appeals (hope, fear, balanced). While most results were not significant, Fridays for Future seems more effective in shifting attitudes on information dissemination in the balanced and hope conditions. Dagens Nyheter and Fridays for Future influenced attitudes toward collective action in balanced conditions. Findings suggest that source ethos shapes climate perceptions and that different sources play distinct roles in raising awareness and mitigating action.

Keywords

ethos, news media, climate movements, information dissemination, collective action, emotional appeals

Introduction

Effective climate communication has been a central topic in social science research, with a focus on understanding how different framing strategies and emotional appeals influence public engagement (e.g., Nabi et al., 2018). Yet, despite the amount of research, and the pressing need for societies to adapt to climate change, numerous barriers such as skepticism, competing priorities, and a sense of hopelessness hinder these efforts (Hornsey & Fielding, 2020). Although many climate change solutions are out of reach for ordinary citizens, individuals can take personal actions and pressure policymakers by spreading knowledge and encouraging collective action (Lorenzoni et al., 2007; Ockwell et al., 2009). Historically, much of the information about climate change has come from the traditional news media, and research on climate change has subsequently focused on the media's framing of climate issues (Agin & Karlsson, 2021; Schäfer & Schlichting, 2014). However, recent changes in the media landscape, with increased reliance on platforms for public opinion and information, have changed this, and news media is only one of many different actors that compete for attention (Jensen et al., 2023; Newman et al., 2023). Competitors include climate movement groups (CMGs) such as the prolific *Fridays for Future* and *Extinction Rebellion*, which have caught the attention of both researchers and the public (Andi, 2020; Baran & Stoltenberg, 2023).

These groups operate with a very different ethos from journalism, where the latter strives for balance, neutrality, and not taking a position and the former aims to achieve certain political goals. In addition, the CMGs use different approaches to achieve their goals, which influences their ethos. While *Fridays for Future* can be considered a group with a conventional action repertoire (at least at the time of the study), characterized by hopeful messages and using legally and socially acceptable methods such as peaceful marches and petition signing (de Moor et al., 2021), *Extinction Rebellion* can be considered a group with disruptive action repertoire, working with fearful messages and methods outside the law (Extinction Rebellion, 2019; Berglund & Schmidt, 2020). This is intriguing theoretically, since there is little research on how the ethos of the *source* that conveys *frames* of climate change (the representation) affects people's perception of climate change (the represented) and subsequent attitudes and actions to mitigate it (Bolsen et al., 2019; Boström & Uggla, 2015; Earl & Garrett, 2017).

In this shifting media ecology, messages about climate change from news media and CMGs circulate alongside one another, competing and complementing each other. The objective of this study is to investigate to what extent different source ethos and emotional appeals influence attitudes towards information dissemination and collective action regarding climate change. An experimental setting comprising seven treatment groups ($N = 507$) from Sweden collected in 2021 serves as the foundation for this investigation. This study contributes to the growing body of literature on climate communication by highlighting the interplay between source ethos and emotional appeals utilized. Understanding these dynamics can offer practical guidance for sources seeking to maxi-

mize the impact of their messaging, fostering greater public engagement and collective action in the face of the climate crisis.

Theory and literature:

The role of gatekeeper ethos for perceptions about climate change

Climate change is one of the most pressing global challenges of our time, necessitating not only individual behavioral changes but also public collective action. In the context of this urgency, how climate issues are communicated can significantly influence public attitudes, intentions, and behaviors (Carmichael et al., 2017; Murali et al., 2021; Nabi et al., 2018). Previously, much of the information about climate change has come from news media, while in the contemporary media landscape, a host of other representors are undermining and competing with news media's gatekeeping function (Newman et al., 2023; Thorson & Wells, 2016). Who will provide information about climate change is crucial, since the source of climate change communication plays a crucial gatekeeping role, influencing not only beliefs about climate threats and policy support but also perceptions of climate research credibility and susceptibility to misinformation (Bolsen et al., 2019).

The communication strategies across the various sources as they seek to build relationships with the public (and other actors) will vary. This study is interested in investigating the extent to which source ethos interacts with framing, particularly in relation to emotional appeals, and how this impacts attitudes towards climate change action. *Ethos* refers to the perceived credibility, character, and alignment of the source with the public's preconceptions and values, and is one of Aristotle's three pillars of persuasion (the others being *logos* and *pathos*), referring to the character of the speaker or message sender (Demirdöğen, 2010). A source's ethos can influence how an audience interprets and responds to climate messages, affecting their trust in the information, willingness to share content, and motivation to take collective action. Many aspects of the ethos are also connected to pathos, which appeals to the audience's emotions (Demirdöğen, 2010), making emotional framing and ethos logically intertwined.

