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Assessing Message and Messenger Effects in Public Responses to Disruptive Climate Protests

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Abstract

Climate activists increasingly use disruptive tactics, such as blocking roads and defacing property, to draw attention to climate change. While these actions can increase visibility, they may undermine public support, with some governments imposing stricter anti-protest laws. Recent cases of UK doctors imprisoned for disruptive protests, who justified their actions on public health grounds, raise important questions about how protesters' identities and message framing shape public responses to disruptive climate protests. This study uses survey experiments in the UK to examine how messenger identity and message framing affects attitudes toward disruptive climate protest, climate policy, prosecution of protesters, and anti-protest legislation. We find that messenger identity and message framing significantly influence public opinion. Notably, health professionals delivering health-framed messages shift attitudes to disruptive protest and significantly increase public support for climate action. The findings highlight how messenger credibility and message framing condition public responses to climate activism.

Introduction

Current efforts to reduce greenhouse gas emissions and to limit warming to 1.5 °C above pre-industrial levels are well off track.[1] This lack of progress on climate change has seen protesters increasingly turn to more disruptive tactics. In the UK, for example, climate activist groups including *Extinction Rebellion*, *Insulate Britain*, and *Just Stop Oil* have "engaged in mass civil disobedience and public disruption," adopting tactics such as defacing property, gluing themselves to property, and obstructing bridges, highways and roads in an effort to attract public and political attention to the need for more action on climate change.[2] While employing such methods can raise awareness and increase pressure on governments to respond,[3,4] some argue they risk undermining public support for climate activists due to the disruption caused.[5]

This rise in disruptive climate activism has been met with a crackdown on environmental protests globally, with governments introducing anti-protests laws that impose harsher

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punishments on those using disruptive tactics.[6,7,8] In the UK, for example, the government has introduced the *Public Order Act 2023*, which includes provisions to criminalise certain forms of protest with penalties that include imprisonment for breaches. While British public opinion is divided on such legislation;[9,10] human rights and environmental actors have condemned these laws for undermining climate action and the right to peaceful protest. Indeed, the UN Special Rapporteur on Environmental Defenders in 2024 referred to the new laws as "draconian" and expressed serious concern about "regressive new laws" that resulted in the imprisonment of climate activists engaged in peaceful protest.[11]

Among the climate activists recently imprisoned in the UK, was a General Practitioner (GP) who was given a one-year sentence for damaging petrol pumps during a *Just Stop Oil* protest.[12] This was not an isolated case; several medical doctors have been prosecuted in recent years for participating in disruptive climate protests.[13] This growing activism in part reflects the expanding evidence base on the health impacts of climate change, which has prompted greater engagement by the health community with climate action over the past decade.[14] The inadequate policy response to the climate crisis has led some medical professionals to call for strong forms of climate activism, including civil disobedience and disruptive protests, drawing on the long tradition of doctors and nurses contributing to social change.[15,16,17] This has included the establishment of '*Health for Extinction Rebellion*' (https://healthforxr.com/about/), a movement of doctors, nurses, and other health professionals participating in protests that may include 'an element of disruption.' Participants often justify such tactics by emphasising the harmful impact of climate change on human health and their professional duty to protect public health.

The participation of health professionals in disruptive climate protests, and their use of messages emphasising the health impacts of climate change, raises important questions about public responses to such protests. Does the identity of the 'messengers' (e.g., doctors and nurses) taking part in disruptive climate protests, and the use of different message frames (e.g., health-based) alter the 'activists' dilemma'? In other words, does the involvement of doctors and nurses – among the professions most trusted by the public[18] – issuing statements that emphasise the health impacts of climate change influence public support for climate protesters, their concern about climate change, or the attitudes towards climate policies and individual climate action? The spread of anti-protest legislation, together with the imprisonment of climate activists for disruptive protests, also raise questions about how the involvement of different messengers and messages in disruptive climate protests affects public attitudes

towards prosecuting and imprisoning those that take part in peaceful but disruptive protests, and towards legislation that criminalises forms of peaceful protests? This study seeks to address these questions.

Existing research on disruptive climate protests has found that it can be highly effective in generating media coverage of the protests,[19,20,21] and can lead to greater media coverage of climate change issues more broadly.[19] The greater media coverage of disruptive climate protests has been found to increase public awareness about climate change.[20,22] Studies However, research on how disruptive protests affect concern about climate change and support for climate action has produced mixed findings, with most studies finding very small or no effect.[2,4,21,22,23,24] Similarly, research on how disruptive climate protests influence individuals' willingness to take action on climate change has produced mixed results.[2,4]

While civil disobedience and disruptive protests may increase awareness about climate change, and in certain contexts increase support for climate action, some argue they can undermine support for climate activists due to the disruption they cause.[2,5,24] Indeed, the wider literature on protest politics has highlighted how disruptive tactics can be counterproductive by generating a public backlash against protest movements.[25] Studies find low support among citizens for disruptive climate protests.[5,26] However, focusing on the UK climate activist group, *Just Stop Oil*, Berglund et al. find that the use of civil disobedience has not been counterproductive for public opinion about net zero policies.[21] Several studies suggest that attitudes to disruptive climate protests differ according to political ideology and prior attitudes to climate change,[27,28] and the specific tactics protesters use and their target.[29,30]

Despite growing interest in the effects of disruptive climate protests, we know little about how messenger identity and message framing in disruptive climate protests impacts public responses. In other words, does *who* participates in such protests, and *how they frame* climate change and their actions, influence public attitudes? The few studies on framing in the climate protests literature have typically sought to understand the ways in which climate protesters frame their message[31,32,33] or how the media frames climate protests.[32,34,35] Much less attention has been given to how message framing and messenger identity can affect public attitudes.

The broader literatures on protest politics and social movements, and on climate change communications, suggest that messenger identity and message framings in disruptive climate protests is likely significantly influence public attitudes. Research on the former has long emphasised the importance of messengers and messages in disruptive protests for mobilising

public support.[36,37,38] These messenger effects may occur because the public identifies more (or less) with some protesters[38,39] or because 'high status' protesters, such as scientists and teachers, can strengthen the credibility and legitimacy of the protests, thereby increasing public support.[40,41] This research also indicates that public statements made by protesters, and the framing of these messages, is critical for building support.[37,42]