In climate communication, ethos plays a crucial role because climate discourse is highly politicized and polarized (Bolsen & Druckman, 2018; van der Linden, 2015), and because individuals often evaluate information based on how credible they find the source of the information. This means that two identical messages (one delivered by what is believed to be a trusted source and another by a skeptical or partisan source) can elicit different responses from the recipient (e.g., Bolsen et al., 2019).

Studies highlight how source credibility affects perceptions of climate risk and solutions, e.g., for uncertain or irresolute members of the public. Consensus among experts can be used as a guide for helping shape beliefs and guide actions (van der Linden et al., 2015), and messages from political figures and organizations perceived as partisan may reinforce ideological divides rather than bridge them (Hart & Nisbet, 2012). Sources

perceived as credible and trusted, particularly among skeptical audiences, have recently been shown to overcome barriers to communication, fostering engagement in otherwise resistant groups (Bolsen et al., 2019).

However, despite the widely acknowledged importance of message framing in climate communication and the importance of sources on the perception of the message (Bolsen et al., 2019), the interaction between source and message requires further investigation (Bolsen et al., 2019). Different sources embody different ethos dimensions, and their framing of climate issues may either reinforce or challenge the public's expectations. This, in turn, can shape the effectiveness of their communication (Agin, 2022).

News media and social movement ethos

While ethos may be important in principle, there is still the issue of what kind of ethos is associated with what kind of source and their representation of climate change. The norms guiding traditional news media emphasize objectivity, neutrality, and balanced reporting and have resonance with journalists around the world (Hanitzsch et al., 2010; Schudson, 2001; Wahl-Jorgensen et al., 2017). This can lead to the false equivalence problem (i.e., giving disproportionate weight to climate denial arguments in the name of journalistic balance) (Boykoff & Boykoff, 2007; Koehler, 2016; Van Eck et al., 2019), but some research indicates that journalism has moved towards a less objectivist and more interpretative framework in climate change reporting (Brüggeman & Engesser, 2017; Hiles & Hinnant, 2014; Schmid-Petri et al., 2017). Still, while the reality of climate change may be stressed in the reporting there are still other parts – problem vs solution – that needs to be given appropriate ratios in the coverage. Furthermore, a balanced and detached ethos is something that the public appreciates and expects from news media in general (Karlsson & Clerwall, 2019; Tandoc & Thomas, 2017), making it hard to break away from it.

In contrast, activist groups and social movements have complex communication dimensions (Obregón & Tufte, 2017) and often use more urgent, emotionally charged messaging to drive action (de Moor et al., 2020). Thus, *Fridays for Future* (FFF) draws on moral authority and grassroots authenticity, resonating with audiences that prioritize intergenerational equity and youth-led activism. FFF's ethos may align with those who value inclusive, bottom-up approaches to climate advocacy. In contrast, *Extinction Rebellion* (XR) embodies a disruptive ethos, challenging societal norms and leveraging civil disobedience to demand urgent action. This ethos may align with individuals who view radical change as necessary but alienate those who favor incremental approaches.

Thus, given the ethos and centrality of news media in the hitherto information ecology, it can be posited that the baseline representation about climate change has been an account delivered by a source committed to a balanced and non-interventionist ethos. CMGs have an ethos without commitment to balance, advocate social adaptation

explicitly, and aim to provide different messaging, particularly concerning fear and hope appeals.

Fear and hope appeals in climate communication

A central component of climate message framing is emotional appeal, particularly fear and hope appeals. Fear appeals, defined by Witte and Allen as “persuasive messages that arouse fear” (2000, p. 591), have been extensively studied in terms of their effectiveness. Research in this area focuses on three dimensions: (a) the message content, (b) the recommended behavior, and (c) the characteristics of the message recipients (Tannenbaum et al., 2015). Yet, findings regarding fear appeals remain divided. Some studies demonstrate their effectiveness (Tannenbaum et al., 2015), while others caution against potential backfiring effects (Feinberg & Willer, 2011; Moser, 2007; Witte & Allen, 2000), or even argue that they can be counterproductive (Bain et al., 2012; Smith and Leiserowitz, 2014). A key determinant of fear appeal success is whether the audience feels capable of addressing the threat; without a sense of efficacy, fear can lead to disengagement and avoidance (Witte & Allen, 2000).

In contrast, hope appeals (which are designed to evoke the anticipation of a positive outcome) are often linked to collective efficacy and optimism, motivating people to take action (Bailey et al., 2007; Chadwick, 2015). Hope-based messaging fosters a belief in collective capacity (McAfee et al., 2019) and can encourage participation in climate activism. However, optimism can also reduce perceived urgency (Hornsey & Feilding, 2016), and debates persist about whether hope is an effective mobilizing force. Van Zomeren et al. (2019) argue that while hope instills confidence in overcoming adversity, it does not necessarily enhance collective motivation.