The importance of messengers and message framings is also recognised in research on climate change communication.[43,44,45] For example, studies have considered whether more positive messages highlighting the opportunities of climate action generate greater public engagement than negative messages emphasising the costs of climate change.[46,47,48] Increasing attention has also been given to framing climate change as a health issue, which may shift attitudes by making climate change more immediate, personally relevant, and geographically proximate.[46] This framing can also motivate climate action by highlighting the health co-benefits of mitigation rather than focusing solely on the negative harms of inaction. There is growing evidence to support the argument that a health framing can increase public support for climate action,[48,49] and that public engagement with the health dimensions of climate change is rising.[50] Health framings of climate change – and the link to human rights – are also increasingly used in climate litigation.[14 ,51] The importance of messengers in climate change communication has also long been recognised, with highly trusted professionals seen as being particularly effective in engaging the public.[52,53,54,55] Again, there has been increasing focus on the climate change and public health relationship, with several studies suggesting that health professionals are viewed by the public as trusted messengers on climate change but are under-engaged messengers for climate advocacy.[56,57]

We conduct two survey experiments with the UK public to examine how different message framing and messengers in the context of disruptive climate protests impact public support for such protests, concern about climate change, support for climate action, attitudes towards the prosecution and punishment of those partaking in disruptive climate protests, and support for legislation that imposes harsher punishments on peaceful disruptive protests to deter such approaches. The survey experiments focused on climate activists participating in disruptive protests to raise awareness about climate change who had been given a prison sentence due to recent changes in protest laws. In the first survey experiment, respondents were assigned either to a *control* vignette or one of four treatment vignettes. Three of the treatments included protesters making a statement, which focused on climate change as an existential threat to humanity (*extinction frame*); climate change as a health issue (*health frame*); and climate

change in terms of health and human rights consequences (*health and human rights frame*). The fourth treatment included the health-based statement and informed respondents that the protesters were doctors and nurses (*health frame and health professionals*).

As we discuss in more detail below, the results of the first survey experiment show that the *health frame and health professionals* treatment, in particular, influences public attitudes across the outcomes considered. This raises questions on the extent to which health professionals using alternative messages would have the same impact on public attitudes, and whether protesters coming from other trusted professions would have the same impact. We address these questions using a second survey experiment, which includes four alternative treatments that vary message framing and messengers: *health professionals* (no statement); *extinction frame and health professionals*; *health frame and scientists*; and *health frame and teachers*.

Across the two surveys, our results show that message framing and messengers causally influence public responses to disruptive climate protests. We find that statements based on an extinction- or a health frame reduce support for prosecuting the protesters. We find that the protesters' identity also influences support for the climate protests, attitudes towards addressing climate change, support for punishing the protesters, and attitudes towards anti-protest laws. Notably, the combination of health professionals as messengers and health-focused framing is most effective: when participants are informed that doctors and nurses engage in disruptive protests and emphasise the health impacts of climate change, they show greater support for the protests, increased concern about climate change, stronger support for government and individual climate action, reduced support for prosecuting protesters, and lower support for legislation imposing harsher punishments on protesters. Overall, this study demonstrates how messenger and message framing can influence public attitudes to climate action, while also advancing our understanding of public attitudes to climate protests more broadly.

Results

We present the results of the two survey experiments in turn. We begin by examining public support for the climate protesters. Figure 1 presents the average treatment effects on support for the climate protesters. The results demonstrate the significant public opposition to disruptive climate protests, with 52% of participants who received the *control* vignette expressing opposition to the climate protesters, 25% expressing support, and 23% neither supporting nor opposing the climate protesters. The results indicate that both *extinction frame*

treatment and the *health frame and health professionals* treatment have a statistically significant effect (95% CI) on increasing support for climate protesters relative to the control, with support increasing to 31% of participants for both treatments. The *health frame* treatment has a statistically significant positive effect at the 90% confidence level but falls just outside the 95% confidence level. The *health and human rights frame* treatment has no effect on support for the climate protesters, though, along with the *extinction frame* treatment, it increases support for climate protesters among respondents less concerned about climate change (see SI, Figure E9).

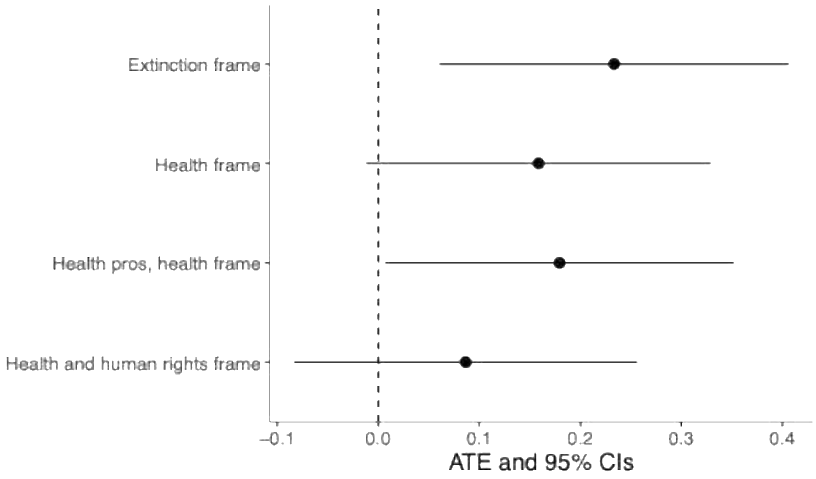


Figure 1. Average treatment effects (ATE) for protest message framing and messenger on support for climate protesters. Positive values indicate higher support for climate protesters relative to the *control*. Horizontal lines indicate 95% confidence intervals.

We next consider message framings and messenger identity effects on attitudes towards climate change and support for climate action. As discussed, participants were asked about their levels of concern about climate change at the start of the survey and again after they were presented with the vignette. Previous research suggests people's concern about climate change is largely influenced by political and socio-demographic factors, making it difficult to shift concern with short informational cues.[58,59] Therefore, in addition to analysing treatment effects on overall concern about climate change, we test whether the treatments increase people's concern about climate change from pre-existing levels (which was included in our pre-analysis plan). In other words, we examine within-subject treatment effects. Figure 2 present the results for the average treatment effects on overall levels of concern about climate change (left), and for the change in concern for climate change (right). The results show that the effects of the *health frame and health professionals* vignette on overall concern about climate change falls marginally outside

the 95% confidence level but is statistically significant at the 90% level. We find that the *health frame and health professionals* vignette leads to a statistically significant increase in concern about climate change at the 95% confidence level.

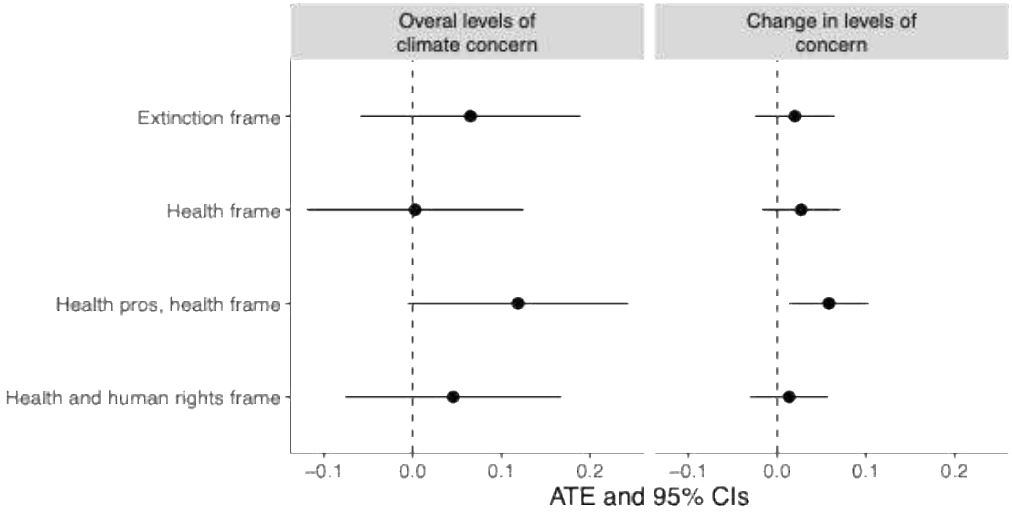


Figure 2. Average treatment effects (ATE) for protest message framing and messenger on overall levels of concern about climate change (left) and on within-subject change in levels of concern about climate change (right). Positive values indicate higher levels of concern relative to the *control*. Horizontal lines indicate 95% confidence intervals.

We next consider attitudes towards climate action. As with other outcome variables in the analysis, we used Likert-scale measures to capture the extent to which participants felt the government should do more/less to address climate change, support for specific climate policies, and the belief that people should adopt behaviours that help tackle climate change. However, these questions on climate action yielded a high proportion of 'don't know' responses from survey participants, significantly reducing our sample of respondents that expressed a position on these climate action questions. For example, 13% of respondents answered 'don't know' on whether they felt the government should do more or less to tackle climate change, 23% stated they did not know whether the government should halt any exploration of new oil fields and other sources of fossil fuels in the UK, and 22% responded 'don't know' on whether the government should end fossil fuel subsidies. We address this by generating binary outcome variables from these questions based on whether respondents indicated support for any the climate actions. These binary measures mean that responses in opposition of the climate action or answering 'don't know' are coded as '0', while any expression of support for the climate action (strong or moderate) are coded as '1'. We present the ATEs on these binary outcome measures of support for climate action in Figure 3. The results of the analysis with the ordinal

measures are included in the Supplementary Information (Figure E1), though it is worth stating that we find no statistically significant treatment effects.

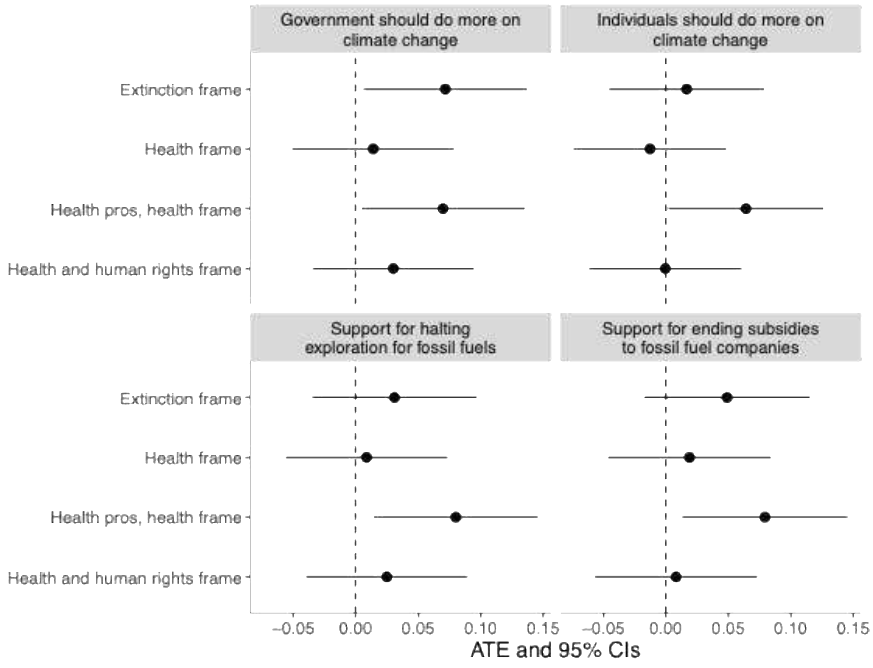


Figure 3. Average treatment effects (ATE) for protest message framing and messenger on: (top left) whether government should do more or less to address climate change (binary outcome); (top right) whether individuals should do more or less to address climate change (binary outcome); (bottom left) whether government should or should not halt exploration of new oil fields and other fossil fuel sources (binary outcome); (bottom right) whether government should or should not end financial subsidies to fossil fuel companies (binary outcome). Positive values indicate government should do more to address climate change relative to the *control*. Horizontal lines indicate 95% confidence intervals.

Figure 3 (top left) shows that both the *extinction frame* treatment and the *health frame and health professionals* treatment increase the belief among respondents that the government should do more to tackle change relative to the *control*. Figure 3 also indicates that the *health frame and health professionals* treatment leads to greater support for individual action on climate change (top right), and support for specific mitigation policies in terms of halting exploration of new oil fields and ending financial subsidies to fossil fuel companies. The *health frame and health professionals* treatment also increases support for governmental action, ending fossil fuel subsidies, and halting fossil fuel exploration among those respondents who are less concerned about climate change (see SI, Figure E9). The other treatments have no statistically significant impact on support for the two mitigation policies (though the *health and human rights frame* increases support for individual action on climate change among Conservative voters – see SI, Figure E8.)

The analysis also considers how the different treatments impact public attitudes to the prosecution and imprisonment of climate protesters. As previously discussed, respondents were presented with a scenario in which recently introduced laws meant that protesters were given a two-year prison sentence for taking part in disruptive protest. Figure 4 presents the results of treatment effects on support for prosecuting the climate protesters (left) and the extent to which the two-year prison sentence is viewed as too harsh or lenient.