The effectiveness of these emotional frames could thus depend on how they are balanced. Fear-based messaging, by emphasizing the severe consequences of inaction, heightens risk perception (Witte & Allen, 2000) and can serve as a powerful motivator for immediate behavior change (Leiserowitz, 2006). However, if not paired with clear solutions, fear appeals risk overwhelming audiences, leading to helplessness and disengagement – a phenomenon known as fear fatigue (O’Niell & Nicholson-Cole, 2009; Moser & Dilling, 2004). On the other hand, hope-based framing, by focusing on actionable solutions and emphasizing potential positive outcomes, can foster empowerment and information sharing behaviors (McAfee et al., 2019). Yet, an overemphasis on optimism may diminish the perceived urgency of the problem, potentially reducing motivation for immediate action (Chadwick, 2015). As research suggests that audiences process climate messages differently depending on the source of the information (Bolsen et al., 2019; Brulle et al., 2012), the reason as to why we see varying outcome in appeal effectiveness could be connected to source ethos.

Based on this, we propose that the effect of emotional appeals – fear, hope, or a balanced account – might be shaped by the ethos of the source delivering the message to the public. This leads to the introduction of the second part of this study: exploring to what extent the combination of source ethos and emotional appeals in the representation affects people's attitudes and willingness to mitigate climate change.

Information dissemination and collective action regarding climate change

Public inclination to disseminate information and engage in collective action are critical outcomes of effective climate communication, yet scholars have been inclined to overlook the role of social movements as knowledge producers (Chesters, 2012). Information dissemination involves individuals sharing climate-related content through interpersonal channels or digital platforms, amplifying the message's reach and influence. Emotional appeals play a significant role in this process, as messages invoking fear can drive urgency, while those emphasizing hope foster a sense of shared purpose and collective agency. Studies confirm that emotionally charged content, particularly on social media platforms, is more likely to be shared than neutral messages (Berger & Milkman, 2012), thereby extending the reach of climate communication.

Collective action, on the other hand, refers to coordinated efforts to address systemic challenges, ranging from participation in protests to policy advocacy (Tarrow, 2011). Studies on collective action suggest that individuals are more likely to engage when they perceive personal efficacy, shared goals, and social norms that encourage involvement (Tarrow, 2011). Emotional appeals aligned with the audience's values can enhance these perceptions, motivating sustained collective efforts. Risk perception further amplifies this dynamic; it not only shapes attitudes but also fosters action when individuals feel they can mitigate threats (Stern, 2000; Ballew et al., 2019). Understanding the factors that drive mobilization and collective action has long been a focus of social movement studies (Tarrow, 2011). Information dissemination acts as a critical precursor, setting the stage for broader societal engagement by increasing awareness and shaping public discourse. Researchers have found that risk perception, a central element in climate communication, influences both attitudes and behavior by highlighting the urgency of threats and the potential for mitigation (Leiserowitz, 2006; Smith & Mayer, 2018). As protest actions have grown in scale and frequency (Norris, 2002), interdisciplinary research has continued to explore the psychological and communicative mechanisms – particularly the power of emotional and value-driven messages – that inspire individuals to share information and participate in collective action.

While news media and CMGs have different ethos, they all explicitly strive towards the same goals of spreading information about an issue (in this case, climate change), and the legitimacy of news media rests on their ability to enable an informed citizenry (Carlson, 2017). CMGs *raison d'être* is to mobilize, stimulate, and encourage action towards their

social goals (Bagchi et al., 2024). While this mission is much less explicit in the case of news media, research has shown a connection between the quality of journalistic coverage, the level of informed citizenry, subsequent actions such as voter turnout (Aalberg & Curran, 2012; Carpini & Keeter, 1996), and the normative framework of journalism placing value on holding power to account, meaning that the publishing of news should ideally lead to action by others in *some* form. Thus, to what extent the combination of source ethos and representation of climate change is linked to attitudes towards climate change among the public is not only of academic but also of practical interest.