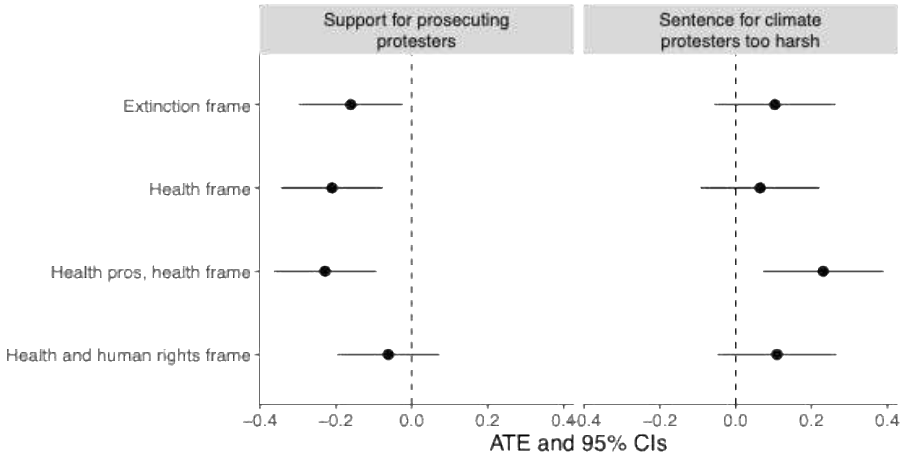


Figure 4. Average treatment effects (ATE) for protest message framing and messenger on (left) support for prosecuting protesters (negative values indicate lower support for prosecution relative to the *control*); (right) on attitudes towards harshness of the two-year prison sentence for climate protesters (positive values indicate view that the prison sentence is too harsh relative to the *control*). Horizontal lines indicate 95% confidence intervals.

The result show that three treatments – *extinction frame*, *health frame*, and *health frame and health professionals* – reduce support for prosecuting the climate protesters relative to the *control*, at the 95% confidence level. The results in Figure 4 (right) also show that the *health frame and health professionals* treatment leads respondents to view the prison sentence as too harsh. None of the other treatments has a statistically significant effect.

Finally, we consider whether message framing and messenger in disruptive climate protests impact attitudes towards laws that impose harsher punishments on those that participate in disruptive protests. Figure 5 shows that the *health frame and health professionals* treatment reduces support for retaining these laws, and once again, it is the only treatment to have a statistically significant effect.

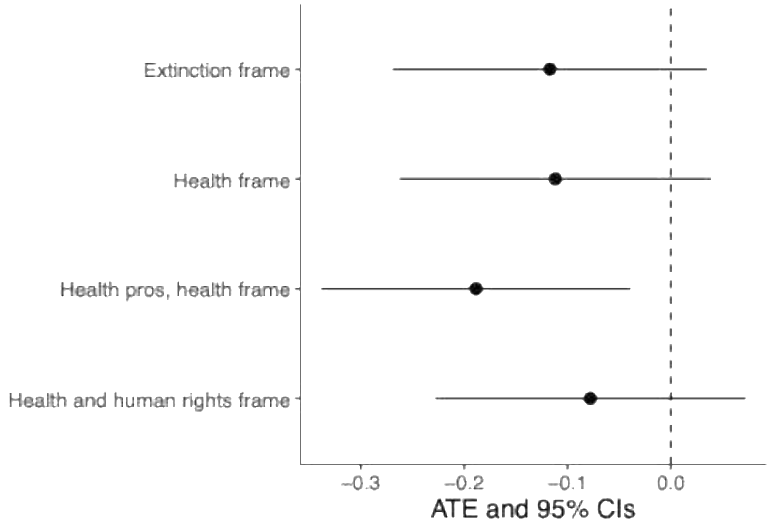


Figure 5. Average treatment effects (ATE) for protest message framing and messenger on support for retaining laws that target disruptive protests. Negative values indicate lower support for retaining laws relative to the *control*. Horizontal lines indicate 95% confidence intervals.

These results provide strong evidence for importance of message and messengers in climate protests, particularly regarding the effectiveness of health-based messages and the involvement of health professionals (doctors and nurses). They raise two important questions. First, given the vignette that combined health professionals and health frames was consistently more effective than the vignette with the health frame alone, does the framing of the message matter or were our results driven exclusively by the messenger effects? In other words, would an alternative statement by doctors and nurses participating in disruptive climate protests be as effective as the health-framed message? Or does the effectiveness of this treatment depend on the combination of health professionals and health framed messages? Second, are messenger effects in disruptive climate protests limited to health professionals (specifically doctors and nurses), or would protesters from other professions have a similar effect on public attitudes?

We conducted a second UK survey experiment using alternative treatments to address these questions. As we explain in more detail in the Methods section, we address the first question by including a *health professionals* treatment in which the protesters are NHS doctors and nurses but make no statement, and an *extinction frame and health professionals* treatment in which the protesting doctors and nurses make a statement highlighting the existential threat posed by climate change (rather than a health-based message). We address the second question with two treatments in which the disruptive climate protesters consist of scientists and teachers using a health-based message (*health frame and scientists* and *health frame and teachers* vignettes). While both scientists and teachers are trusted professions (see Methods), they differ

in important ways on how the public engages with them. Scientists have greater expertise, but the public are likely to have less engagement with them on a day-to-day basis; whereas while teachers may have less expertise than scientists, they have higher public familiarity as all respondents will have engaged directly with teachers.

In terms of support for climate protesters, Figure 6 shows that all four additional treatments increase support for climate protesters. The results suggest that including any reference to the climate protesters consisting of the trusted messengers (health professionals, scientists, and teachers) increases support for the climate protesters. It is worth noting that the vignette with the combination of health professionals and the extinction message has the largest effect on increasing support for the climate protesters.

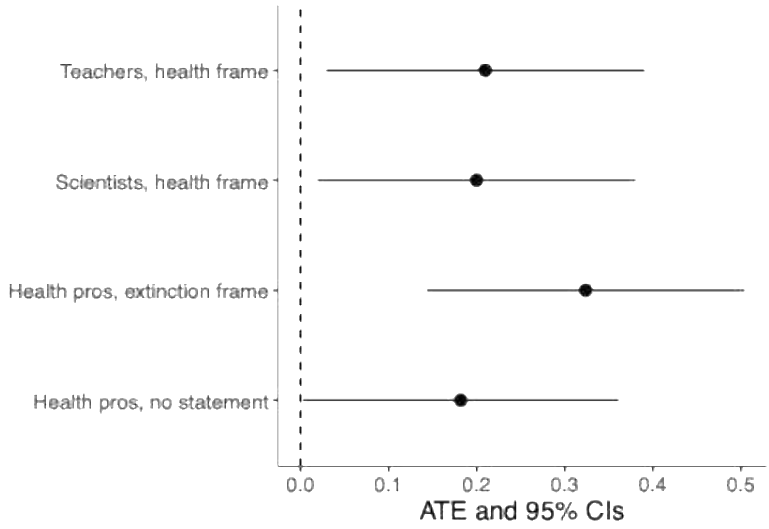


Figure 6. Average treatment effects (ATE) for protest message framing and messenger on support for climate protesters. Positive values indicate higher support for climate protesters relative to the *control*. Horizontal lines indicate 95% confidence intervals.

Figure 7 shows the results from the second survey on changes in concern about climate change. The results show that the *extinction frame and health professionals* treatment significant increases concern about climate change. None of the other treatments effect climate change concern. Hence across the two survey experiments, we find that health professionals making a clear statement about the effects of climate change – whether in terms of the specific health impacts or a more extinction-based message – leads to greater public concern about climate change.