Research questions

Following the theoretical framework above, focusing on source ethos and hope, fear, or balanced appeals in framing, the study asks four research questions. The baseline for this study is a news media account of climate change that balances hope and fear appeals. The first set of research questions (RQ1 and RQ3) investigates if changing the ethos of the source impacts attitudes towards information dissemination and collective action. The second set of research questions (RQ2 and RQ4) then investigates to what extent changing source ethos *and* emotional appeals impacts attitudes towards information dissemination and collective action. In detail the RQs ask:

- RQ1: To what extent does source ethos impact respondents' inclination to spread information about climate change in general (RQ1a) and specific information (i.e., the treatment in this experiment) about climate change (RQ1b)?
- RQ2: To what extent does the framing (hope, fear, balanced) and source ethos impact respondents' inclination to spread information about climate change in general (RQ2a) and specific information (i.e., the treatment in this experiment) about climate change (RQ2b)?
- RQ3: To what extent does source ethos impact respondents' expressed interest in engaging with collective action regarding climate change?
- RQ4: To what extent does the framing (hope, fear, balanced) and source ethos impact respondents' expressed interest in engaging with collective action regarding climate change?

Method

This study explores the potential effects of a) source ethos and b) balanced, hope, or fear framing and utilizes an experimental approach to answer the RQs. Since much of previous research on climate communication is based on media framing, this study uses traditional news media and affiliated norms as point of departure. Thus, in order to study the impact of different source ethos and their framing on information dissemination and collective

action, Sweden's largest national quality newspaper, *Dagens Nyheter* (DN), was used to represent traditional news media. *Fridays For Future* (FFF) was chosen to represent a conventional social movement group and *Extinction Rebellion* (XR) to represent a disruptive social movement group. A previously published news article about wildfires, tweaked for the purposes of the study (see Figure 1), was used as an example of climate change, due to their global prevalence and recent significant incidents in Sweden (2014 and 2018) that received extensive media coverage. In total, the study encompassed 507 participants, and each of the seven groups consisted of at least 70 people who were randomly assigned to the treatment conditions.

Procedure

The study was conducted in cooperation with Kantar/Sifo between May 31 and June 30, 2021, using their randomly sampled web panel of 100,000 demographically representative Swedish adults aged 18 and older. Kantar/Sifo has an incentive program, and participants earned credits in that program by being a part of this study. The participants were informed about who conducted the study, the principal investigator, contact details, how their data would be handled, the ethical approval from the principal investigator's university, and that they could opt out at any time. They were also informed that the general purpose of the study was about their perception and attitudes towards news media, other actors in society, and that there would be a focus on environmental issues. After this step, the participants completed a pre-survey about demographics, habits, and attitudes towards environmental issues and perceptions of various actors in society. This was followed by the treatments (detailed below) that consisted of a mock-up website of one of the different sources (DN, FFF, XR), containing a logotype and various design details that conveyed the source in question (see Figure 1). The respondents subsequently answered a survey asking them about various aspects of the information in the treatment and their own attitudes towards environmental issues (not all are reported in this study). After they had completed all the above steps and without possibility to go back, respondents were informed that the information that they had been presented was based on an authentic news report that had been tweaked for the purpose of the study and that the organization in the treatment was not the originator of that information.

Treatments: Source ethos and balanced, hope, and fear representations

For the treatments, mock-ups of the source websites were created to resemble their aesthetics including fonts, colors (identified by HEX numbers), design elements, color plates, and logotypes.

Since one aim of the study (RQ1, RQ3) is to investigate the effect of source ethos by comparing news from traditional news media in relation to those from social movement groups, the first treatment group constituted a balanced news report from DN (see the image on the left in Figure 1 for illustration).

DAGENS NYHETER.

VETENSKAP

Prognos: Risk för ökning av skogsbränder i Sverige

I skogsrika Kanada har skogsbränderna mer än fördubblats sedan 1970. Nu menar kanadensiska och svenska forskare att skogsbränderna kommer att öka även i Sverige.

– I Kanada så hade vi under 1970-talet ett tiotaligt genomsnitt på en miljon hektar nedbrunnen skog. Nu är det tioåriga genomsnittet per år uppe i 2,5 miljoner hektar nedbrunnen skog, säger Mike Flannigan, professor vid University of Alberta och en av världens främsta skogsbrandsforskare.

Enligt skogsbrandsforskare runtom i världen beror de ökade skogsbränderna på klimatförändringar med längre somrar och mer torka. En studie på skog i USA visar att klimatförändringarna har orsakat en fördubbling av skogsbränderna även där sedan 1980-talet.

"Kronbränderna ökar"



PROGNOS: RISK FÖR ÖKNING AV SKOGSBRÄNDER I SVERIGE – VÄTMARKER EN LÖSNING

I skogsrika Kanada har skogsbränderna mer än fördubblats sedan 1970. Nu menar kanadensiska och svenska forskare att skogsbränderna kan komma att öka även i Sverige.

"I Kanada så hade vi under 1970-talet ett tiotaligt genomsnitt på en miljon hektar nedbrunnen skog. Nu är det tioåriga genomsnittet per år uppe i 2,5 miljoner hektar nedbrunnen skog", säger Mike Flannigan, professor vid University of Alberta och en av världens främsta skogsbrandsforskare.

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"Vätmarker stoppar bränder"

Prognosen är enligt Mike Flannigan att Sverige precis som Kanada kan komma att drabbas av en fördubbling av skogsbränder. "Enligt våra modeller över framtiden så förväntar vi oss mycket mer skogsbränder i Kanada. Utifrån den forskning som vi gjort så kan vi förutspå fler skogsbränder i Sverige också", säger Mike Flannigan.

**Prognos: kraftig ökning av skogsbränder i Sverige**

Foto: Pixabay

I skogsrika Kanada har skogsbränderna mer än fördubblats sedan 1970. Nu menar kanadensiska och svenska forskare att skogsbränderna kommer att öka kraftigt även i Sverige. "I Kanada så hade vi under 1970-talet ett tiotaligt genomsnitt på en miljon hektar nedbrunnen skog. Nu är det tioåriga genomsnittet per år uppe i 2,5 miljoner hektar nedbrunnen skog", säger Mike Flannigan, professor vid University of Alberta och en av världens främsta skogsbrandsforskare.

Enligt skogsbrandsforskare runtom i världen beror de ökade skogsbränderna på klimatförändringar med längre, varmare somrar och mer intensiva perioder av

Figure 1: Illustration examples of treatments (from left to right: DN balanced condition, FFF hope condition, XR fear condition).

The balanced condition utilized a previously published news item, tweaked for the purpose of this study, for authenticity and to ensure that it had been subjected to journalistic news judgement and norms (i.e., neutrality, balance, etcetera) before being published. The news item (SVT, 2019) was originally published by Swedish public service broadcaster SVT in 2019, ensuring that some time had passed between when the news item was published and when the study was done. The news item informed the reader about the dangers of wildfires as a consequence of climate change but that marshes would be a measurement to decrease them or hinder their spread when they would occur, hence balancing fear/problem and hope/solution. The news item included quotes from several institutional stakeholders, ranging from positive to skeptical about the proposed solution, providing an example of balanced journalism. In this condition, the image was a montage of both a raving wildfire and a marsh. The second and third treatment groups, then, were the same balanced news report, but the source was replaced with FFF and XR. This was done to investigate the effect of the source ethos while holding the balanced journalistic message constant.

However, since social movement groups want to get people to take action in a way that differs from the traditional journalistic mission, it is necessary to create conditions that are more in line with how they communicate regularly (RQ2, RQ4). To address this issue, a further four treatment conditions were created in which the text was changed to emphasize hope or fear, one each for FFF and XR (2x2), two common tactics in attempts to mobilize against climate change (Ereaut & Sengit, 2006). The treatments were varied in headline, image(s), ingress, and text to reflect balanced, hope, and fear appeals (see Figure 1).

In the hope condition, the image only showed the marsh and the focus was on how marshes could mitigate wildfires. The fear condition, in contrast, featured the wildfire

image and the text highlighted the problems with them while the benefits of marshes were toned down.

In total, there were seven treatment groups. Hope and fear conditions for DN are not included, since the purpose of the study is to investigate ethos and framing effects of social movement groups in relation to traditional news media – a key object of study in climate communication – not how an alternative form of traditional journalism would be received. Consequently, the study consists of three balanced conditions (DN, FFF, and XR), two hope conditions (FFF and XR) and two fear conditions (FFF and XR).

There was a small information box in the treatments informing the respondents about the source ethos in their treatment group. DN was described as a leading journalistic news outlet, XR was characterized as an international network of activist committed to non-violent resistance but using civil disobedience to combat climate change, and FFF was characterized as a global youth climate strike movement, dedicated to primarily peaceful demonstrations and school strikes to address climate change.

Dependent variables

As information sharing is a key mechanism in climate communication, influenced by emotional appeal and risk perception (e.g., Leiserowitz, 2006), and emotionally charged content is more likely to be shared on social media platforms (Berger & Milkman, 2012), three variables were used to explore RQ1a and RQ2a about general information dissemination. First the respondents were asked about the extent to which they would consider spreading information about wildfires from 1) scientific reports, 2) news stories, and 3) information from environmental organizations. Four variables were then used to measure respondents' inclination to disseminate the specific information seen in the treatment condition, as asked in RQ1b and RQ2b. Respondents were asked to what extent they would consider the following: 1) like the piece on social media, 2) comment the piece on social media, 3) share the piece on social media, and 4) talk about the piece with family and friends. Taken together, these seven variables cover various ways in which the respondents would consider disseminating information about wildfires and, subsequently, climate change.