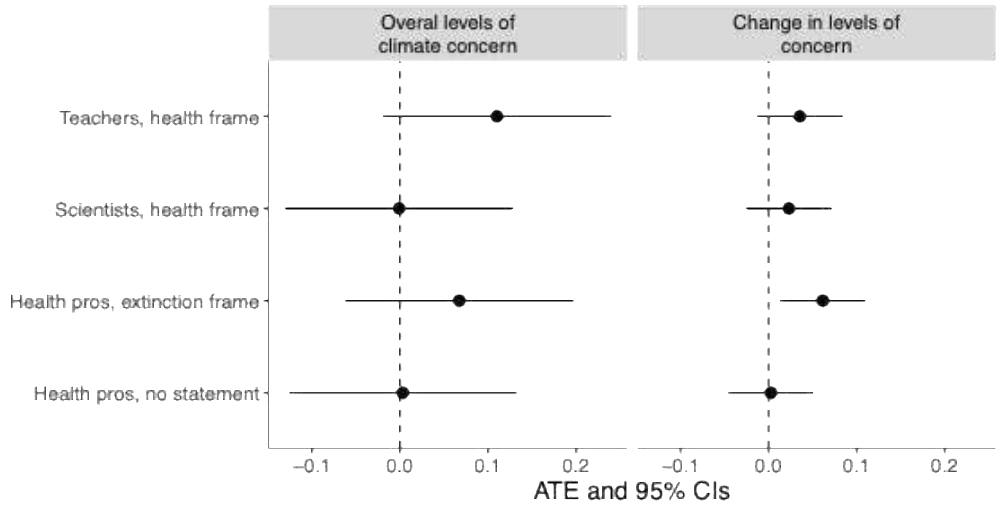


Figure 7. Average treatment effects (ATE) for protest message framing and messenger on overall levels of concern about climate change (left) and on change in levels of concern about climate change (right). Positive values indicate higher levels of concern relative to the *control*. Horizontal lines indicate 95% confidence intervals.

We next turn to support for climate action, focusing on whether the additional treatments impact attitudes towards whether the government should do more to address climate change, individual action on climate change, whether the government should halt new exploration of fossil fuel sources, and whether the government should end subsidies to fossil fuel companies. The results in Figure 8 show that none of the four treatments in the second survey experiment shift attitudes to government action or towards the specific policy measures to address climate change (this is based on binary measures as with the first survey). Hence, across the two survey experiments only the health frame and health professionals message leads to more support for government action on climate change. Figure 8 also shows the effects of the four treatments on individual action on climate change. Interestingly, we find that the *health frame and teachers* vignette has a statistically significant effect on support for individual action to address climate change.[4] It is worth noting that both the *teachers*- and *scientists and health frame* vignettes increased support for individual climate action among respondents less concerned about climate change (see SI, Figure E10). Over the two survey we find that it is the *health frame and health professionals* treatment and the *health frames and teachers* treatment that increase support for individual action on climate change across all respondents.

[4] It is worth noting that both the *teachers*- and *scientists and health frame* vignettes increased support for individual climate action among respondents less concerned about climate change (see SI, Figure E10).

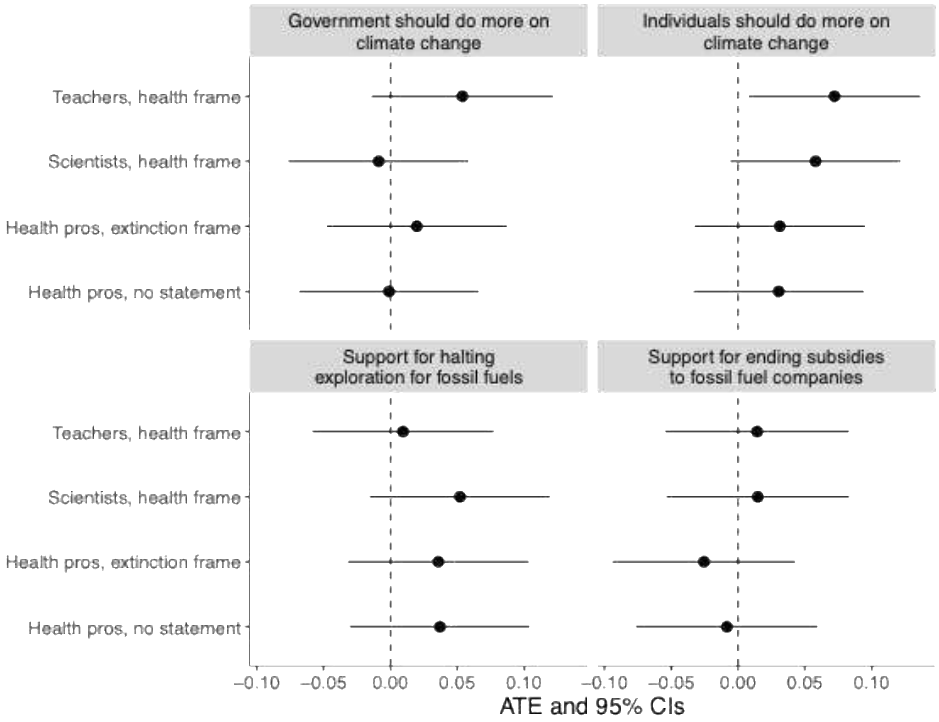


Figure 8. Average treatment effects (ATE) for protest message framing and messenger on: (top left) whether the government should do more or less to address climate change (binary outcome); (top right) whether individuals should do more or less to address climate change (binary outcome); (bottom left) whether the government should or should not halt exploration of new oil fields and other fossil fuel sources (binary outcome); (bottom right) whether the government should or should not end financial subsidies to fossil fuel companies (binary outcome). Positive values indicate government should do more to address climate change relative to the *control*. Horizontal lines indicate 95% confidence intervals.

We next consider attitudes towards prosecuting and punishing the protesters. Figure 9 shows that all four treatments significantly reduce support for prosecuting the protesters. Hence, across the two surveys, we find that any reference to the climate protesters consisting of one of the three respected professions (health professionals, scientists, and teachers) – whether the message is based on climate change being framed as a health issue or in terms of human extinction – reduces support for prosecuting the protesters. Similarly, Figure 9 shows that all four treatments lead to participants viewing the two-year prison sentence has too harsh.