Collective action, on the other hand, depends on the perceived efficacy, shared values, and social norms (Tarrow, 2011), and risk perception increases participation likelihood, especially when threats seem urgent (Leiserowitz, 2006; Stern, 2000). Therefore, the collective action that RQ3 and RQ4 are focused on was measured through eight variables. Respondents were asked to what extent they themselves would consider the following measures to reduce the risk of wildfires: 1) sign a protest, 2) participate in an organized physical demonstration, 3) become a member of an environmental movement, 4) do voluntary work for an environmental movement, 5) participate in a boycott, 6) contact a politician, 7) participate in a digital manifestation, and 8) encourage others to do any of the above.

Pre-study test and attention check

Before the data collection started, arrangements were made to evaluate the research design. The first measure was that a small but diverse sample of people with different age, education, and gender, and with varying knowledge and interest in climate issues, were asked to evaluate the design of the mock-up websites, the content of the treatments, and the questions asked in the survey. The second measure was that the polling company invited people from their panel, who did not participate in the present study, to test out the questionnaires and treatments and provide feedback. No problems were discovered, and instead, the people testing the study found it straightforward and engaging. The polling company also provided a support team while the study was conducted in case there were questions or difficulties, but no such issues surfaced.

To ensure that the respondents spent enough time in the treatment to read the provided information, but without introducing effects that might occur with questions regarding the treatment itself (Hauser et al., 2018), an attention check was implemented. The attention check measured the time between when the respondents opened the treatment and when they closed it. Any respondent that spent less than 15 seconds were omitted from the study. This ensured that they had enough time to see the headline, image(s), and the ingress, which were the most altered parts of the content.

Checking skewness between treatment groups

The pre-treatment questionnaire collected various demographic data from respondents and their attitudes towards news media and environmental organizations, and their interest in environmental issues. A Kruskal-Wallis test showed that there were no significant differences between the treatment groups in the following: interest in environmental issues ($H(6) = 6.766, p = .343$), trust in journalists in general ($H(6) = 3.809, p = .702$), trust in environmental organizations in general ($H(6) = 9.044, p = .235$), trust in Swedish news media to cover the environment and climate change ($H(6) = 5.073, p = .534$), trust in DN ($H(6) = 2.538, p = .864$), trust in FFF ($H(6) = 3.397, p = .758$), trust in XR ($H(6) = 8.172, p = .226$), gender ($H(6) = 2.538, p = .864$), age ($H(6) = 5.571, p = .473$), or education ($H(6) = 3.283, p = .773$). Thus, the results are unlikely to be a consequence of the composition of the treatment groups.

Results

The first part of the study asked about relationship between source ethos, framing, and information dissemination. Table 1 contains the descriptive results, means, and standard deviations, for RQ1 and RQ2.

Kruskal-Wallis tests for non-parametric data showed no significant differences between the different treatment groups, neither between the three balanced conditions, nor between the DN balanced condition and the XR and FFF hope and fear conditions. In

Open Section: Ethos of news media vs social movements

	DN Balanced (<i>n</i> = 74)	FFF Balanced (<i>n</i> = 73)	XR Balanced (<i>n</i> = 72)	FFF Hope (<i>n</i> = 71)	FFF Fear (<i>n</i> = 76)	XR Hope (<i>n</i> = 70)	XR Fear (<i>n</i> = 71)
Information dissemination in general. How likely is it that you would...							
Spread scientific reports about climate change	4.05 (2.05)	4.18 (2.10)	4.14 (2.08)	4.17 (2.07)	3.67 (2.21)	3.55 (2.03)	3.98 (1.82)
Spread news stories	3.50 (1.92)	3.97 (1.98)	3.64 (1.94)	3.58 (1.89)	3.22 (1.93)	3.34 (2.06)	3.63 (1.87)
Spread information from environmental organizations ...	3.22 (1.98)	3.45 (2.11)	3.24 (1.98)	3.14 (1.78)	2.88 (1.95)	2.94 (2.03)	3.12 (1.97)
Information dissemination of the content in the treatment. How likely is it that you would do any of the following regarding the piece of information you just read...							
Like on social media	2.64 (2.07)	3.03 (2.10)	2.93 (2.20)	3.49 (2.38)	2.69 (2.12)	2.93 (2.07)	2.70 (2.03)
Comment on social media	1.72 (1.21)	2.12 (1.57)	2.03 (1.49)	2.03 (1.56)	2.03 (1.66)	1.87 (1.49)	1.82 (1.32)
Share on social media	2.08 (1.64)	2.20 (1.65)	2.25 (1.93)	2.28 (1.78)	2.15 (1.78)	1.93 (1.54)	2.08 (1.46)
Talk about the item with family and friends	4.25 (1.82)	4.49 (1.92)	4.14 (2.07)	4.29 (1.99)	4.19 (2.13)	4.13 (1.92)	4.22 (1.86)

Table 1: Information dissemination (means and standard deviation)

Note: Table 1 contains means and standard deviation in parentheses from the treatment groups (columns) regarding information dissemination. The highest score for each variable (rows) is marked in bold and the lowest is marked in italics. A Kruskal-Wallis test, the proper test for nonparametric data, found no significant differences when all treatment groups were compared.

that regard, the answer to RQ1a and RQ1b is that the sender ethos does not seem to have any major impact. Furthermore, sender ethos in combination with framing, and RQ2a and RQ2b, does not seem to have any major impact either. However, looking closer at the results, it is evident that FFF scores highest on all six variables in either their balanced (four times) or hope (two times) framing.

The lowest scores are more scattered, but it can be noted that FFF scores lowest twice when they use fear and XR three times when they use hope. It can also be noted that if only comparing the highest with the lowest scores (and not all three or five groups simultaneously), there is a significant difference, using Mann-Whitney tests, between FFF hope and DN neutral on “like on social media” ($U = 1900.00$, $z = -2.295$, $p = .022$) and between FFF balanced and FFF Fear on “spread news stories” ($U = 2085.50$, $z = -2.178$, $p = .029$).

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	DN Balanced (<i>n</i> = 74)	FFF Balanced (<i>n</i> = 73)	XR Balanced (<i>n</i> = 72)	FFF Hope (<i>n</i> = 71)	FFF Fear (<i>n</i> = 76)	XR Hope (<i>n</i> = 70)	XR Fear (<i>n</i> = 71)
Questions about collective action. How likely is it that you would ...							
Sign a protest...	4.04 (2.13)	4.27 (2.21)	3.89 (2.19)	4.40 (2.12)	3.75 (2.13)	3.97 (2.10)	3.99 (2.16)
Participate in an organized demonstration...	2.54 (1.79)	2.49 (1.90)	2.54 (2.03)	2.37 (1.81)	2.28 (1.83)	2.35 (1.76)	2.41 (1.60)
Become a member in an environmental movement/ organization	3.18 (1.90)	3.30 (2.19)	3.17 (2.15)	2.98 (2.00)	2.85 (1.96)	3.04 (2.04)	3.29 (1.99)
Do voluntary work for environmental movement/ organization	2.78 (1.83)	2.67 (1.74)	2.56 (1.83)	2.50 (1.70)	2.76 (1.90)	2.61 (1.78)	2.57 (1.59)
Participate in a boycott	3.41 (1.97)	3.01 (2.06)	3.14 (2.05)	2.97 (2.21)	3.08 (2.03)	2.79 (2.04)	3.27 (2.01)
Contact a politician	2.70 (1.58)	3.00 (1.88)	2.87 (1.87)	2.56 (1.68)	2.71 (1.90)	2.80 (1.92)	2.72 (1.70)
Participate in a digital manifestation (that does not demand physical presence)	3.26 (2.06)	3.28 (2.10)	3.14 (2.09)	3.05 (2.03)	2.70 (1.97)	2.97 (2.04)	3.22 (2.01)
Encourage other to do any of the above	3.41 (2.04)	3.31 (2.04)	3.37 (2.12)	3.52 2.02)	2.85 (1.89)	2.85 (2.02)	3.22 (1.89)

Table 2: Collective action (means and standard deviation)

Note: Table 2 contain means and standard deviation in parentheses from the treatment groups (columns) regarding collective action. The highest score for each variable (rows) is marked in bold and the lowest is marked in italics. A Kruskal-Wallis test, the proper test for nonparametric data, found no significant differences when all treatment groups were compared.

Moving on, RQ 3 asked about sender ethos and RQ4 about sender ethos in combination with changed framing in relation to collective action, and the results to these RQs are presented in Table 2.

Like before, Kruskal-Wallis non-parametric tests were performed, showing no significant differences, neither between the balanced condition, nor the DN balanced and FFF and XR hope and fear condition. Consequently, source ethos on its own or in combination of changed framing does not seem to have any major impact on respondents' inclination to engage in collective action. A more granular analysis of Table 2 shows, similar to the results in Table 1, that balanced messages, primarily from DN and FFF, and twice

in the FFF hope conditions, produce the highest scores. Interestingly, the results further show that FFF scores lowest on all variables; this applies five times to the FFF fear condition and three times to the FFF hope condition.

Using Mann-Whitney tests, and comparing the highest and lowest means, significant differences were found between FFF hope and FFF fear in “Encourage others to do any of the above” ($U = 1838.50$, $z = -2.084$, $p = .037$).