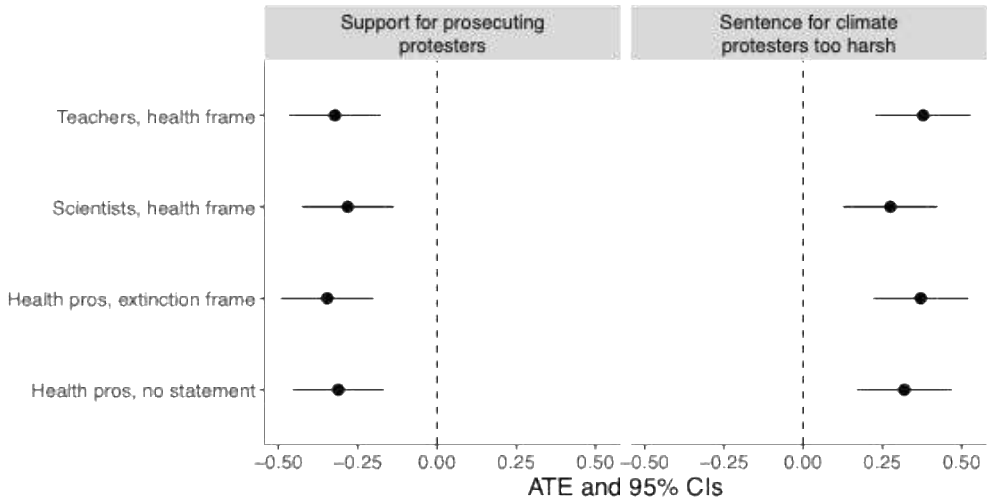


Figure 9. Average treatment effects (ATE) for protest message framing and messenger on (left) support for prosecuting protesters (negative values indicate lower support for prosecution relative to the *control*); (right) on attitudes towards harshness of the two-year prison sentence for climate protesters (positive values indicate view that the prison sentence is too harsh relative to the *control*). Horizontal lines indicate 95% confidence intervals.

Finally, in Figure 10 we consider the effects of the four additional vignettes on support for retaining laws that target disruptive protests. We find that three of the treatments – the health professionals with no statement, the health professionals with the extinction message frame, and the teachers with the health message frame – reduce support for retaining these laws. Only the *scientists and health frame* has no statistically significant effect on the attitudes towards retaining anti-protest laws.

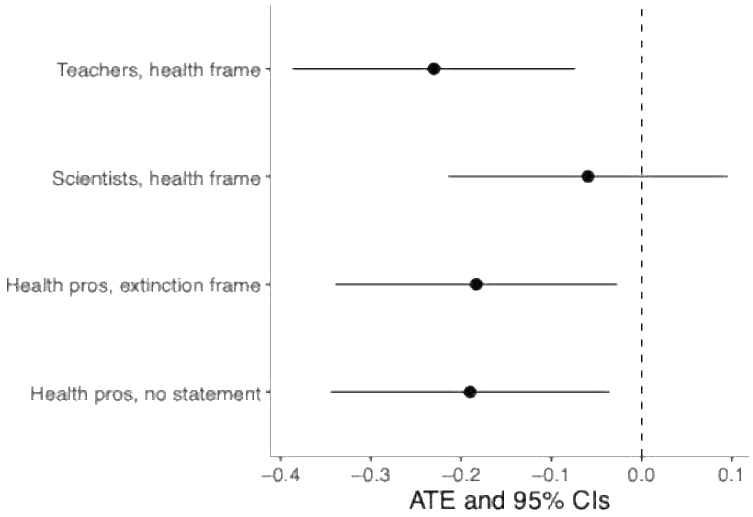


Figure 10. Average treatment effects (ATE) for protest message framing and messenger on support for retaining laws that target disruptive protests. Negative values indicate lower support for retaining laws relative to the *control*. Horizontal lines indicate 95% confidence intervals.

Discussion

This study examines whether messenger identity and message framing influence public responses to disruptive climate protests. The increasing use of civil disobedience and disruptive tactics by climate activists has prompted greater attention to the effects of such approaches, particularly on public attitudes. However, there has been little focus on whether the identity of those who participate in disruptive climate protests and the statements they make influence public responses. This is despite recent examples of doctors and nurses participating in disruptive climate protests, and justifying their actions based on the harm that climate change is doing to people's health. Does the involvement of health professionals or other trusted professionals, and the use of alternative messages by protesters, such as those emphasising the health impacts of climate change, influence public responses to disruptive climate protests?

We conducted survey experiments in the UK to examine how messenger identity and message framing affect public responses to disruptive climate protests. Our findings show that both significantly shape attitudes across the issues studies. When protesters were identified as trusted professions – doctors and nurses, scientists, or teachers – public support for the climate protesters increased significantly, regardless of the message conveyed. In fact, stating that doctors and nurses were involved in the protests increased support, even when the protesters made no statement. When protesters' identities were unspecified, framing climate change as an extinction threat increased support, while a health-focused message alone had no significant effect. However, when the same health message was delivered by the trusted professionals (health professionals, scientists, or teachers), it led to higher levels of public support for the protesters.

The results indicate that messenger and message framing in disruptive climate protests also influence concern about climate change and support for climate action. When health professionals took part in the disruptive climate protests and used a health-framed or extinction-framed message, participants' concern about climate change increased from pre-existing levels. Health professionals using a health-based message also strengthened the view that the government should do more to address climate change. This combination – health professionals using a health-based message – also increased support for mitigation policies, specifically that government should halt exploration of new oil fields and other fossil fuel sources, and should end financial subsidies to fossil fuel companies. It also increased support for individual climate

actions, such as switching to green energy, reducing car use, or eating less red meat. A health-framed message delivered by teachers similarly increased support for individual climate action.

Across both surveys, all the treatments – except the *health and human rights frame* – reduced public support for prosecuting climate protesters. Mentioning any of the trusted professionals were involved in the protests increased the perception that the two-year prison sentence was too harsh. In contrast, message framing alone (*extinction*, *health*, or *health and human rights*) had no significant effect on views of the sentence. Similarly, referencing the trusted professions participated in the protests reduced support for retaining laws imposing longer prison sentences for peaceful but disruptive protests, while message frames alone had little impact. The only exception was the *scientists and health frame* treatment, which had no significant effect on attitudes towards these laws.

Taken together, these results provide strong evidence showing that both messenger identity and message framing shape public responses to disruptive climate protests. The most effective combination is health professionals, specifically doctors and nurses, using a message that emphasises the health impacts of climate change. This is the only treatment that significantly affects all the outcomes we examine. It increases support for protesters, leads to higher concern about climate change, strengthens support for government action on climate change, including specific mitigation policies, and increases support for individual behaviour change to address climate change. It also reduces support for prosecuting and imprisoning protesters and lowers support for legislation imposing longer prison sentences for protesters. Importantly, this combination of health professionals using health-based messages also increased support for governmental action, ending fossil fuel subsidies, and halting fossil fuel exploration, among respondents less concerned about climate change (see Supplementary Information). While previous studies show that doctors and nurses are trusted climate messengers,[56,57] our findings provide causal evidence that their advocacy, especially when framed around health, can meaningfully shift public attitudes and increase support for climate action.

The results also show that teachers participating in climate protests were more effective than scientists across different outcome variables. Teachers and scientists differ in two key respects as climate messengers. Although scientists may be viewed as having greater expertise on climate change, people are generally more familiar with teachers, based on more direct experience, which may increase trust. These findings suggest that trust and familiarity are key in shaping public perceptions of climate activists engaged in disruptive protest. This helps to

explain why health professionals using health-framed messages were the most effective overall in shifting public attitudes. Doctors and nurses occupy a distinctive position, combining high levels of expertise with regular, direct engagement with the public. In our survey experiments, their expertise and credibility were reinforced through messages highlighting the health impacts of climate change, while their willingness to participate in disruptive protests, despite personal risks such as imprisonment, signalled the strong commitment to urgent climate action.

These findings have implications for understanding public responses to climate activism, support for climate action, and attitudes towards protest. They suggest that the identity and professional status of protesters, and how they frame the issue, shape how disruptive protest tactics are perceived. Participation by highly trusted professional groups such as doctors and nurses, framing climate change as a threat to human health and wellbeing, appears to increase the perceived legitimacy of these protest actions and may mitigate some of the backlash often associated with disruptive climate activism. More broadly, the results indicate that messenger identity and message framing can shift public attitudes towards civil disobedience and disruptive protest. This includes strengthening opposition to government measures that criminalise some forms of non-violent disruptive protest, which are widely viewed as undermining the right to peaceful protest.[7]

The analysis also highlights a potentially important role for health professionals in public debates about climate change. As climate change increasingly impacts people's health – including through heat exposure, the spread of infectious diseases, food insecurity, and through more frequent and severe extreme weather events – health professionals may serve as particularly credible messengers regarding the consequences of climate inaction, and the health co-benefits of climate action. While further research is needed to assess how these dynamics operate in real-world contexts, the results suggest that the involvement of trusted professional communities, coupled with messages that emphasise their expertise and the make the issue of climate change more personally relevant, may help broaden public support for climate action.

Methods

We examine how message framing and messenger identity in disruptive climate protests shape public attitudes using two pre-registered survey experiments in the UK. The surveys were administered by *YouGov* and were embedded in larger surveys using their online panel of respondents. We used quota sampling on key demographic variables (age, gender, and

geographic location) and political attributes (past voting) to ensure representativeness. Participants received a vignette describing climate protesters using disruptive tactics to raise awareness about climate change and being sentenced to two years in prison for participating in disruptive climate protests under new protest laws. We randomly assigned participants to treatments, which varied according to protesters' identity and statement, and compared differences in attitudes across experimental groups, inferring the causal effect of message framing and messenger identity. In line with experimental realism, the vignettes closely mirror the language and framing of news coverage.[60] We set up a *control* vignette, which provides a brief description of climate protesters being sentenced to two years in prison for participating in disruptive non-violent protests:

> *Some people engage in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some climate protesters were recently sentenced to two years in prison for participating in disruptive non-violent protests.* (Control vignette)

Recent cases in the UK, where climate activists have received prison sentences between 18 months and four years for disruptive protests, informed our decision to specify a two-year sentence (https://www.bbc.co.uk/news/articles/cm2jvmrvydro).

To examine message and messenger effects in disruptive climate protests, we developed four treatment vignettes that extend the *control* vignette with a statement made by the protesters, with one treatment also varying the identity of the protesters. The text of the vignettes is presented in Table 1. The first treatment, the *extinction frame* vignette, includes a statement justifying the protests as climate change represents an existential threat to humanity. The statement is based on a declaration made by *Extinction Rebellion* (https://extinctionrebellion.uk/declaration/). Some have questioned the effectiveness of extinction-framed messages in engaging the public with climate action, and hence this treatment enables us to test its impact.[61]

Based on recent research on how health framings of climate change can increase public engagement, we include a vignette in which protesters emphasise the health impacts of climate change (*health frame*). To test messenger effects, a third vignette combines the health frame with a change in messenger identity, presenting the protesters as 'doctors and nurses' (*health frame and health professionals*). In seeking to keep the vignettes short and of a similar length, we also altered the text of the 'control' part of this vignette to state the climate protesters consisted of 'NHS doctors and nurses.' As the health impacts of climate change have been used

to argue that climate change undermines human rights, and some argue that new protest laws violate people's right to protest, our final vignette connects the health impacts of climate change to human rights (*health and human rights frame*) to assess whether a health-human rights framing affects public attitudes. The full text of the vignettes used in the second survey experiment are provided in Table 1.

Treatment	Text
Extinction frame	*Control + The protesters stated, "the climate crisis, caused by burning fossil fuels, is an unprecedented event in human history. Without urgent action we face the destruction of this nation, its peoples, our ecosystems and the future of generations to come. We are in the sixth mass extinction event and face catastrophe if we do not act swiftly."*
Health frame	*Control + The protesters stated, "the climate crisis, caused by burning fossil fuels, is the biggest threat to people's health in the UK and globally. Rising temperatures are causing heat-related illnesses, the spread of infectious diseases, food insecurity, and deaths from extreme weather events. Urgent action is needed to protect people's lives."*
Health frame and health professionals	*Some NHS doctors and nurses have engaged in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some doctors and nurses were recently sentenced to two years in prison for participating in disruptive non-violent protests.* *The doctors and nurses stated, "the climate crisis, caused by burning fossil fuels, is the biggest threat to our patients' health in the UK and people's health globally. Rising temperatures are causing heat-related illnesses, the spread of infectious diseases, food insecurity, and deaths from extreme weather events. Urgent action is needed to protect people's lives."*
Health and human rights	*Control + The protesters stated, "the climate crisis, caused by burning fossil fuels, is the biggest threat to people's health in the UK and globally, violating their human rights. Rising temperatures are causing heat-related illnesses, the spread of infectious diseases, food insecurity, and deaths from extreme weather events. This undermines their right to life, security, health and wellbeing. Urgent action is needed to protect people's lives and defend their basic human rights."*

Table 1. Text for treatment vignettes used in the first UK survey experiment.