While it is important to keep in mind that few statistically significant differences were discovered, Tables 1 and 2 still collectively provide some interesting observations and general patterns. Overall, balanced or hopeful framing invariably get the highest scores. Fear-mongering seems to have a slightly paralyzing effect, in contrast. Looking at the different ethos, it seems that FFF is the most successful source, achieving the highest mean in both the “hope” and “balanced” conditions on many variables, but also scoring the lowest in some other cases.

Discussion: Little action but fear and disruption will not help

Taking all the results into consideration, keeping in mind that they did not reach statistical significance, there are patterns worthy of further exploration.

Considering that all items are measured with a 1-7 scale with 4 as the middle option, it is encouraging that the respondents expressed willingness (means over 4) to do some things (spread scientific reports about climate change, talk about the news article with family and friends, and sign a protest) in most of the conditions regardless of source ethos. But it is also discouraging that for most dependent variables, the story about wildfires did not manage to move the needle above 4. Thus, the results show that people can be nudged into some, but not most, forms of action, at least on the basis of the story presented in the treatment.

If it is assumed that the news article in treatment is at least somewhat representative for other news stories about climate change, the results raise the issue of whether this form of storytelling (following the classical structure of news media articles) is suitable for communicating climate change, since none of the hope, fear, or balanced conditions seem to have any mobilizing effect. Should the results be replicable, the findings suggest that a big hurdle for action seems to be in people’s minds rather than in how climate change is represented or by whom.

Looking beyond these main findings, there are some other interesting patterns. In the contemporary media ecology where news media compete with other outlets for attention (Jensen et al., 2023; Newman et al., 2023; Thorson & Wells, 2016), it is important to discern what role different actors can play – a sort of division of labor. Concerning the dissemination of information, the results clearly indicate that a conventional social movement like FFF can play a more important role. However, this is only possible if the movement offers balanced or hopeful messaging more aligned with their conventional “play it

nice” action repertoire and is punished when their framing and action repertoire misalign. It is noteworthy that a disruptive group like XR is not successful in triggering attitudes towards information dissemination, despite its success in drawing attention to the climate issue through media coverage of its events. Contrary to FFF, the hope condition seems to impede XR’s performance rather than enhance it. This may be attributed to a misalignment effect, whereby individuals do not anticipate hope from XR – or that XR, despite their rather self-explanatory name and description of them accompanying the treatment, is somewhat unknown to the respondents.

Another observation regarding the CMGs is that there is no instance of fear conditions getting the highest means, indicating that while fear might create awareness about climate change, it might at the same time dampen the inclination to engage in solutions – consistent with the risk of fear appeals backfiring that was highlighted by Feinberg and Willer (2011), Moser (2007), and Witte and Allen (2000).

A legacy news organization like DN, who works with spreading information, is less able than the FFF to make people consider engaging with either spreading information about climate change in general, or trigger people to engage with the specific article on social media.

Concerning collective action, the climate activist groups FFF and XR, whose *raison d’être* is to mobilize people to prevent climate change (Bagchi et al., 2024), in some part come up short compared to DN. Another related observation is that DN scores highest in several collective action variables (demonstrating, doing voluntary work, and boycotting), while FFF scores highest in others (signing a protest, becoming a member, contacting a politician, participating in digital manifestations, and encouraging others to take collective action). It is interesting that a traditional news media outlet like DN seems more suited to the promotion of labor-intensive collective action, as it does not align too well with classical journalistic norms (Hanitzsch, et al., 2010; Schudson, 2001; Wahl-Jorgensen et al., 2017).

As noted, DN scores highest in the more labor-intensive activities, while FFF scores highest in labor-intensive activities. Given that FFF also scored highest in information dissemination, it can be surmised that they are more associated with symbolic and “fun” activities. Talk the talk, rather than walk the walk, seems to apply in relation to FFF. This may be the reason respondents rate them low in the fear condition (“You should be positive and fun to be with”) and lowest in the hope condition (“You are so positive and fun to be with that we forget about doing the hard work”).

Overall, the study shows the relevance of comparing the different forms of sources and representations that are circulated in the media ecology in relation to each other, and to consider this in relation to various climate change activities.

Limitations

A limitation is that the study used DN and balanced reporting as a baseline against which all other results were compared. It is therefore unclear how DN would have fared with

hope and fear conditions in relation to the other treatments. Other limitations are that this experimental study might have used a stimulus that is not engaging enough, does not represent the climate information that people come across in their information flows, or that effect occurs after repeated exposures over time. The study is also conducted in Sweden, which is a relatively high-trust country where news media have a good standing. These issues are worth considering in follow-up studies.

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