We include several outcome variables in the analysis, using four- and five-point scales, as well as binary measures. The exact wording of the outcome questions can be found in Supplementary Information (SI) Section B. First, after reading the vignette, respondents were asked to indicate their support for the climate protesters. Second, they were asked to indicate their level of concern about climate change. We also included a pre-treatment question on levels of concern about climate change, which respondents answered much earlier in the survey, and enabled us to examine any potential shifts in levels of climate change concern (within-subject treatment effects). Third, we assess support for government action by asking whether respondents think the government should do more (or less) to address climate change, and their

support for specific mitigation policies – specifically, the government halting exploration of new oil fields and other sources of fossil fuels in the UK, and ending subsidies to fossil fuel companies. Fourth, we examine support for individual actions that help to tackle climate change (e.g., switching to a green energy supplier, reducing car travel, and eating less red meat). Fifth, we consider attitudes towards the prosecution and punishment of the climate protesters. Specifically, we asked respondents to indicate whether the climate protesters should be prosecuted, and whether the two-year prison sentence was too harsh or too lenient. Finally, we examined attitudes towards new laws that impose harsher prison sentences on those engaging in more disruptive protests, asking whether such laws should be retained or overturned. As we have explained, we present the results of binary variables on support for government and individual action on climate change in the main analysis. We did not include these binary variables in our pre-analysis plans, as we had not expected the high proportion of 'don't know' responses. As we explain, on the original ordinal measures of climate action, we find no statistically significant results (see SI Figure E1). However, the statistically significant effects on the transformed binary measures are clearly meaningful and have real world relevance, and hence we include these in the main analysis.

We asked respondents several pre-treatment questions – much earlier in the *YouGov* survey to avoid potential priming effects – on factors that might influence respondents' support for the protesters and climate action. This covered concern about climate change, and attitudes towards protests and government priorities. *YouGov* provided data on participants' socio-demographic characteristics and political preferences, used in the subgroup analysis presented in the Supplementary Information (SI).

As we explain, we conducted the second survey experiment to address the following two questions arising from the first survey: 1) given the vignette that combined health professionals and health frames was consistently more effective than the vignette with the health frame alone, does the framing of the message matter or were our results driven exclusively by the messenger effects? 2) Are messenger effects in disruptive climate protests limited to health professionals (specifically doctors and nurses), or would protesters from other professions have a similar effect on public attitudes?

To address these questions, we conducted a second survey experiment, which included four alternative treatments: *health professionals* (no statement); *extinction frame and health professionals*; *health frame and scientists*; and *health frames and teachers*. The *health professionals* treatment alters the *control* vignette by specifying that it is NHS doctors and

nurses participating in the disruptive climate protests but includes *no statement* by the protesters. Hence, it tests the effects of the messenger without a specified message. We also include an *extinction frame and health professionals* treatment, which again focuses on health professionals engaging in disruptive climate protests, but includes a statement by the protesters. However, unlike the first survey in which doctors and nurses used a health framed message, in this treatment the protesters use a message based on the existential threat posed by climate change (identical to the *extinction frame* statement in the first survey).

We included two additional treatments to address the second question on whether the messenger effects in the climate protests extend to other professions. A 2024 YouGov survey of 'who Britons trust to tell the truth?' indicates that the most trusted professions are doctors, scientists, and teachers (https://yougov.co.uk/society/articles/50459-who-do-britons-trust-to-tell-the-truth). Based on this, our two additional treatments focused on scientists and teachers participating in disruptive climate protests. While both are trusted professions, scientists and teachers differ in important ways on how the public engages with them. Scientists have greater expertise, but the public are likely to have less engagement with them on a day-to-day basis; whereas while teachers may have less expertise than scientists, they have higher public familiarity as all respondents will have engaged directly with teachers. The *health frame and scientists* vignette specifies that it is 'scientists' (rather than doctors and nurses) who were given the two-year prison sentence for taking part in disruptive climate protests and includes the same health-framed statement as in the first survey. The *health frame and teachers* vignette presents the health argument used by teachers who received the prison sentence for engaging in disruptive climate protests. The full text of the vignettes used in the second survey experiment are provided in Table 2.

Treatment	Text
Health professionals (no statement)	*Some NHS doctors and nurses have engaged in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some doctors and nurses were recently sentenced to two years in prison for participating in disruptive non-violent protests.*
Extinction frame and health professionals	*Some NHS doctors and nurses have engaged in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some doctors and nurses were recently sentenced to two years in prison for participating in disruptive non-violent protests.* *The protesters doctors and nurses stated, "the climate crisis, caused by burning fossil fuels, is an unprecedented event in human history. Without urgent action we face the destruction of this nation, its peoples, our ecosystems and the future of generations to*

	come. We are in the sixth mass extinction event and face catastrophe if we do not act swiftly."
Health frame and scientists	*Control + Some scientists have engaged in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some scientists were recently sentenced to two years in prison for participating in disruptive non-violent protests. The scientists stated, "the climate crisis, caused by burning fossil fuels, is the biggest threat to people's health in the UK and globally. Rising temperatures are causing heat-related illnesses, the spread of infectious diseases, food insecurity, and deaths from extreme weather events. Urgent action is needed to protect people's lives."*
Health frame and teachers	*Control + Some schoolteachers have engaged in disruptive protests – such as blocking major roads and spraying paint on corporate buildings – to draw more attention to climate change. New protest laws meant some teachers were recently sentenced to two years in prison for participating in disruptive non-violent protests. The schoolteachers stated, "the climate crisis, caused by burning fossil fuels, is the biggest threat to people's health in the UK and globally. Rising temperatures are causing heat-related illnesses, the spread of infectious diseases, food insecurity, and deaths from extreme weather events. Urgent action is needed to protect people's lives."*

Table 2. Text for treatment vignettes used in the second UK survey experiment.

The first UK survey experiment was fielded in July-August 2025 (n=2,257). It is worth noting that this survey was fielded during a resident doctors' strike in the UK over salaries, which may have impacted our results (https://www.bbc.co.uk/news/articles/c0epel8gd49o). We conducted a second UK survey experiment in October 2025 (n=2,052) to further unpack our findings, particularly in terms of the combination of message and messenger effects. We discuss this second survey, and the specific treatments used in this second survey experiment, in more detail below. The second survey experiment was fielded during a week that restrictions on protests received substantial news coverage, as the UK government announced plans to give police new powers to restrict repeat protests (https://www.gov.uk/government/news/new-police-powers-to-protect-communities-from-disruption-caused-by-protests), which may have influenced participants' responses. We provide further information about the survey design (SI, Sections A-B) and our samples (SI, Section C) for both surveys in the Supplementary Information. Both survey experiments were pre-registered. The pre-registrations for the two survey experiments are available at https://osf.io/smd9u/files/vmu58 (survey 1) and https://osf.io/smd9u/files/q39zc (survey 2). Both surveys also received institutional ethics approval. We provide a more detailed discussion of ethics for the study in the Supplementary Information (SI, Section A).

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Competing interests: The authors declare none.

Data availability. All data and replications will be made available on OSF. Available at: https://osf.io/smd9u/overview?view_only=0b483240b0074028bff25b2b5dd7da72.

Ethical statement. This study has received institutional ethics approval at the University of Birmingham [ethical review number: ERN_4530-Jul2025].

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